Prepared by DigitalTrade4.EU

# Proposals for Digital, Trust-based and Interoperable Fisheries Control

Feedback on the Draft Implementing Regulation and Annexes under Regulation (EU) 1224/2009

August 2025

# About Us

The **DigitalTrade4.EU consortium** envisions a **seamlessly interconnected Europe** and **neighbouring regions** powered by harmonized standards for the digitalisation of trade documents and processes. By fostering the digital transformation of trade, we aim to promote economic integration, enhance cooperation, and ensure long-term trade facilitation across borders.

Our consortium is made up of **experts in their field**, including **108 full partners**—trade associations, logistics providers, shipping lines, banks and insurances, technology innovators, etc.—**from 17 European Union countries** (*France, Belgium, Netherlands, Austria, Estonia, Finland, Italy, Latvia, Spain, Germany, Sweden, Poland, Luxembourg, Lithuania, Slovenia, Denmark, Bulgaria*) and **22 non-EU countries** (*United Kingdom, Switzerland, Montenegro, Japan, Singapore, Hong Kong, Australia, New Zealand, India, Nepal, Canada, United States of America, Cameroon, Morocco, Egypt, Kenya, Pakistan, Nigeria, Brazil, Uzbekistan, Turkey, Ukraine*).

Our consortium is already **aligned with the fundamentals** of the **EU Competitiveness Compass**. Learn more:

1. How DigitalTrade4.EU Can Help Achieve the Objectives of the EU Competitiveness Compass (February 2025) https://www.digitaltrade4.eu/how-digitaltrade4-eu-can-help-achieve-the-objectives-of-the-eu-competitiveness-compass/


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# 1. Introduction

The **fisheries sector** stands at the intersection of **environmental sustainability**, **digital transformation**, and **regulatory modernization**. As the **European Union** advances its efforts to align fisheries control mechanisms with the objectives of the **European Green Deal**, the **Digital Decade**, and the **Sustainable Blue Economy**, it is essential that its **regulatory framework** reflects the realities of **21st-century trade** and **compliance**.

This document provides **targeted feedback** on the **Draft Implementing Regulation and Annexes** under **Regulation (EU) 1224/2009**, focusing specifically on provisions that could be **modernized**, **strengthened**, or **clarified** to enable a **digital**, **trust-based**, and **interoperable** fisheries control regime. The feedback is grounded in practical **cross-sectoral experience** across **digital identity**, **trade logistics**, **traceability**, and **ESG compliance**, as well as aligned with broader EU frameworks such as **Regulation (EU) 2024/1183 (eIDAS 2.0)**, **Regulation (EU) 2020/1056 (eFTI), Regulation (EU) 2024/1781 (Digital Product Passport)**, the **Customs Single Window, the Import Control System 2 (ICS2)**, and the **UNECE Recommendations**.

Our proposals aim to enhance **legal clarity**, reduce **administrative burden** for both **authorities** and **operators**, and ensure **technological neutrality** while embracing emerging tools such as **AI-based monitoring**, **verifiable credentials**, **machine-readable identifiers**, and **blockchain registries**. The document includes **ten core amendment proposals** to the main body of the Implementing Regulation and its Annexes, along with **justifications** that reflect both **strategic value** and **operational feasibility**.

These proposals are designed not only to support **enforcement** of the **Common Fisheries Policy** but also to position the EU as a global leader in **sustainable**, **transparent**, and **digitally enabled fisheries governance**. We believe the integration of these recommendations would bring tangible benefits to **Member States**, **supply chain operators**, and **citizens**, reinforcing **trust**, **competitiveness**, and **environmental responsibility** across the sector.

# 2. Strategic Digital Models for Sustainable Trade and Logistics

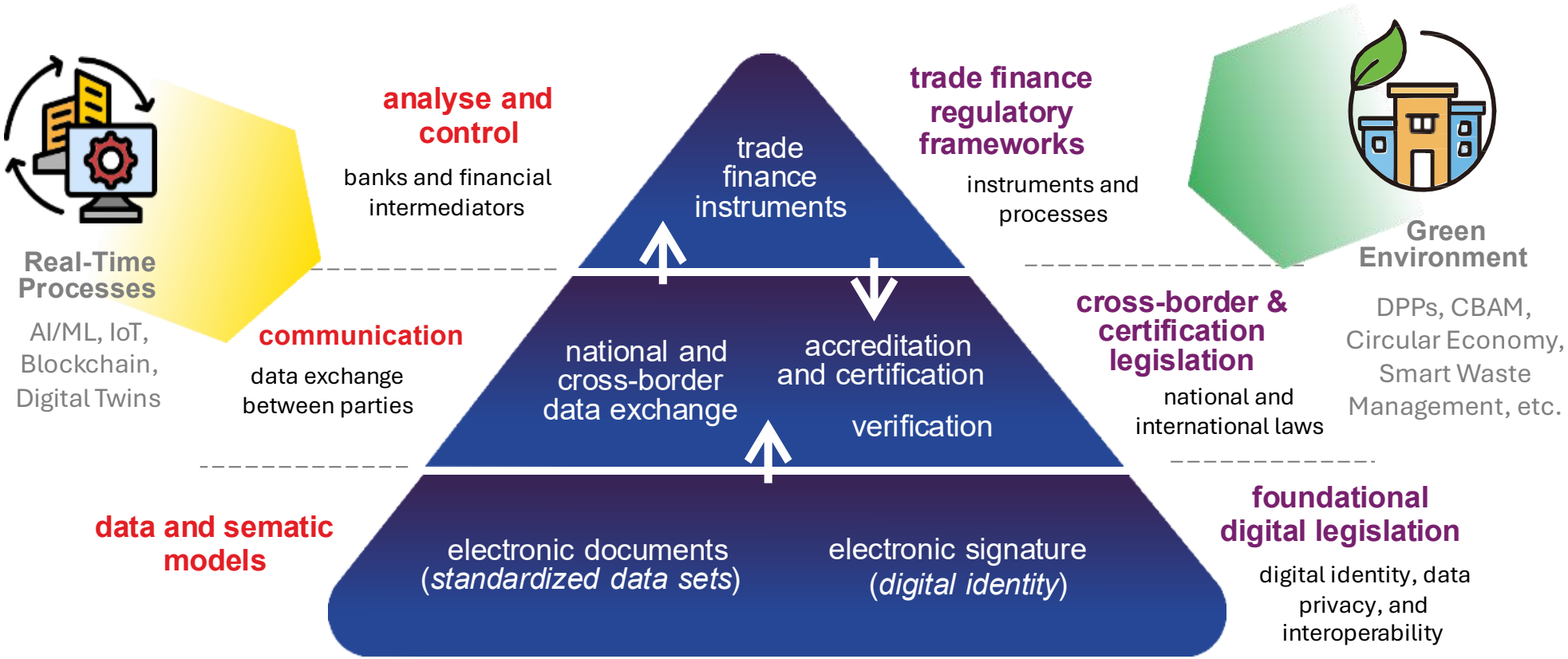


*Figure 1: Vedler, R. DigitalTrade4.EU. This visual model bridges the European Commission's strategic objectives with the proposed regulatory and operational solutions, illustrating how digital requirements and compliance mechanisms can be implemented in a technologically neutral and future-proof manner. All digital requirements and compliance mechanisms must remain technologically neutral and future-proof, allowing companies to select and reuse their preferred IT solutions. Icons by Flaticon.*

# 3.Proposed Amendments to the Implementing Regulation and Annexes

## 3.1. Digital Product Passport for Fisheries

**Proposed Amendment,** *Article 12 – Add new paragraph (4):*

> *Each lot of fishery and aquaculture products referred to in this Article shall be accompanied by a Digital Product Passport (DPP), in line with Regulation (EU) 2024/1781. The DPP shall contain essential traceability data, environmental and social impact indicators, and compliance metadata, and shall be made digitally accessible to all economic operators and authorities across the supply chain.*

**Justification**: Introducing the Digital Product Passport to the fisheries sector supports the EU's strategic objective of achieving full lifecycle transparency for products. Although currently not mandatory for food products, extending the DPP framework here would align fisheries control with the principles of the Ecodesign for Sustainable Products Regulation. It would also increase consumer trust, reduce administrative burdens through digital standardization, and improve enforcement through machine-verifiable compliance. Furthermore, the DPP would facilitate integration with other digital tools such as eFTI and customs platforms. This amendment anticipates upcoming legislative expansions and places EU fisheries at the forefront of sustainable product governance.

## 3.2. eIDAS 2.0 Trust Services

**Proposed Amendment,** *Article 7 – Add final paragraph:*

> *All electronic declarations and reports submitted under this Article shall be signed and authenticated using qualified electronic signatures and trust services compliant with Regulation (EU) 2024/1183 (eIDAS 2.0).*

**Justification**: The transition to fully digital control and reporting systems requires a secure and interoperable identity and trust infrastructure. eIDAS 2.0 provides a legal and technical framework for mutual recognition of electronic identification and signatures across Member

States. Applying this framework ensures that submissions are tamper-proof, verifiable, and legally binding. It also reduces the risk of fraud and misreporting in fisheries logbooks and declarations. Ensuring that all operators use the same trust standard simplifies cross-border data exchange and enforcement collaboration.

## 3.3. ML/AI-Based Monitoring Systems

**Proposed Amendment,** *Article 18 – Add paragraph (3):*

> *Member States shall deploy monitoring and surveillance systems incorporating artificial intelligence and real-time analytics to detect non-compliance, identify irregular patterns in vessel movement and quota usage, and issue automated alerts to control authorities.*

**Justification**: Advanced data analytics and AI models are increasingly being used in risk-based enforcement across sectors. Applying them to fisheries enhances early detection of illegal, unreported, and unregulated (IUU) fishing and improves resource allocation. Such systems can integrate VMS, REM, and logbook data, and automatically flag anomalies without manual screening. This approach enables smarter, more effective control while reducing administrative load. AI also provides transparency by generating objective, reproducible risk assessments.

## 3.4. Distributed Ledger Technologies for Catch Certificates

**Proposed Amendment,** *Article 11 – Add paragraph (5):*

> *Member States shall permit the issuance and validation of catch certificates using Distributed Ledger Technologies (DLT), such as blockchain, provided they guarantee data immutability, traceability, and interoperability with EU control systems.*

**Justification**: Catch certificates are central to preventing IUU imports and ensuring traceability. Using blockchain or other DLT systems enables secure, tamper-proof documentation, which is critical in cross-border contexts. This ensures that once data is recorded, it cannot be altered without detection, which increases trust among importers and regulatory bodies. DLT can also streamline verification processes and support real-time access for customs and authorities. While maintaining a technology-neutral approach, this

amendment allows modern, secure methods to be voluntarily adopted under clear conditions.

## 3.5. Simplified Digital Reporting for Small-Scale Operators

**Proposed Amendment,** *New Article 7a:*

> ***Simplified Digital Reporting for Small-Scale Operators.*** *Member States shall develop simplified reporting templates and user-friendly digital interfaces for operators of small-scale fisheries and micro-enterprises. These templates shall cover essential data elements only and be adapted to the operational realities of artisanal fisheries.*

**Justification**: Small-scale operators often face disproportionate administrative burdens compared to industrial fleets. Requiring them to use complex digital platforms without adaptation risks non-compliance and sectoral exclusion. By introducing streamlined templates, Member States can ensure both legal compliance and social inclusion. This approach also supports digital literacy, cost efficiency, and the European Union's goals for rural and coastal development. Clear differentiation based on operator size will ensure proportional implementation of the control regulation.

## 3.6. Customs and Tax Integration

**Proposed Amendment,** *Article 11 – Add paragraph (6)*:

> *Digital catch documentation and reporting systems shall be interoperable with national customs and tax platforms, including the EU Customs Single Window, Import Control System 2 (ICS2), to allow automated validation of import declarations and VAT records.*

**Justification**: Fragmentation between fisheries and customs systems leads to inefficiencies, duplication, and delays. Integrating fisheries data flows into the broader customs and tax infrastructure allows real-time validation and cross-verification of declarations. This reduces fraud, accelerates customs clearance, and simplifies operator compliance. It also aligns with the EU's digital-by-default and once-only principles. Moreover, it supports traceability throughout the product lifecycle, from catch to market.

## 3.7. Machine-Readable Markings on Lots

**Proposed Amendment,** *Annex III – Add required field for product labelling*:

> *Each product lot shall bear a machine-readable identifier (e.g. QR code, NFC tag, or digital seal), linking to the Digital Product Passport and relevant traceability and compliance information.*

**Justification**: QR codes and similar technologies are widely accepted and inexpensive tools to enhance product transparency. They enable consumers, retailers, and enforcement officials to instantly access validated digital records. This supports traceability, prevents mislabelling, and increases trust across the supply chain. In combination with DPP and e-signatures, machine-readable markings form part of a modern, integrated control framework. The ability to scan a product and retrieve its origin, certification, and handling data represents a major step forward in smart fisheries governance.

## 3.8. Full Trust Services Compatibility and Use of eSeal

**Proposed Amendment,** *New Article (e.g. Article 6a or placed under Chapter I, General Provisions)*:

> ***Trust Services and Digital Authentication**. All digital records, data transmissions, and documents generated or exchanged under this Regulation shall support and accept all qualified trust services as defined in Regulation (EU) 2024/1183 (eIDAS 2.0), including but not limited to Qualified Electronic Signatures and Qualified Electronic Seals (eSeal). For organizational, automated, or machine-to-machine processes—such as digital product passports, electronic freight transport information, negotiable cargo documents, and IoT-enabled data exchange—the use of Qualified Electronic Seal (eSeal) is recommended as the default trust mechanism to ensure integrity, authenticity, and non-repudiation, unless a different trust service is expressly required by law or technical standard.*

**Justification**: This amendment aligns the regulation with the EU's legal framework for electronic trust services under eIDAS 2.0, ensuring consistent and secure handling of digital data across Member States. By mandating support for Qualified Trust Services, the fisheries control system can achieve strong legal certainty, data integrity, and cross-border

interoperability. The emphasis on Qualified Electronic Seals (eSeal) for automated and machine-to-machine exchanges ensures that organizations can authenticate and protect data in real time without human intervention.

This is particularly critical for technologies such as IoT sensors, blockchain registries, or automated digital declarations used in traceability, transport, and certification. Recognizing eSeals as the default mechanism in these contexts enhances reliability and future-proofs the regulation against growing cyber risks and data manipulation.

## 3.9. Use of LEI and vLEI for Entity Identification

**Proposed Amendment,** *New Article under Chapter I or inserted in Article 6a (Trust Services and Digital Authentication)*:

> ***Legal Entity Identification using LEI and vLEI****. All legal persons, economic operators, and organizational actors involved in fishery and aquaculture supply chains—such as vessel owners, producers, traders, and importers—shall be identified using a valid Legal Entity Identifier (LEI) as defined in ISO 17442. For digital records and automated or remote verifications, the use of Verifiable Legal Entity Identifier (vLEI) credentials is recommended to ensure real-time authenticity, provenance, and integrity of organizational identity.*

**Justification**: The LEI is a globally recognized, ISO-standardized identifier used to uniquely identify legal entities across jurisdictions. Its use in the fisheries sector would bring consistency and transparency to identity management for vessels, operators, and exporters, particularly in cross-border operations. The vLEI extends this functionality by enabling **machine-readable, digitally verifiable credentials** for automated compliance, which is critical for secure, real-time data exchange and authentication. Incorporating LEI and vLEI into the EU control regulation aligns fisheries governance with financial, trade, and sustainability reporting frameworks, enhancing regulatory interoperability. Furthermore, it supports the European Digital Identity framework and ensures that data submitted under this Regulation can be cryptographically tied to a verified legal actor.

## 3.10. ESG Reporting in Control Documents

**Proposed Amendment,** *Annex I and II – Add new optional fields*:

*New fields shall be added to control and inspection templates to record:*

- *DPP ID (Digital Product Passport identifier)*
- *Carbon footprint score (optional)*
- *Verified sustainability certification code*
- *LEI and/or vLEI of the responsible operator*

**Justification**: This amendment introduces four key data fields that enhance the environmental and compliance value of fisheries control documents. The **DPP ID** refers to the unique identifier of the Digital Product Passport associated with a given product lot, allowing inspectors to retrieve full traceability and sustainability data digitally. The **Carbon footprint score** captures the estimated greenhouse gas emissions associated with harvesting, processing, or transporting the product—supporting alignment with the EU Green Deal and future carbon accounting schemes. The **Verified sustainability certification code** records any third-party certification reference (e.g., MSC, ASC, Naturland), offering verifiable evidence of environmental or social standards met by the operator or product batch. The **LEI (Legal Entity Identifier)** is a globally standardized code that uniquely identifies the legal entity responsible for the activity, while the **vLEI (verifiable LEI)** extends this to machine-verifiable credentials usable in digital and automated environments. Collectively, these fields create a multi-layered ESG compliance profile directly embedded in fisheries inspection records, supporting better governance, market access, financing, and consumer trust. They also enable the reuse of ESG data across regulatory, trade, and reporting platforms in line with EU interoperability and sustainability objectives.

## 3.11. Use of Negotiable Cargo Documents in Fisheries Trade

**Proposed Amendment,** *New Article under Chapter III (Control of Activities at Sea) or Chapter V (Data Management)*:

> ***Recognition of Negotiable Cargo Documents****. Member States shall ensure that electronic negotiable cargo documents—such as electronic bills of lading (eBL), electronic transport records, and transferable digital certificates—are legally*

*recognized and accepted in the context of fisheries trade and inspection, including transactions conducted before physical landing. Such documents shall be issued and validated using trust services in accordance with Regulation (EU) 2024/1183 (eIDAS 2.0), and may be cryptographically secured through qualified electronic seals (eSeal), digital ledgers, or other technologies ensuring authenticity, integrity, and non-repudiation.*

**Justification**: Fisheries products are highly perishable, and transactions often begin at sea—before vessels have landed. Recognizing **Negotiable Cargo Documents**, such as **electronic bills of lading (eBL)** or **transferable digital cargo records**, enables the legal transfer of ownership, financing, and insurance rights while the catch is still en route. This reduces latency in seafood supply chains, supports liquidity, and aligns with global trade digitization standards such as the **UNCITRAL MLETR** and **G7 e-documents roadmap**. Ensuring that such documents are trusted, verifiable, and admissible under EU fisheries control systems allows authorities to monitor not only biological activities but also the **legal and economic flows of goods**. Using eIDAS 2.0 trust services (e.g. eSeal) for issuance and verification guarantees that these digital documents retain legal equivalence with paper-based originals. This amendment strengthens the EU's commitment to modernizing trade facilitation and supports competitive, transparent, and sustainable fisheries markets.

## 3.10. Interoperability Standards for Data Exchange

**Proposed Legal Text,** New Article under Chapter XII (Data and Information) or Article 90 (Data Validation and Exchange)**:**

*All electronic surveillance, inspection, and reporting data exchanged under this Regulation shall comply with EU Master Data Register formats and use internationally recognised open standards (UNECE, WCO, ISO) to ensure interoperability across Member States' systems and with international partners.*

**Justification:** Current draft annexes (Annex VI–VII) define XML schemas for surveillance and inspection reports, but do not ensure long-term interoperability with wider trade and customs systems. By mandating open standards, Member States avoid vendor lock-in and reduce costs of integration. It also aligns fisheries control with the EU's "once-only principle"

and supports reuse of data across customs, transport, and environmental systems. This measure strengthens cross-border enforcement while promoting digital sovereignty through common EU-wide standards.

## 3.11. Integration of Remote Electronic Monitoring (REM) and IoT Sensors

**Proposed Legal Text,** Article 18 (Monitoring and Surveillance) – add new paragraph (4)**:**

> *Remote Electronic Monitoring (REM) systems, including on-board cameras, IoT-based sensors, and automated weighing devices, shall be interoperable with the fisheries control system. Data generated shall be digitally sealed using Qualified Electronic Seal (eSeal) under Regulation (EU) 2024/1183 to guarantee authenticity and integrity, and shall be linkable to the Digital Product Passport.*

**Justification:** The draft Implementing Regulation acknowledges REM but leaves its application fragmented. This amendment ensures REM data is tamper-proof and directly usable for compliance verification. Linking IoT devices and automated weighing to e-Seals and the DPP establishes a fully digital audit trail from catch to market. It also enhances the fight against IUU fishing by providing verifiable real-time evidence. Technological neutrality is preserved, while safeguarding trust in the system through EU trust service standards.

## 3.12. Transitional Support Measures for Small-Scale Fisheries

**Proposed Legal Text,** New Article 7b (following Article 7a – Simplified Digital Reporting)**:**

> *Member States shall provide transitional support, including technical assistance and targeted funding from EU programmes (e.g. EMFAF, Digital Europe), to ensure small-scale fisheries and micro-enterprises can comply with digital reporting requirements introduced by this Regulation. Transitional periods of up to 24 months may be granted to such operators before full digital compliance is mandatory.*

**Justification:** Small-scale operators face significant cost and capacity barriers to adopting digital tools. While simplified templates (Article 7a) reduce administrative burdens, practical transition support and funding are essential for equitable implementation. By embedding transitional assistance into the Regulation, the EU avoids social exclusion, prevents non-

compliance due to resource gaps, and ensures a fair digital transition. This approach also supports cohesion objectives, rural development, and the viability of artisanal fisheries in coastal regions.

## 3.13. ESG and Environmental Indicators in Annexes

**Proposed Legal Text,** Annex II (Minimum Information for Fishing Licences) and Annex III (Minimum Information for Fishing Authorisations)**:**

> *Fishing licences and authorisations shall include mandatory fields for environmental and ESG indicators, such as fuel consumption per trip, estimated $CO_2$ emissions, and percentage of by-catch. These indicators shall be digitally recorded and linkable to the Digital Product Passport.*

**Justification:** The current annexes define technical and vessel-related data but omit environmental indicators. Adding ESG metrics aligns fisheries control with the European Green Deal and the EU's climate neutrality objectives. Linking such data to the DPP enables lifecycle transparency, supports CBAM and sustainability reporting, and provides policymakers with accurate monitoring tools. This amendment also enhances market trust, as consumers and supply chain partners increasingly demand verified sustainability credentials.

## 3.14. Use of EUTIR Indexing Services and Certified Providers

**Proposed Legal Text,** New Article under Chapter XII (Data and Information) or Chapter I (General Provisions)**:**

> *All digital records, reports, and certificates exchanged under this Regulation, including catch certificates, fishing licences, authorisations, surveillance, and inspection reports, shall be registered through the European Trade Indexes Registry (EUTIR) for indexing and verification purposes. EUTIR shall not store the substantive content of documents but shall provide tamper-proof metadata, versioning, and authenticity verification. Only Certified Service Providers, accredited under a harmonised EU-wide trust scheme, shall be authorised to interface with EUTIR for the submission, registration, and validation of fisheries data.*

**Justification:** The current draft Implementing Regulation enables electronic data exchange but lacks a uniform trust and indexing layer across the EU. By integrating EUTIR, fisheries control gains a cross-sectoral registry that anchors authenticity and traceability without duplicating data storage. EUTIR provides a **trust layer** for regulators, operators, and inspection authorities by ensuring that all records are linked to accredited and Certified Service Providers. This prevents unverified or non-compliant platforms from participating in official processes, reduces fragmentation between Member States, and enhances cross-border interoperability. Moreover, EUTIR's metadata indexing supports AI-based risk assessment and lifecycle traceability, reinforcing alignment with the Digital Product Passport, eFTI, and CBAM frameworks. In this way, fisheries data becomes part of the EU's broader trusted digital trade ecosystem.

## 3.15. Data Protection and GDPR Compliance

**Proposed Legal Text,** New Article under Chapter XII (Data and Information)**:**

> *All personal data collected and processed under this Regulation shall comply with Regulation (EU) 2016/679 (GDPR). Member States shall ensure that fisheries control systems implement data minimisation, purpose limitation, and secure processing measures, including pseudonymisation or anonymisation where appropriate. Access to personal data shall be strictly limited to competent authorities and Certified Service Providers operating under EU trust schemes.*

**Justification:** While the draft Implementing Regulation references data protection obligations, it does not provide operational clarity for fisheries authorities or operators. Explicitly embedding GDPR principles into fisheries control strengthens legal certainty and prevents misuse of personal and commercially sensitive data. This measure also builds trust among small-scale operators, who may otherwise be hesitant to adopt digital reporting tools. Linking GDPR compliance to Certified Service Providers ensures that privacy safeguards are consistently applied across the EU. Moreover, it positions the EU as a leader in balancing technological innovation with fundamental rights, thereby reinforcing public legitimacy of the fisheries control system.

## 3.16. Accreditation and Certification of Service Providers

**Proposed Legal Text,** New Article under Chapter I (General Provisions) or Chapter XII (Data and Information)**:**

> *Service Providers participating in the digital fisheries control system, including those interfacing with the European Trade Indexes Registry (EUTIR), shall be accredited and certified under a harmonised EU-wide scheme. Accreditation shall be issued by independent national or EU-recognised bodies, based on compliance with common technical, security, and legal requirements. Certificates shall be mutually recognised across all Member States.*

**Justification:** The draft Implementing Regulation defines digital reporting obligations but does not guarantee uniform quality and reliability of platforms or intermediaries. Without accreditation, there is a risk of fragmentation, weak data security, and non-compliance. Introducing a harmonised EU-wide accreditation and certification regime ensures that only trusted, technically competent, and legally compliant service providers can participate. Mutual recognition of certificates avoids duplication, reduces costs for operators, and supports interoperability with international trust frameworks (e.g. LEI/vLEI, eIDAS 2.0). This measure creates a robust trust layer, enabling EUTIR to function as a reliable indexing and verification service while safeguarding both data integrity and stakeholder confidence.

# 4. Interoperability Ecosystem for EU Digital Trade and Customs Integration

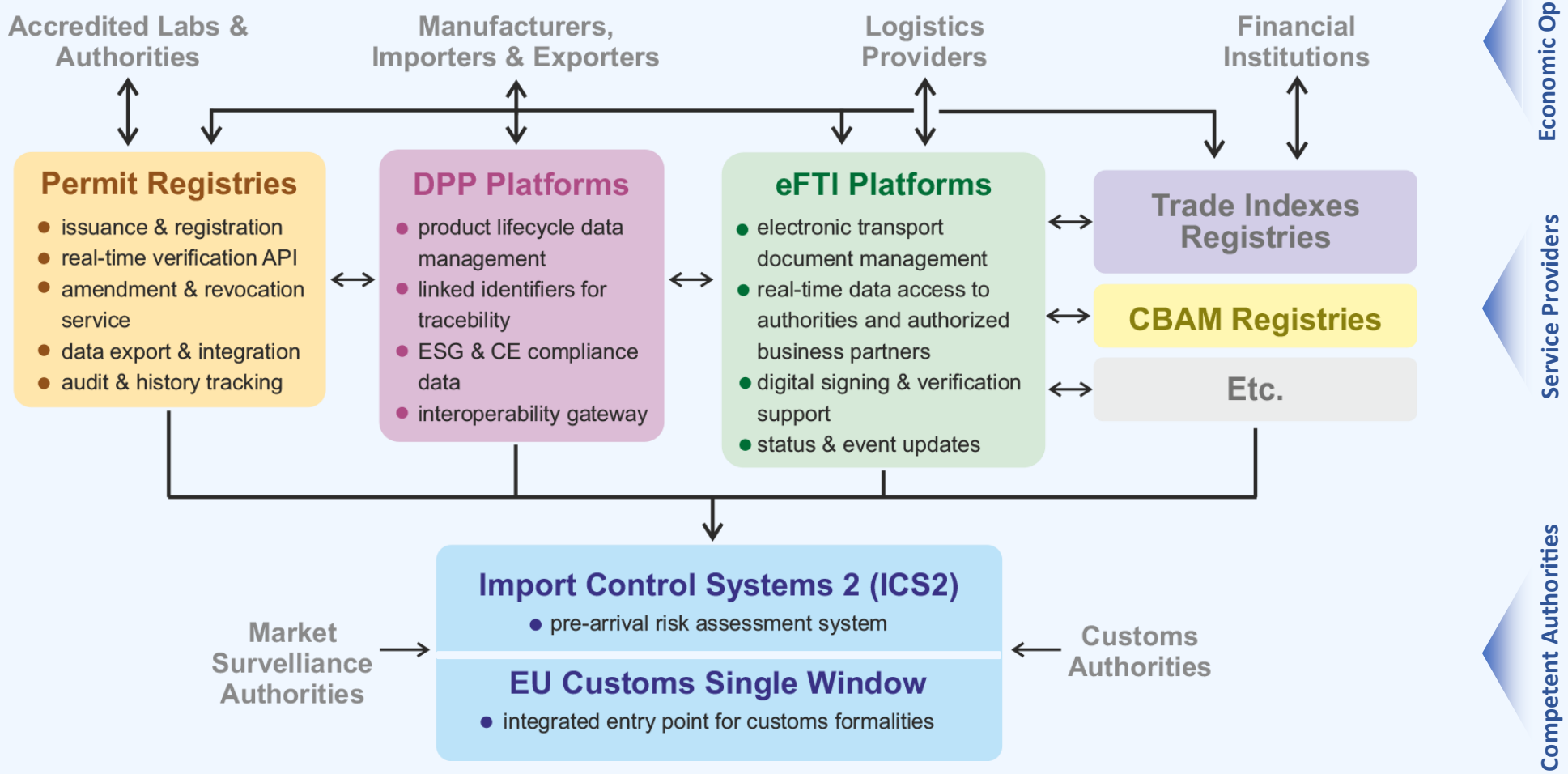


*Figure 2. Vedler, R. This diagram illustrates the key platforms, data flows, and stakeholder interactions across the EU's digital trade and customs ecosystem. It highlights how manufacturers, logistics providers, and regulatory systems connect through structured data platforms—such as eFTI, Digital Product Passport, and EU Customs systems—while integrating with trusted external sources including TRACES, REACH-IT, EUDAMED, and digital identity services. All data exchange and processing within this ecosystem strictly adhere to the principles of the General* ***Data Protection Regulation (GDPR)****, ensuring lawful, transparent, and purpose-limited handling of personal and sensitive data.*

# 4.1. Platform Functions and Trust Roles in the EU Digital Trade Ecosystem

| # | platform | core function | key actors | interoperability role | trust features |
|---|---|---|---|---|---|
| 1 | **eFTI Platform** | Structures and exchanges electronic freight transport information in accordance with EU regulation. | Logistics providers, freight forwarders, customs brokers, software vendors | Connected to ICS2, Customs Single Window, DPP | Signing-enabled, eIDAS/vLEI, traceable submission logs |
| 2 | **DPP Platform** | Digitally represents product lifecycle data, compliance (CE, ESG), and traceability information. | Manufacturers, importers/exporters, ESG auditors, platform providers | Linked to eFTI, permit registries, eInvoicing, CBAM Registries, and customs declarations. | Verifiable ESG/CE data |
| 3 | **EU Customs Single Window** | Single EU-wide gateway for customs and regulatory documentation (incl. permits). | National customs authorities, inspection agencies | Receives data from eFTI, DPP, ICS2, CBAM Registries; pushes to national systems. | Integrated with risk analysis |
| 4 | **ICS2** | Performs pre-arrival cargo risk assessments using Entry Summary Declarations (ENS). | EU customs administrations, transport carriers, EU security agencies | Pulls eFTI/permit info | Real-time validation |
| 5 | **Permit Registries** | Hosts and validates official permits and certificates (e.g. veterinary, phytosanitary, chemical). | National competent authorities (e.g. TRACES, ECHA), EU agencies | Linked from DPP & eFTI | Real-time verifiability |
| - | **Business Wallet** | Decentralised environment for securely holding and sharing credentials and electronic documents (data sets) under user control. | Traders, SMEs, logistics operators, authorised representatives, identity providers | Interacts with all above | vLEI identity, eIDAS 2.0 |
| 6 | **Trade Indexes Registry (TDR)** | Anchors and registers metadata (e.g. hashes, signatures, timestamps) of trade documents (e.g. eFTI, eBL, invoices), enabling full document traceability across platforms. Tracks document origin, versioning, and linkages without exposing content. | Registry operators (EU or delegated), customs, logistics integrators, financial institutions | Reference point for document verification and linking across eFTI, DPP, CBAM, and Customs SW. | Tamper-proof identifiers, issuer verification, MLETR compliance, supports traceable audit trails |
| 7 | **CBAM Registries** | Record and manage embedded carbon emissions data for imported goods subject to the EU Carbon Border Adjustment Mechanism. Provide $CO_2$ reporting, verification and certification infrastructure aligned with customs and sustainability frameworks. | Importers, customs authorities, national CBAM authorities, accredited $CO_2$ verifiers, ESG auditors | Linked with DPP for product-level emission data, Customs Single Window for compliance validation, and trade finance systems for tariff adjustments. | Verified emission declarations, EU-accredited verifier network, secure transmission to customs |

# Appendix 1. EU Green-Digital Trade Leadership Roadmap (DigitalTrade4.EU, 2025)

| # | activity | objective | indicative metrics | tools/enablers |
|---|---|---|---|---|
| 1 | EU-Singapore DTA & Expand DEPA Partnerships | Strengthen digital trade diplomacy in Asia through high-standard agreements. | - 5+ new digital trade agreements with key Asian partners (e.g., Japan, India, ASEAN) by 2030<br>- 15% increase in EU-Asia digital services trade by 2028 | DEPA framework, EU-Singapore DTA, Global Gateway Initiative, eIDAS 2.0 |
| 2 | Implement Digital Product Passports (DPPs) | Ensure traceable, sustainable supply chains aligned with EU Green Deal. | - 50% adoption of DPPs by 2030<br>- 20% reduction in supply-chain carbon intensity by 2030 | EU Sustainable Products Initiative, CBAM incentives, UNECE Recommendation 49 |
| 3 | Fund Secure Digital Corridors in Asia | Build interoperable digital infrastructure for EU-Asia trade. | - ~€2B allocated via NDICI-Global Europe<br>- 10+ blockchain-based traceability pilots by 2027 | NDICI-Global Europe, ASEAN digital customs systems, EU Customs Data Hub |
| 4 | Harmonize Digital Standards (MLETR/eIDAS 2.0) | Enable cross-border recognition of e-documents and digital identities. | - 90% mutual recognition of e-signatures by 2028<br>- 70% SME adoption of eIDAS wallets | MLETR framework, eIDAS 2.0, EU Transport Law updates, UN/UNECE protocols |
| 5 | Implement LEI and vLEI for Supply Chain Trust | Harmonise and simplify legal entity identification across borders | - 90% entity coverage with LEI by 2030; 50% vLEI use in customs and eFTI transactions | ISO 17442, vLEI, eIDAS 2.0, UNECE UID |
| 6 | Launch Green-Digital Trade Academy | Upskill SMEs and officials on DPPs and carbon accounting. | - 40% increase in SME participation by 2027<br>- 60% cost savings for SMEs | Erasmus+ grants, COSME programme, tiered compliance thresholds |
| 7 | Integrate ESG into Trade Finance | Link trade finance to sustainability metrics for cheaper capital access. | - €10B/year unlocked for green trade finance<br>- 30% lower Scope 3 emissions by 2030 | InvestEU guarantees, CSRD-aligned reporting, FinTech platforms |
| 8 | Enforce Platform Interoperability | Prevent vendor lock-in and empower SMEs. | - 100% compliance with CJEU rulings by 2026<br>- 50% reduction in platform dominance | Court of Justice of the European Union (CJEU) Case C-233/23, DEPA, eIDAS 2.0, Digital Markets Act (DMA) |
| 9 | Global Digitalisation Projects with EU Standards | Extend EU digital infrastructure and norms globally. | - 20+ co-funded projects by 2030<br>- 80% interoperability with EU systems | Digital Europe Programme, CEF funding, EU-Asia Digital Standards Taskforce |
| 10 | Advance UNECE Transparency Protocols | Globalize EU sustainability standards for supply chains. | - 100% alignment with UNECE Rec. 49 by 2028<br>- 30% reduction in greenwashing claims | UNECE CEFACT, W3C Verifiable Credentials, EU CBAM registry |
| 11 | Pilot CBAM-DPP Corridors | Link trade finance to verifiable ESG metrics for tariff incentives. | - 20% CBAM compliance cost reduction<br>- 50% DPP adoption by 2030 | IoT carbon trackers, CBAM rebate schemes, EU Customs Single Window |

Table 1. The roadmap above, DigitalTrade4.EU's input to the European Commission's "International Digital Strategy" operationalises the recommendations outlined in this document. For instance, Activity 1 (EU-Singapore DTA & Expand DEPA Partnerships) directly supports the harmonisation of international digital standards, while Activity 8 (Global Digitalisation Projects with EU Standards) aligns with efforts to promote dual-use infrastructure globally. These activities collectively reinforce the EU's ability to leverage digital trade diplomacy as a tool for both economic growth and strategic security.

# Appendix 2. Digital Trade & Capital Markets Integration Roadmap (DigitalTrade4.EU, 2025)

| # | activity | objective | indicative metrics | tools/enablers |
|---|---|---|---|---|
| 1 | Establish EU Trade Document Registry (ETDR) | Decentralize and secure cross-border trade/ESG data for supervision using a distributed architecture, enabling trusted and interoperable access to regulatory and ESG information across the EU. | - 30% reduction in duplicate filings by 2027<br>- 100% fraud detection rate | Zero Trust Architecture & cross-border verification (e.g., blockchain-based systems like EBSI), MLETR-compliant systems, PSD3-PSR/FiDA APIs, vLEI |
| 2 | Digitalise Tax & Customs Interfaces | Integrate trade, tax, and customs data flows to reduce friction and fraud | - 50% faster customs clearance<br>- 30% reduction in VAT fraud<br>- Full uptake of EU Single Window by 2028 | EU Customs Data Hub, Single Window for Customs, VAT in the Digital Age (ViDA), vLEI for trader authentication, eFTI/eCMR linkages |
| 3 | Adopt MLETR + eIDAS 2.0 | Enable seamless digital negotiable instruments and cross-border recognition | - 70% faster transaction times<br>- 95% SME adoption of e-signatures | MLETR framework, eIDAS 2.0 digital identity wallets, EU legal harmonization tools |
| 4 | Develop RegTech supervision tools | Enhance real-time oversight of capital markets and ESG compliance | - 50% reduction in supervisory costs<br>- 80% automated ESG data collection | AI/ML dashboards, Legal Sandboxes, ETDR-linked reporting systems |
| 5 | Digital Bonds & Convertibles | Enable automated, ESG-linked debt instruments | - 30% reduction in issuance costs<br>- 20% lower interest rates for ESG-compliant bonds<br>- 100% real-time conversion execution | ETDR registry, smart contracts, DPP/ESG data integration, eIDAS 2.0 authentication |
| 6 | SME-friendly compliance frameworks | Ensure SMEs benefit from digital reforms without disproportionate burden | - 40% increase in SME participation<br>- 60% cost savings for SMEs | Tiered compliance thresholds, Green-Digital Trade Academy, Erasmus+ grants |
| 7 | Pilot CBAM-DPP Corridors | Link trade finance to verifiable ESG metrics for tariff incentives | - 20% CBAM compliance cost reduction<br>- 50% adoption of DPPs by 2030 | Digital Product Passports (DPPs), IoT carbon trackers, CBAM rebate schemes, CBAM certificate registry integration, EU Customs Single Window |
| 8 | Harmonize e-document laws | Eliminate legal fragmentation for digital trade documents | - 90% mutual recognition of e-Bills of Lading<br>- 0 paper-based processes | EU Transport Law updates (e.g. eFTI, eCMR), UN/UNECE protocols, Legal Harmonization Sandboxes |
| 9 | ESG-linked finance incentives | Reward sustainable supply chains with cheaper capital | - €10B/year green trade finance unlocked<br>- 30% lower Scope 3 emissions | InvestEU guarantees, FinTech platforms, CSRD-aligned reporting templates |