

MultiModal Travel Information Services

A review of the European
MMTIS - Regulation



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Reading guide

This document explains the scope of the MMTIS – Regulation (adopted in 2017 and amended in 2024). It is a single directly applicable EU regulation.

Terminology

In this document, we – authors of this publication – use various terms relating to legal frameworks, technical standards and transport sectors. To avoid confusion, we explain the terms below.

Legal frameworks

- **MMTIS – Regulation:** Delegated Regulation¹ (EU) 2017/1926, as amended in 2023 ((EU) 2024/490), which sets out which mobility data must be made available via national access points for the purposes of multimodal travel information services. In this document, we therefore refer to 2023 because the regulation was adopted in November of that year.
- **RTTI – Regulation:** the Delegated Regulation on Real-Time Traffic Information (EU 2022/670), which applies to road transport and is designated by MMTIS as the reference framework for this domain.
- **Rail – TSI/TEL – TSI:** the technical specifications for interoperability in rail transport, laid down in Regulation (EU) 2026/253, to which MMTIS explicitly refers in Article 5 for rail-related travel information.
- **ITS – Directive:** Directive 2010/40/EU. This is the overarching framework for ITS and the basis for the MMTIS and RTTI delegated regulations. The directive delegates to the European Commission the power to adopt specifications through delegated acts, subject to the European Parliament and the Council being able to object.
- **GDPR:** Data provided by data holders via the NAP under MMTIS must not include personal data within the GDPR. Where personal data are processed elsewhere in the mobility-data chain, the GDPR remains applicable

Technical standards

- **NeTEx:** standard for the exchange of static public transport data, such as network descriptions and timetables.
- **SIRI:** standard for dynamic public transport travel information, such as delays, disruptions and status information on vehicles and facilities.
- **DATEx II:** standard for the exchange of traffic and road-related data, applied within the RTTI framework.

Use in this document

- Where we refer to **obligations**, we refer to the relevant regulation (MMTIS, RTTI or Rail – TSI) and/or the ITS – Directive.
- Where we refer to **exchange or implementation**, we mention the related technical standards, as well as EU implementing acts and impact assessments by the Dutch Ministry of Infrastructure and Water Management (IenW).
- We deliberately maintain the distinction between legal framework, technical standard and modality in order to clarify the relationship between regulation and implementation.

This terminology framework is intended as a reading guide and does not alter the formal scope or obligations of the underlying European legislation.

¹ **Explanation of delegated regulations.** The MMTIS – and RTTI – Regulations are delegated regulations. This is a specific type of EU legislation which, like a ‘standard’ regulation, is directly applicable in the Member States. It is called ‘delegated’ because, on the basis of the ITS – Directive, the European Commission has been granted the power to draw up further specifications for certain ITS – topics in the form of delegated acts. These are not adopted through the regular legislative process involving the Council and the European Parliament, but are prepared with the involvement of (experts from) the Member States. See also the ITS – Directive, Article 12

Summary

This document explains the scope of the MMTIS – The Regulation is directly applicable in all Member States and does not require transposition into national law. It does, however, require implementation and operational arrangements at national level. This document is specifically intended to outline the challenges facing road authorities, transport authorities and other data holders in relation to the broader multimodal travel information chain.

In 2017, rules were therefore established for the provision of mobility data for the purposes of multimodal travel information services (MMTIS) in Delegated Regulation (EU) 2017/1926, which were supplemented and amended in 2023 and published in Regulation (EU) 2024/490. The central aim of this regulation is to enable accurate, up-to-date and multimodal travel information services for passengers, across different modes of transport and national borders. As such, MMTIS forms an important prerequisite for the development of multimodal travel planners and MaaS-type services within Europe.

The MMTIS – Regulation sets out which mobility data must be made available, discoverable and usable within Europe via national access points (NAPs), using common standards such as NeTEx and SIRI, and within specified timeframes. This harmonisation is necessary to ensure interoperability between local, regional, national and international systems and to enable the reuse of data by travel information service providers. In the Netherlands, the National Access Point for Mobility Data (Nationaal Toegangspunt Mobiliteitsdata, NTM) has been established for this purpose.

The revision of the regulation in 2023 led to several significant changes compared to the original version from 2017. For example, parking data has been explicitly added to the scope of MMTIS, charging and refuelling stations have been removed from the regulation, and phased deadlines have been introduced for making dynamic travel and traffic data available. In addition, the regulation places greater emphasis on data quality, interoperability and cooperation within the data chain, including through the use of common definitions, profiles and standards.

The obligations under the MMTIS – Regulation affect multiple types of actors in the chain. This concerns not only public authorities and data holders, such as transport authorities, transport operators, infrastructure managers and transport on demand service providers, but also, and explicitly, organisations that develop, manage and operate travel information services. These parties form the intended endpoint of the data chain and are essential for actually unlocking value for the passenger.

This document is analytical and interpretative in nature and is intended to support the understanding and implementation of the MMTIS – Regulation. The Regulation itself remains authoritative. No independent rights or obligations can be derived from this text.

MMTIS at a glance

Relevant regulations and policy	
The EU Sustainable and Smart Mobility Strategy	The roll-out of Intelligent Transport Systems (ITS) is a key action in achieving connected and automated multimodal mobility .
European Green Deal	The growing role of automated and connected multimodal mobility, and the aim to support new, sustainable transport and mobility services that can reduce congestion and pollution, especially in urban areas.
European Strategy for Data	Making more data available in a secure and non-discriminatory manner is crucial to tackling societal climate and environmental challenges.
ITS – Directive	Priority area 1.1 of the Directive describes what the specifications and standards must cover regarding the availability, accessibility and timeliness of multimodal mobility data for passengers. The ITS – Directive was revised in 2023. This has an impact on the MMTIS domain, including by clarifying the (digital) availability of certain crucial travel data such as the locations of <i>access nodes</i> (stops, stations and interchange points). In addition, Annex III contains an obligation to make (static) multimodal data available via national access points for EU-wide multimodal travel information services.
Harmonisation legislation	
RTTI – Regulation	To avoid overlap with Delegated Regulation (EU) 2022/670 (RTTI), data on parking is added to the scope of MMTIS. RTTI also covers data on charging infrastructure, such as the location and availability of charging points for electric vehicles.
Passenger rights and obligations	Consistency with the rules on passengers’ rights and obligations, such as those laid down in Regulations (EC) No 261/2004, (EU) No 1177/2010, (EU) No 181/2011 and (EU) 2021/782.
Who does MMTIS apply to?	
Data holders	Data holders (often referred to as ‘source holders’ in the Netherlands), such as road authorities, transport authorities, transport operators, transport on demand service providers or parking operators.
Data users	Service providers from the public and private sectors offering multimodal travel planning for passengers.
Data obligations	
General	MMTIS is explicit regarding the obligation to ensure data accessibility. With regard to the exchange of static, historic, observed and dynamic travel and traffic data, data holders must make such data accessible via the National Access Point (NAP), as specified in Article 3. In doing so, they shall use the standards and technical specifications referred to in Articles 4 and 5. This is phrased as ‘providing access’, as this can also be done via an API. MMTIS is about providing access to certain data, including a timeline. Ultimately, it is about value creation, whereby it is important to think from the end-user’s perspective. Example: data on accessibility, which may include data on the operation of lifts. The important question is not ‘am I obliged to share this real-time data?’, but ‘can someone who relies on a lift still make the journey?’. In general terms, there is a clear objective: to make greater use of sustainable travel options, to which information can make a significant contribution. Knowing whether a hub’s car parks are full or not, knowing that a train is actually running and on time, or knowing that a ferry is actually sailing, makes multimodal travel more attractive to the end user. The revision of MMTIS also explicitly mentions parking data, such as the location of parking spaces (including P+R), parking rates and the availability of parking spaces.

Data obligations	
Data holders	With regard to the exchange of static, historic , observed and dynamic travel and traffic data, data holders must make that data accessible via the National Access Point (NAP). Transport authorities, transport operators, infrastructure managers or transport on demand service providers shall provide the metadata (description of a dataset) to enable users to consult and use the datasets to which access is granted via the NAP. In doing so, they shall use the standards and technical specifications referred to in Articles 4 and 5. This may also be done using other standards, provided that the data holders can demonstrate that these are fully compatible with the reference standards, and provided that all requested information is made available. To prove compatibility, data holders can use converters or validators .
Road transport	For road transport, the standardised format as referred to in Article 4 of Delegated Regulation (EU) 2015/962¹ is used. In practical terms, this refers to the use of the mandatory data formats (primarily DATEX II and, to a lesser extent, INSPIRE or TN – ITS). Explanation of 1) <i>This revised version of MMTIS still refers here to the now-repealed RTTI – Regulation, possibly because MMTIS 2024 was already in preparation when RTTI 2022/670 had not yet been formally adopted.</i>
Other modes of transport	For other modes of transport, datasets must be supplied in one of the standards listed in the MMTIS (NeTEx, TSI TAP, IATA or Transmodel), or in another digital machine-readable format that can be demonstrated to be fully compatible and interoperable with these standards, including automatic conversion and validation.
Spatial networks	Article 4(1)(c) of the MMTIS – Regulation links the provision of spatial data to the INSPIRE framework, in which the EU establishes binding interoperability rules. New or substantially modified datasets must comply with these rules within two years; existing datasets within seven years. In this way, MMTIS ensures that geographical components of travel information are made available in a harmonised and interoperable manner.
Updating	
	Article 6 obliges data holders to keep multimodal travel information made available via the NAP up to date and reliable, to give advance notice of known changes and disruptions, and to update data in a timely manner so that service providers can use it effectively; the 2023 amendment reinforces this, particularly for dynamic datasets. Here too, in practice, the focus should be on the passenger and what they need to travel comfortably.
Data quality	
	Member States, in collaboration with the relevant ITS stakeholders, shall agree on the requirements regarding metadata. Data holders shall ensure that they provide the metadata in accordance with those requirements. Preparations for this are underway within NAPCORE (the European partnership that coordinates and harmonises NAPs).
Privacy	
	Any processing in connection with the provision and reuse of personal data must be carried out in accordance with Union and Member State legislation on the protection of personal data and privacy, in particular Regulation (EU) 2016/679 of the European Parliament and of the Council and Directive 2002/58/EC of the European Parliament and of the Council, as transposed into national law. It is not necessary to share personal data via national access points in order to achieve the objectives of this Regulation. Data holders should therefore take appropriate technical and organisational measures to ensure that personal data is anonymised before being provided via national access points.

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1 Introduction

1.1 Purpose and target audience of this publication

Like many legal texts, European regulations are often complex and it takes time to fully understand their content. CROW has therefore read the MMTIS – Regulation from the perspective of road authorities, transport operators and transport authorities, with the aim of clearly explaining exactly what it says and why. This, of course, does not alter the regulation itself. Previous publications on the RTTI – Regulation and the ITS – Directive were drafted in a similar manner and were well received and widely used. Like the previous series, this new series of publications does not address implementation in the Netherlands. The decision on how to implement the regulation lies with the member state. In the Netherlands, the ministry has commissioned various impact assessments to support implementation (such as for the ITS – Directive^{2,3} and the RTTI – Regulation⁴). The final decision on how to implement the regulations is reached with input from stakeholders.

This publication can help to improve understanding of the regulation and provides greater clarity on its content, purpose and scope.

1.2 The 2023 changes: better travel information and a shared European Mobility Data Space

Every year, approximately 13 billion passengers (2019) in the EU use transport services, a figure expected to rise to 15 billion by 2030 and 20 billion by 2050. Regulations in the EU are needed to ensure data-driven operations, which, in terms of services for passengers, can provide a solid foundation for both the development of information

Useful links

- [Sustainable and Smart Mobility strategy](#)
- [MMTIS – Regulation DR 2017/1926](#)
- [MMTIS – Regulation DR 2024/490](#)
- [MMTIS impact assessment \(Dutch\)](#)
- [CROW publication: ITS guidelines](#)
- [CROW publication RTTI – Regulation](#)
- [CROW Smart Mobility Ladder – Data \(Click English flag on main page for auto translation\)](#)
- [CROW Smart Mobility Ladder - MMTIS \(Click English flag on main page for auto translation\)](#)
- [NTM \(Dutch\)](#)

services and cross-border travel within the EU. These information services must contribute to a shift towards greater use of sustainable modes of transport. This is enshrined in the EU Strategy for Sustainable and Smart Mobility, which focuses on digitalisation and emission reduction, with the aim of achieving a 90% reduction in emissions from the transport sector by around 2050 (source: EUR-Lex – 52020DC0789 – EN – EUR-Lex).

In addition, the regulation aims to ensure that passengers can also make use of accurate and reliable EU-wide multimodal travel information services across borders. This requires data to be made available in a standardised and interoperable manner, so that travel and traffic information from different Member States can be seamlessly combined, enabling cross-border route planning. In this way, the regulation aligns with the broader ambition of a shared European mobility data space.

² Impact Assessment Report on the Revision of the ITS – Directive – What does the Netherlands need to organise? | Report | Rijksoverheid.nl (Dutch)

³ Report on the Impact Assessment of the Revision of the ITS – Directive – Contribution to Achieving Mobility Data Objectives | Report | Rijksoverheid.nl (Dutch)

⁴ RTTI Impact Analysis and Scenarios | Report | Rijksoverheid.nl (Dutch)

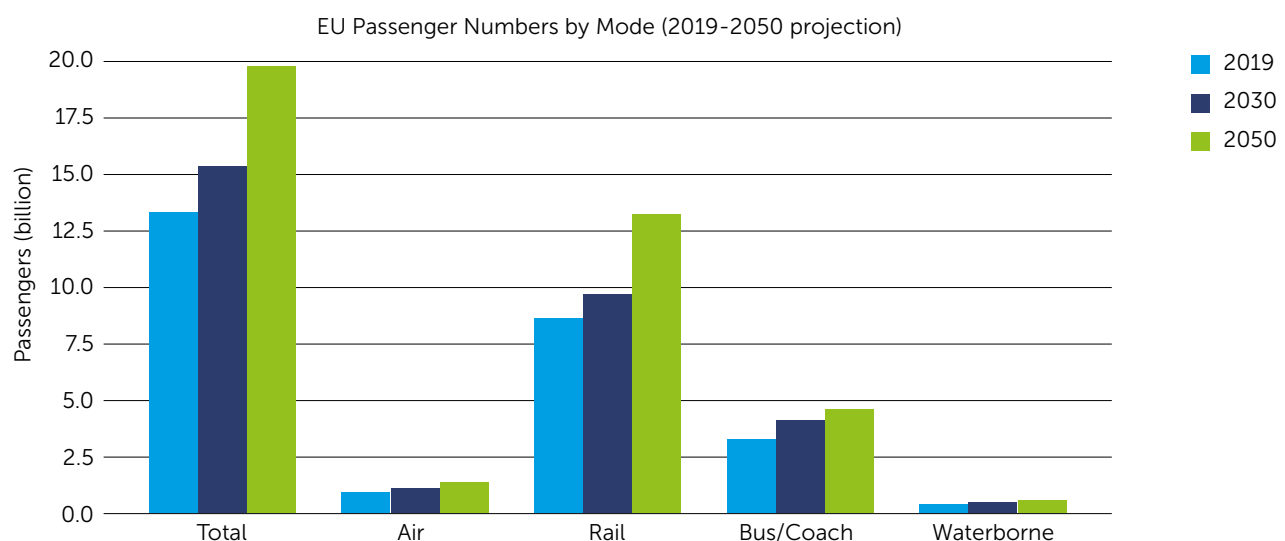


Figure 1. Expected increase in passenger numbers, in total and by mode of transport
(Source: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52023SC0386#footnote92>)

By combining different modes of transport, passengers can travel more intelligently and sustainably, which helps to reduce emissions. In 2017, rules for multimodal travel information services (MMTIS) were therefore drawn up, which were supplemented and amended in 2023. The aim is to make it easier for passengers to find real-time travel information, as this information can be integrated by service providers into multimodal travel information services. The revision includes tightening of and additions to the existing 2017 rules concerning, among other things, delays and cancellations. New data types have also been added, such as whether bicycles are permitted on trains and what facilities are available for passengers with disabilities. The 2023 revision mandates the accessibility of new dynamic datasets via National Access Points (NAPs), so that service providers can consult and use these datasets for their travel information services. This provides passengers with relevant information to plan journeys more easily, including across different modes of transport. The revised regulation also covers the sharing of information regarding refunds for bookings made through intermediaries and improved protection in the event of cancellations.^{5,6,7,8}

More broadly, the European data strategy refers to the development of a common European Mobility Data Space (EMDS), where data on transport and mobility is collected and shared. Ultimately, this could help passengers plan their journeys more efficiently, and gives governments and businesses the opportunity to develop innovative mobility services and formulate better policies. In this context, MMTIS contributes by increasing the accessibility and sharing of multimodal travel information data via National Access Points (NAPs).

⁵ The MDMS – Regulation (COM(2023) 751) (focuses in this area on the relationship between transport operators and intermediaries).

⁶ Package Travel – Directive: (EU) 2015/2302 <https://eur-lex.europa.eu/legal-content/NL/ALL/?uri=celex%3A32015L2302> A proposal for its revision has been tabled, bearing the reference COM(2023) 905, and is intended to amend the existing directive.

⁷ Passenger rights for multimodal travel (proposal) <https://eur-lex.europa.eu/legal-content/NL/ALL/?uri=CELEX:52023PC0752>.

⁸ <https://eur-lex.europa.eu/legal-content/NL/TXT/?uri=CELEX:52023AE5130> (the proposal is intended to amend and supplement existing regulations (such as 261/2004, (EU) 1177/2010 and (EU) 2021/782).

2 Legislative framework, harmonisation of regulations and policy

2.1 Strategy

In the European Green Deal, the European Union has set the objective of accelerating the shift to sustainable and smart mobility. Mobility plays a key role in reducing emissions, improving road safety and making more efficient use of infrastructure.

As part of this policy agenda, the European Commission presented the Sustainable and Smart Mobility Strategy (SSMS). This strategy sets out a series of objectives to make the European mobility system safer, more efficient and more sustainable. Examples include:

- harnessing the full potential of data
- well-functioning integrated ticketing systems designed to facilitate multimodal travel
- the widespread roll-out of automated transport.

The SSMS comprises a number of key areas. One of the actions under key area 6 (action 38) is the revision of the ITS – Directive. This revision, adopted in November 2023, strengthens the exchange and availability of mobility data and supports the development of smart mobility services in Europe.

2.2 Relationship with the ITS – Directive

The MMTIS – Regulation focuses on data accessibility (making data available via the National Access Point (NAP)), whilst the ITS – Directive focuses on the digitisation and provision of certain key data (primarily at the source itself). In practice, the MMTIS therefore concerns data that is already available or will become available in machine-readable format, and which must subsequently be made accessible in a harmonised manner via the NAP (using standard formats). The ITS – Directive also encourages data creation, albeit in a limited form covering far fewer data items than the MMTIS requires. For instance, the ITS – Directive stipulates that data regarding the location of certain access points for all planned modes of transport, including information on the accessibility of access points

and walking routes at a transfer point (e.g. the presence of lifts, escalators), must be made accessible if such facilities are not present. However, this applies only to urban nodes from 31 December 2026 (urban nodes designated by the EU in the TEN-T – Regulation) and from 31 December 2028 for the entire network in Europe, but this in turn applies only to additions, such as new infrastructure. It has yet to be determined from when historic data must be converted to digital format. In essence, the ITS – Directive (to a limited extent) encourages the digitisation of data held by a data holder. In such cases, the MMTIS takes over by requiring that this existing data be made accessible via the National Access Point (NAP).

In addition, the ITS – Directive enables the European Commission to make proposals to amend the regulations. The Commission is therefore mandated to amend the regulations drawn up on the basis of the ITS – Directive.

2.3 Scope of the MMTIS

The MMTIS distinguishes between scheduled transport (such as train, bus, tram, metro, ferry and trolleybus), transport on demand (such as shuttle buses, bike-sharing and ride-sharing) and personal transport (such as car, bicycle and scooter). The static and dynamic datasets, listed in the annex, distinguish between different service levels. Although it is not a direct objective of the regulation, data relevant to private vehicle users will become available. This focuses on multimodal travels via hubs, parking, pick-up and drop-off, etc. Obligations apply only to the data types listed in the annex and only if these already exist in a digital, machine-readable format. The MMTIS does not require the creation of new data. Nor does it require the digitisation of existing (analogue) data, although digitisation is encouraged.

See Chapter 4 for further information.

2.4 Legal integration with the ITS – Directive

The MMTIS is a delegated regulation that supplements the ITS – Directive. Article 3 of the ITS – Directive, for example, identifies the EU-wide provision of multimodal travel information services as a priority action. Article 6 of the Directive empowers the Commission to adopt delegated acts to establish the specifications for this priority. Regulation (EU) 2017/1926 (and its amendment (EU) 2024/490) is the result of this power and specifies the requirements for the provision of MMTIS.

For more information on the ITS – Directive, see <https://crow-smartmobility.nl/kenniscatalogus/its-richtlijn/>
(Click English flag on main page for auto translation)

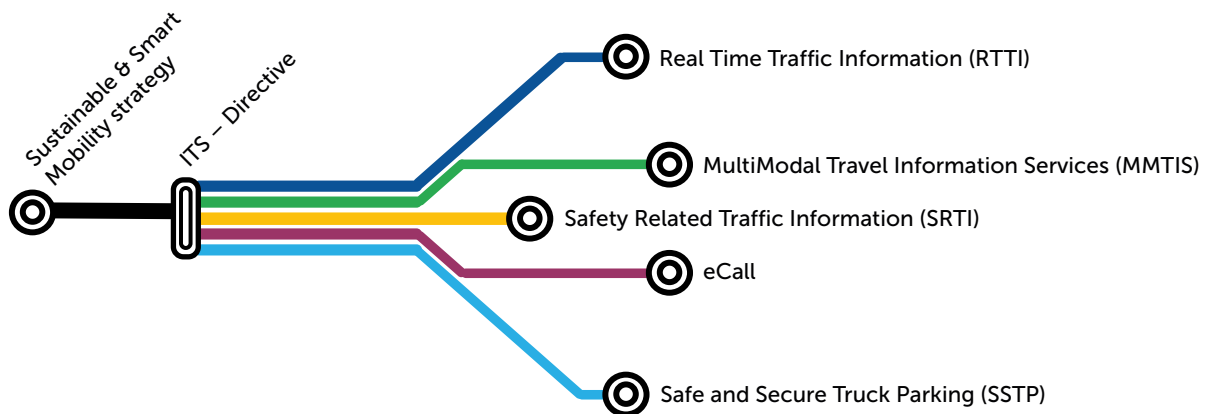


Figure 2. The ITS – Directive with supplementary regulations from the European Commission

3 Stakeholders

The MMTIS Delegated Regulation sets out obligations for public authorities, data holders (both public and private entities providing a service) and travel information service providers (such as journey planners including NS, 9292 and Google). This chapter briefly outlines the obligations for all these parties arising from the amendment to the MMTIS Delegated Regulation.

3.1 Public authorities (Member States)

The MMTIS Delegated Regulation sets out the following obligations for national governments:

- Establishing a national access point (NAP). The various data to which MMTIS applies must be made accessible via this national access point. The national access point must offer users search services, which, for example, enable data to be searched based on the content of the corresponding metadata and display that content (Article 3).
- Ensuring that the conditions for the use of the traffic and travel data provided via the NAPs are laid down in a licence agreement. The parties entering into such a licence agreement must comply with the MMTIS requirements (Article 8 in 2017; Article 4(4) in the amended text). This is not a structural requirement of the NAP itself, but a requirement concerning the conditions for the use and re-use of data.
- Assessing whether the requirements imposed on data holders (transport authorities, transport operators, transport on demand service providers) and providers of travel information services are being complied with (Article 9).
- Reporting to the European Commission (EC) on the measures taken and the progress made regarding the accessibility and exchange of the travel and traffic data listed in the annex to the Delegated Regulation.
- The amendment adds that Member States must reach an agreement with ITS-stakeholders (such as local authorities and market operators) on the requirements for metadata (Article 3) and the minimum requirements regarding data quality (Article 8).

In addition, the impact assessment indicates that compliance by data holders is not a given and that in many cases there is no compelling business case. One solution proposed by the researchers is to ensure compliance with MMTIS obligations through concessions, licences or tenders. However, this is not a requirement under the Regulation, but a national choice that may be necessary to facilitate practical implementation.

EU Member States: national authorities responsible for the implementation and management of the National Access Points (NAPs) and the enforcement of the regulations. They are also responsible for the following:

- Ensuring that licence conditions for data use are established (by the parties entering into licence agreements)
- Supervision and enforcement (including the appointment of a supervisory authority)
- National guidance on definitions, quality agreements and concessions/licences
- Reporting to the European Commission.

3.2 Data holders

The MMTIS Delegated Regulation also contains obligations for data holders. Data holders include transport authorities, transport operators, infrastructure managers and transport on demand service providers. The obligations:

- Providing metadata to the NAP to enable users to consult and use the data (to which access is granted via the NAP) (Article 3).
- Making data available in an accurate and up-to-date manner (Article 8). In addition, any errors identified must be corrected in a timely manner (Article 6).
- Adhering to certain data standards for the exchange and reuse of data (Article 4). The following is stated in this regard:
 - Static, historic and observed data are supplied in a format that can be automatically converted to NeTEx and DATEX II. As regards data from the aviation industry, this should be the standard defined by IATA. If this is not possible, the Transmodel data standard may be used.
 - Dynamic data (Article 5) must be supplied in a format that can be automatically converted to the SIRI/CEN/TS 15531 standard. For dynamic rail data, the TEL TSI (EU) 2026/253 data standard applies.

The MMTIS Delegated Regulation states that data must only be made accessible by the data controller if it is available in a digital, machine-readable format.

Data holders such as transport authorities, transport operators, infrastructure managers or transport on demand service providers are obliged to:

- provide data in accordance with European standards and the rules on the re-use
- publish metadata and quality information
- update dynamic data in a timely manner and correct errors.

Subgroups also include: providers of shared mobility, on-demand transport, hub managers (lifts, platforms, walking routes, facilities) and parking data operators (local authorities, commercial operators).

- Make it clear to the passenger on what the result is based (When reusing travel and traffic data, the source shall be indicated if the data controller so wishes. The interval for updating the static, historic, observed and, where possible, dynamic data shall also be indicated (Article 8(3)).
- Data users and data holders shall cooperate to ensure that any inaccuracies are reported without delay to the data holder from whom the data originate (Article 4(5) and Article 5(6)).

The data must be made available via a national access point. APIs via the NAP are publicly accessible to data users, subject to registration where relevant (Article 4(4)) and Article 5(5)). This section therefore also briefly discusses what a national access point is and how the Netherlands has organised it. The MMTIS requires that data be made available via a national access point. Although the MMTIS does not contain specific obligations for national access points, for example regarding how they should be organised, we briefly describe below what a NAP is and does.

3.3 Travel information service providers

3.3.1 Obligations of travel information service providers

Providers of travel information must, as a minimum, comply with the following requirements:

- To cooperate by providing route advice to other travel information service providers upon request (Article 7).
- The conditions for the integration of travel information 'shall be defined in contractual agreements between the travel information service providers', whereby the financial compensation of the expenses of linking travel information services incurred shall be reasonable and proportionate (Article 8(5)).
- Base route result on (Article 7):
 - the departure and arrival points of a journey, together with the specific dates and times of departure and/or arrival
 - possible travel options and the specific dates and times of departure and/or arrival, including possible connections
 - the interchange point between travel information services
 - in the event of disruptions, alternative travel options and the specific dates and times of departure and/or arrival, including available connections.
- Presenting the various travel options to the end user in a neutral and non-discriminatory manner. The data referred to in Article 8(1) must be reused in a neutral manner, without discrimination or bias towards the data holder. The criteria for ranking travel options involving different modes of transport and/or combinations of modes of transport must be transparent and must not, for example, be based on a factor directly or indirectly linked to the user's identity (Article 8). Any commercial considerations relating to the re-use of data must be applied on a non-discriminatory basis to all users. The display of the first significant travel route must not be misleading to the end user (Article 8(2)).

Service providers: companies and organisations that offer travel information to end users, such as MaaS-platforms, route planners and navigation services. They must:

- share routing results with other providers upon request (interoperability)
- base route recommendations on relevant and complete travel information
- present travel options in a neutral and non-discriminatory manner
- be transparent about the data used
- make relevant data available via a national access point (NAP).

3.4 Nationaal toegangspunt (NAP)

The ITS – Directive sets out obligations regarding the availability, discoverability and accessibility of infrastructure data, traffic data, travel data and road safety data at national access points. For the Netherlands, the National Access Point for Mobility Data (Nationaal Toegangspunt Mobiliteitsdata, NTM) has been established for this purpose, making all this data available.

The MMTIS – Regulation also obliges Member States to establish and maintain a National Access Point (NAP) as a central access point for multimodal travel information, and requires data holders to make the datasets designated in the Regulation accessible and discoverable via that NAP.

The guiding principle is to work from the perspective of the desired application, rather than from the data supply.

3.5 NAPCORE

NAPCORE (National Access Point Coordination Organisation for Europe) is the name of the organisation established to coordinate and harmonise more than 30 mobility data platforms across Europe.



4 MMTIS chain in the Netherlands

With the revised MMTIS – Regulation, which amends the previous version, access to the dynamic datasets listed in the annex (points 2.1 and 2.2) via the NAP has been made mandatory. In 2017, member states could still choose whether to make dynamic data available via the NAP. For public transport, the exchange usually takes place via the Service Interface for Real-time Information (SIRI), a European standard for exchanging real-time public transport data between systems.

The new version also stipulates that data holders must provide metadata (data about data, such as source, time, measurement method, etc.) to the NAP in accordance with the agreed metadata requirements as described in Article 3; for NTM, see the following paragraph. Within MMTIS, metadata is defined as a structured description of the content of the data that facilitates the search for and use of the data. Finally, data holders and data users must collaborate to ensure that errors in data are corrected in a timely manner. The chain therefore becomes somewhat more extensive and involves closer collaboration, in accordance with the regulation. To provide an overview of the chain within MMTIS, we briefly outline below the parties active in the MMTIS data chain (non-exhaustive).

4.1 Data holders

Parties that hold historic, current and dynamic MMTIS data (as data holders, managers or operators) include the following data holders.

■ *Transport authorities*

Public bodies that formulate policy, tender for contracts and manage mobility, such as the Ministry, Provinces, Metropolitan or Transport Regions, municipalities of other larger cities, public transport authorities and concession providers and airport authorities.

■ *Transport operators*

Parties that actually provide transport services, such as urban public transport, international carriers (e.g. Deutsche Bahn), ferry operators, bicycle and shared scooter operators, airlines or regional charter airlines and Helicopter or regional air connections for specific (small-scale) passenger services. Shared cars. Car-sharing.

■ *Infrastructure managers*

road or rail authorities, provinces (provincial roads), municipalities (local roads, bicycle infrastructure), port authorities, Airports, airport companies in other Member States and Terminal and Facility Managers with regard to gates, terminals, passenger flows.

■ *Transport on demand service*

Transport that is offered on demand or reservation, such as by Regional taxis, student transport, public transport flex, stop taxi, door-to-door transport services in sparsely populated areas, MaaS-integrated DRT services, Shared cars, ride-hailing (e.g. Uber, Bolt – where allowed), This also includes reserved shuttles and transfers, for example to and from airports.

4.2 Ecosystem coordination and standardisation actors

MMTIS implementation does not only depend on individual data holders and data users. It also requires coordination between public authorities, transport operators, infrastructure managers, standardisation bodies, National Access Point operators and service providers. These parties help align definitions, data models, metadata, technical profiles, quality arrangements, and implementation practices. The exact institutional set-up differs between Member States. The examples below therefore focus on European and cross-border structures that are relevant across the EU.

■ *National Access Points and NAP coordination*

National Access Points (NAPs) are the access layer through which MMTIS-relevant data can be found and reused. At European level, coordination between NAPs is supported through NAPCORE, which works on interoperability, harmonisation of mobility data standards, metadata alignment, tooling catalogue <https://awesome.napcore.eu/> and common approaches for European NAPs. This is important because MMTIS data are only useful for cross-border services if they can be discovered and interpreted in a consistent way across Member States.

■ *Public transport data standards*

For public transport, the main European standards environment is built around Transmodel, NeTeX and SIRI. Transmodel <https://transmodel-cen.eu/> provides the common conceptual data model. NeTeX is used for exchanging planned and static public transport data, such as stops, routes, timetables, and fares. SIRI supports the exchange of real-time public transport information between systems. Data4PT is a European support action that helps Member States and stakeholders deploy these harmonised public transport data standards.

■ *Road traffic and road-related data*

For road traffic and road-related travel information, DATEX II <https://datex2.eu/> is the main European standard. It is used for the exchange of traffic and travel information, including information relevant to road authorities, traffic management centres, and service providers. DATEX II is particularly important where MMTIS data interact with road traffic information, parking information, traffic management, and multimodal journey planning involving road networks.

■ *Spatial, network and location data*

MMTIS also relies on spatial and network data, such as addresses, points of interest, access nodes, and transport networks. In the EU context, INSPIRE https://knowledge-base.inspire.ec.europa.eu/publications/inspire-data-specification-transport-networks-technical-guidelines_en provides an important reference framework for interoperable spatial data, including transport networks. This is relevant because multimodal travel information depends on the ability to connect stops, stations, roads, walking links, cycling links, parking facilities, and other access points in a consistent spatial model.

■ Rail sector coordination

For rail, the European Union Agency for Railways (ERA) is relevant because of its role in the Technical Specifications for Interoperability (TSIs), including telematics applications for passenger services. These specifications cover systems for passenger information before and during the journey, and relate to reservation, payment, luggage, and connection management. Sector organisations such as UIC <https://uic.org/standardisation/> can also play a role through railway specifications, operational standards and data exchange practices used by railway undertakings and infrastructure managers.

■ Aviation and airport stakeholders

For aviation, cross-border coordination is mainly organised through sector bodies and international standards. IATA <https://www.iata.org/en/programs/passenger/passenger-facilitation/passenger-data/> develops standards and guidance used by airlines, including in commercial and operational processes. Airports Council International (ACI) <https://aci.aero/> represents airports and develops policies, programmes, and best practices for airport operations. In the MMTIS context, these actors are relevant where air travel, airport access nodes, passenger information, and multimodal connections to and from airports are part of the travel information chain.

Role in the MMTIS chain

These bodies are not necessarily data holders under MMTIS. Their role is often indirect but important: they help define standards, profiles, governance arrangements, metadata practices, and implementation guidance. This reduces fragmentation and makes it easier for data holders to publish data and for travel information service providers to reuse it across borders.

4.3 Data users

Parties using the available MMTIS-data may include the following:

Party	Example services
Travel information service providers (MMTIS-services)	Multimodal travel planners (door-to-door), MaaS providers, international planners that also integrate aviation, regional travel apps from public authorities
Navigation and route planning services	For example, Google Maps, Apple Maps, TomTom, HERE, Waze, cycling and public transport route planners
MaaS and platform providers	Platforms that bundle various transport services, regional MaaS-pilots
Governments as re-users	Public authorities are not only data holders but also data users for implementation, monitoring, analysis and policy
Research and knowledge institutions	For analysis, evaluation and innovation, organisations such as universities, the EC, TNO etc. use the available data
Commercial re-users	Organisations that use data for additional services, such as travel agencies/tour operators, business travel platforms, logistics or facility service providers at airports, analytics and data companies

4.4 End user

4.4.1 Primary end user (direct)

This is the passenger, the individual who plans or undertakes a journey, such as the commuter, the business passenger, the tourist, the international passenger, or the passenger with reduced mobility. This end user accesses information via a travel planner, a MaaS-app, a navigation-app, an airport- or public transport-app, and so on.

4.4.2 Secondary end-users (indirect)

In the context of MMTIS, this refers to organisations that act operationally on the basis of information. They use the service, not the raw data. Examples include companies that provide travel advice to employees, such as travel agencies, event organisers and hotels (for arrival/departure advice).

4.4.3 Policy-level end-user (indirect)

In addition to the passenger as the primary end-user and secondary intermediaries who provide information or assistance, the government can be regarded as a policy-related end-user of MMTIS, as the availability and quality of multimodal travel information contribute to the achievement of ITS-objectives such as promoting sustainable modes of transport.

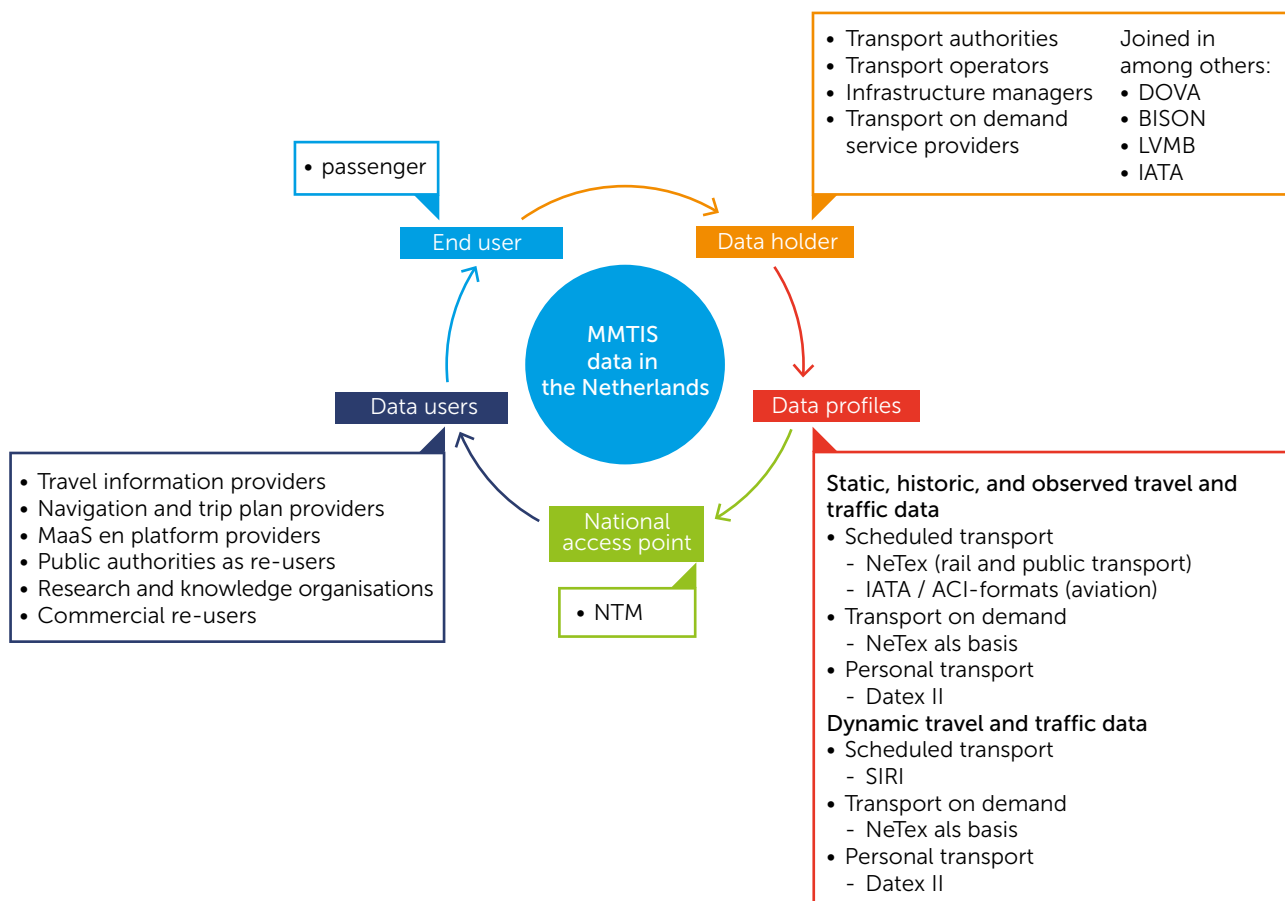


Figure 3. MMTIS-data chains in the Netherlands

The importance of usable MMTIS data

The aim of the MMTIS – Regulation is to encourage the use of sustainable and multimodal forms of transport by providing passengers with reliable, up-to-date and inclusive information. Multimodal travel means that a passenger makes a single journey using multiple modes, such as walking, cycling, personal transport, public transport and/or shared mobility. The key question for the passenger is: what is the best way for me to make my journey? In a way that suits me (quick or with a longer transfer time, personal transport or shared transport, sustainable, etc.).

Travel apps and journey planners can only provide passengers with good advice (the passenger answers the question for themselves; the app merely offers advice) when the underlying mobility data is available, standardised and reusable. MMTIS therefore requires public authorities and data providers to make data on timetables, disruptions, availability and accessibility accessible. This is essential for inclusive mobility. For some passengers, for example, it is important to know whether lifts are working, or whether certain vehicles are accessible to them.

Without MMTIS, travel information remains fragmented and unreliable, and sustainable choices are often ruled out in practice. MMTIS creates coherent travel advice in which different modes of transport are logically combined. This makes multimodal travel not only technically possible, but also a realistic and attractive alternative to the car – and ensures that public policy objectives are effectively reflected in digital travel information.

In addition, the data is made available as open data via the MMTIS data chain. This enables development by service providers who can offer increasingly better travel information: tailored, up-to-date, featuring real-time advice, and so on.

A hypothetical example:

Two passengers, one journey

1. Mark (without good MMTIS-data)

Situation

Mark drives to an appointment in the city in the morning. His plan: to park at a mobility hub, then take the train and finish the journey by bus.

What happens

- Mark navigates to his usual hub. None of the apps show him that the P+R is now full.
- He drives on to the next hub, but ends up in a traffic jam.
- At the station, he discovers that fewer trains are running on part of the route due to engineering works.
- An alternative is not automatically offered: he has to find out for himself whether a bus is running and whether it connects.

Result

Mark arrives late and decides to just drive straight there from now on. Multimodal travel feels unreliable.

2. Christel (with good MMTIS-data)

Situation

Christel makes the same journey on the same morning, and has difficulty walking.

What happens

- Before setting off, Christel sees in her travel app that the planned hub is already full and that the escalator there is currently out of order.
- The app recommends a different hub earlier on the route, as continuing towards the city is now causing traffic congestion. The lift at this hub is operational.
- The same recommendation includes information that a revised timetable applies on the train route, with a realistic connection.
- The app shows that changing to public transport earlier is quicker than continuing by car.

Result

Christel arrives on time and finds that multimodal travel works even on a busy day.

5 MMTIS (2017) and the amendment (2023)

5.1 General

Following the adoption of the ITS – Directive in 2010, the European Commission issued a delegated regulation (2017/1926) in 2017 concerning the provision of EU-wide multimodal travel information services. The aim of the regulation is to enable and make available a Europe-wide multimodal and accurate travel information system in all Member States for end-users (passengers). The obligations under this regulation have implications for public authorities, data holders (both public and private parties offering a service) and travel information service providers (journey planners).

An amendment to this Delegated Regulation was adopted at the end of 2023 (2024/490). In the following sections, we briefly describe the requirements set out in the Delegated Regulations and, in particular, the amendments that have been adopted.

5.2 MMTIS 2017

This Delegated Regulation consists of 26 recitals, 11 articles and an annex describing the data categories. The articles set out provisions regarding the scope, definitions, national access points (NAPs), accessibility and exchange of data and its updating, linkage with travel information services, compliance assessment, reporting and entry into force.

The travel and traffic data set out in the annex may be integrated into the NAP in stages, in accordance with an agreed timetable. It is, of course, possible to integrate the data into the NAP more quickly, distinguishing between static and dynamic journey and traffic data. All Member States are required to provide the static travel and traffic data described, as these are considered crucial for planning a (multimodal) travel. Dynamic travel and traffic data, such as information on disruptions and delays, are also included in the annex. However, this Delegated Regulation does not yet require Member States to make this dynamic data available via the NAP.

The specific requirements regarding this static and dynamic travel and traffic data for the various modes of transport apply only to data that is actually collected and available in machine-readable format. This 2017 Regulation therefore does not impose an obligation on data providers (in this case, transport authorities, transport operators, transport on demand service providers and infrastructure managers) to collect data that is not yet available in machine-readable format. Of course, Member States are encouraged to digitise such data, in order of priority at levels 1, 2 or 3.

With regard to travel information services, providers must be transparent about the criteria used to rank the proposed travel options and must provide neutral travel information. Where possible, data providers should provide passengers with information on greenhouse gas emissions for different travel options to promote the shift towards more sustainable modes of transport. To improve data quality, data holders and data users should collaborate to ensure that the data is as accurate as possible, for example by reporting any inaccuracies to the data holder from whom the data originates. To promote this, this point is also mentioned in the MMTIS under the 'recitals', but is not mandatory.

The provision of EU-wide multimodal travel information services can be achieved through either a centralised approach based on data provided, or a decentralised approach based on data and services offered. The Regulation therefore sets out requirements for the provision of both services and data to support both approaches.

5.3 Amendment 2023

To facilitate the smooth exchange and reuse of such data for the provision of comprehensive travel information services, transport authorities, transport operators, infrastructure managers or transport on demand service providers must make the static data, related metadata and information on the quality of that data available via a NAP. In the Netherlands, the National Mobility Data Access Point (NTM) has been established for this purpose. The revised regulation has particular implications for newer applications, such as real-time information, the integration of parking data and data on shared mobility for the provision of (up-to-date) multimodal travel information to end users.

The MMTIS – Regulation sets out obligations for various modes of transport, such as scheduled transport, on-demand transport and personal transport. These obligations are intended to ensure that the accessibility, exchange, reuse and updating of data result in EU-wide up-to-date multimodal travel information services. This concerns data that already exists (in machine-readable format).

The MMTIS – Regulation 2017/1926 has been amended and supplemented by Amendment 2024/490. This means that the original Regulation remains in force, insofar as it has not been amended by the Amendment, and that both texts must be read in conjunction. The main differences compared to the first version are: (1) the addition of parking data (this was previously included in the RTTI) and (2) the introduction of new deadlines regarding the provision of dynamic travel and traffic data.

5.4 The considerations

The MMTIS 2024 builds on the MMTIS 2017 and places the roll-out of intelligent transport systems and multimodal mobility within the broader context of EU strategies for sustainable, smart and resilient mobility. The revision mandates the provision of dynamic datasets, as well as new static, historic and observed datasets, thereby better enabling multimodal travel information services to provide passengers with reliable and up-to-date information. This also supports the objectives of the European Green Deal by encouraging the use of more sustainable modes of transport, such as cycling and walking, and by reducing congestion and emissions.

In addition, MMTIS 2024 aligns with the European Data Strategy by promoting the availability and reuse of data and supporting interoperable EU-wide data spaces for mobility. The scope of the Regulation has been amended: parking information has been added, whilst data on refuelling and recharging stations has been removed, to avoid overlaps with other Regulations and to improve the reliability of travel information services.

The Regulation takes account of existing rules on passenger rights, whereby historic and observed travel and traffic data, including delays and cancellations, will be made available to inform passengers of their rights to compensation. No personal data is shared via National Access Points (NAPs). Data holders shall take appropriate measures to ensure that any personal data is first anonymised, so that the data provided no longer contains personal data.

MMTIS 2024 also emphasises data quality and cooperation: Member States and ITS stakeholders are encouraged to establish common definitions, quality indicators and monitoring methods, and to share experiences. Cooperation between data holders and users is necessary to ensure the accuracy and timeliness of multimodal services. The metadata and technical specifications have also been harmonised, taking into account the napDCAT-AP-schema, to enable data to be made available cost-effectively and compatibly via NAPs.

Finally, the Regulation contains agreements on timetables for making the various data types available and on the harmonisation of conformity assessments in coordination projects. The amendment of MMTIS from 2017 to 2024 thus ensures that multimodal travel information services can be better developed across the European Union, with improved accessibility, reliability, interoperability and sustainability, fully in line with European mobility and data strategies.

5.5 Additions to and amendments of the articles

The original regulation from 2017 focused on the sharing of static data. The aim was to improve the availability of basic travel information across the EU.

The amendments of November 2023 (published in 2024) were primarily intended to modernise this Regulation and make it more effective. The reasons for the amendments are:

- **Article 1 (Subject matter and scope).** In paragraph 1, 'ITS-users' has been replaced by the broader term 'End users'. The rest of Article 1 remains unchanged (meaning, among other things, that the scope covering the entire EU transport network remains in full force).
- **Article 2 (Definitions).** New definitions have been added or amended to take account of new technologies and service models. This was necessary because the original framework was too limited (see Annex 1).
- **Article 3 (Data obligations).** This article has been expanded to make not only static but also dynamic data mandatory. This includes real-time information on delays, cancellations, the current location of a vehicle and occupancy levels. The reason for this amendment is that passengers need up-to-date information to plan their journeys effectively and to deal with unforeseen events.
- **Article 4 (Accessibility, exchange and reuse of static, historic and observed travel and traffic data)**
 - (Paragraph 1): The scope of the data has been expanded from static data alone to include static, historic and observed travel and traffic data. This comprises data collected in real time or through observation, such as current congestion levels or delays. By adding historic and observed data, digital service providers can offer more advanced services, such as predicting delays or recommending alternative, less congested routes.
 - (Paragraphs 1 and 2): NeTEx and DATEX II were already explicitly mentioned in the MMTIS 2017. In the revision, this has been strengthened by the introduction of minimum EU profiles (in addition to national profiles) and by making the standards frameworks and interoperability requirements more explicit, including through Transmodel and the use of converters and validators. The previous, less detailed standards were not always sufficient to ensure seamless exchange. By making specific profiles mandatory, interoperability is enhanced and digital systems across the EU can process the data unambiguously.
 - (Paragraph 3): The original deadlines (2019–2021) have been replaced by a new, phased timetable running until 1 December 2025.
 - (Paragraph 5): A completely new provision has been added requiring cooperation between data users and data holders to report inaccuracies. Data quality is essential. This addition creates an official mechanism for feedback and corrections, which improves the reliability of the information and increases trust in digital mobility services.

- (Paragraph 6): An explicit provision stating that the shared data must not contain personal data. Although this was already covered by the General Data Protection Regulation (GDPR), this addition reinforces the emphasis on privacy and provides a clear demarcation within the context of this specific regulation.

■ **Article 5 (Accessibility, exchange and reuse of dynamic travel and traffic data)**

- Paragraph 1: The provision has been amended from an optional measure dependent on a decision by the Member State ('Where Member States decide') to a mandatory requirement for data holders ('Data holders shall provide...'). This now makes the provision of dynamic travel data a binding obligation within the EU.
- Paragraph 2: The standard has shifted from 'national minimum profiles' to 'minimum EU profiles'. This ensures a higher degree of standardisation and harmonisation of data exchange across the Union. The aim is to ensure that data from different countries can be exchanged seamlessly.
- Paragraph 3: This paragraph is entirely new. It introduces specific, phased deadlines (running until 2028) for the provision of dynamic data. The original text contained only an indicative timeframe in the recitals, which left implementation uncertain. The new deadlines ensure compliance.
- Paragraph 4: This is a new paragraph that makes the Regulation future-proof. It gives Member States the option to also mandate dynamic data from on-demand transport, enabling the integration of new forms of mobility into digital services.
- Paragraph 5: The wording has been strengthened to emphasise that APIs providing access to the data must be publicly accessible, with registration being an option. The focus is on promoting openness and innovation.
- Paragraph 6: This is a new paragraph introducing a formal feedback mechanism. It obliges data users and holders to cooperate in reporting inaccuracies, which directly improves the reliability of the data.
- Paragraph 7: This is a new paragraph that explicitly stipulates that the shared data must not contain personal data. Although this was already covered by the GDPR, this addition clarifies the privacy requirements specifically for this Regulation.

■ **Article 6 (Data updates)**

- Paragraph 1: The basis for travel information services has been expanded from merely 'static and dynamic data' to 'static, historic, observed and dynamic' data. The regulation requires that travel information services be built using a more comprehensive set of data. This ensures that a richer information base is available for planning and carrying out a journey, in line with the broader objectives of the new regulations.
- Paragraph 2: The process of data updating has been significantly tightened up. The replacement of the list of responsible parties ('transport authorities, etc.') with the umbrella term 'data holders' ensures uniformity. The new wording requires that data be updated 'within a timeframe that enables reliable and effective use...', which adds a quality standard. A completely new requirement is that data holders must also provide updates 'in advance' when changes are known, which is crucial for communicating planned disruptions.

■ **Article 7 (Interconnection of travel information services)**

- Paragraph 1: The basis for route advice has been expanded and is now required to include 'static, historic, observed and dynamic' information. The addition of historic and observed data, together with the mandatory inclusion of dynamic data, ensures much more comprehensive and realistic advice. The wording 'where possible' gave providers leeway to disregard dynamic data. This conditional wording has been removed. Providers are now obliged to use all the aforementioned data types when providing route advice. This makes the regulation much more prescriptive and ensures consistent quality across route planners.

■ **Article 8 (Requirements for the provision of services, the reuse of travel and traffic data, and the interconnection of travel information services)**

- Paragraph 1: The requirement that data must be 'accurate and up to date' has been tightened by adding that it must be based on 'minimum data quality requirements'. Another new provision is the obligation for Member States to reach agreement on this in cooperation with stakeholders.
- Paragraph 2: The new text adds a crucial sentence stating that the criteria for ranking travel options must not be based on a factor directly or indirectly linked to the user's identity. This is important to guarantee the neutrality and non-discriminatory nature of travel information services. It prevents route rankings from being influenced by personal data or commercial agreements that are not visible to the consumer.
- Paragraph 3: The obligation to cite sources has been extended to all data types: 'static, historic, observed and dynamic' data. The citation of the source is now subject to the data holder's discretion, and the update interval for all data types must be specified.
- Paragraph 4: The wording has been tightened by adding that licence agreements 'shall not impose more restrictions on re-use than is strictly necessary'.

■ Article 9 (Assessment of compliance)

- Paragraph 1: The responsibility is summarised under the broader terms 'data holders' and 'travel information service providers'. This is in line with the terminology used in the other articles and ensures a more uniform approach.
- Paragraph 2: The list of documents that may be requested has been expanded from two to four items. The description of the data and services (points a and b) has been made more detailed. The addition of point (c) (declaration of conformity) and point (d) (licence or contractual agreements) gives the authorities greater control over commercial arrangements and compliance with technical requirements. This is a direct response to the broader scope of the new Regulation, which also regulates commercial aspects.

■ Article 10 (Reporting)

- Paragraph 2: The old text referred to a 'report... every two years'. The new text integrates the MMTIS reporting into the broader 'progress reports provided for in Article 17(3) of Directive 2010/40/EU'.
- Expansion of the information to be reported (paragraph 2, points (a) to (e)):
 - Point a: The list of information to be reported has been expanded and made more detailed.
 - Point b: The requirement regarding data quality has been tightened. Member States must now not only specify the quality, but also the criteria they use to define that quality and the means to monitor it.
 - Point c: The 'linking of travel information services' is now a separate reporting item.
 - Point d: The reference to the compliance assessment under Article 9 has been made more direct.
 - Point e: The description of changes to the national access point is now explicitly included as a separate point.

5.6 The Annex

The revision of MMTIS 2017 by amending Regulation 2024/490 has, in addition to the textual amendments to the articles, significant implications for the functional design of the data system. Regulation 2024/490 completely replaces the original annex, thereby significantly expanding the data structure, scope and granularity of the data to be made available. This lays the foundation for a more uniform, modular and interoperable European mobility data landscape.

A key consequence of the revision is that the scope of MMTIS is now explicitly aligned with the revised RTTI – Regulation (EU) 2022/670. Where there was previously overlap between the two delegated regulations, this has been removed by the 2024/490 amendment through the removal of charging and refuelling stations from MMTIS and the addition of parking data to MMTIS. This sharpens the distinction between traffic information (RTTI) and multi-modal travel information (MMTIS), which is important for both data holders and service providers when determining which system should be used to make data available.

Furthermore, the introduction of historic and observed datasets, together with new obligations for dynamic data, means that MMTIS is no longer exclusively a route planner-oriented scheme, but a broad data system that must also support the quality and predictability of passenger services. The emphasis on providing metadata, quality information and standardised APIs via the NAP also strengthens the position of national access points as a central infrastructure within the European Mobility Data Space.

The obligation for data holders and data users to cooperate, combined with stricter provisions on updating, increases the responsibility of data holders not only to provide data but also to ensure it remains operationally reliable. This enables travel information services to generate better multimodal recommendations based on a consistent and up-to-date data set.

6 Data types

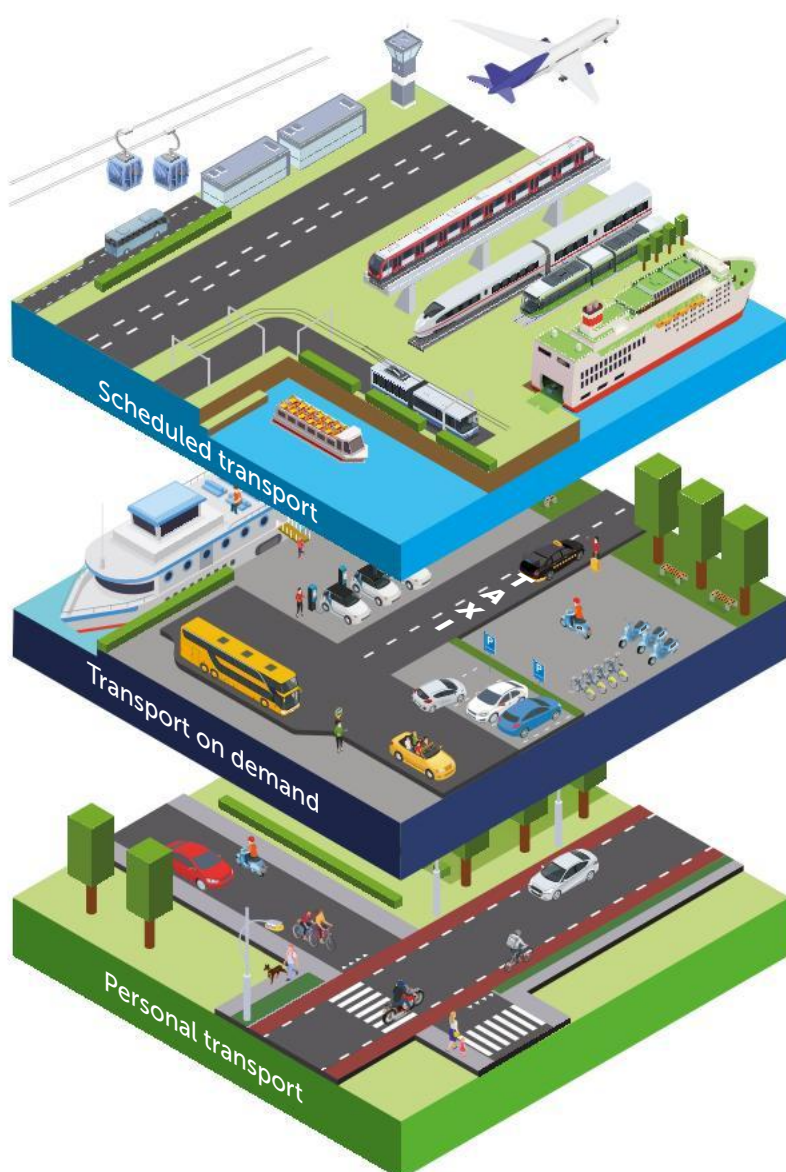
The MMTIS – Regulation mandates the sharing of data types via the National Access Point (NAP). The annex containing data types in the 2024/490 amendment to the MMTIS – Regulation effectively replaces the original annex from the 2017 version. Although, from a legal perspective, the 2024/490 Regulation constitutes an amendment within a supplementary delegated act, the annex is not structured as a supplement to the previous annex. Instead, it has been completely rewritten, with new, adapted and reorganised data types. Consequently, the 2017 annex is effectively no longer relevant as a reference.

6.1 Modes of transport

The annex is structured in such a way that it first addresses the classification of modes of transport

6.2 Data types

The MMTIS annex lists various data types to which the data holder must provide access via a national access point, provided these data items are available in machine-readable format. The structure of the annex is based on service levels. Before discussing these service levels, we first provide an overview of these data items. To present the requested data items in a clear manner, a different structure has been chosen from that of the annex. Naturally, all data items from the annex are used. The data items are grouped based on the data being requested, such as real-time and historic status information, or data on the infrastructure. The structure below is therefore intended solely to provide a clear overview. This does not alter the data items required under the MMTIS Delegated Regulation. The structure in accordance with the regulations follows later in the document.



Scheduled transport

Air, rail (including high speed rail, conventional rail and light rail), cableways, long-distance coach, maritime (including ferries), inland waterways, metro, tram, bus, trolley-bus

Transport on demand

Shuttle bus, shuttle ferry, dial-a-ride services, taxi, car-sharing, carpooling, car-hire, ride-sharing, bike-hire, bike-rental, e-scooter sharing

Personal transport

Car, motorbike, bicycle, scooter, walking

An additional reason for choosing this alternative structure is that the structure of the annex to the MMTIS – Regulation is primarily based on legal logic (obligations, service levels and modalities), whereas the implementation issues for data holders and travel information services arise more from a functional data structure. By grouping the data items according to the type of information (such as infrastructure data, static characteristics, real-time status information or historic observations), it becomes clear which datasets are related in terms of nature, technology, update frequency and implementation requirements.

This classification also supports the analysis of data quality, technical standards and maturity levels, as comparable data types often use the same standards (for example, NeTEx for timetables, DATEX II for dynamic traffic data). The alternative clustering also makes it easier to assess the impact, data flows, governance and dependencies for each data domain, before the formal classification in accordance with the regulation is followed later in the document.

The aim is therefore not to deviate from the MMTIS – Regulation, but to provide a more comprehensible analytical framework that clarifies how the various data items relate to one another from the perspective of implementation, technology and management.

6.3 Data format

With the entry into force of Delegated Regulation (EU) 2024/490, the dynamic datasets referred to in Annex II, points 2.1 and 2.2, have become part of the mandatory data categories that must be made accessible via the National Access Point, insofar as this data already exists in digital, machine-readable form. The Regulation does not impose an obligation to create or digitise new datasets. The obligation applies in phases, with earlier deadlines for the TEN-T core and comprehensive networks (2025–2026) and a later deadline for other network sections (2028).

In the Netherlands, three national management organisations support the harmonisation and development of data standards for mobility data under the coordination of the National Access Point for Mobility Data (NTM):

- MaaS: for standards relating to multimodal services and MaaS
- BISON: for standards relating to public transport, such as NeTEx and SIRI
- MOGIN: for the management and (further) development of ITS-related standards such as DATEX II and other ITS specifications.

NTM supports these management organisations and provides coordination, oversight and advice to promote the interoperability and harmonisation of data standards.

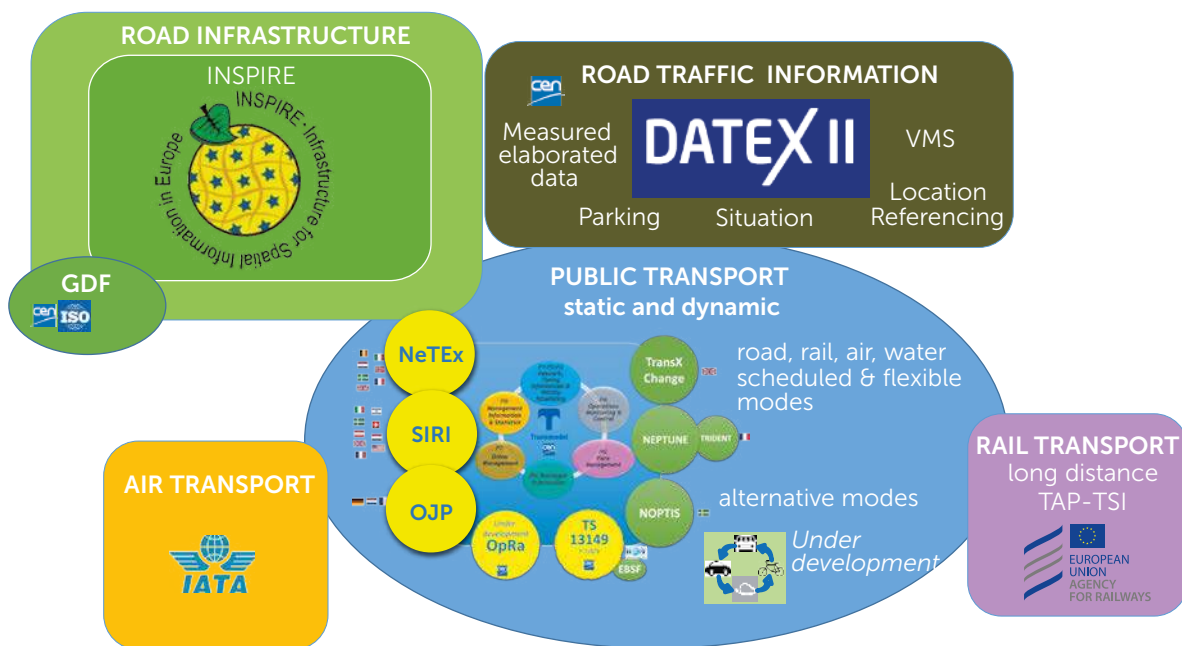


Figure 4. Key standards for the Delegated Regulation (EU) 2017/1926 | 2024/490 Citation from: Bourée, K., De Vries, B., Duquesne, C., Dodson, C., Jugelt, S., Martirano, G., Minghini, M., Pignatelli, F., INSPIRE-MMTIS: Overlap in standards related to the Delegated Regulation (EU) 2017/1926, EUR 29975 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-13046-8, doi:10.2760/404745, JRC118744

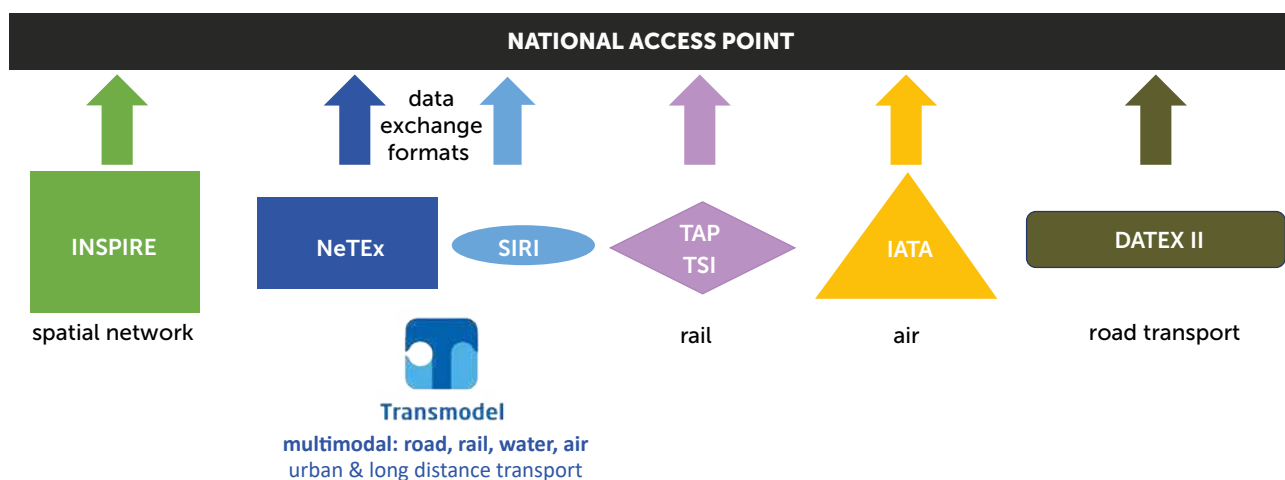


Figure 5. Publication of data via the NAP using standards. Source: Bourée, K., De Vries, B., Duquesne, C., Dodson, C., Jugelt, S., Martirano, G., Minghini, M., Pignatelli, F., INSPIRE-MMTIS: Overlap in standards related to the Delegated Regulation (EU) 2017/1926, EUR 29975 EN, Publications Office of the European Union, Luxembourg, 2019, ISBN 978-92-76-13046-8, doi:10.2760/404745, JRC118744

For the average passenger (and therefore also for local government decision-making), it helps to view the data as a sequence of stages during the journey.

Before departure:

The passenger wants to know where stops and entrances are, how the network operates, where and when to change modes of transport, fare information for the entire journey and how to obtain tickets, and what the scheduled timetable is. This information is mainly static and falls under NeTeX for public transport, and DATEX II/spatial networks (INSPIRE) for road and networks. Just before departure, the passenger often also wants to know if there are any current disruptions, such as breakdowns, diversions, delays or cancellations. If these changes are known in advance, they must also be made available to data users in advance.

During the journey:

The passenger wants to know what is happening right now. Delays, cancellations, diversions, and whether an escalator or lift is working. This is dynamic information covered by

Article 5. At the same time, route guidance – such as walking routes for transfers and map navigation – remains based on the static network and stop descriptions, supplemented by these dynamic updates.

Adjustments:

If something goes wrong, a journey planner must be able to calculate an alternative. It is therefore crucial that dynamic data is not 'disjointed', but fits neatly with the static description. That is precisely why MMTIS focuses on profiles and interoperability.

MMTIS makes a clear distinction in Article 4:

- **Road transport.** Use the formats from the RTTI specifications. In practice, this means DATEX II-based exchange as under RTTI.
- **Other transport modes** (public transport, rail). Use SIRS (CEN/TS 15531) or, for rail, the technical specifications from Regulation (EU) No 454/2011 (TAP-TSI, now replaced by: (EU) 2026/253 TEL TSI).
- **Spatial networks:** the requirements laid down in Article 7 of Directive 2007/2/EC, with INSPIRE as the format.

Data holder	Supplies to	Data format	NAP role	Data type	EU framework
Road authority	National Access Point	DATEX II	Reference	Static & dynamic	EU 2022/670 RTTI*
Public transport operator	National Transport Authority	NeTeX	Reference	Static	NeTeX CEN/TS 16614 and later versions EU 2026/253 (TEL-TSI)**
		SIRS	Reference	Dynamic	
Shared mobility	Proprietary/aggregator API	Mapping to NeTeX (MMTIS profile)	Validation	Static & dynamic	EU 2024/290 MMTIS
Geo/network	National Access Point	INSPIRE (Infrastructure for Spatial Information)	Reference	Static	2007/2/EC (+ amendments EU2019/1010 and 2024/2829) INSPIRE
		DATEX II			EU 2022/670 RTTI*
Aviation	Airports/IATA Global Distribution System	IATA/ACI formats (selective)	Reference	Static & limited dynamic	n/a

Overview:

*) MMTIS still refers to the old RTTI – Regulation EU 2015/962, as Regulation 2022/670 had not yet been formally adopted and published in the OJEU (Official Journal of the European Union) at the time of MMTIS's preparation.

**) MMTIS still refers to the old TAP TSI – Regulation EU 454/2011 and TAF TSI EU 1305/2014.

In addition, an efficiency principle applies that was already made explicit in the original MMTIS text: avoid duplication of the same data in multiple formats. Therefore, choose the 'leading' format per domain, and carry out mapping or conversion where necessary (5b).

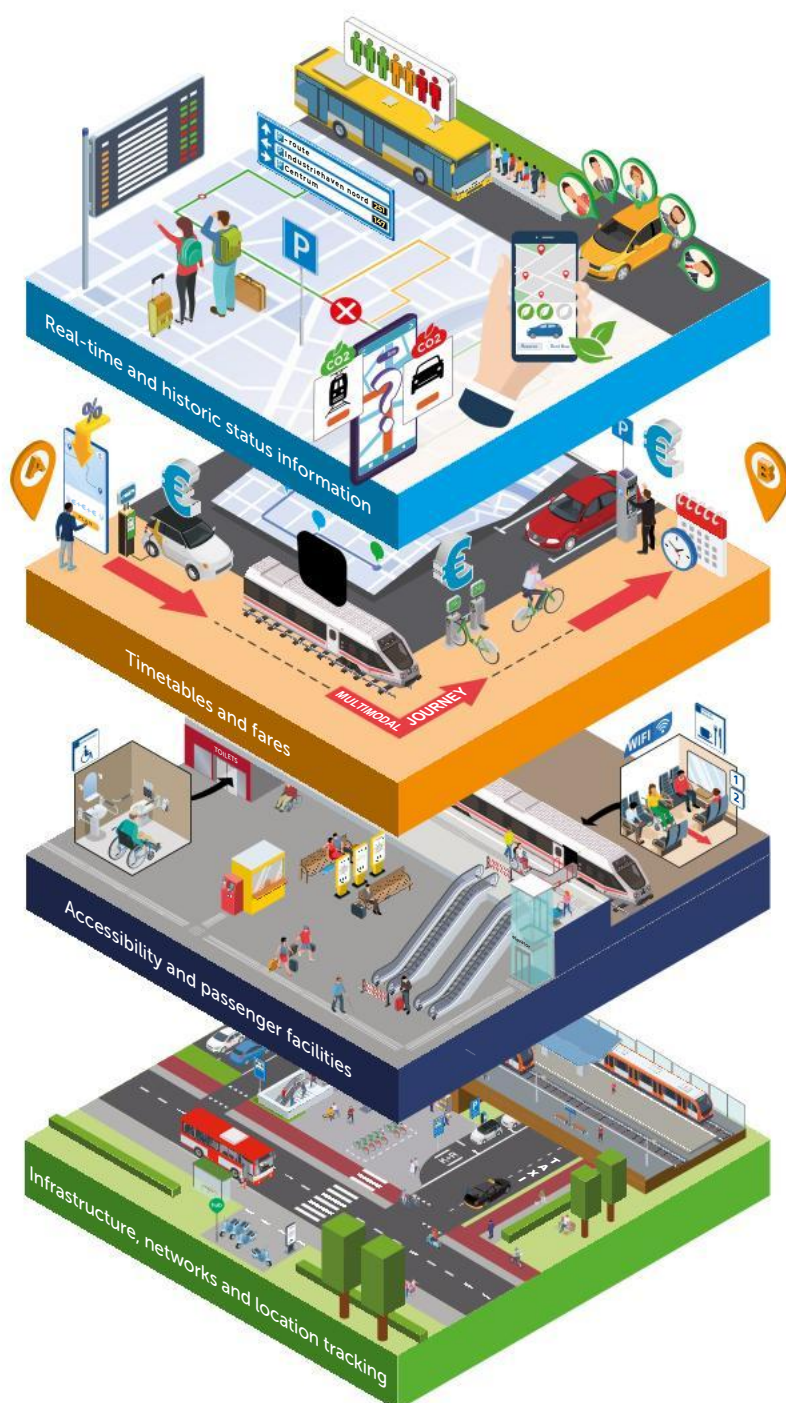
6.4 Data types in the Annex

Although MMTIS 2024/490 supplements the 2017 version, the Annex has been replaced and the Annex as set out in the 2024/490 version applies. To provide some clarity, the various data types from the Annex have been grouped into layers. This is because the classification in MMTIS is organised by service levels, which provides a less clear overview when

considering which data types fall under MMTIS. This classification therefore does not originate from the Regulation itself, but we have divided the items from the Regulation (Annex to Regulation 2024/490) into four groups:

- Layer 1: Infrastructure, networks and location determination
- Layer 2: Accessibility and passenger facilities
- Layer 3: Timetables and fares
- Layer 4: Real-time and historic status information

The data types are thus grouped according to infrastructure, facilities and amenities, timetables and dynamic status. In the following sections, we will examine the data types by layer and where they are located in the annex to the MMTIS.



Real-time and historic status information

Real-time and historic information on delays, cancellations, availability and occupancy, etc.

Timetables and fares

Static timetables and ticketing

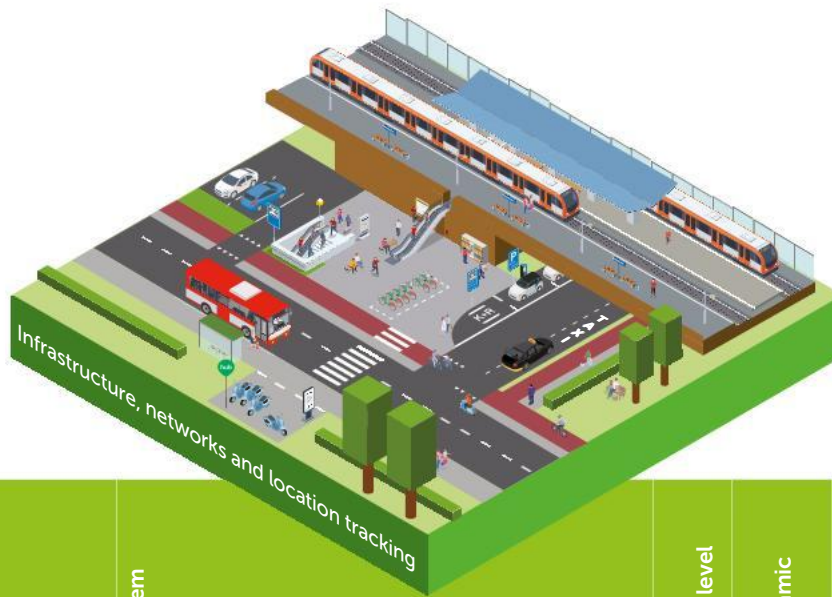
Accessibility and passenger facilities

Information on passenger facilities

Infrastructure, networks and location tracking

Infrastructure information for location tracking, point of departure/destination, access point and route calculation

6.4.1 Infrastructure, networks and location tracking



Datatype	Data-item	Service service level	Static or dynamic	Mode of transport
Location search (origin/destination)	i) addresses (building number, street name, postcode) ii) topographic places (city, town, village, suburb, administrative unit) iii) points of interest (related to transport information) to which people may wish to travel	1	static	all (unspecified)
location search (access nodes)	i) identified access nodes ii) geometry/map layout structure of access nodes	1	static	for scheduled transport and, where applicable, transport on demand
location search	i) location of parking places (on and off-street), including accessible parking places for persons with disabilities and persons with reduced mobility ii) Park & Ride stops iii) Park & Drive stops iv) bike-sharing stations v) car-sharing stations vi) secure bike parking (such as locked bike garage) vii) scooter parking zones	2	static	for transport on demand and personal transport
trip plan computation (*)	i) road network (including segregated lanes for bus/taxi) ii) cycle network (cycle tracks, cycle lanes, bus-and-cycle lanes, on-road shared with vehicles, on-path shared with pedestrians) iii) pedestrian network and accessibility facilities.	1	static	all (unspecified)
trip plans	i) detailed cycle network attributes (surface quality, side-by-side cycling, shared surface, on/off road, scenic route, "walk only", turn or access restrictions, e.g. against flow of traffic)	3	static	all (unspecified)

(*) Network data relates to RTTI data types as described in the annex to the RTTI – Regulation. The MMTIS – Regulation provides further clarification here, including classification for the purposes of permitted use. Insofar as this does not fall under RTTI type 1 infrastructure, it falls under RTTI type 2 a iii permanent access restrictions, as it concerns a restriction on the free use of the infrastructure.

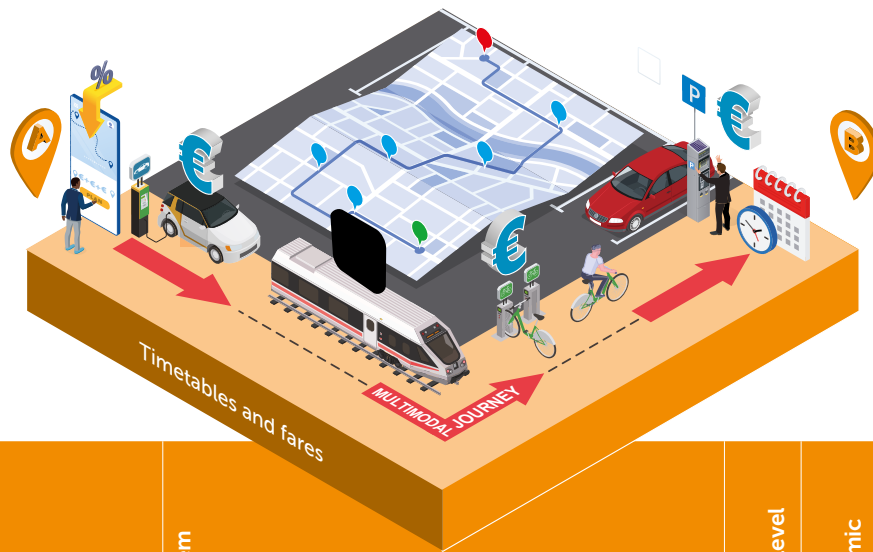
For the cycle route network, a data product is generated based on the above, which can be used for cycle navigation. If the road network is properly recorded, the cycle network can be derived from it. For the pedestrian network and accessibility facilities, accessibility facilities for stations have been published, but not for the entire pedestrian network.

6.4.2 Accessibility and passenger facilities



Datatype	Data-item	Service service level	Static or dynamic	Mode of transport
Auxiliary information	vehicle facilities, including classes of carriage, on-board Wi-Fi, capacity and access conditions for bicycles	2	static	for scheduled transport and transport on demand where relevant
Passing times, trip plans and auxiliary information	status of access node features (including dynamic platform information, operational lifts/escalators, closed entrances and exit locations)	1	dynamic	for scheduled transport

6.4.3 Timetables and fares



Datatype	Data-item	Service service level	Static or dynamic	Mode of transport
trip plans: operational calendar, mapping day types to calendar dates		1	static	all (unspecified)
trip plan computation	i) connection where interchanges may be made; ii) default transfer times at interchanges; iii) network topology and routes/lines (topology); iv) transport operators; v) timetables; vi) planned interchanges between guaranteed scheduled services; vii) hours of operation; viii) facilities of access nodes (including platform information, help desk/information points, ticket booths, lifts/stairs, entrances and exit locations); ix) vehicles, including their accessibility (such as low floor, wheelchair accessible, pram accessible) and accessibility of on-board services (such as toilets); x) accessibility of access nodes, and paths within an interchange (such as existence of lifts, escalators); xi) existence of assistance services (such as existence of on-site assistance)	1	static	for scheduled transport and transport on demand where relevant
information service	i) where and how to buy tickets for scheduled transport, including retail channels, fulfilment methods, payment methods; ii) where and how to pay for parking, including retail channels, fulfilment methods, payment methods	2	static	all (unspecified)
information service	i) how to book demand-responsive transport services, including retail channels, fulfilment methods, payment methods	3	static	for transport on demand

Datatype	Data-item	Service service level	Static or dynamic	Mode of transport
Auxiliary information	i) basic common standard fares : - fare network data (fare zones/stops and fare stages) - standard fare structures (point to point including daily and weekly fares, zonal fares, flat fares)	2	static	for scheduled transport and transport on demand where relevant
Information on parking tariffs		4	static	all (unspecified)
detailed common standard and special fare query	i) passenger classes (classes of passenger such as adult, child, senior, student, military/veteran, passenger with disability and passenger with reduced mobility, and qualifying conditions, and classes of travel); ii) common fare products (access rights such as zone/point-to-point including daily and weekly tickets/single/ return, eligibility of access, basic usage conditions such as validity period/operator/ time of travel/ interchanging, standard point-to-point fares prices for different point-to-point pairs including daily and weekly fares/zonal fare prices/ flat fare prices); iii) special fare products (offers with additional special conditions such as promotional fares, group fares, season passes, aggregated products combining different products, and add-on products such as parking and travel, minimum stay); iv) basic commercial conditions such as refunding, replacing, exchanging or transferring v) basic booking conditions such as purchase windows, validity periods, routing restrictions zonal sequence fares, minimum stay	3	static	for scheduled transport and transport on demand where

6.4.4 Real-time and historic status information



Datatype	Data-item	Service level	Static or dynamic	Mode of transport
Trip plans	i) parameters needed to calculate an environmental factor such as greenhouse gas emissions per vehicle type or passenger mile or per distance walked ii) parameters needed to calculate fuel consumption of conventional and alternative fuels	3	static	all (unspecified)
Trip plan computation	i) estimated travel times by day type and time-band by transport mode/combination of transport modes	3	static	all (unspecified)
Passing times, trip plans and auxiliary information	i) disruptions, such as network closures and/or diversions, and when possible, the reason ii) real-time status information, such as estimated departure and arrival times of services, delays, cancellations, guaranteed connections monitoring	1	dynamic	
Historic travel and traffic data on delays		4	static	for scheduled transport and transport on demand where relevant
Observed data on delays and passing time	i) length of, and when possible the reason for, delays of at least 60 minutes for rail passenger services (in accordance with Article 19 of Regulation (EU) 2021/782) ii) length of, and when possible the reason for, delays in departure of more than 90 minutes for sea and inland waterways passenger services (in accordance with Article 18 of Regulation (EU) No 1177/2010) iii) length of, and when possible the reason for, delays in departure from a terminal of more than 120 minutes for regular bus and coach passenger services with a scheduled distance of 250 km or more (in accordance with Article 19 of Regulation (EU) No 181/2011); iv) length of, and when possible the reason for, flight delays at departure of at least 120 minutes; and flight delays at arrival of at least 180 minutes (in accordance with Articles 5 and 6 of Regulation (EC) No 261/2004)	4	static	for scheduled transport

Datatype	Data-item	Service service level	Static or dynamic	Mode of transport
Observed data on cancellations	i) cancellations, and when possible the reason, of rail passenger services ii) cancellations, and when possible the reason, of sea and inland waterways passenger services iii) cancellations, and when possible the reason, of regular bus and coach services with a scheduled distance of 250 km or more iv) cancellations, and when possible the reason, of flights	4	static	for scheduled transport
Occupancy information of the vehicle		3	dynamic	for scheduled transport and transport on demand where relevant
Information service on parking tariffs		2	dynamic	for transport on demand and personal transport
Availability check and location	i) car-sharing availability and location, bike-sharing availability and location, scooter-sharing availability and location, and other vehicle-sharing availability and location ii) car parking spaces available (on and off-street)	2	dynamic	for transport on demand and personal transport where relevant

6.5 Geographical scope and implementation period

In the tables and figures below, we return to the structure of the MMTIS Annex. Articles 4 and 5 set out the scope and effective date in complex legal language. This information can be found in the tables, and the same information is then clarified further in the 'metro maps'.

NB: Network data relates to RTTI data types as described in the annex to the RTTI – Regulation:

- I roads and their physical characteristics
- II geometry
- III road width
- IV number of lanes
- V gradients
- VI junctions

The MMTIS – Regulation adds items such as:

- bus lane, public transport lane and whether these may also be used by taxis.
- cycle tracks, cycle lanes, mixed traffic on the carriageway or cycle path, cycle streets
- footpaths, but also features such as tactile paving, audible signals at traffic lights, wheelchair accessibility, etc., may be included in due course.

This lies at the intersection of navigation information and multimodal travel information.

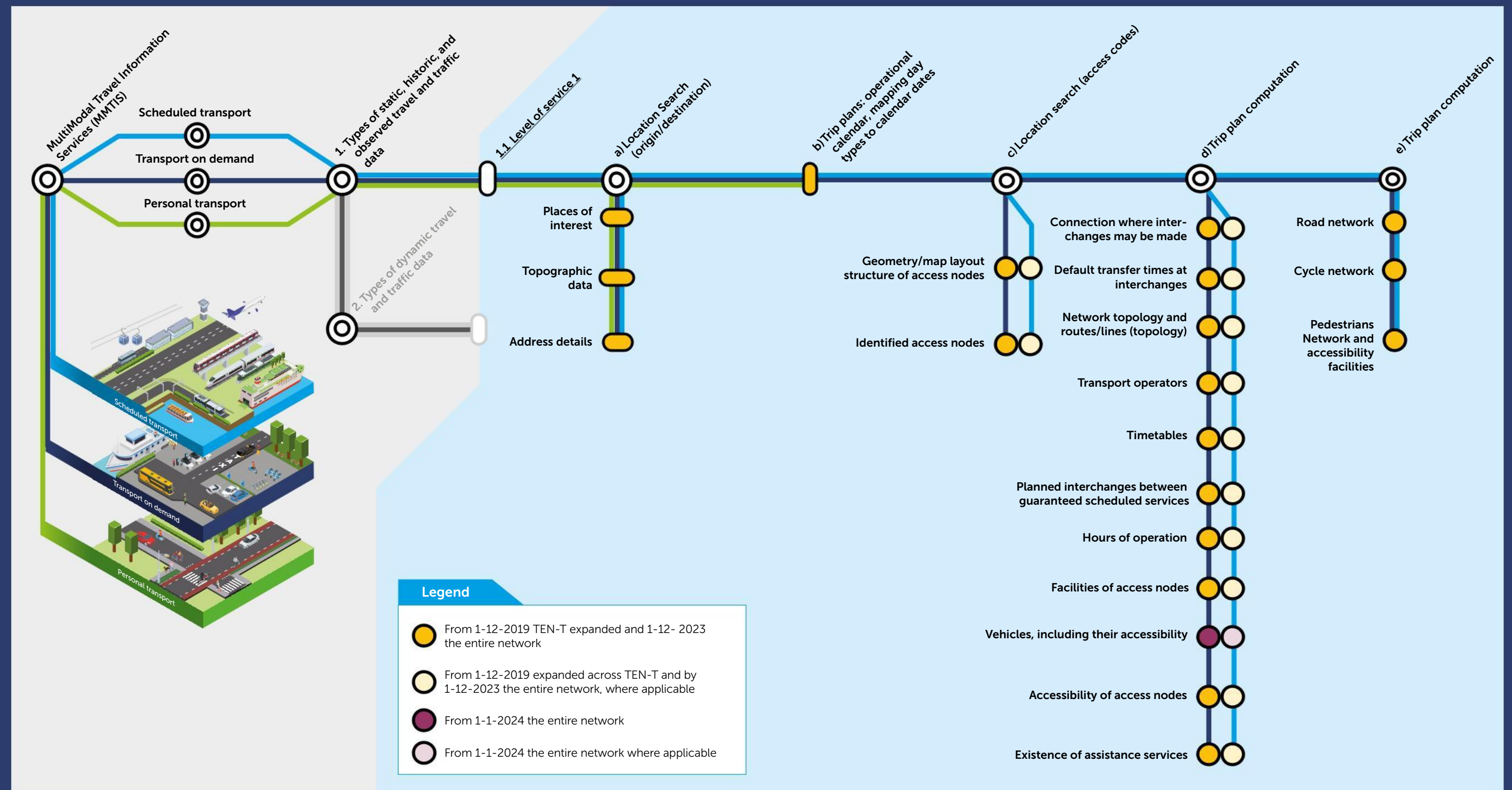
The tables and 'metro maps' on pages 34 to 43 present the MMTIS annex with the various data types. The overviews link these data types to the mode of transport, the geographical scope and the effective date. In terms of content, the tables and maps are identical.

1. TYPES OF STATIC, HISTORIC AND OBSERVED TRAVEL AND TRAFFIC DATA					
1.1 Level of service 1					
Applicable to:		Scheduled transport	Transport on demand	Personal transport	
a) Location Search (origin/destination)	i) addresses (building number, street name, postcode)	1 December 2019 TEN-T extended			
	ii) topographic places (city, town, village, suburb, administrative unit)				
	iii) points of interest (related to transport information) to which people may wish to travel				
b) Trip plans: operational calendar, mapping day types to calendar dates		1 December 2023 entire network			
c) Location search (access codes)	i) identified access nodes;	1 December 2019 TEN-T extended	1 December 2019 TEN-T extended	N/A	
	ii) geometry/map layout structure of access nodes				
d) Trip plan computation	i) connection where interchanges may be made				
	ii) default transfer times at interchanges				
	iii) network topology and routes/lines (topology)				
	iv) transport operators				
	v) timetables				
	vi) planned interchanges between guaranteed scheduled services				
	vii) hours of operation				
	viii) facilities of access nodes (including platform information, help desk/information points, ticket booths, lifts/stairs, entrances and exit locations)				
ix) vehicles, including their accessibility (such as low-floor, wheelchair-accessible, push-chair-accessible) and accessibility of on-board services (such as toilets)	1 December 2024 entire network	1 December 2024 entire network where applicable			
x) accessibility of access nodes, and paths within an interchange (such as existence of lifts, escalators)	1 December 2019 TEN-T extended	1 December 2019 TEN-T extended			
xi) existence of assistance services (such as existence of on-site assistance)	1 December 2023 entire network	1 December 2023 entire network Where applicable			
e) trip plan computation	i) road network (including segregated lanes for bus/taxi)	1 December 2019 TEN-T extended			
	ii) cycle network (cycle tracks, cycle lanes, bus-and-cycle lanes, on-road shared with vehicles, on-path shared with pedestrians)				
	iii) pedestrian network and accessibility facilities (*)				
(*) in e) iii: for example, 'Accessibility (nodes, facilities, routes), Pedestrian networks and infrastructure, Metadata (including data quality), Collaboration & quality assurance, Corrections & updates					

(*) in e) iii: for example, 'Accessibility (nodes, facilities, routes), Pedestrian networks and infrastructure, Metadata (including data quality), Collaboration & quality assurance, Corrections & updates

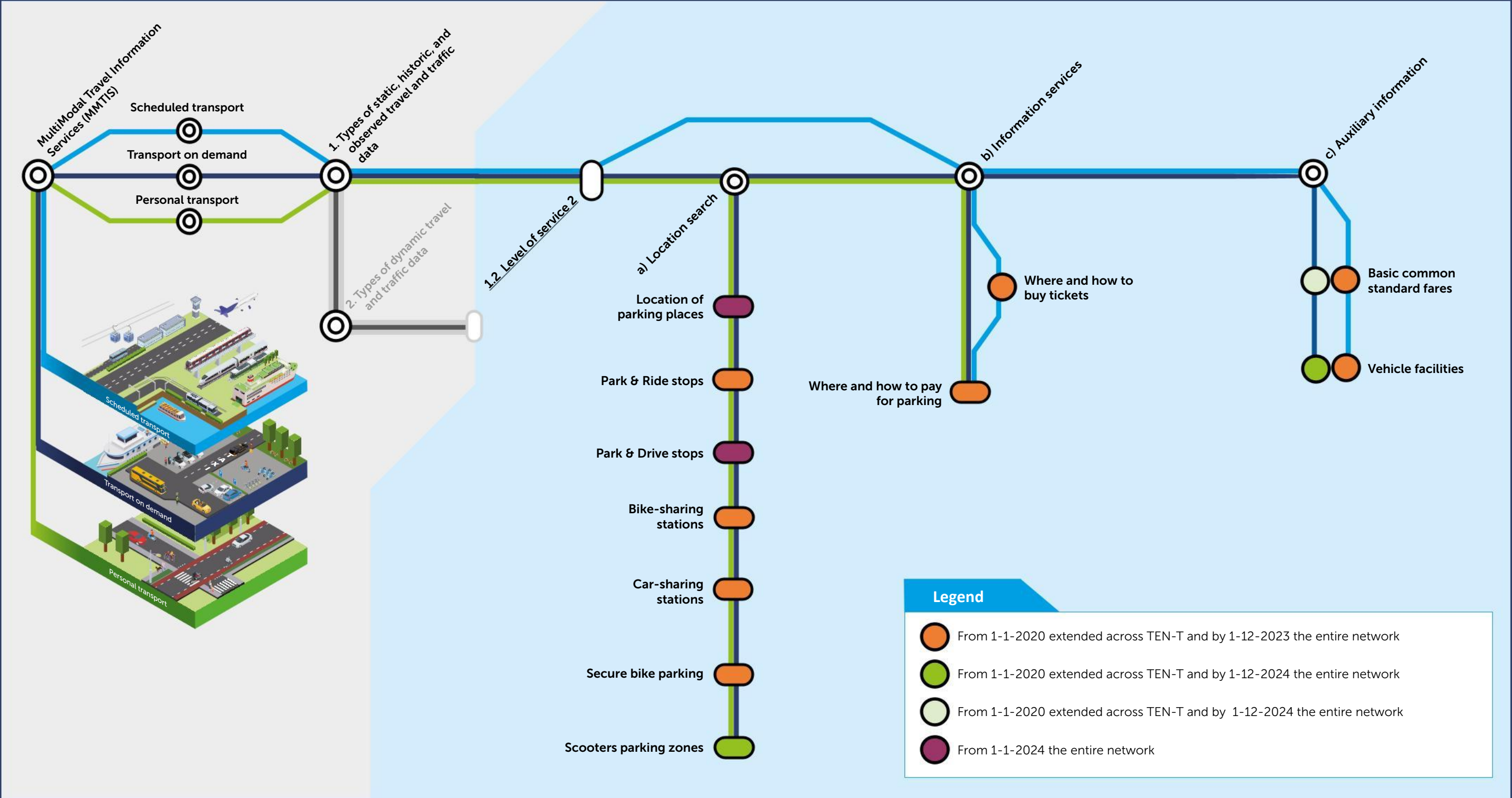
1. Types of static, historic and observed travel and traffic data

1.1 Level of service 1



1. TYPES OF STATIC, HISTORIC AND OBSERVED TRAVEL AND TRAFFIC DATA				
1.2 Level of service 2				
Applicable to:		Scheduled transport	Transport on demand	Personal transport
a) Location search	i) location of parking places (on and off-street), including accessible parking places for persons with disabilities and persons with reduced mobility	N/A	1 December 2024 entire network	
	ii) Park & Ride stops		1 December 2020 TEN-T extended	
			1 December 2023 entire network	
	iii) Park & Drive stops		1 December 2024 Entire network	
	iv) bike-sharing stations		1 December 2020 TEN-T extended	
	v) car-sharing stations		1 December 2023 Entire network	
	vi) secure bike parking (such as locked bike garage)		1 December 2020 TEN-T extended	
	vii) scooters parking zones		1 December 2024 entire network	
b) Information service	i) where and how to buy tickets for scheduled transport, including retail channels, fulfilment methods, payment methods	1 December 2020 TEN-T extended	N/A	N/A
	ii) where and how to pay for parking, including retail channels, fulfilment methods, payment methods	1 December 2020 TEN-T extended 1 December 2023 entire network		
c) Auxiliary information	i) basic common standard fares: – fare network data (fare zones/ stops and fare stages) – standard fare structure (point to point including daily and weekly fares, zonal fares, flat fares)	1 December 2020 TEN-T extended 1 December 2024 entire network	1 December 2020 TEN-T extended, 1 December 2024 entire network Where applicable	N/A
	ii) vehicle facilities, including classes of carriage, on-board Wi-Fi, capacity and access conditions for bicycles	1 December 2020 TEN-T extended 1 December 2024 entire network		

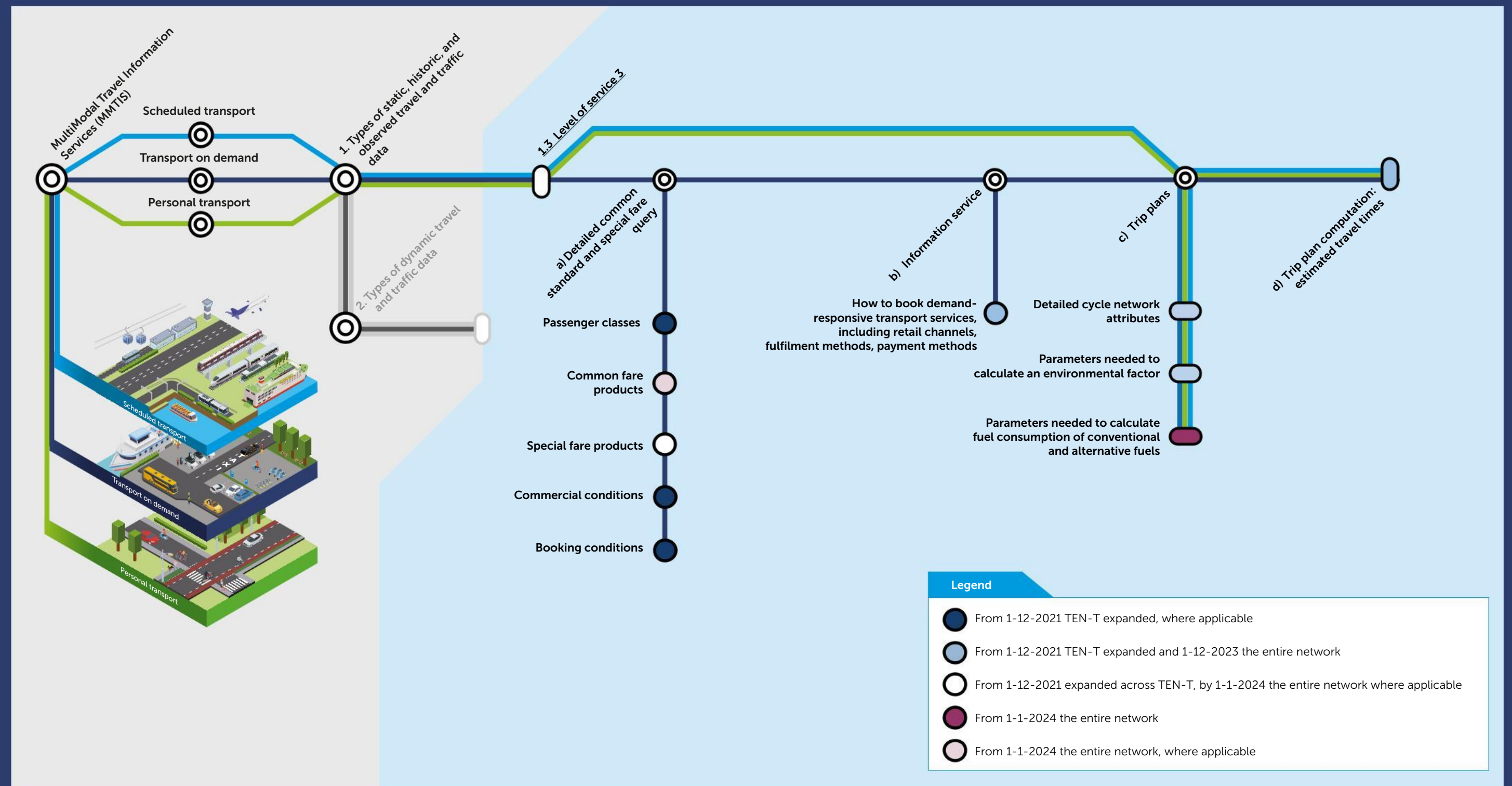
1. Types of static, historic and observed travel and traffic data
1.2 Level of service 2



1. TYPES OF STATIC, HISTORIC AND OBSERVED TRAVEL AND TRAFFIC DATA				
1.3 Level of Service 3				
Applicable to:		Scheduled transport	Transport on demand	Personal transport
a) detailed common standard and special fare query	i) passenger classes (classes of passenger such as adult, child, senior, student, military/veteran, passenger with disability and passenger with reduced mobility, and qualifying conditions, and classes of travel)	1 December 2021 TEN-T extended	1 December 2021 TEN-T extended Where applicable	N/A
	ii) common fare products (access rights such as zone/point-to-point including daily and weekly tickets/single/return, eligibility of access, basic usage conditions such as validity period/operator/time of travel/ interchanging, standard point-to-point fares prices for different point-to-point pairs including daily and weekly fares/zonal fare prices/flat fare prices)		1 December 2024 Entire network Where applicable	
	iii) special fare products (offers with additional special conditions such as promotional fares, group fares, season passes, aggregated products combining different products, and add-on products such as parking and travel, minimum stay)		1 December 2021 TEN-T extended 1 December 2024 entire network Where applicable	
	iv) basic commercial conditions such as refunding, replacing, exchanging or transferring		1 December 2021 TEN-T extended	
	v) basic booking conditions such as purchase windows, validity periods, routing restrictions zonal sequence fares, minimum stay		Where applicable	
b) Information service how to book demand-responsive transport services, including retail channels, fulfilment methods, payment methods		N/A	1 December 2021 TEN-T extended 1 December 2023 entire network	N/A
c) Trip plans	i) detailed cycle network attributes (surface quality, side-by-side cycling, shared surface, on/off road, scenic route, "walk only", turn or access restrictions , e.g. against flow of traffic)	1 December 2021 TEN-T extended		
	ii) parameters needed to calculate an environmental factor such as greenhouse gas emissions per vehicle type or passenger mile or per distance walked	1 December 2023 entire network		
	iii) parameters needed to calculate fuel consumption of conventional and alternative fuels	1 December 2024 entire network		
d) trip plan computation: estimated travel times by day type and time-band by transport mode/combination of transport modes		1 December 2021 TEN-T extended 1 December 2023 entire network		

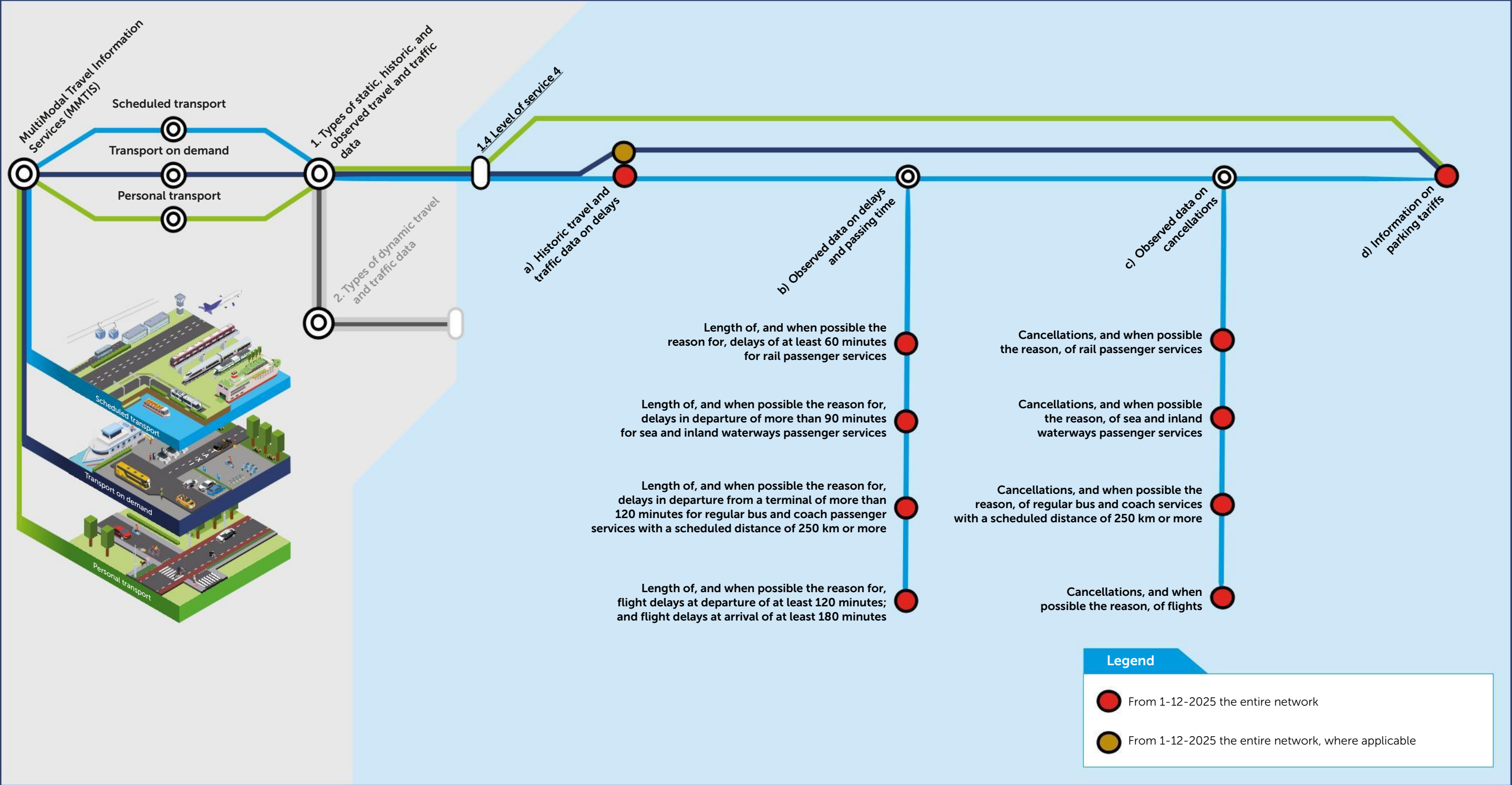
1. Types of static, historic and observed travel and traffic data

1.3 Level of Service 3



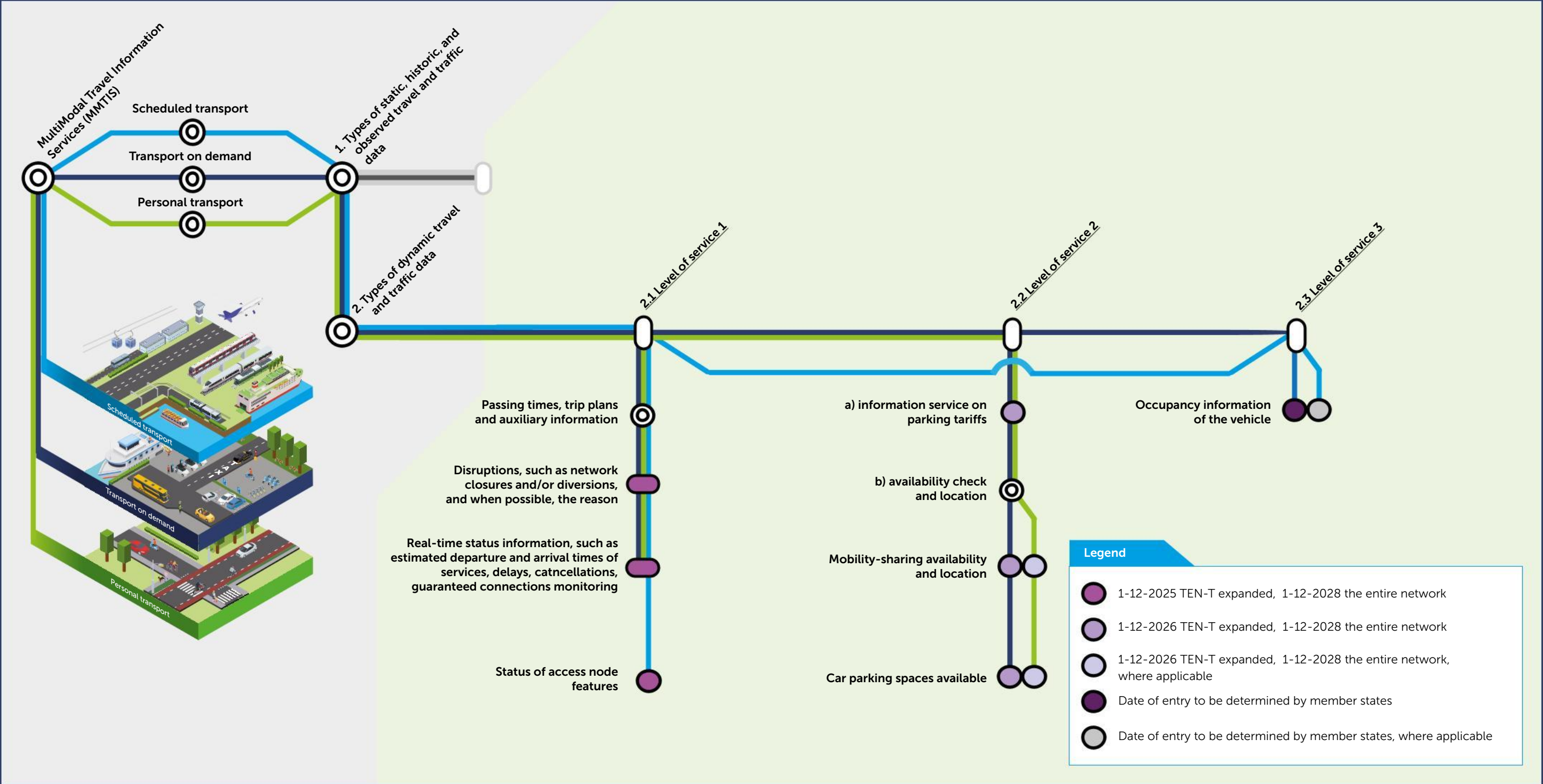
1. TYPES OF STATIC, HISTORIC AND OBSERVED TRAVEL AND TRAFFIC DATA				
1.4 Level of service 4				
Applicable to:		Scheduled transport	Transport on demand	Personal transport
a) Historic travel and traffic data on delays		1 December 2025 Entire network	1 December 2025 entire network Where applicable	
b) Observed data on delays and passing time	i) length of, and when possible the reason for, delays of at least 60 minutes for rail passenger services (in accordance with Article 19 of Regulation (EU) 2021/782)	1 December 2025 entire network	N/A	N/A
	ii) length of, and when possible the reason for, delays in departure of more than 90 minutes for sea and inland waterways passenger services (in accordance with Article 18 of Regulation (EU) No 1177/2010)			
	iii) length of, and when possible the reason for, delays in departure from a terminal of more than 120 minutes for regular bus and coach passenger services with a scheduled distance of 250 km or more (in accordance with Article 19 of Regulation (EU) No 181/2011)			
	iv) length of, and when possible the reason for, flight delays at departure of at least 120 minutes; and flight delays at arrival of at least 180 minutes (in accordance with Articles 5 and 6 of Regulation (EC) No 261/2004)			
c) Observed data on cancellations	i) cancellations , and when possible the reason, of rail passenger services	1 December 2025 entire network	N/A	N/A
	ii) cancellations , and when possible the reason, of sea and inland waterways passenger services			
	iii) cancellations , and when possible the reason, of regular bus and coach services with a scheduled distance of 250 km or more			
	iv) cancellations , and when possible the reason, of flights			
	d) Information on parking tariffs .	1 December 2025 full network		

1. Types of static, historic and observed travel and traffic data
1.4 Level of Service 4



2. TYPES OF DYNAMIC TRAVEL AND TRAFFIC DATA				
2.1 Level of service 1				
Applicable to:		Scheduled transport	Transport on demand	Personal transport
Passing times, trip plans and auxiliary information	i) disruptions , such as network closures and/or diversions , and when possible, the reason	1 December 2025 TEN-T extended	1 December 2025 Extended TEN-T	1 December 2025 Extended TEN-T
	ii) real-time status information , such as estimated departure and arrival times of services, delays, cancellations, guaranteed connections monitoring	1 December 2028 entire network	1 December 2028 entire network	1 December 2028 entire network
	iii) status of access node features (including dynamic platform information, operational lifts/escalators, closed entrances and exit locations)		N/A	N/A
2.2 Level of service 2				
a) information service on parking tariffs		N/A	1 December 2026 TEN-T extended 1 December 2028 entire network	1 December 2026 Extended TEN-T 1 December 2028 entire network
b) availability check and location	i) car-sharing availability and location, bike-sharing availability and location, scooter-sharing availability and location, and other vehicle-sharing availability and location	N/A	1 December 2026 TEN-T extended	Where applicable 1 December 2026 TEN-T extended
	ii) car parking spaces available (on and off-street)	N/A	1 December 2028 entire network	1 December 2028 entire network
2.3. Level of service 3				
Occupancy information of the vehicle		Effective date to be determined by Member States themselves	Where applicable Effective date to be determined by Member States themselves	N/A

2. Types of dynamic travel and traffic data
2.1 Level of service 1,2 and 3



Multimodal travel is more than just data

Multimodal travel is about the smart combination of different modes of transport within a single journey, tailored to the passenger's needs. The European Commission declared 2018 the Year of Multimodality, with the aims of making mobility more efficient, sustainable and user-friendly, making better use of existing infrastructure, and reducing congestion and emissions. Since then, steps have been taken, for example in data exchange, journey planners and hubs, but there is still much to be gained. In practice, the sector often still thinks in unimodal terms: road, rail, cycling or public transport as separate and sometimes competing worlds. This is partly understandable and even necessary, because the key to good multimodality lies, in principle, precisely in strengthening each mode individually. Only when cycling, public transport or driving are reliable and attractive does a strong basis emerge for combining them, but this is less successful if hubs are not easily and safely accessible to everyone, or are too expensive to use (total cost of the journey, including parking).

It is important to distinguish between **multimodality** and **modal shift**. Multimodality is about being able to choose and combine modes of transport within a single journey. Modal shift focuses explicitly on shifting journeys from less sustainable to more sustainable modes, such as from car to bicycle or public transport (source: Multimodal Travel Information Services (MMTIS) Quality Package). Multimodality does not automatically lead to a modal shift, but it can facilitate it. Within MMTIS, the

operational aim is to connect modes as effectively as possible, with the overarching goal of making the use of sustainable alternatives simpler, more transparent and more reliable, thereby encouraging their use. In combination with good, up-to-date data, this encourages passengers to consider and use these options sooner, as has already been noted elsewhere in this document.

Typical multimodal aspects are mainly found in the **transfer (to a different mode of transport or a different service within the same mode)**: from bicycle to train, from car to public transport, or from shared mobility to walking. Hubs play a crucial role here. Hubs are not only physical junctions, but also places where the travel experience is made or broken. This requires attention to social and physical safety, clarity, accessibility and facilities that meet a variety of needs. Not every passenger is a commuter: waiting times can be work times, rest periods, or moments when facilities such as catering, toilets, workspaces or secure bicycle parking are essential. By 'shifting' waiting times into a meaningful part of the (working) day, multimodal travel becomes even more attractive. MMTIS primarily adds standardisation and mandatory requirements here: it ensures that hub and interchange information (accessibility, facilities, parking and cycling, real-time disruptions, fares and bookability where applicable) is made available in a uniform, digital and reusable format. This enables planners and MaaS providers to genuinely incorporate that 'interchange experience' into their advice and decision-making.

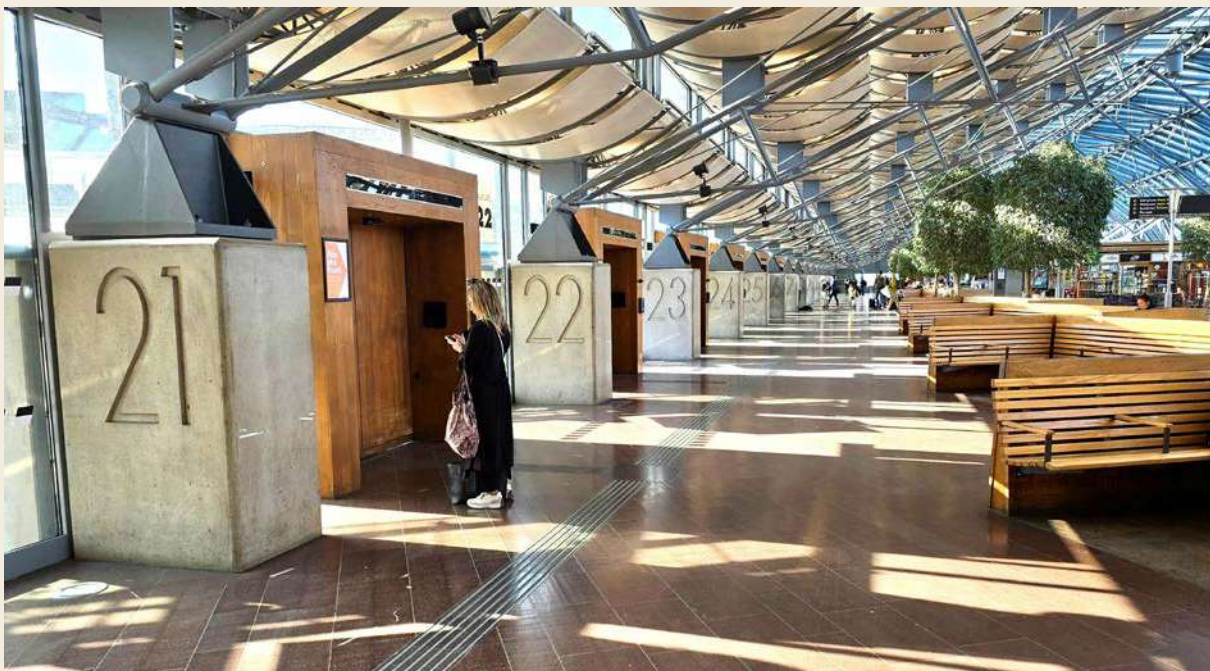


Figure 6. The bus station in Gothenburg, where passengers wait indoors while buses stop outside. Comfortable facilities for working, relaxing, and spending time make the transfer time feel less like waiting and more like a valuable part of the multimodal journey. Photo: Søren Sørensen.

It is crucial **to think from the passenger's perspective rather than from the system's**. Passengers are primarily guided by factors such as time, convenience, comfort, safety and reliability, rather than by transport modes. Road authorities and transport authorities can facilitate this by strengthening unimodal networks, developing multimodal hubs in an integrated manner, and ensuring reliable, open and up-to-date data for MMTIS. In addition, they can steer developments through policy, the design of public spaces, and collaboration with transport operators and service providers. In this way, multimodality becomes not an abstract policy objective, but a logical and attractive choice in everyday travel.

Some key factors that can support the use of multimodal hubs include:

- Location of the hub (in relation to regional and national strategies for hub planning)
- Multimodal accessibility of the hub
- Real-time information on available parking spaces
- Information on public safety
- Information on physical safety
- Information on weather protection
- Cleanliness
- Accessibility
- Real-time information on accessibility
- Services and facilities tailored to needs
- Information on walking routes between transport modes
- Clear wayfinding (navigation does not always work optimally in and around buildings and across different levels or floors)
- Coordination of timetables with regard to transfers
- Nationwide design based on uniformity
- People at the heart of the design

For more information on mobility hubs, see <https://www.mobiliteitshubs.nl/>

7 Data quality in practice

Data quality is a key prerequisite for a well-functioning MMTIS data chain. Regulations require data holders to make mobility data available via national access points. In practice, however, it appears that compliance with formal obligations does not automatically lead to usable and reliable information. Attention must therefore be paid to the entire data chain: from source registration to publication and actual use. A dataset that is technically compliant may be incomplete, outdated or inconsistent in terms of content, thereby undermining the objectives of the regulations.

Article 4(5) of MMTIS encourages collaboration and the establishment of a feedback loop that, at the very least, reports any identified shortcomings to the data holder:

Data users and data holders shall collaborate in order to ensure that any inaccuracies related to the static, historic and observed travel and traffic data are notified without delay to the data holder from which the data originates.

7.1 Quality dimensions and prioritisation

Data quality comprises several dimensions. Not every aspect is equally decisive for the usability of mobility information. The table below sets out the most important dimensions, including prioritisation from a user perspective.

Priority	Dimension	Significance	Relevance to practice and the end user
1	Timeliness	The speed at which changes are processed and published	Essential for up-to-date travel information; delayed updates lead to incorrect advice.
2	Accuracy	The extent to which data is factually correct	Errors in routes, stops or times reduce trust and usage.
3	Completeness	The presence of all relevant modes and connections	Incomplete data limits multimodal applications.
4	Availability	The continuity of access to datasets or APIs	Unstable access hinders integration by market players.
5	Semantic consistency	Consistent application of definitions and coding	Reduces differences in interpretation between systems.
6	Geographical coverage	The extent to which the network is fully covered	Influences use in a national or cross-border context.

Prioritisation: improvements in timeliness, accuracy and completeness offer the greatest immediate added value for the end user and for the societal return on public data infrastructures. Other dimensions can be refined subsequently.

7.2 New emphases in the amendments of 2024/490

The recent amendments to the regulations broaden the scope of modalities and quality obligations. These changes have direct consequences for the work of data holders.

Expansion to new modes

Data on cycling, shared mobility, pedestrians and micro-transport are addressed more explicitly and comprehensively in the revised annex. Standardisation in these areas is still limited. Coordination on definitions and classifications is necessary to ensure interoperability.

1 Accessibility information

Information on the physical accessibility of infrastructure and stops is increasingly becoming a mandatory requirement. This type of data is often fragmented and requires cooperation with local operators.

2 Quality metadata and monitoring

Data holders must not only provide data, but also metadata regarding timeliness, completeness and provenance. Structural quality monitoring thus becomes part of regular management processes.

3 Real-time integration

The emphasis on real-time information increases the need for short update cycles, minimal latency and reliable synchronisation between systems.

Taken together, this means that data quality is no longer a technical prerequisite, but an integral part of policy implementation and governance.

The MMTIS – Regulation does not itself contain detailed quantitative standards for data quality, but it does require Member States to agree on minimum data quality requirements, to include quality information in the metadata, and to report on this to the European Commission.

NAPCORE is working on a harmonised metadata standard that also includes quality information.

7.3 Practical considerations for data holders

This section translates the quality and availability requirements set out in MMTIS into concrete points for data holders to consider, which support realistic and effective implementation.

Ensuring data quality requires a combination of organisational and technical measures. The following points have proven to be decisive in practice:

Process design and responsibilities

Quality assurance requires a clear division of roles between data holder, administrator and publisher. Without unambiguous responsibilities, structural improvement is not feasible.

Quality control and validation

Automatic checks for accuracy, completeness and consistency should be a standard part of the publication chain. Validation must comply with national profiles and MMTIS requirements.

Monitoring and reporting

Continuous monitoring of uptime, latency and error rates enables early detection of problems. Dashboards and reports increase transparency and management insight.

Feedback mechanisms

End users and service providers can flag anomalies that are not detected by automatic validation. Structured feedback increases the reliability of the dataset.

Iterative improvement

Data quality develops incrementally. Version control, feedback and periodic audits support a process of continuous improvement.

Collaboration and knowledge sharing

Regional and national working groups on data quality promote uniformity, knowledge building and the sharing of best practices among data holders.

7.4 Role of the end user

The end user – the passenger or the service provider who uses data in travel advice – is the true test of data quality. When information is not reliable or up to date, usage declines and the public data infrastructure loses public support.

Data holders can actively involve end users in quality assurance through

- feedback: reports of errors or missing information via digital channels
- usage monitoring: analysis of how datasets are actually used
- transparency: the publication of quality indicators, such as update frequency and coverage.

In this way, the end-user can become a functional part of the quality cycle, but in practice most passengers are unlikely to provide active feedback readily. That is why the link between the data holder and the user (the service provider) appears to be important. The service provider also benefits from high quality in order to retain users. The role of service provider can also be fulfilled (in part) by public sector bodies, in which case it is important to put the end-user at the centre. Human factors specialists can play a role here.

Data quality largely determines the effectiveness of the MMTIS chain. Whereas the first implementation phase focused on data availability, the emphasis is now on usability, reliability and transparency. Working on data quality is not a one-off effort, but a continuous process that determines the effectiveness and credibility of the mobility data system.

7.5 Privacy

For all forms of data – including MMTIS-data – it is important to comply with privacy regulations. Article 4(6) of the MMTIS – Regulation highlights this:

The data provided by data holders via the national access point shall not include personal data as defined in Article 4(1) of Regulation (EU) 2016/679.

The aforementioned article of Regulation (EU) 2016/679 (GDPR) contains a definition:

‘personal data’ means any information relating to an identified or identifiable natural person (‘data subject’); an identifiable natural person is one who can be identified, directly or indirectly, in particular by reference to an identifier such as a name, an identification number, location data, an online identifier or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.

In Article 4(6), MMTIS explicitly refers to Article 4(1) of the GDPR to clarify when MMTIS data must be regarded as personal data. This relates exclusively to the definition of personal data. As soon as data can be traced back to a natural person, the GDPR applies in full. MMTIS does not introduce its own privacy rules and does not limit the scope of the GDPR.

In addition to all the points of attention that are important when processing data in relation to the GDPR, it is advisable to pay specific attention to the following with regard to MMTIS data:

- **Explicitly check whether data can be traced back to a person**

Location, route or time data may also constitute personal data, depending on the context and possible combinations.

- **Do not automatically assume ‘no personal data’**

The fact that data is primarily of a traffic-related or technical nature does not mean that the GDPR cannot apply.

- **Do not treat all MMTIS-data as personal data**

The reference prevents the GDPR from being applied by default to all MMTIS data; a specific assessment is always required.

- **Record your assessment**

Substantiate and document why data is or is not classified as personal data, including assumptions regarding traceability.

If in doubt, it is always advisable to seek expert advice and to have an internal or network-wide DPIA carried out and updated periodically.

The reference to Article 4(1) of the GDPR in MMTIS helps determine whether data protection legislation applies. This assessment is not a formality, but an explicit responsibility of the data controller or service provider.

For more information, see

<https://ladder.crow-smartmobility.nl/data/privacy/>

8 Impact and significance of MMTIS-data

The following sections discuss governance, cooperation and quality aspects of MMTIS. These topics are particularly relevant for policymakers, commissioning bodies and coordinating roles, but also provide context for implementing parties regarding the broader framework within which implementation takes place.

For data holders, the sharing of a number of MMTIS-related datasets is a legal obligation. In addition, a Member State may decide to make additional (non-mandatory) datasets available, for example as a strategic policy choice. In addition to the legal obligation, making MMTIS-data available and reusing it can yield the following benefits.

- 1 Efficiency in management: one-off registration and standardised publication reduce administrative burdens and prevent duplication of work.
- 2 Policy support: open data provides objective evidence to underpin policies on accessibility, safety and sustainability.
- 3 Reliability and transparency: up-to-date data strengthens public confidence in government information.
- 4 Alignment with European developments: participation ensures alignment with future systems for digital traffic rules, real-time traffic management and integrated mobility services.
- 5 For transport authorities: the number of users of sustainable alternatives can be increased.

8.1 From obligation to added value

The strength of MMTIS lies in the transition from obligation to collaboration. When data holders, market parties and users view the system as a shared public service, a flywheel of innovation and quality improvement is created. The availability of reliable, up-to-date and standardised mobility data makes policy more effective, markets fairer and mobility more accessible. Without MMTIS, Europe would consist of islands of information, each with their own standards, definitions and quality requirements, causing the passenger to lose the connection both literally and figuratively. MMTIS offers the opposite: a common language for mobility that works across borders, modes and systems.

MMTIS data is not only valuable in terms of content, but also acts as a catalyst for further standardisation in Europe. By mandating uniform profiles such as NeTEx, SIRI and DATEX II, a cross-border data base is created that makes reuse by service providers much easier.

The new category of historic and observed data gives public authorities a better insight into transport operators' performance. This enables better policy-making, supports concession management and allows for objective monitoring of punctuality and service disruptions.

MMTIS within the taxi industry

Transport on demand service is also a key data source within MMTIS. The impact can vary significantly depending on the transport operator and the services they offer. Here is a hypothetical example:

The Monday morning email...

At 08:07 on Monday morning, a new email appears in the inbox of Verivoer Mobiliteit, a small regional provider of care transport and on-demand taxi services. Planner Linde opens it between two phone calls.

Subject: Access to mobility data under the European MMTIS – Regulation

Dear Sir/Madam,

In accordance with Regulation (EU) 2017/1926, we request that you make your mobility services available via the National Access Point, so that they can be included in multimodal travel information services.

Linde reads the email twice. "Multimodal travel information," she mutters. "We don't do travel information. We do people." A colleague adds: "Something from Brussels...?"

Verivoer has no timetable. Every day starts afresh, with fixed Wmo journeys, medical appointments and always a few urgent requests. Availability is not a given, but the result of considerations: who can drive, which vehicle is suitable, which indication applies. The system contains journeys, not routes or times.

At the first team meeting, the prevailing concern is that MMTIS means they will have to show in real time how many taxis are available. That would not only be technically complicated, but would also lead to expectations they cannot meet. "Soon an app will say we're available, when in fact we're not at that moment," says someone.

Only when they read the regulation more carefully does the picture become clearer. MMTIS does not require new data, nor does it require operational planning. What is mandatory is the data that already exists and that says something about the existence and nature of the service: what type of transport, in which area, within which time slots and under what conditions.

Verivoer has therefore deliberately opted for a limited approach. Via the National Access Point, they publish that healthcare transport and transport on demand exist as transport modes, in which regions, that advance booking is required, and that use is subject to a medical assessment or contract. No promises about availability, no travel information, no personal data.

A few weeks later, Linde notices that her day is unfolding differently. Fewer last-minute phone calls. Fewer conversations in which she has to explain that 'available' is not the same as 'right now'. Passengers seem to know more often what is and isn't possible. The local authority is also asking different questions: no longer about incidents, but about distribution and accessibility.

For Verivoer, MMTIS does not result in extra journeys. But it does bring peace of mind. Expectations are better aligned with reality and planning becomes less reactive.

At the end of the month, Linde opens the email again. She smiles. At first, the requirement felt like a risk and yet another extra task. In practice, it turned out to be mainly a way of making the system a little clearer.

9 In conclusion

Data quality is a key prerequisite for a well-functioning MMTIS-data chain. In practice, however, it appears that meeting formal obligations does not automatically lead to usable and reliable information. Attention is required throughout the entire data chain: from source to publication and actual use. Data quality largely determines the effectiveness of any (data) chain, and this is no different for the MMTIS chain. Whereas an initial implementation phase focused on data availability, the emphasis is now on usability, reliability and transparency. Working on data quality is not a one-off effort, but a continuous process that determines the effectiveness (usefulness) and credibility of the mobility data system.

The end user (passenger or service provider) who applies data in travel advice is the actual litmus test for data quality. When information is not reliable or up to date, usage declines and the public data infrastructure loses support. That is why the link between the data holder and the user (passenger or service provider) appears to be important. They too benefit from high quality in order to retain users. The role of service provider can also be fulfilled (in part) by public bodies, whereby it is important to put the end-user at the centre. Human factors specialists can play a role in this.

When data holders, market players and users view the system as a shared public service, a flywheel of innovation and quality improvement is created. Without MMTIS, Europe would consist of islands of information, each with their own standards, definitions and quality requirements, causing the passenger to lose the connection both literally and figuratively. MMTIS offers the opposite: a common language for mobility that works across borders, modes of transport and systems.

At an overarching level, work is underway on a shared European Mobility Data Space (EMDS), in which data on transport and mobility is collected and shared. Ultimately, this could help passengers plan their cross-border journeys more efficiently. And it gives governments and businesses the opportunity to develop innovative mobility services and formulate better policies.

The guiding principle is that the desired application takes centre stage, rather than the data supply.

Appendix 1: References

- 1 [MMTIS-Regulation DR 2017/1926](#)
- 2 [MMTIS-Regulation DR 2024/490](#)
- 3 [MMTIS Impact Assessment](#)
- 4 [Sustainable and Smart Mobility strategy](#)
- 5 [CROW publication ITS Guidelines](#)
- 6 [CROW publication RTTI – Regulation](#)
- 7 [Impact Analysis Report on the Revision of the ITS – Directive – What does the Netherlands need to organise? | Report](#)
- 8 [Report on the Impact Assessment of the Revision of the ITS – Directive – Contribution to Achieving Mobility Data Objectives | Report](#)
- 9 [RTTI Impact Analysis and Scenarios | Report](#)
- 10 [ITS – Directive \(2010/40/EU\), additions and amendments EU 2023/2661](#)
- 11 [Revised RTTI – Regulation \(EU\) 2022/670](#)
- 12 [Package Travel – Directive: \(EU\) 2015/2302, proposal COM\(2023\) 905](#)
- 13 [The MDMS – Regulation \(COM\(2023\) 751\)](#)
- 14 [Passenger rights for multimodal journeys \(proposal\)](#)
- 15 [Existing regulations \(such as 261/2004, \(EU\) 1177/2010 and \(EU\) 2021/782\)](#)
- 16 [European Green Deal \(2019\)](#)
- 17 [EU Strategy for Sustainable and Smart Mobility](#)
- 18 [NTM and management organisations](#)
- 19 [NTM MMTIS illustration](#)
- 20 <https://open.overheid.nl/documenten/ronl-7ce5869b63dbb94ee1cee3d9501bb56f15491e6f/pdf>
- 21 https://napcore.eu/wp-content/uploads/2025/05/DD_2022_670.pdf

Appendix 2: Definitions and terms

Terms as defined in the MMTIS – Regulation relating to multimodal travel and traffic information:

- 1 **multimodal travel information**: information derived from any static, historic, observed or dynamic travel and traffic data, or any combination thereof, for end users, provided through any communication means, covering at least two modes of transport and allowing the possibility to compare transport modes
- 2 **travel information service**: an ITS service, including digital maps, that provides data users, and end users, with travel and traffic information of at least one transport mode
- 3 **dynamic travel and traffic data**: data relating to different transport modes that change often, or data on unexpected events or circumstances, as listed in the Annex
- 4 **static travel and traffic data**: data relating to different transport modes that do not change often, or data on planned changes, as listed in the Annex
- 5 **historic traffic data**: data relating to traffic characteristics, used to calculate average delays, depending on the hour, day and season, which is based on previous measurements, including rate of congestion, average speeds, and average travel times
- 6 **observed data**: operational data related to travel and traffic, such as the length of and reason for delays and cancellations, resulting from and collected during service operations
- 7 **data user**: any public or private entity, such as transport authorities, transport operators, travel information service providers, digital map producers, transport on demand service providers and infrastructure managers, or any other entity using data listed in the Annex to create multimodal travel information, or where provided by the terms and conditions determined by the data holder, using the data for other purposes
- 8 **transport authority**: any public authority responsible for the traffic management or the planning, control or management of a given transport network or transport service, or both, falling within its territorial competence
- 9 **transport operator**: any public or private entity that is responsible for the maintenance and management of the transport service
- 10 **transport on demand service provider**: any public or private provider of transport on demand service to end users
- 11 **data holder**: any legal person, public or private entity, such as transport authorities, transport operators, infrastructure managers or transport on demand service providers, who has the right to grant access to or to share the data under its control, listed in the Annex, in accordance with applicable Union or national law
- 12 **transport on demand service**: a service which requires interaction between the transport on demand service provider and the end user before delivery
- 13 **end-user**: any natural or legal person who has access to travel information services
- 14 **metadata**: a structured description of the contents of the data facilitating the discovery and use of the data
- 15 **routing result**: the travel itinerary in a digital machine-readable format resulting from an end users' journey request with reference to the handover point or points used
- 16 **handover point**: the station, stop or location at which two travel information services' routing results are linked to produce a journey
- 17 **access point**: a digital interface where data listed in the Annex together with the corresponding metadata are made accessible for reuse to data users, or where the sources and metadata of those data are made accessible for reuse to data users
- 18 **data update**: any modification of the existing data, including its deletion or the insertion of new or additional elements
- 19 **discovery services**: a service allowing for the search of the requested data using the contents of the corresponding metadata and displaying such contents
- 20 **accessibility of the data**: the possibility to request and obtain the data at any time in a digital machine-readable format
- 21 **Trans-European Transport Network or TEN-T**: the transport infrastructure and measures referred to in Article 6(2) of Regulation (EU) No 1315/2013
- 22 **timeliness of data**: the availability of up to date data provided to data users and end users sufficiently in advance to be useful

- 23 **travel information service provider:** a public or private provider of at least one travel and traffic information, to data users and end users, excluding a mere converter of information
- 24 **linking of service:** the connection of local, regional, and national travel information services which are interlinked via technical interfaces to provide routing results or other application programming interfaces (APIs) results based on static, historic, observed and/or dynamic travel and traffic data
- 25 **access node:** a pre-defined location where passengers may board or leave scheduled transport or transport on demand

Commission Implementing Regulation (EU) 2026/253 of 6 February 2026 on a technical specification relating to the telematics subsystem of the rail system in the European Union for interoperability of data sharing in rail transport (TEL TSI) and repealing Regulations (EU) No 454/2011 (TAP TSI) and (EU) No 1305/2014 (TAF TSI) https://eur-lex.europa.eu/eli/reg_impl/2026/253/oj

Key data-related abbreviations

ACI	Airports Council International develops standards for airports that are not mandatory in MMTIS. https://aci.aero
DATEX II	Data Exchange standard for road traffic (infrastructure, traffic regulations, intended use – function – and actual use), prescribed in RTTI (EU 2015/962 – already revised) https://datex2.eu
IATA	International Air Transport Association, develops commercial and operational standards for passenger aviation that are not mandatory in MMTIS. https://www.iata.org
NAP	National Access Point, national access point for mobility data under the EU ITS – Directive https://transport.ec.europa.eu/transport-themes/smart-mobility/road/its-directive-and-action-plan/national-access-points_en overview of all EU NAPs: https://transport.ec.europa.eu/document/download/963c997d-efd9-40ae-a38b-5d4b935bdfcf_en?filename=its-national-access-points.pdf
NAPCORE	NAPCORE (National Access Point Coordination Organisation for Europe), an umbrella European organisation that coordinates and harmonises more than 30 mobility data platforms across Europe. https://napcore.eu
NeTex	Network Timetable Exchange, prescribed in TEL TSI (EU 2026/253) and mandatory for static data, such as timetables, stops/stations, lines and routes, connections, and basic product information. NeTex is a CEN standard explicitly designated within TAP-TSI and can be regarded as the basis for MMTIS in public transport and, to some extent, for other modes. https://transmodel-cen.eu/index.php/netex
SIRI	Service Interface for Real-time Information. For dynamic data, such as delays, disruptions, and real-time arrival and departure times. https://transmodel-cen.eu/index.php/siri
TAP-TSI	Telematics Applications for Passengers – Technical Specification for Interoperability. TAP-TSI ensures that railway undertakings and infrastructure managers in Europe exchange passenger-oriented travel information, booking and ticket data in a uniform and interoperable manner, thereby enabling cross-border rail travel. https://www.era.europa.eu/domains/technical-specifications-interoperability/telematics-applications-passenger-service-tsi_en

Colophon

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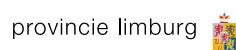
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