

TN-ITS's Breakthroughs

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Introduction

Digital maps are foundational to **Intelligent Transportation Systems (ITS)**, underpinning applications from navigation to automated mobility, all reliant on high-quality, up-to-date data. Leading map providers address this need by integrating diverse sources, including **authoritative public sector data**.

Improving access to this data has been a long-standing European objective. Under the **TN-ITS umbrella**, ERTICO-coordinated initiatives have united public agencies, private map providers, and industry.

The **TN-ITS GO project (2018-2021)** operationalised these efforts, deploying services across 13 European road organisations.

The evolving regulatory landscape, including **EU Delegated Regulations on RTTI** and **ISA**, provided the policy mandate for the **NAPCORE project**. With a €7 million grant and over 40 partners, NAPCORE aims to harmonize **National Access Points (NAPs)**.

TN-ITS was formalised as a dedicated working group (SWG4.2). This paper presents its major outcomes: (1) strategic alignment of TN-ITS with DATEX II, (2) refinement of TN-ITS specifications, and (3) development of a holistic data quality framework.

Methodology: in 4 areas

Alignment with DATEXII

- Established joint task force under NAPCORE.
- Conducted SWOT analysis on governance and technical alignment.
- Assessed criteria: industry recognition, integration effort, governance feasibility, and dissemination benefits.
- Validated through joint workshops (2023–2025).

Update of TN-ITS Technical Specifications

- Taskforce compared TN-ITS (CEN/TS 17268) with DATEX II Part 11 (Traffic Regulations).
- Analyzed Common elements and Location Referencing; reconciled GML-based geospatial modeling (TN-ITS) with UML-based dynamic data modeling (DATEX II).

Enhancements of the Data Sharing Supply Chain

- Phase 1: Desktop research on trust, quality, integrity, security, sovereignty; mapped data chain vulnerabilities using EU EIP and TN-ITS GO.
- Phase 2: Expert meetings and focus groups (late 2023–mid 2024) to assess vulnerabilities and mitigation measures; validated findings in workshops to develop quality assessment framework.

AI Developments in the TN-ITS Ecosystem

- Desktop research to identify emerging AI technologies.
- Expert elicitation via NAPCORE SWG 4.2 Quarterly Partner Meetings (2024–2025) with contributors including Insight Warehouse, AI Infrasolutions, and MOVIAS.

DATEX II & TN-ITS Alignment	Advantages	Hindrance
Internal	Strengths: - Streamlined data exchange - Improve accuracy and timeliness - Enhances reliability - Support greater interoperability	Weaknesses: - Addressing technical complexities - Addressing compatibility - Addressing governance matters (technical & non-technical elements) - Implementation costs
External	Opportunities: - Driving innovation - Promote collaboration between public and private sectors - Consistent data quality - Greater flexibility for future adaptations (AI-based) - Increased adoption and trust - Simplified regulation - Global leadership positioning of the alignment	Threats: - Ensuring compliance with legal challenges (National and European level) - The challenge in engaging stakeholders - Lack of awareness or expertise among stakeholders - Cybersecurity risks - The slow pace of adaptation

Table 1: SWOT analysis of the for the alignment of TN-ITS with DATEX II

Result 1: Alignment TN-ITS with DATEX II

The alignment between TN-ITS with DATEX II was first formalised in a declaration statement, presented at the **ITS European Congress 2023 in Lisbon**.

The **Declaration of Lisbon** outlined several key commitments:

- Enhanced cooperation** to avoid duplication and ensure complementary, interoperable standards.
- Interoperability by design** to enable smooth data flow between systems.
- User-centric approach** to ensure shared data's applicability and value.

It also positioned TN-ITS and DATEX II as fundamental pillars for the **European Mobility Data Space** and established agreement to develop a **joint strategic roadmap** outlining technical and organisational steps.

Result 1: continued

The Declaration recognized that no single standard serves all needs:

- TN-ITS → static road data**
- DATEX II → dynamic traffic information**

Both must work in concert to support a complete data ecosystem.

This commitment was operationalised in May 2025 at the **ITS European Congress in Seville** through the signing of a formal cooperation agreement that established a concrete framework for joint action. The pact solidified collaboration on technical interoperability, user-driven standards development, and a shared strategic roadmap, marking a significant step toward a seamless road transport data ecosystem in Europe.

Result 2: Update of Technical Specifications

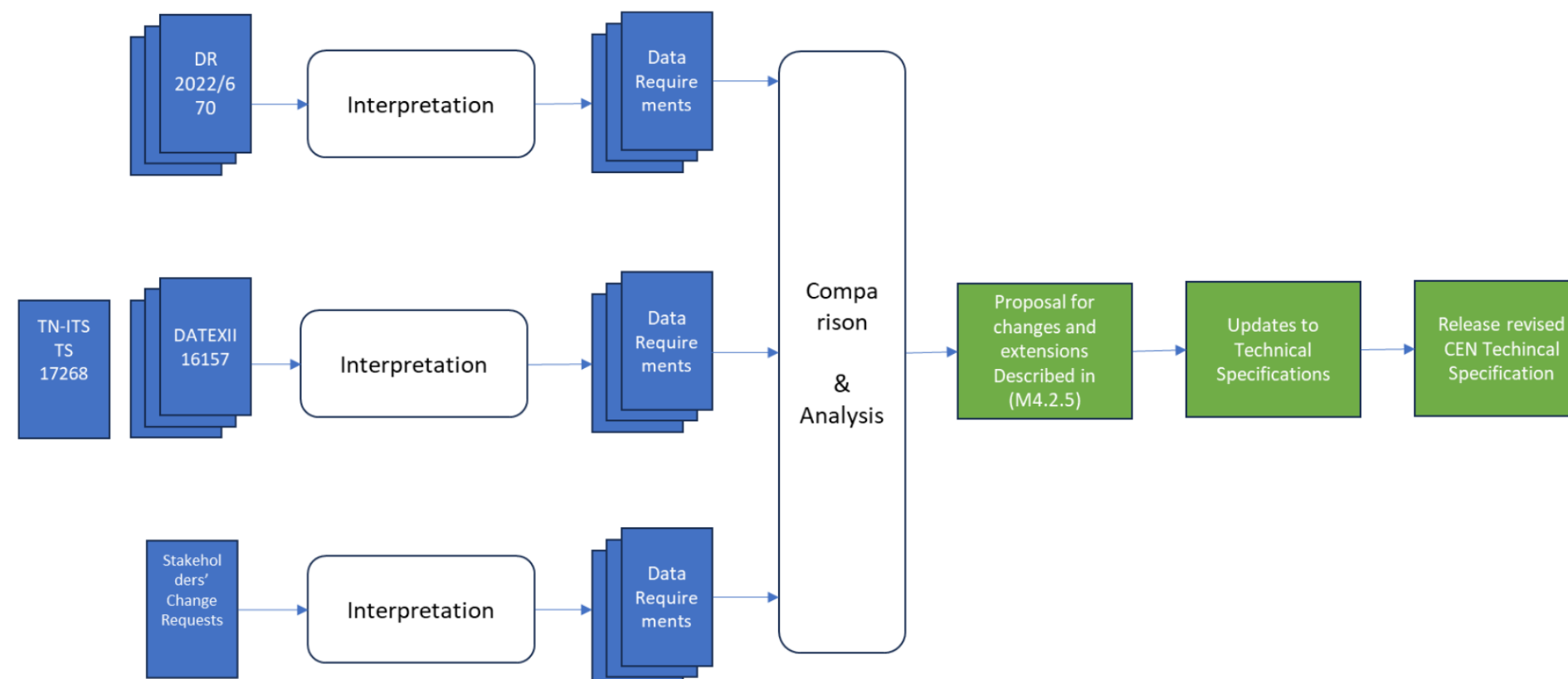


Figure 1: Methodology adopted by NAPCORE Task 4.2.3

The **TN-ITS CEN 17268 specifications** underwent a comprehensive revision driven by multiple inputs. The primary driver was addressing gaps between the specification and the **EU RTTI regulation**, as detailed in NAPCORE report M4.2.4, yielding modifications to incorporate missing datatypes. A second input was strategic alignment with **DATEX II (CEN 16157 - Part 11)**, resulting in refinements to the data model. The update also incorporated requests from European road authorities (e.g., Sweden, Flanders) for cycling networks and new traffic signs.

During alignment, it was decided to formally integrate TN-ITS into the CEN 16157 series as Part 14, with the title: **CEN/TS 16157-14: "Intelligent transport systems - DATEX II data exchange specifications for road and traffic information - Part 14: TN-ITS road attribute update exchanges"**.

Publication is expected by early 2026. Technical files will be available on the ERTICO Open TN-ITS Github repository.



Results 3: TN-ITS enhancements of the data sharing supply chain

Research on TN-ITS enhancements proposed an **integrated framework** for improving **data quality in intelligent transport systems**. NAPCORE milestone M4.2.7, developed under Task 4.2.4, provides updated guidance for strengthening the **RTTI data chain**. Building on Deliverable 4.2.6, the report focuses on data trustworthiness, quality, integrity, security, and sovereignty, proposing practical tools and methodologies for continuous improvement.

A refined **TN-ITS data chain framework** delineates stakeholder roles, data flows, and critical quality control points, emphasizing alignment with **ISO norms**, the **EU ITS Directive**, **NIS 2 [2022/2555]**, **EU-EIP**, **TM2.0**, and **TISA quality ratings**. System vulnerabilities are identified with mitigation responsibilities assigned to stakeholders.

Guidelines support deployment of **tools for data quality assessment**, alongside **feedback mechanisms** to address inaccuracies. A **speed limit use case** validates the proposed framework. Additional proposals include **cooperative trust models** based on TM2.0, and analytical guidance for aligning TN-ITS with DATEX II, addressing integrity, security, and interoperability (see figure 2).

Key recommendations include:

- A structured RTTI data chain
- Quality assessment models using EU-EIP, TN-ITS GO, and TISA criteria
- Tools to mitigate vulnerabilities
- Feedback loop enhancements to support continuous improvement and stakeholder collaboration

This work aims to **improve interoperability across NAPs** and **harmonise data practices across Member States**. While immediate policy changes are not proposed, recommendations support future advancements in data procurement, management and public-private partnerships within the EU Mobility Data Space. Adoption of standardised evaluation tools is expected to increase uniformity and reliability for emerging technologies, including AI-driven analytics, and connected or autonomous vehicles, reinforcing EU technological competitiveness.

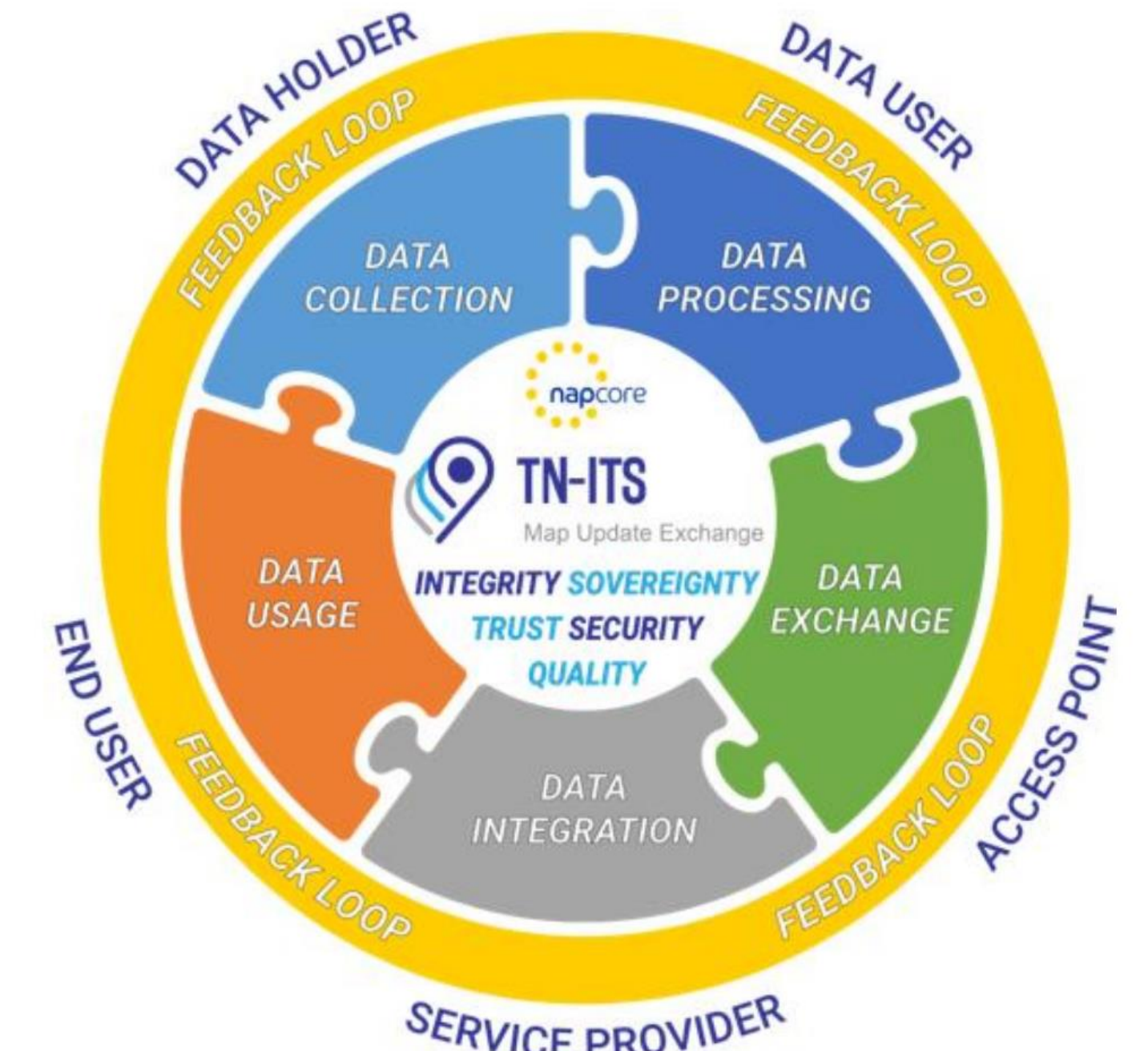


Figure 2 : Circular TN-ITS data chain (NAPCORE Milestone 4.2.7) illustrating the key stages of data collection, processing, exchange, integration, and usage.

Result 4: AI developments in the TN-ITS ecosystem

A key challenge remains: in many European countries, road authorities have not been able to publish TN-ITS services that share road attributes changes, mainly because such data is not readily available. To address this, TN-ITS management decided to focus on furthering work to make more data available.

Two approaches are in scope:

- AI tools** supporting operators (non-GIS experts) on **data entry**
- AI tools** to **mine and combine different data sources** to generate TN-ITS road data changes

AI-driven data conversion can greatly decrease the complexity of any TN-ITS centred project. By applying an **AI agentic approach**, data can be converted from any source to TN-ITS and back without the complexity of a traditional data mapping approach. This allows for the rapid deployment of TN-ITS services on top of existing tools, and the development of user-friendly interfaces to kickstart uptake of the TN-ITS standard in new regions and organisations.

Conclusions and further work

This work successfully advanced European mobility data interoperability through the strategic alignment of TN-ITS and DATEX II standards, formalised in a cooperation agreement, and the forthcoming CEN/TS 16157-14 specification.

The TN-ITS specification was updated for EU RTTI compliance and to incorporate new operational needs. A significant output is the development of a holistic data quality framework that harmonises criteria from TN-ITS GO, EU-EIP and TISA to enhance trust across the data chain.

Looking forward, AI-driven tools for data conversion present a transformative opportunity to overcome implementation barriers and rapidly scale TN-ITS deployment. These collective breakthroughs establish a robust contribution to a seamless European Mobility Data Space and will be further matured within subsequent project phases.

The forthcoming EU CEF project TISGRADE (2025-2028) is essential for enhancing RTTI availability and quality across Europe. It operationalises TN-ITS standards by developing tools for data digitisation, validation and NAP upgrades, including implementing a semantic feedback loop. For TN-ITS, TISGRADE represents a critical deployment phase, translating technical standards into widespread, policy-compliant implementation.

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