Introduction to MA Identification System and MA–DPP

Zhongguan Industry & Information Research Institute of Two-dimensional Code Technology (ZIIOT)

August 2025

Contents

ZIIOT is a Globally Serving International Identification Code Issuing Agency

中关村工信二维码技术研究院
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- **Zhongguan Industry & Information Research Institute of Two-dimensional Code Technology (ZIIOT)**

Approved by three major international organizations — ISO, CEN, and AIM — as a **global code issuing agency** with the **Issuing Agency Code (IAC) "MA".**

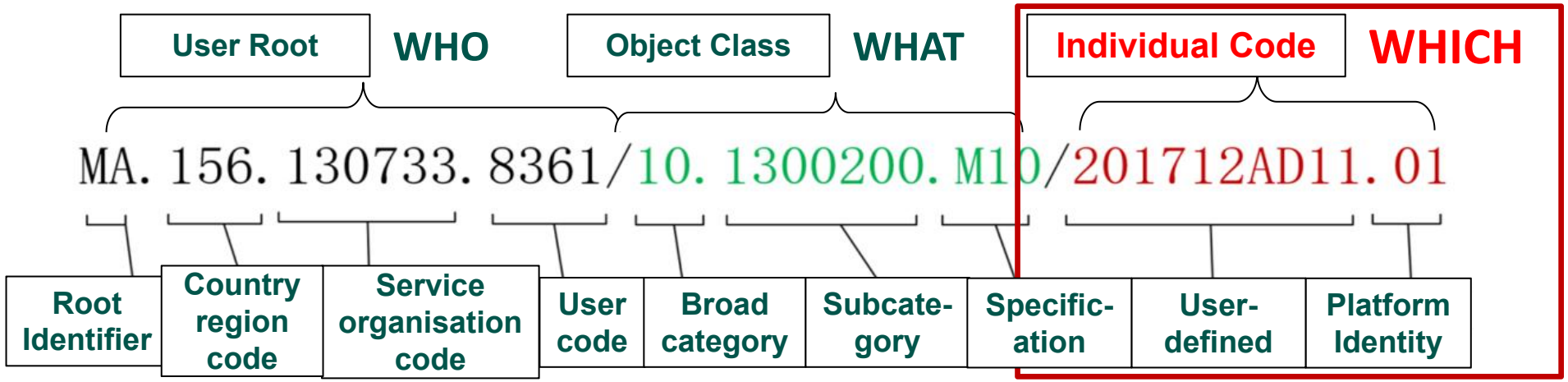
2. Register ordered by Issuing Agency Code

0 thru 9	GS1 Global Office	GS1 AISBL Blue Tower Avenue Louise 326, bte 10 BE 1050 Brussels BELGIUM
D	NSPA (Nato Support Agency)	NSPA (Nato Support Agency) 11, Rue de La Gare L-8302 CAPELLEN G.D. LUXEMBOURG
GH	Ghana Revenue Authority	Ghana Revenue Authority PMB, TUC Post Office Accra GHANA
J	Universal Postal Union	Universal Postal Union Case Postale 3000 BERNE 15 SWITZERLAND
VIE	IEEE	IEEE 445 Hoes Lane Piscataway, NJ 08854 USA
VNA	NAMSA	Namsa 11, Rue de la Gare L-8302 Capellen G.D. LUXEMBOURG
MA	ZIIOT Zhongguangcun Industry & Information Research Institute of Two-Dimensional Code Technology	ZIIOT (Zhongguangcun Industry & Information Research Institute of Two-Dimensional Code Technology No.27 Wanshou Road Haidian District Beijing, 100846 CHINA zhangchao@idcode.cn Phone: +86(010)68207583 Fax +86(010)68207610

MA Identification System – International Standard Identification Code System

One Enterprise, One code; One Type, One code; One Item, One code.

MA Identification Code
（example）



MA标识优势

1. **Internationally standardized,** globally unique, and universally applicable.
2. **Authorized to issue identification codes worldwide.**
3. **Matrix-based coding structure** with flexible, decentralized, hierarchical, and tiered management of codes.
4. **Open compatibility and high scalability**, enabling interconnection across regions, platforms, systems, and carriers.

MA Identification Parsing System Architecture (A multilateral, democratic, and transparent global distributed root infrastructure)

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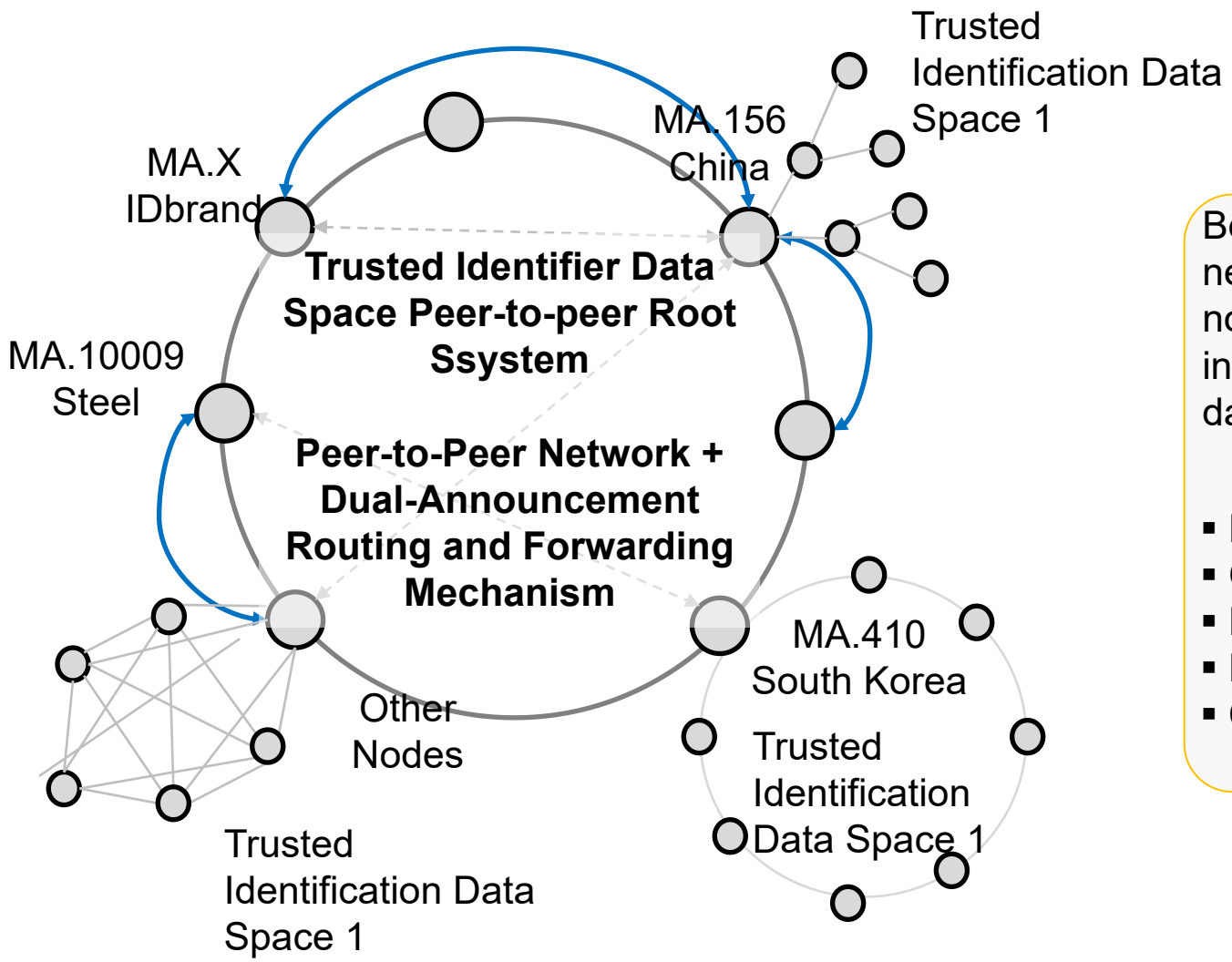

MA Identification Parsing System Node Architecture

Behind root nodes/inside network nodes: Each MA root node's internal space adopts an independent and autonomous data management mechanism.

- **Encoding Rules**
- **Code Allocation Scheme**
- **Registration Mechanism**
- **Parsing Mechanism**
- **Object Management Mechanism**

MA's Four Key Scenarios

MA + Digital Cities

Builds a unified digital identification foundation for smart cities, enabling expanded government services and smart city applications

MA + Industrial Internet/ Digital Supply Chains

Applications in industries such as Industrial manufacturing, Agriculture, Food, Healthcare/ pharmaceuticals, Natural resources, Transportation, Energy, Safety/emergency response, Steel, Automotive, Water Management

MA + Data Capital as Factor of Production

Services of Data Capital as Factor of Production, including Ownership Confirmation, Registration, Valuation, Trading, and Financial Reporting Integration

MA + Dual Carbon Initiatives

Product solutions including MA Carbon codes, Digital product passports. Collaborations with green exchanges to establish carbon code centers

MA Identification System Serves the World

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Over 500,000 registered users worldwide, nearly 1 trillion identification codes, covering 30+ countries and regions.

Established national code issuing agencies in South Korea, India, Canada, etc., building a global MA parsing network.

Hosted multiple International Identification Industry Development Conferences to promote global collaboration.

As a Co-founding member, participated in establishing the International Identification Code Industry Alliance (ICA) to unite global industry forces.

Contributed to the development of the international standard IEC 63538 "Lifecycle Events: Information Models and Services" to advance international standardization.

Multiple Ministries and Agencies have Adopted MA Identification

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Industry and Information Technology: China's Ministry of Industry and Information Technology (MIIT) adopts MA identification as part of the national industrial internet identification system.

Pharmaceuticals and Healthcare: China's National Medical Products Administration (NMPA) adopts MA identification as one of the Unique Device Identifiers (UDI).

Natural Resources: China's Ministry of Natural Resources adopts MA identification as the unique spatial identity coding rule for "3D Digital China Construction" foundational geographic entities, established as a national standard.

Emergency Management: China Academy of Safety Science and Technology adopts MA identification for workplace safety and emergency management industry identification systems.

Hydraulic Engineering: Tsinghua University adopts MA identification for global river network identification systems..

International Trade: Chinese Academy of International Trade and Economic Cooperation (CAITEC) adopts MA identification for digital trade identification.

Transportation: China's Ministry of Transport Information Center adopts MA identification for waterways, highway infrastructure, vehicles, and personnel identification, established as an industry standard.

Green & Low-Carbon: Beijing Green Exchange and Shanghai Environment and Energy Exchange adopt MA identification for carbon labeling.

Metallurgy: China Metallurgical Industry Information and Standardization Institute adopts MA identification for the steel industry identification system.

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The Evolution of Product Digitalization

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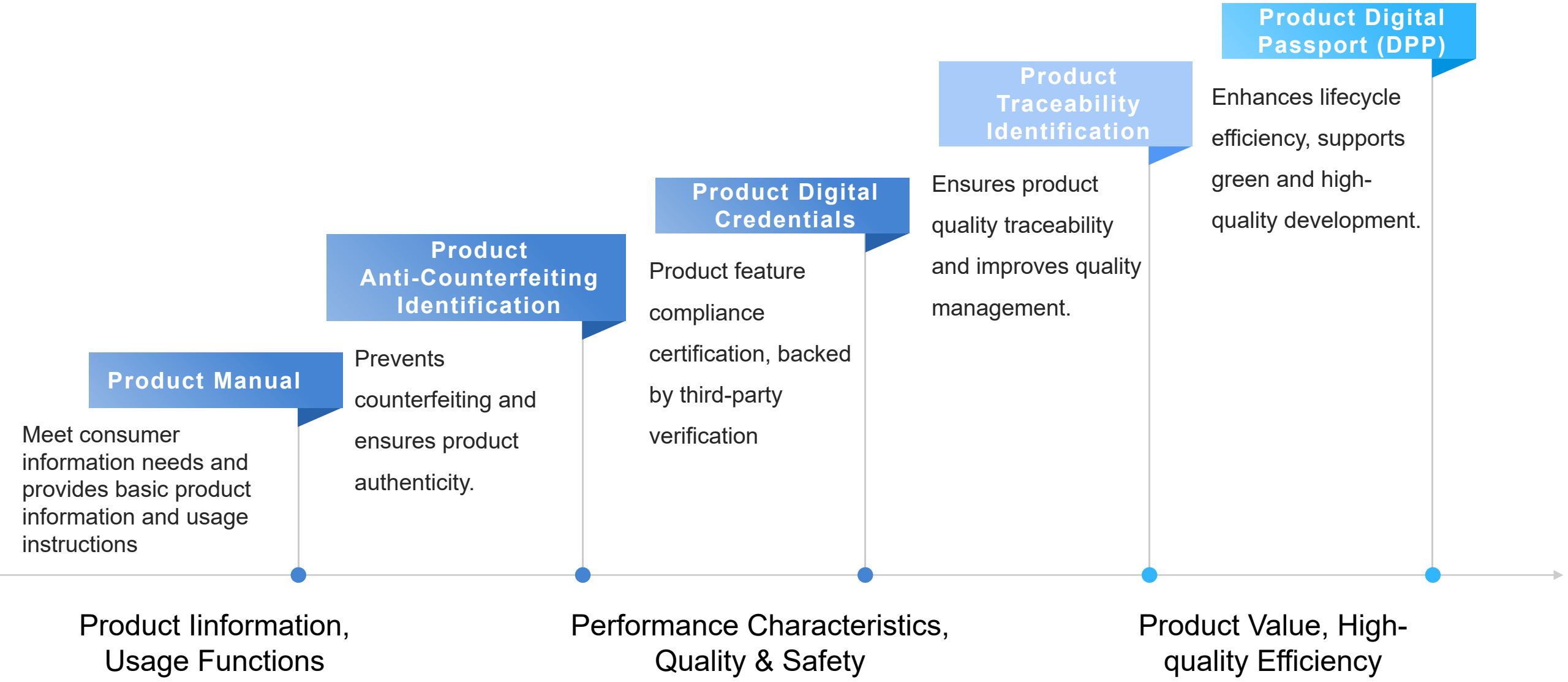

DPP is the Core Support for Global Supply Chain Transparency and Green Transformation

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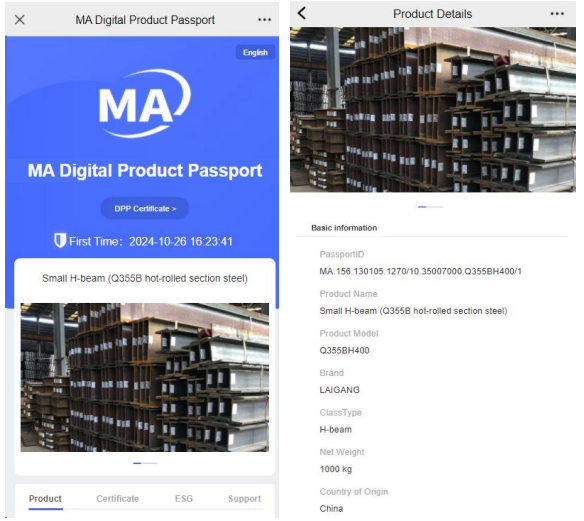
Just as humans use passports to verify nationality and identity during international travel, products also need to prove their origin, identity, and journey information in cross-border trade and circulation. Analogously, the core of DPP is to answer **three key "customs questions"** in product trade: **Who are you?** (Product identity information) **Where do you come from and where are you going?** (Manufacturer, supply chain, and end-customer information) **Are you eligible for clearance?** (Functional, performance, and green sustainability information)

Subject Information: Person

Visa Information: Cross-border Mobility

Process Information: Entry/Exit Records



Subject Information: Product

Visa Information: Cross-border Trade Compliance

Process Information: Full Lifecycle

Human Passport

Digital Product Passport

DPP Requirements (Taking EU's ESPR as Example)

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Standardization of product information

Ensures product comparability and information mutual recognition, including product descriptions, performance indicators, environmental impact, etc.

Data accessibility and transparency

Ensures information availability for easy access and use by all stakeholders.

Technical compatibility and interoperability

Ensures system connectivity to achieve interoperability across different systems and platforms.

EUROPEAN COMMISSION

Brussels,
30.3.2022

COM(2022) 142 final

2022/0095(COD)

Proposal for a

REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

establishing a framework for setting ecodesign requirements for sustainable products and repealing Directive 2009/125/EC

(Text with EEA relevance)

{SEC(2022) 165 final} - {SWD(2022) 81 final} - {SWD(2022) 82 final} - {SWD(2022) 83 final}

Article 9
General requirements for the product passport

1. A product passport shall meet the following conditions:

(a) it shall be connected through a data carrier to a unique product identifier;

(b) the data carrier shall be physically present on the product, its packaging or on documentation accompanying the product, as specified in the applicable delegated act adopted pursuant to Article 4;

(c) the data carrier and the unique product identifier shall comply with standard ('ISO/IEC') 15459:2015;

(d) all information included in the product passport shall be based on open, standards, developed with an inter-operable format and shall be machine-readable, structured, and searchable, in accordance with the essential requirements set out in Article 10;

(e) the information included in the product passport shall refer to the product model, batch, or item as specified in the delegated act adopted pursuant to Article 4;

(f) the access to information included in the product passport shall be regulated in accordance with the essential requirements set out in Article 10 and the specific access rights at product group level shall be identified in the applicable delegated act adopted pursuant to Article 4.

Key Elements of Product Digital Passport

01

Unique identifier

Whether the unique identifier meets requirements.

02

Full lifecycle information

Whether the full lifecycle information is complete.

03

Carbon accounting report

Whether the carbon accounting report meets requirements.

04

Customs acceptance

Whether it is accepted by relevant customs authorities.

Common Challenges in DPP Implementation

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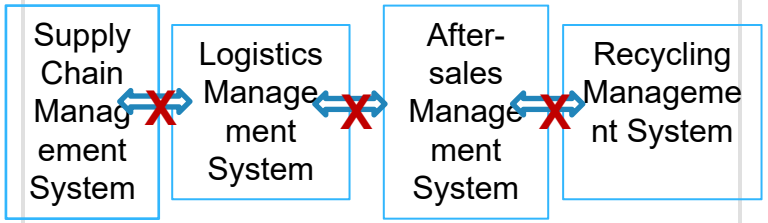
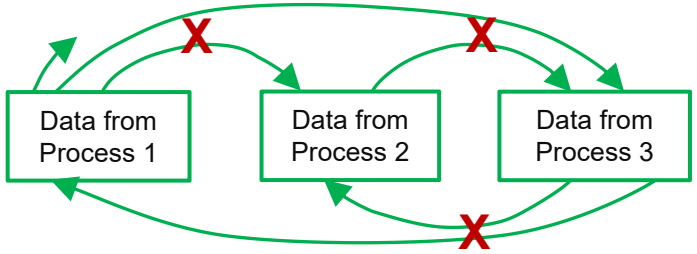
01 Data connectivity challenges

Lack of unified identification standards across supply chains makes data connectivity difficult.



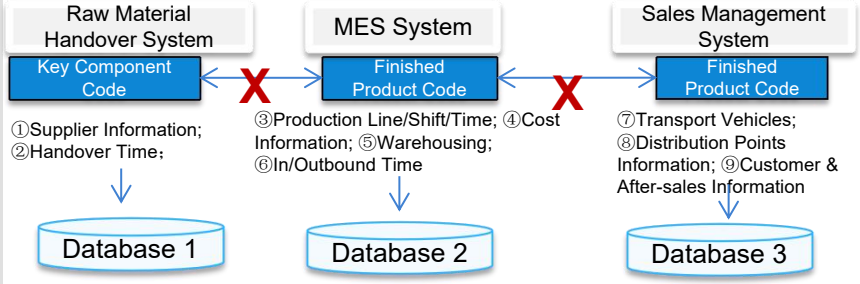
02 Data recognition challenges

Heterogeneous data sources, inconsistent models, and uncontrolled origins hinder data mutual recognition and trust.



03 Data sharing challenges

Inconsistent data exchange protocols across platforms and systems impede data sharing and interoperability.



Building a globally-covered digital Smart-Flex Supply Chain system faces tremendous challenges, establishing an open and universal DPP foundational architecture supporting full lifecycle management is an urgent common issue for the industry to resolve!

ZIIOT Developed MA–DPP Universal Framework

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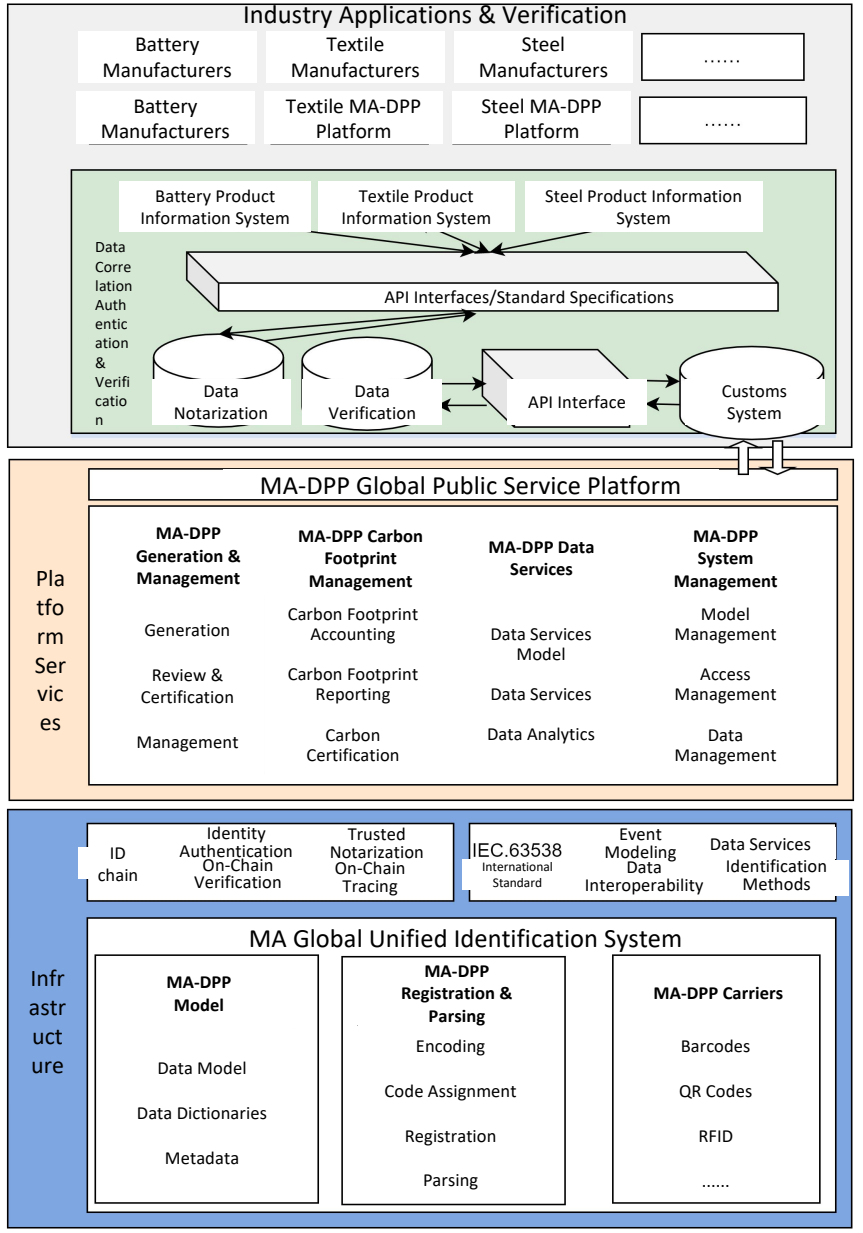
MA-DPP Universal Framework:

Based on the architectural concept of IEC 63538 international standards, integrating unified identification systems, blockchain, artificial intelligence, big data, and digital twin technologies, with the core objective of building a trusted, open, and shared full lifecycle data chain infrastructure. It supports global DPP owners, technology developers, users, and regulators in jointly establishing standardized, universal, and trustworthy DPP foundational frameworks, technical frameworks, and public service frameworks.

1. **MA Identification System** — Complies with EU's ESPR requirements, providing unique product identifiers that meet ISO/IEC 15459 international standards
2. **Data Model** — A structured representation of product lifecycle data, defining event types, model structures, data formats, and identification methods
3. **Data Interoperability Specifications** — Developed based on IEC 63538 "Lifecycle Events: Information Models and Services" international standard in interoperable formats to facilitate sharing of key upstream/downstream events and data interoperability, enhancing information transparency and collaboration efficiency
4. **IDchain System** — MA Identification + Blockchain" code-chain integration ensures all on-chain data is authentic, tamper-proof, and traceable, guaranteeing data security and trustworthiness



1. Joint Development of International Standards

Co-chaired by ZIIOT's LIU Zerong and IEC/TC65 Chairman Rainer Schrundner, the international standard IEC 63538 "Life-cycle Events: Information Models and Services" was jointly established with participating nations to standardize event modeling, representation, storage, data exchange, and interoperability services for product lifecycle operations, addressing cross-industry supply chain challenges in data connectivity, recognition, and sharing.

Project Purpose and Scope

By describing product lifecycle events and providing related services, it facilitates sharing of key supply chain events, enhances information transparency and collaboration efficiency, and lays the foundation for data sharing in industrial internet, smart manufacturing, industrial IoT, and global IoT. This standard primarily applies to modeling, representation, and access of product lifecycle events across industries.

Project Content

① **Uniqueness data levels:** such as project-level, batch-level, product-level covering physical products, software, and service products.
② **Identification methods:** decentralized or hierarchical identifiers (e.g., internet domains, URIs, IEC 61406 series, ISO/IEC 15459-compliant codes)
③ **Data exchange and interoperability:** Standardized event collection and service interfaces for event databases, fundamentally resolving cross-industry supply chain collaboration challenges

- On July 18, 2024, the preparatory kickoff meeting for IEC 63538 and the DPP & Lifecycle Process Management seminar were held in Beijing, attended by global digital identification standardization experts, international technical organization representatives, IEC 63538 drafting committee members, and supply chain industry leaders.
- Industry leaders including Huawei, Haier, and Siemens participated in the standard development.

IEC 63538 International Standard Provides Data Interoperability Framework for DPP

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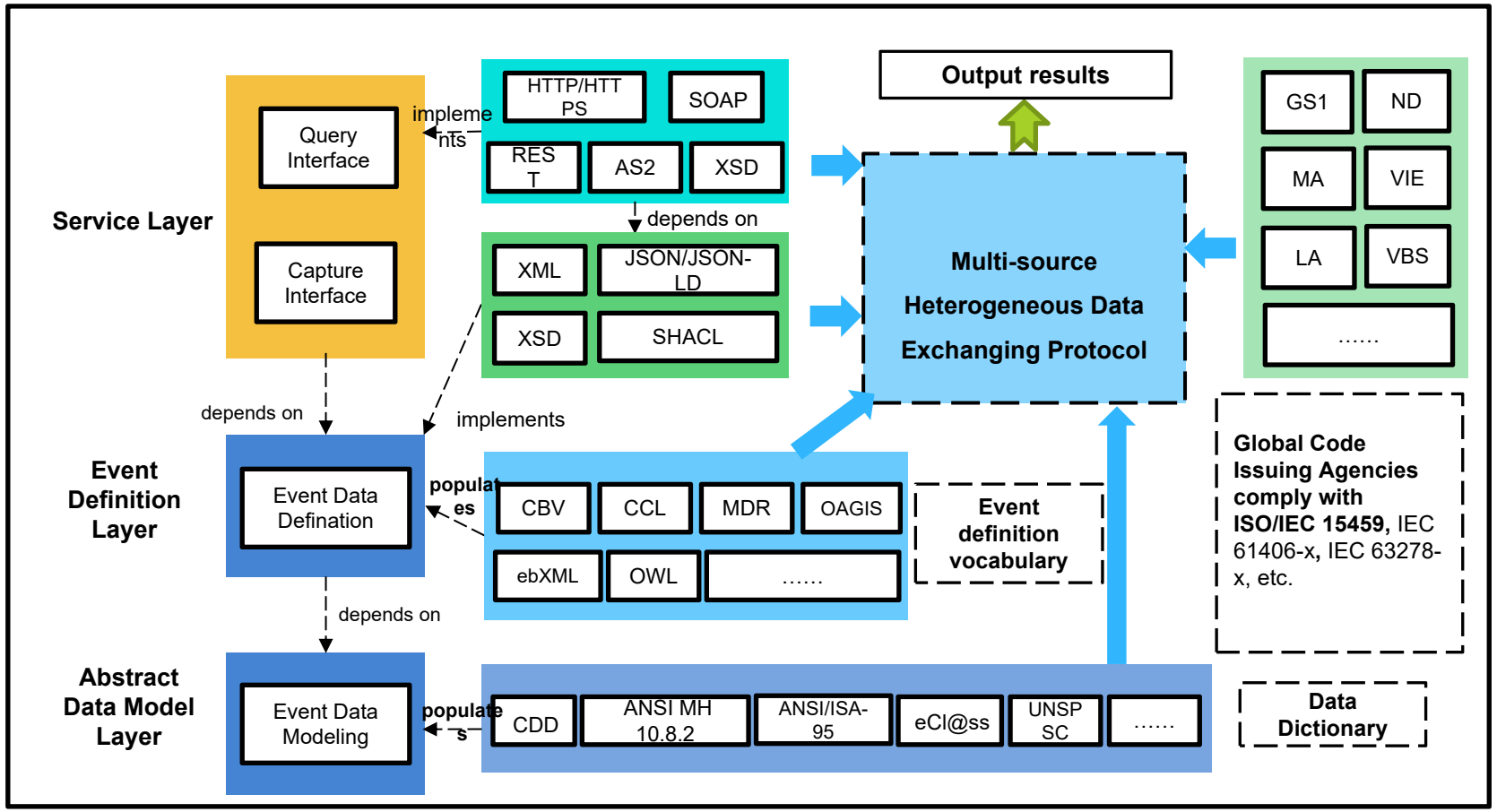
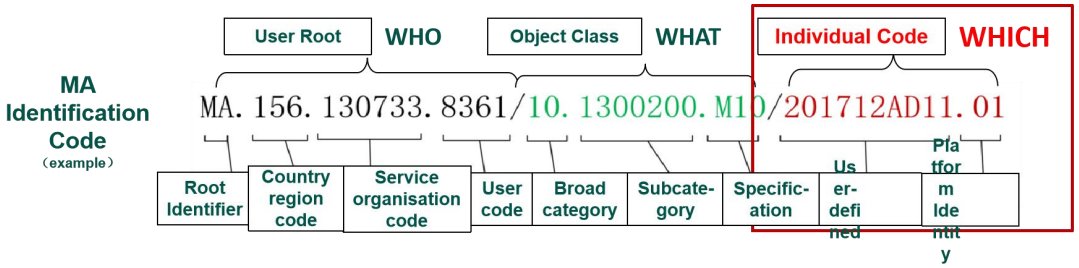
- **The IEC 63538 framework:** Data models for lifecycle operations at the base layer; event definitions and uniqueness granularity at the middle layer; open query interfaces and multi-source heterogeneous data mapping mechanisms at the service layer—collectively supporting an open, shared DPP system for all industries and participants.

IEC 63538: Life-cycle events: information models and services

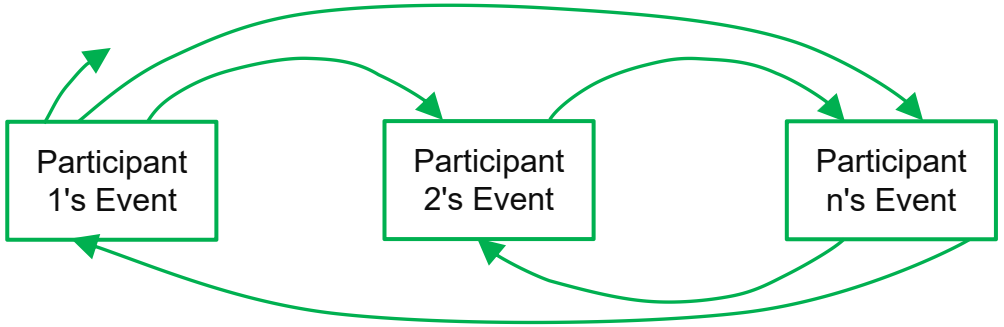


2. Developing Three Universal Capabilities



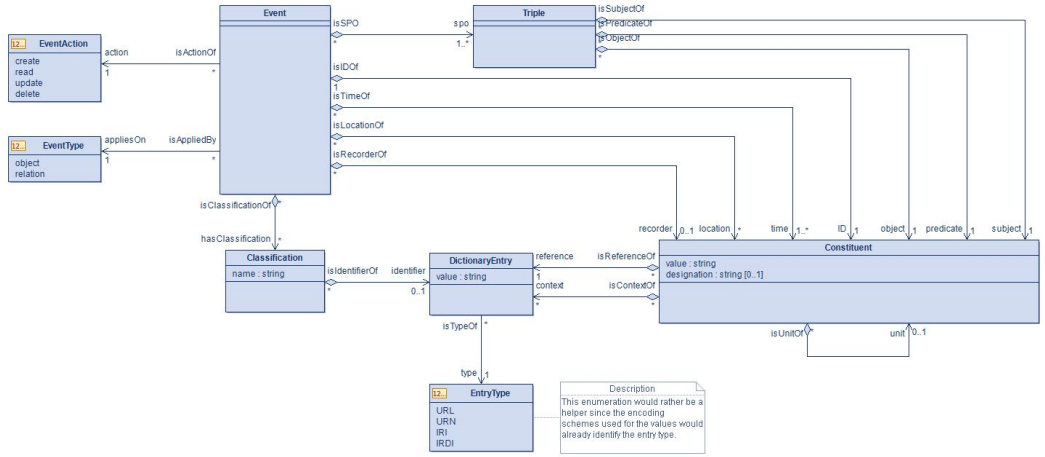
Unified Identity Identification

MA codes assign globally unique digital identities to physical/virtual objects, complying with EU ESPR requirements for DPP unique identifiers—one object, one code, universally applicable.



Intelligent Data Exchange

Integrated with IEC 63538, MA establishes data exchange hubs to resolve multi-source heterogeneous data recognition/sharing barriers, enabling intelligent data exchange across supply chains.



Full Lifecycle Data Chain

Unique identifiers track products throughout their lifecycle, automatically capturing and binding key data (raw material sources, production energy, carbon footprint, recycling status) to ensure complete data collection. Real-time blockchain recording guarantees tamper-proof reliability.

3. Delivering Three Service Types

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Three MA-DPP Service Types

Universal Framework Services

Provides DPP universal frameworks for industries and enterprises, enabling low-code development and rapid deployment of customized DPP platforms.

SaaS Services

Offers one-stop DPP generation and management services compliant with industry regulators and EU requirements.

Open Platform Services

Provides open APIs for carbon footprint/ accounting/ certification service providers, hardware/ software vendors, developers, and consultants to co-build the DPP ecosystem.

Collaborating with Global Partners to Build the DPP Ecosystem

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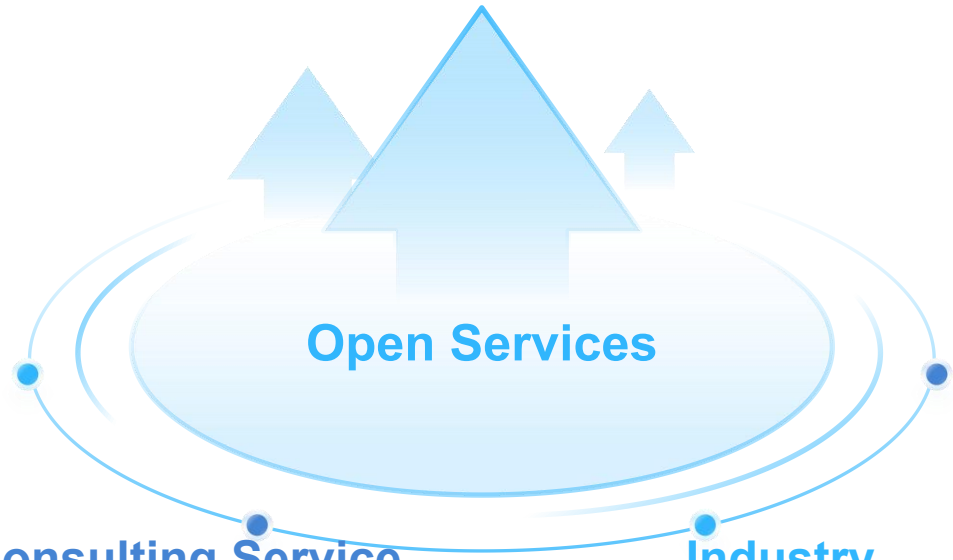
The MA-DPP Universal Framework offers flexible integration solutions via open APIs, enabling joint development of the DPP ecosystem with service providers and manufacturers.



Carbon Footprint & Certification Providers

Delivers carbon tracking/accounting APIs for automated lifecycle emissions data collection/analysis, with real-time certification verification/display.

Hardware/Software Vendors & Developers

Embeds DPP capabilities into hardware for trusted product authentication; provides API integration for software platforms to enable rapid DPP adoption.

Consulting Service Providers

Offers compliance consulting and certification to ensure DPP meets international standards.

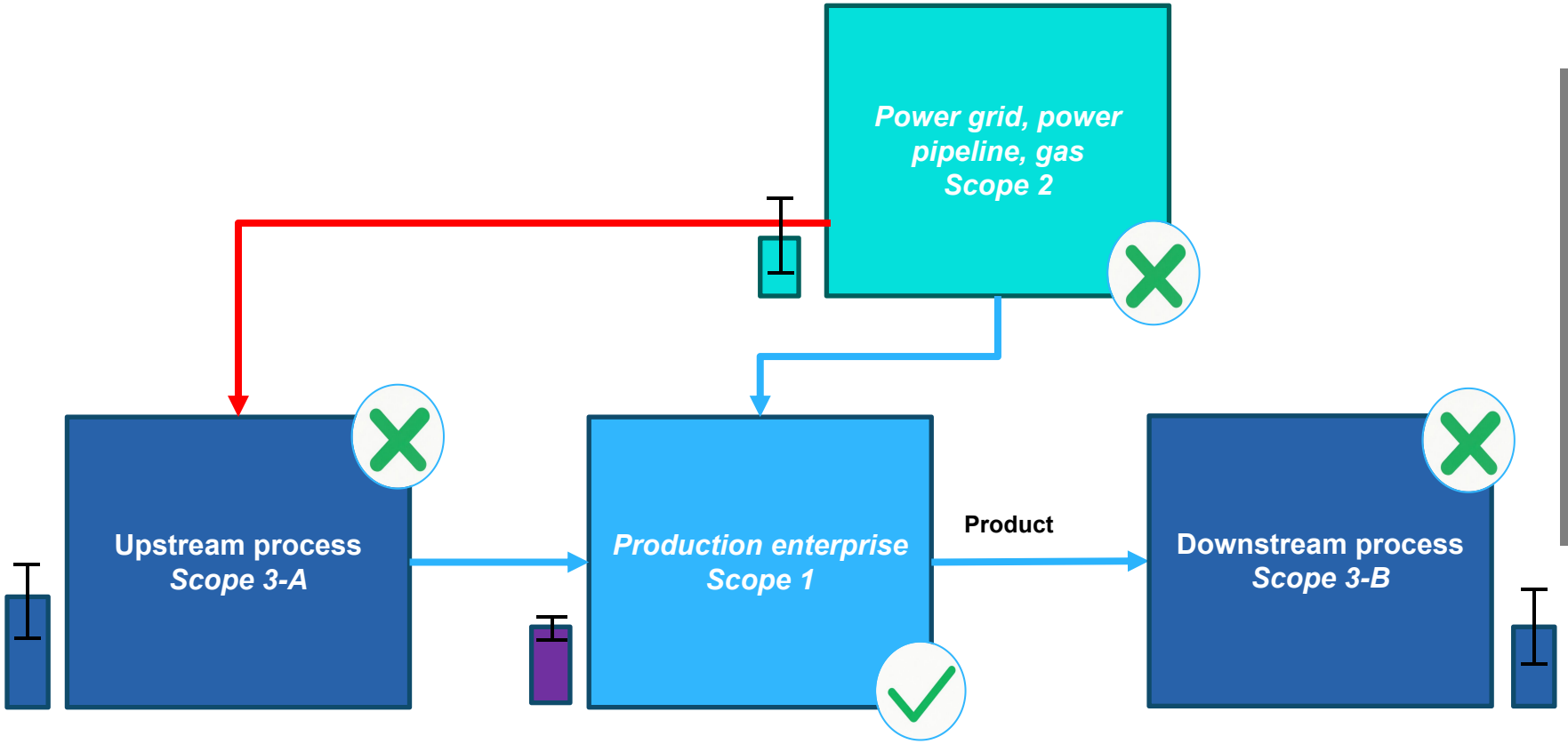
Industry Organizations

Drives industry standards development, facilitating digital transformation and green initiatives.

Through open platform services, we are committed to collaborating with global partners to build a transparent, secure, and trustworthy DPP ecosystem!

Product Carbon Footprint is a Key Supporting Element of DPP

- The credibility of carbon footprint data has become a critical issue for DPP
- One major cause of carbon footprint uncertainty: Spatial attribute mismatches



The same product, produced in different locations, has different carbon footprints!

The spatial heterogeneity of carbon footprints must be identified and addressed; otherwise, the reliability of carbon footprint results cannot be ensured.

$$CFP_t = C_{scope1} + CFP_{scope2} + CFP_{scope3\text{-}A} + CFP_{scope3\text{-}B}$$

Establishing MA–GIS–LCA: Geospatial Carbon Footprint Accounting Model

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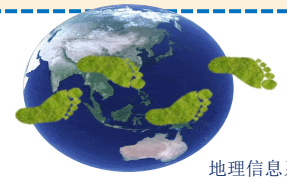
Integrating MA identification system with GIS geolocation services to create the MA-GIS-LCA model, enabling carbon footprint service providers to build geospatial carbon accounting systems. This supports dynamic carbon traceability, creating internationally recognized "green IDs" for cross-border traded products and providing replicable solutions for global green transition.

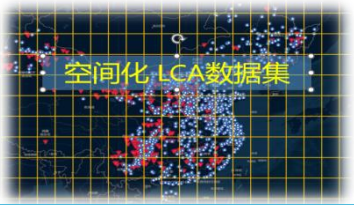
Spatial Carbon Footprint Assessment - Identifies spatial heterogeneity for accurate accounting



地理信息系统

AI-Enhanced Efficiency, GPT-powered Q&A, intelligent search, and analytics

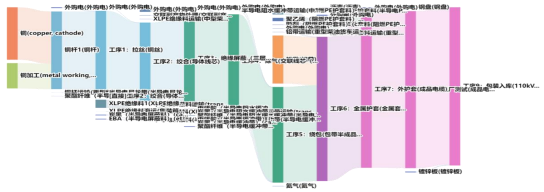
Features geospatial, localized, high-resolution databases with transparent traceability



Deep Integration of LCA and MA, establishes "one object - one code - one coordinate" traceability, auto-generating carbon reports and EPDs compliant with ISO 14067, GB/T 24067, ISSB, EU CBAM/ESPR.

Spatial Representation & Analysis: Visualizes carbon trajectories and precisely identifies high-emission sources

Multi-dimensional Data Import Support: Meets disclosure requirements for CFP, EPD, ESG, carbon audits, and inventory reporting



One-Form Three-Steps: Automatically exports product carbon footprint reports and provides customized services to meet diverse user needs

Features of MA–GIS–LCA Geospatial Carbon Accounting Model

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Spatial Modeling: Real-scene based modeling with WYSIWYG; single modeling for multiple uses

Spatial Representation & Analysis: Visualizes carbon trajectories and pinpoints high-emission sources

Three-Step Report Generation: Auto-generates carbon reports with customizable services

Spatial Consistency Evaluation: Spatial granularity and geolocation consistency

AI Empowerment: Integrates GPT for smart Q&A, search, and analytics

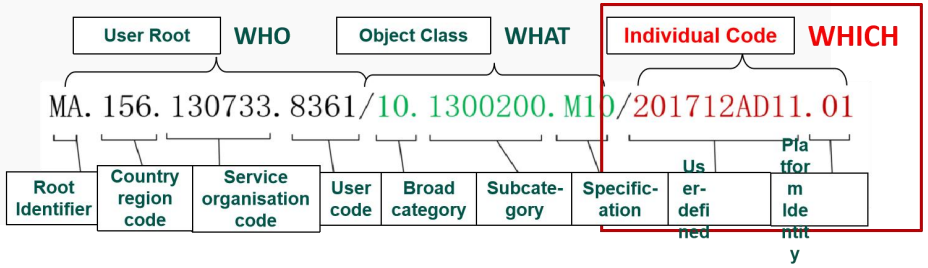
Flexible definition of assessment objects and phases: Enables rapid carbon emission calculations for products, enterprises, regions, etc.

Spatial Carbon Footprint Assessment: Identifies spatial heterogeneity for precise accounting

Multi-Dimensional Data Support: Supports CFP, EPD, ESG, carbon audits, inventory reporting

Supports multiple applications including Resource potential evaluation, Factory site selection, Industrial chain planning, Supply chain optimization

Globally Unique Identification: MA identification system compliant with ISO/IEC 15459 assigns globally unique identifiers to all objects, internationally recognized



MA–GIS–LCA Implementation Cases

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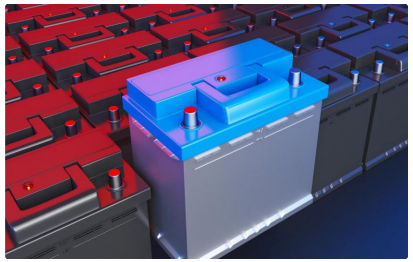
Carbon Footprint Applications



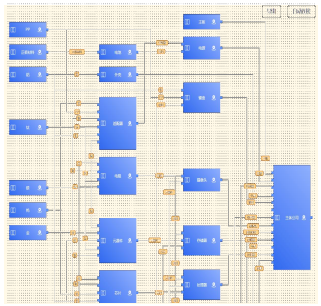
Lithium-sulfur battery carbon footprint tracing

Electronic product management

Supply chain applications

Chemical plant process-level carbon accounting

Regional applications



Supply chain management

Carbon Footprint Service Providers & Systems

China Quality Certification Centre (CQC)

Qingdao Institute of Bioenergy and Bioprocess Technology, CAS

Siemens (China) Co., Ltd.

Beijing Zhongchuang Carbon Investment Technology Co., Ltd.

Shanghai Jikai Information Technology Co., Ltd.

MA-GIS-LCA

MA Identification	GIS	LCA	AI	Spatial Model	……

Carbon Footprint Accounting Model Framework

Summary of MA–DPP Universal Framework

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1. **Unique Identifiers:** ZIIOT is a global code issuing agency. Based on the architectural concept of IEC 63538 lifecycle management standards and through collaboration with international organizations, ZIIOT has jointly developed a globally applicable DPP universal framework, providing foundational tools for industries and enterprises worldwide to implement product digital passports. MA identifiers have passed compatibility tests with EU authorities, fully meeting EU requirements for unique identifiers.

2. **Full Lifecycle Information:** ZIIOT co-leads the development of IEC 63538 lifecycle management standard with Germany's national standards body and partners from the EU, China, and other countries. As the global primary convener and key implementer of this foundational DPP standard, ZIIOT's MA-DPP Universal Framework embodies the world's most advanced lifecycle management mechanisms, inherently compliant with EU DPP requirements.

3. **On Carbon Accounting:** ZIIOT has established a global ecosystem integrating authoritative carbon accounting partners like China Quality Certification Center and Siemens into the MA-DPP Framework. Enterprises can select region/industry-specific carbon accounting and certification services through the framework.

4. **Customs Authority Recognition:** Currently, ZIIOT is collaborating with relevant departments of China Customs to jointly establish a DPP public service platform and electronic facilitated clearance system based on the MA-DPP Universal Framework. Simultaneously, we are actively engaging with customs authorities of related countries to provide convenient customs declaration and clearance services for future MA-DPP users.

ZIIOT Launched World's First DPP Universal Framework

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- On July 18, 2025, ZIIOT's MA-DPP Universal Framework V1.0 — the world's first DPP framework — was officially released globally, providing foundational DPP services and public goods to enhance global supply chain resilience.

MA-DPP Universal Framework V1.0 Official Launch

Three Core Functions

- Unified identification coordination rules
- Standardized data model framework
- Consistent data exchange protocols

This universal framework serves as critical infrastructure supporting cross-industry DPP deployment, analogous to urban utility tunnels.

Addresses Three Challenges

- Data connectivity: Inconsistent identification coordination across supply chains
- Data recognition: Heterogeneous data sources and models
- Data sharing: Disparate data exchange protocols

Three Service Types

- Universal framework services
- SaaS services
- Open platform services

Supports collaborative development of global DPP systems by owners, developers, users, and regulators

THANKS