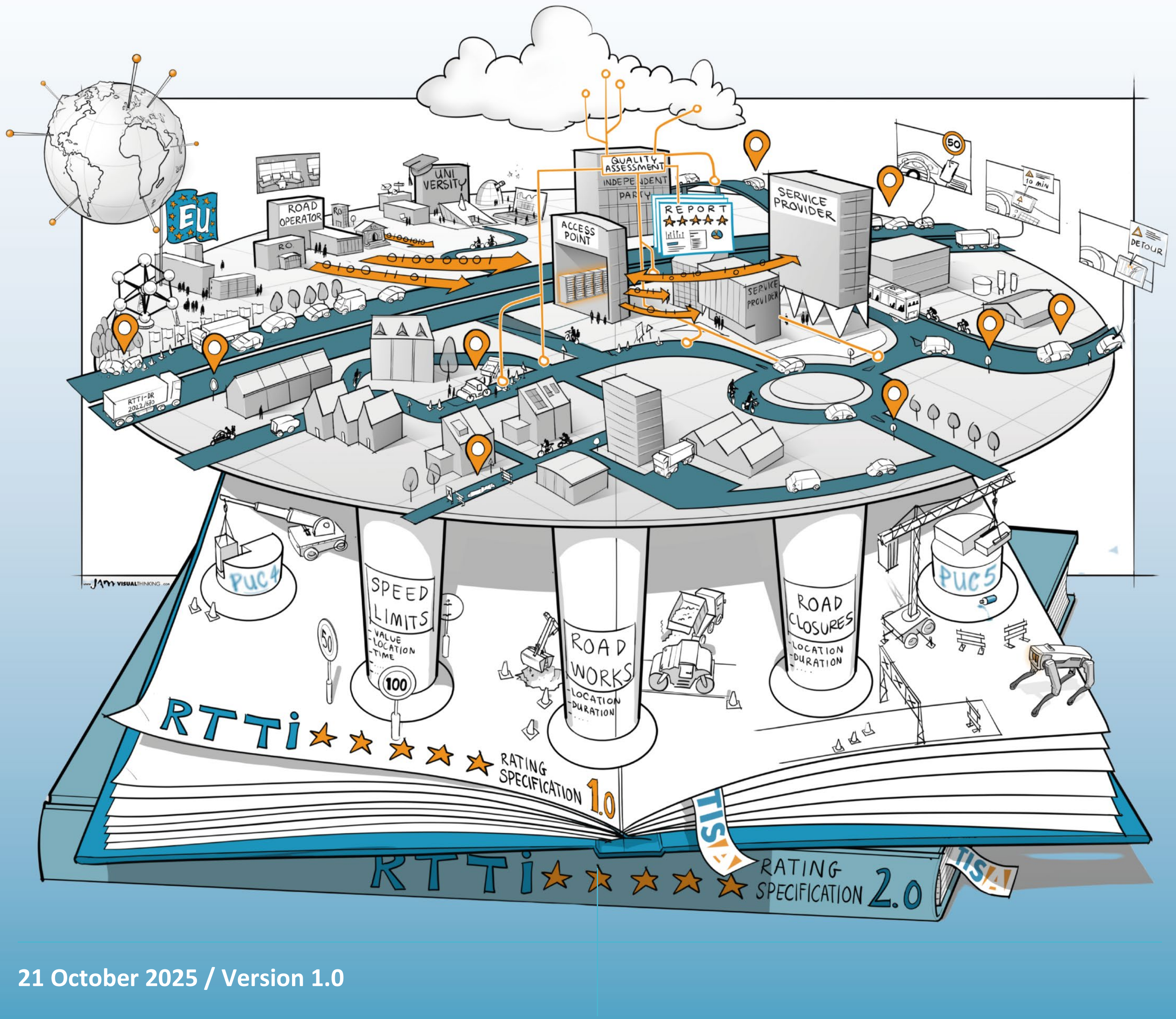
RTTI 5-Star Rating Specification ★★★★★



21 October 2025 / Version 1.0

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FOREWORD

The TISA RTTI 5-Star Rating Specification is a voluntary international framework that proposes all the relevant quality requirements, both quality criteria and performance thresholds, for traffic data usage in Real-Time Traffic Information (RTTI) services. It is intended to be made available for use by stakeholders immediately, but it can also serve as a long term growth framework for stakeholders that need to improve the quality of their traffic data incrementally overtime. For version 1.0, all involved parties agreed to focus on three priority use cases which are the foundation of RTTI: speed limits, roadworks, and road closures. With navigation systems becoming an essential part of daily life and vehicles becoming more automated over time, it's more important than ever for RTTI services to be accurate, complete and reliable. This specification serves as an enabler to increase ITS Service Providers' usage of Road Operators' and Public Authorities' traffic data. It stipulates the conditions under which ITS Service Providers will process and use traffic data from Road Operators / Public Authorities in their RTTI services and defines what constitutes 'usage'. It sets the basis for a mutual understanding and agreement between Road Operators / Public Authorities and Service Providers to clarify what type of data is aiding the services, the value it adds for Service Providers and end users, and the quality level it adds value for inclusion in RTTI services. This approach aims to create the right market conditions to enhance public-private collaboration and service innovation. By doing so, it supports more appropriate traffic management and improved road safety. Stakeholders can use the specification without joining TISA, but TISA members will have the opportunity to access to services that help them apply it effectively.

While this specification can support the implementation of Delegated Regulation (EU) 2022/670 (see section 1.11), it serves as an independent and international framework to be applied anywhere in the world. Most ITS Service Providers operate internationally with the same level of service expected in all markets, so it is important that data quality levels are consistent across the globe. Encouraging the adoption of this specification globally will help create a level playing field for Service Providers and improve the reliability of traffic information for users everywhere. It's an opportunity to align best practices and ensure the benefits of high-quality RTTI services are felt on a broader scale. This rating is more than just an assessment tool; it's a way to encourage ongoing improvement in traffic data quality. By setting clear and realistic expectations and making the evaluation process transparent, it motivates data providers to improve their efforts. This leads to more accurate and timely information, benefiting everyone from Road Operators to end-users. Better quality data means smoother traffic management, less congestion, and safer roads for generations to come.

The following figure provides an overall context for the RTTI 5-star rating and all involved stakeholders. It shows the data flows between Road Operators via the Access Points (APs) to the services providers and back, the services provided to the end users, the academic partners that reviewed the specification and provided significant feedback, as well as the global scope that the specification addresses in the long term.

The figures further show the 3 priority use cases (PUCs) that are covered by this specification, together with new PUCs that are currently being worked on to cover other important traffic situations. These will be addressed in future volumes of the specification.

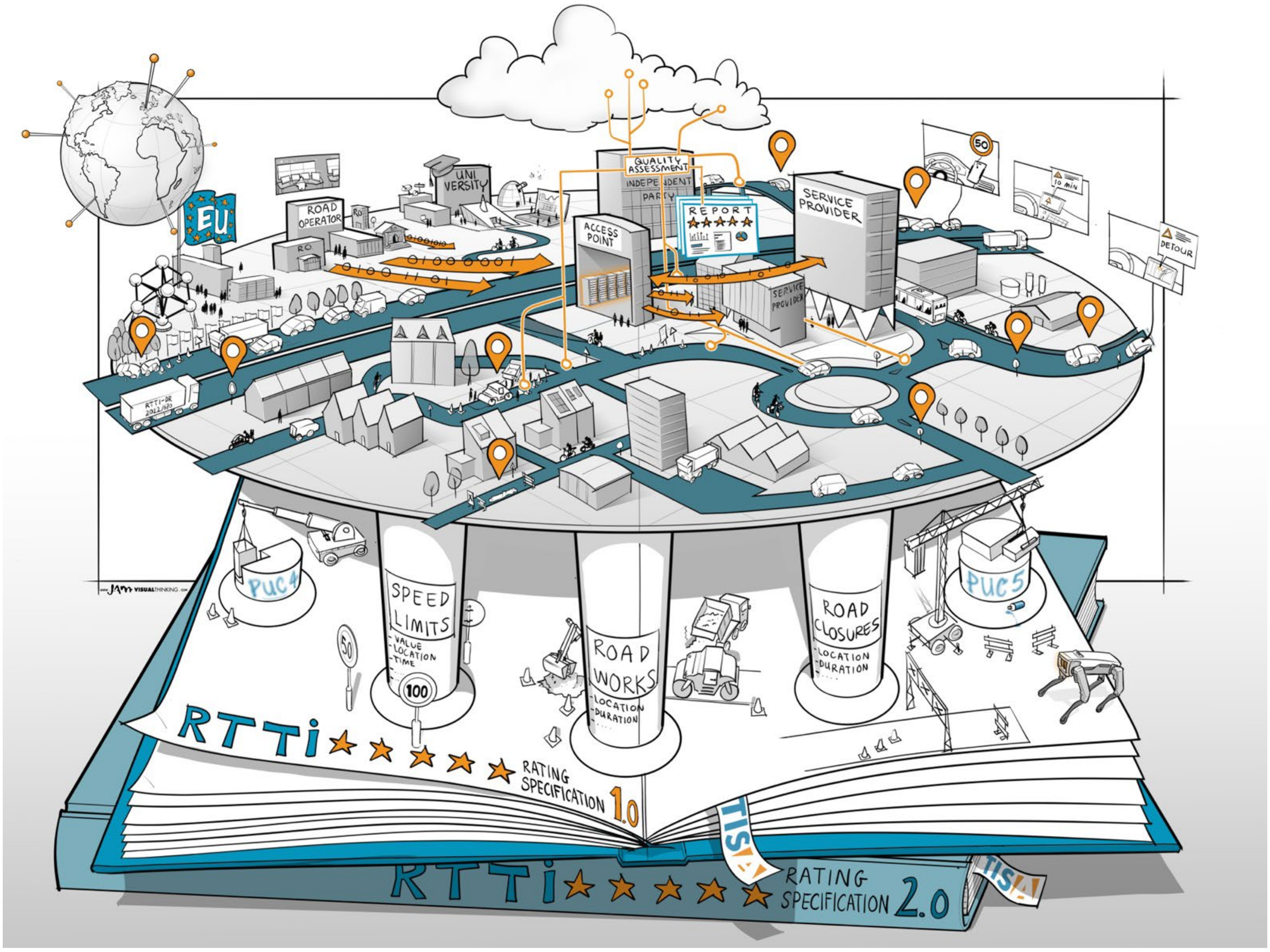


Figure 1 – Context for the RTTI 5-Star Rating Specification

Piloting 1st Version of the TISA 5-Star Rating

As part of TISA's process to continuously improve its specifications and to collect practical feedback and experience from stakeholders, there will be an initial pilot phase of approximately 6-12 months where public/private data providers and data users are encouraged to conduct tests and evaluations of the specification in practice. Such activities can be organised between TISA members internationally, bilaterally between different stakeholders and also inside relevant initiatives (such as EU TISGRADE project, NAPCORE etc). Before the publication of v1.0, TomTom and the Danish Road Directorate (DRD) conducted a small-scale pilot over August-September 2025 which proved an invaluable experience, and it was strongly encouraged to conduct more of these exercises with other stakeholders over a sufficient period of time. Based on these different testing and evaluation experiences the specification will be further improved in version 1.1. It is also encouraged that these testing activities are 'end-to-end' with public-private cooperation and also explore service providers usage of public authority data, i.e. what confidence level attribution will service providers apply to 1-5 star level data and how does that impact how public authority data is merged with other sources, how quickly does it reach end-user services, what type of feedback can service providers give to public authority from levels 1-5 including how it could be delivered and the need for other types of SLAs alongside this specification.

1. INTRODUCTION

1.1. Purpose and Development of the RTTI 5-Star Rating Specification

The original starting point came from world's largest ITS Service Providers who wanted to make their data evaluation process more transparent and better explain to Road Authorities and Operators why they were unable to use their data in production. But over time the development process evolved and widened, and this specification was developed by a large group of professionals representing the entire RTTI value chain incl. governments as well as industry between 2022-2025. The purpose is to establish a clear and consistent framework for evaluating the quality of data provided by the various Road Operators and Public Authorities by setting clear and realistic expectations that could be assessed consistently across the world by different stakeholders. The primary goal is to outline how a 5-Star Rating Specification can help ensure that the traffic information is accurate, timely and useful for Service Providers for embedding in their services. It covers key aspects like accuracy, completeness, and timeliness, so Service Providers receive the most up-to-date and reliable information on road conditions. It includes data on speed limits, roadworks, and road closures in the current version. The goal is to provide a straightforward way for data providers, particularly Road Authorities, or delegates thereof, to assess and improve their data quality. This also helps build trust among Service Providers, ensuring they rely on the information provided. It also builds trust among Public Authorities that need to know their efforts to deliver data of adequate quality will result in the information being used by Service Providers.

This specification is based on the consensus reached during multiple dedicated workshops organised by TISA between 2022-2024. The scope of this specification consists of 3 focus areas: speed limits, roadworks, and road closures, as these are considered foundational use cases for RTTI services. The audience of these workshops was an experienced group of people from:

- Road Authorities and Road Operators (data gatherers, data holders).
- Data Distributors (NAP or common access point).
- RTTI Service Providers (users of data).
- ITS Solutions Providers (technology enablers).
- Academic and Research Institutions with expertise in ITS and data quality (researchers).
- Industry Stakeholders (those involved in service generation, distribution, and end-user impact).

Several Road Authorities / Road Operators acknowledged that while there is room for improvement in the quality of data they gather and distribute, there is a general reluctance to invest in these improvements without clear assurances from ITS Service Providers that these enhanced data feeds will be utilised.

This is precisely where the RTTI 5-Star Rating plays a crucial role. It provides a clear specification that not only helps Road Authorities and Road Operators assess the quality of their data but also identifies where targeted investments can lead to tangible improvements, ensuring usage by Service Providers. The higher the rating, the higher the quality of information that end-users will access on the roads.

Essentially this specification aims to solve the so-called 'chicken-and-egg' problem.

The groups represented in the workshops are also the intended audience for this specification; like, but not limited to, Public Authorities, Road Operators, RTTI Service Providers, as well as stakeholders involved in intelligent transport systems. The specification is written so that these groups benefit from a guidance on improving data quality and increasing uptake by Road Operators, e.g. via the Access Points. This specification should be considered a practical tool for everyone involved in the gathering, delivery or improvement of traffic information services.

While this RTTI 5-Star Rating Specification is based on input from industry workshops and developed independently of the EU ITS Platform (EU EIP), it acknowledges the foundational work conducted in the platform between 2016 - 2021, and documented in the EU EIP Quality Package report (1) and related publications. The EU EIP established important definitions for key quality criteria such as accuracy, timeliness, and completeness - many of which align with those used in this framework. The RTTI 5-Star Rating complements this by translating those general principles into concrete thresholds, indicators, and methods tailored to high-priority use cases. The EU EIP established important definitions for key quality criteria such as accuracy, timeliness, and completeness—many of which align with those used in this framework. The RTTI 5-Star Rating complements this by translating those general principles into concrete thresholds, indicators, and methods tailored to high-priority use cases.

1.2. Scope and Applicability of the RTTI 5-Star Rating Specification

The focus of this RTTI 5-Star Rating Specification is on the data exchange between Content Providers and Services Providers. Data will primarily be exchanged with the help of the Access Points (APs). It could therefore be applied in context with Service Level Agreements (SLAs) between content and Service Providers or be used as substitute for SLAs where the closure of such is not possible due to legal, operational or other constraints. For example, when a dataset published via an Access Point includes a declared quality level (e.g., 4-star) as part of its metadata, this can serve as a signal for Service Providers to ingest and apply the data without needing a bespoke SLA.

Please note that this RTTI 5-Star Rating Specification should not be used for, or confused with, the quality of an RTTI Service as perceived by the End User, e.g. when being displayed on a navigation display. However, by ensuring minimum quality thresholds for key input data, the specification helps enable better service quality downstream. While end-user experience depends on many factors—some outside the control of Service Providers, such as OEM implementation choices, content blending, or network limitations—Service Providers are inherently customer-focused and have strong market incentives to deliver reliable information. This specification supports those efforts by aligning upstream data quality with service-level expectations.

There is indeed a positive correlation between the quality of the data output of the Content Providers respectively input to the Service Providers on one hand, and the End User-perceived quality on the other hand: higher quality content will result in higher quality End User services. However, for the evaluation of the End User-perceived quality, other methodologies need to be applied, such as the QBench methodology for travel times information, as described in the TISA guidelines SP16001 (2), SP16002 (3) and SP16003 (4).

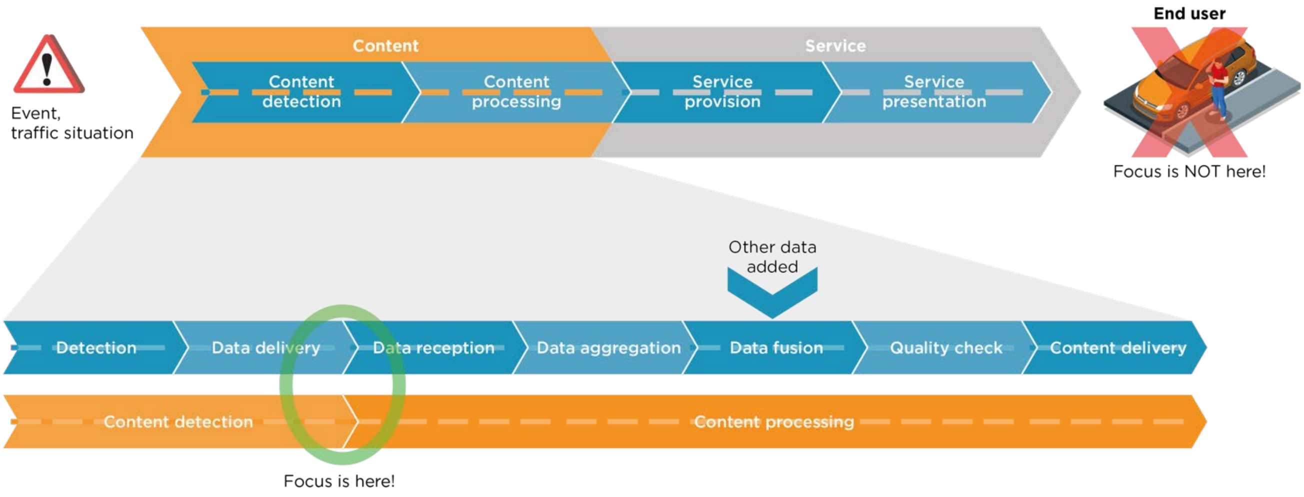


Figure 2 – Scope of the RTTI 5-Star Rating Specification

Figure 1 reflects the data flow and quality alignment between content and Service Providers, up to the point of service integration. While end-user experience is the ultimate objective, it is not the technical focus of this specification and is also influenced by additional layers and external factors beyond the scope of this specification.

While this specification focuses on evaluating the quality of RTTI data shared between content providers and Service Providers—primarily at the Access Points—its ultimate intent is to support high-quality end-user services. However, assessing end-user perceived quality (e.g., satisfaction with navigation outputs) falls outside the technical scope of this document. Further work in this area may evolve in parallel, based on industry needs and regulatory guidance.

1.3. Benefits for the different Stakeholder Groups

The specification provides, beyond providing a level playing field for all stakeholders involved in the generation and provisioning of RTTI content and services, several specific benefits for the different stakeholder groups, as outlined below:

For end users who need to know about critical events happening on the road network before and during their trip, the TISA 5-star rating specification vol. 1 harmonises the relevant quality criteria and thresholds for traffic data that can

- increase the availability to accurate, precise and complete traffic information which in turn makes travelling less stressful and safer.

For Road Authorities and Operators who want to inform and instruct ITS Service Providers about events happening on their network, the TISA 5-star rating specification vol. 1 harmonises the relevant quality criteria and thresholds for traffic data that can

- make it easier to assess current quality levels and plan how to improve incrementally overtime,
- guarantee the conditions under which ITS Service Providers use such data increasing usage,
- support any investment decision if needed,
- help Road Operators better manage their subcontractors for day-to-day operations, including road maintenance.

For ITS Service Providers who need to use high quality data sources to power their products and services, the TISA 5-star rating specification vol. 1 harmonises the relevant quality criteria and thresholds for traffic data that can

- increase access to higher quality public feeds worldwide,
- make it faster and easier to evaluate new public sources, and
- provide transparency to stakeholders on the conditions to use their data.

For Academic and Research Institutions who seek to develop new methodologies or assess real-world ITS deployments, the 5-star rating specification harmonises the relevant quality criteria and thresholds for traffic data that can

- enable foundational research through access to structured data,
- support applied studies evaluating data quality, service effectiveness and policy outcomes, and
- inform the development of curricula and training aligned with real-world quality benchmarks.

For Data distributors who are responsible for the delivery of data and / or meta data this specification helps to clarify the technical and operational requirements for data distribution set KPIs for their systems and services. This can help validation during onboarding new and improved incoming feeds which in the end contributes to the reliability of the platform and the (meta) data feeds.

For ITS solution providers that process, visualise and/or integrate RTTI data, this specification helps to get a consistent reference for feature/product alignment that depend on certain quality expectations. Also, it facilitates the integration and merging of multisource data with a performance baseline. Reduces overhead for filtering flawed data from quality data; enabling further innovation by reducing data ambiguity.

1.4. Importance of a Harmonized Rating for RTTI Services

Having a harmonized rating is crucial for various reasons:

- Consistency makes it **easier for Service Providers to adopt** and use official and publicly available road and traffic data in various geo-regions across the globe and inform end users respectively.
- Leading to **better informed and safer travel**. A driver can be made aware of events beyond their immediate line of sight. Additionally, the delay times and durations of incidents will be more accurate, providing drivers with better information and reducing frustration.
- This specification further ensures that real-time traffic information is both **reliable and available across borders**.
- Adhering to this rating system allows Road Authorities and Service Providers to **collaboratively harness untapped data** sources, **enhance data** quality, and ultimately **improve road safety** and travel efficiency. For example, planned roadworks from local municipalities or static speed limits on lower-class roads may exist in internal systems but are not yet actively shared via Access Points.

This harmonized approach helps to build trust among suppliers and Service Providers and encourages the adoption of best practices, ultimately leading to a more efficient and integrated transportation network. The collaborative development of this specification reflects the shared commitment of all parties to enhancing traffic information services for the greater good.

By adopting the RTTI 5-Star Rating System, Road Operators and Public Authorities have access to a tool to assess the quality of traffic data provided by their suppliers and ensure it meets the needs of real-time traffic information services. This helps authorities manage and steer their suppliers toward delivering higher-quality data that supports better routing, reduces congestion, and enhances road safety.

The rating system also serves as a clear benchmark for improvement, offering suppliers transparent guidelines on what is expected to achieve higher ratings. It provides a structured way to identify gaps, prioritise investments, and ensure that data aligns with the needs of end users and Service Providers. In this way, the system fosters collaboration and trust between stakeholders while giving authorities a measurable way to oversee progress and hold suppliers accountable.

This approach not only aligns with UN mobility goals but also ensures that public investments in data and technology directly benefit road users. By improving the quality of data through a systematic framework, member states can create opportunities for innovation and new partnerships, ultimately driving a more efficient, reliable, and connected transport network.

Link to the UN mobility goals: https://www.un.org/sites/un2.un.org/files/2020/09/un_road_safety_flyer.pdf

This rating is more than just an assessment tool; it's a way to encourage ongoing improvement in traffic and road data quality. By setting clear and realistic expectations and making the evaluation process transparent, it motivates data providers to improve their efforts. This leads to more accurate and timely information, benefiting everyone from Road Operators to end-users. Better quality data means smoother traffic management, less congestion, and safer roads for generations to come.

The transparency of the rating system helps align expectations and supports ongoing improvements across the RTTI ecosystem.

1.5. Technical Scope of the RTTI 5-Star Rating Specification

Loosely inspired by systems like EuroNCAP's (5) 5-Star Rating for vehicle safety and iRAP (6) for road infrastructure safety, this specification focuses on both static and dynamic traffic data, RTTI data quality and related evaluation methods:

- Data quality criteria and metrics specific to RTTI applications.
- Best practices for data quality management across the RTTI value chain.
- Interoperability standards to support seamless data exchange among ITS components.
- The impact of emerging technologies on RTTI data quality and specification creation.

This volume only covers speed limits, roadworks, and road closures as the most priority use cases but there are many more relevant datasets in RTTI. These priority use cases are considered the foundation for basic traffic management operations and navigation functionality. The choice is also based on a consensus that starting with these would make it easier to define requirements on the other RTTI data items (see Chapter 3.2 for more details). These three priority use cases—speed limits, roadworks, and road closures—correspond to the key traffic data categories listed in Annex III of EU Directive 2023/2661 (such as static and dynamic traffic regulations, and roadworks notifications).

The rating is based on various factors such as accuracy and timeliness, tailored to different road types. This approach considers the challenges Road Authorities and Service Providers face, like integrating multiple, often hundreds of data sources. This specification aims to be a practical tool for evaluating and improving traffic data quality. The specification will not cover hardware standardisation or non-ITS specific data governance issues.

1.6. Scope of Data Collection and Availability Thereof

This document follows the principles set out in Delegated Regulation (EU) 2022/670, which makes it clear in Recital (19) that stakeholders are not required to collect new data or digitise data that isn't already available in a digital format. The focus is on using what's already there and ensuring it's accessible, interoperable, and reusable for real-time traffic information services.

This means this specification builds on existing data from Road Authorities / Operators, without creating new investment requirements. However, existing data providers - both public and private - may choose to make moderate investments to reach higher quality levels (e.g. 3-star or above), although such enhancements remain voluntary and proportionate to their operational capacity. While the regulation applies to the entire road network that's open to public motorised traffic, the practical implementation of this specification can prioritise where data is currently available, avoiding unnecessary burdens while still delivering value.

At the same time, the EU regulation encourages stakeholders to explore cost-effective ways to digitise existing data and improve data accessibility[1] where feasible. This forward-looking approach ensures that this specification not only leverages what is available but also supports gradual enhancements to data quality and coverage in line with evolving technological and operational capabilities. Furthermore, Directive (EU) 2023/2661 now obliges European Member States to ensure the availability of the underlying information for specific crucial data types, such as speed limits, road works, and road closures, through Access Points by defined dates and for specified geographical areas, where this information already exists. It is expected that other regions around the world will also replicate the European model.

[1] The Delegated Regulation states that there is *no obligation on holders of in-vehicle generated data and private service providers to grant access to or share any of their data with private data users. Exchange and re-use of their data may be subject to terms and conditions determined by the private data holder*, see (EU) 2022/670, Article 6, 2. (e).

1.7. Collaboration and the Role of Stakeholders

Developing this rating specification is a team effort involving Road Operators, Public Authorities, RTTI Service Providers, ITS solution providers, and researchers from academia. By bringing together these different groups, the specification remains relevant and achievable.

Research institutions also stand to benefit significantly from having access to standardised and rated data. The availability of high-quality, well-structured RTTI data through Access Points (APs) can streamline research efforts, making it easier to analyse mobility patterns, test new concepts, and contribute to advancements in traffic management and safety. This specification not only supports the needs of current stakeholders but also opens opportunities for research that further enhances the transportation ecosystem.

Importantly, as explained in Table 11, while Service Providers may still use data that receives a 1- or 2-star rating depending on specific operational needs, the commitment behind this framework is that once data achieves a 3-star rating or higher, it is expected to be integrated into service offerings. This reinforces the role of quality thresholds in guiding uptake and fostering accountability across the data value chain.

1.8. History

On the 2nd February 2022, the European Commission adopted the Delegated Regulation (EU) 2022/670 regarding the provision of EU-wide real-time traffic information services under the ITS Directive. A key component of the regulation concerns the use, exchange and re-use of various traffic datasets between all ITS stakeholders via the so-called (National) Access Points. The regulation defined different sets of obligations for stakeholders to adhere to, but without stipulating the technical content of the requirements to implement them. For what concerns data quality, the regulation states that data made available in the Access Points must confirm to commonly agreed minimum quality requirements, but without stipulating the content of those quality requirements. Therefore, in the period between the adoption of the Delegated Regulation and the entry into force, the ITS community needed to organise themselves to help prepare the implementation and define requirements not included in the regulation itself. In November 2022, a session was organised at the NAPCORE Advisory Board meeting in Paris, addressing the 'Implications of the revision of the RTTI directive on private parties' which investigated all the different obligations requiring public-private collaboration. In this meeting it was agreed to focus on priority use cases to help navigate how to prioritise the work for the coming period. TomTom, on behalf of other ITS Service Providers agreed to take the lead in coordinating a group under the NAPCORE umbrella, which comprised at first with the National Road Traffic Data Portal (NDW), the ERTICO TM2.0 platform and TISA.

In February 2023, a webinar[2] was co-organised by this core group in collaboration with the NAPCORE Advisory Board, POLIS and CEDR, attracting over 160 participants. In the webinar several local, regional and national Public Authorities from across Europe presented their biggest challenges on RTTI and public-private collaboration. As a result of the webinar, in April 2023 the commercial ITS Service Providers (BeMobile, Google Maps, HERE Technologies, TomTom) hosted a two-day workshop for Public Authorities and all other stakeholders along the ITS value chain. The two-day workshop was held the offices of Google Maps and TomTom in Berlin with more than 60 participants. On the 1st day, a dedicated training on RTTI products and services was delivered and amongst several other topics, ITS services providers explained the quality criteria they typically use to assess traffic data from Public Authorities. In this training the ITS Service Providers proposed the use of a Service Level Agreement (SLA) for data hosted on the Access Points which would stipulate the required minimum quality requirements. At the end of the workshop, it was agreed amongst the participants that the ITS Service Providers would propose an alternative to the use of an SLA as it was deemed too difficult from a legal perspective for Public Authorities to use it. Because of its long history and experience in quality and standardisation, it was also agreed that TISA would take the lead on coordinating data quality activities.

In November 2023, another two-day workshop with 55 participants was organised by TISA in Amsterdam, where the concept of a 5-Star Rating was first proposed by the ITS Service Providers BeMobile, Google Maps, Here Technologies, TomTom. Inspired by

[2] https://www.youtube.com/watch?v=VDaq5ZAPyL8

the EuroNCAP vehicle safety assessment programme, the proposal focused on the three priority use cases and the initial list of quality criteria and proposed performance thresholds. During this event, the commercial ITS Service Providers presented the conditions under which they would agree to use data from Public Authorities or Road Operators if at least a 3-star quality rating would be achieved (see section 4.3)[3]. Through a series of breakout activities with all participants, the quality criteria and thresholds were discussed and debated, and different elements were identified to further improve the concept. TISA was asked to organise a follow-up workshop where recommended proposals on how to address the different identified issues would be presented. During the third workshop in March 2024 with over 60 participants (in Brussels and Online), the basic set of draft requirements were defined, and TISA was tasked with the formation of a Technical Working Group comprising subject matter experts around RTTI with the objective to cast the quality requirements for the three priority use cases. A second Strategy Working Group should overlook the work of the Technical Working Group and provide guidance as well as ensure broad stakeholder outreach and involvement. It was agreed that participation to both WG's would be open to non-TISA members. At this point in time the ITS Service Providers handed over the coordination and management of the 5-star rating concept to TISA and to transform the overall concept into a TISA quality specification that could be considered the official minimum quality requirements of EU 2022/670.

Between March 2024 and October 2025, the RTTI 5-star rating concept was further developed and defined and matured into a formal document. In this period the RTTI 5-star rating specification also received a lot of attention across the entire ITS value chain. The key discussion points were (1) how to balance to needs of end users, the ambition level of ITS Service Providers and the current capabilities of Road Operators & Public Authorities and (2) what the approval and governance process would be needed for the specification to serve within EU 2022/670.

When version 0.9 of the specification was reviewed by more than 16 EU Member States between January and April 2025 via the 'RTTI Task Force' it became clear that TISA would need to first publicly publish v1.0 of the specification during 2025 unilaterally. Subsequently the Member States would need to separately lead a process to decide how the specification could be officially recognised as the minimum quality requirements of EU 2022/670. In parallel, Road Authorities and Operators around the world outside of Europe without a similar legal framework could voluntarily decide to use the specification.

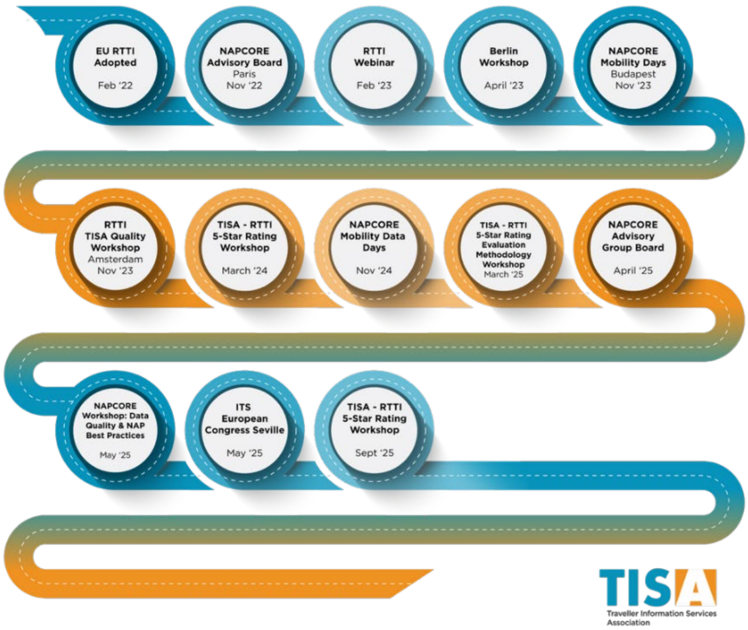


Figure 3 – Sequence of events that led to the creation of this RTTI 5-Star quality rating specification

[3] This commitment does not imply that data with a 1- or 2-star quality rating will not be used by commercial Service Providers. Most likely, such data will in fact be used. However, this commitment implies the obligation of commercial Service Providers to use such data if it reaches a 3-star rating or above.

1.9. Contributors

As explained in the introduction, while the blueprint of the specification originated from the ITS Service Providers there were several activities organised for stakeholders to provide feedback on the overall concept and vision of this specification. Table 1 shows the different participants along the ITS value chain that were present in the three consensus-building workshops where the baseline parameters for the core functionality and the three priority use cases were discussed.

Workshop 1	Workshop 2	Workshop 3
26-27 April 2023, Berlin, Germany	27-28 Nov 2023, Amsterdam, The Netherlands	12 March 2024, Brussels, Belgium & Online
• Albrecht Consult • ASFINAG • AUTO STRADE • BAST • Belgian Nationaal Geografisch Instituut • Be-Mobile • CERTH • City of Amsterdam • City of Gent • City of Gronigen • City of Helmond • City of Stuttgart • Danish Road Directorate • DGT • Dutch Ministry of Infrastructure • ERTICO-ITS Europe • Finish Traficom Agency • GEWI AG • Google Maps • HERE Technologies • Lithuanian Ministry of Transport • National Highways UK • NDW • Norwegian Public Roads Administration Vegvesen • NRW • Prisma Solutions • Promet • Realis • RWS • Slovenia Ministry of Infrastructure • Swarco • TISA • TomTom • Trafficon • Transport Infrastructure Ireland • Travikverket • UK Department of Transport • VO Verkeerscentrum	• AI-InfraSolutions • ASFINAG • Autostrade per l'Italia • AWV - Traffic Centre Flanders • Be-Mobile • Belgian National Geographic Institute • CERTH-HIT • City of Amsterdam • City of Ghent - Mobility Department • City of Helmond • Danish Road Directorate • Department for Transport • ERTICO-ITS Europe / TN-ITS • European Commission • Federal Highway Research Institute (BASt) • French Ministry of Transport • GEWI AG • Google Maps • HERE Technologies • KIOS CoE - University of Cyprus • Livecrowd • National Highways • NDW • Norwegian Public Road Administration • NRW Mobidrom • PRISMA solutions • SWARCO • The Danish Road Directorate • The Department for Transport • TISA • TomTom • Traficon Ltd • Transport Infrastructure Ireland • TripService • Vialis bv • VO Verkeerscentrum • XOUBA	• AI-InfraSolutions • ASFINAG • ASFINAG (Austria) • Belgian National Geographic Institute • Be-Mobile • City of Amsterdam • City of Ghent - Mobility Department • City of Helmond • Crow • Danish Road Directorate • Department for Transport • Directorate-General for Infrastructure, Transport and the Sea (DGITM) • ERTICO-ITS Europe / TN-ITS • Federal Highway Research Institute (BASt) • GEWI AG • Google Maps • HERE Technologies • KIOS CoE - University of Cyprus • Ministry of Infrastructure and Waterman-agement • Mobiris Brussels • NAPCORE / BASt • NDW • NNG • Norwegian Public Road Administration • NTM • PRISMA solutions • Rijkswaterstaat • Service Public Régional de Bruxelles • Service Public Wallonie • STA – Südtiroler Transportstrukturen AG • SWARCO • Swedish Transport Administration • The Department for Transport • TISA • TomTom • Traficon Ltd • Transport Infrastructure Ireland • Triona • TripService • Vialis bv • Vlaamse Overheid

Table 1 – Participants in the three consensus-building workshops

Following the third and concluding workshop, two groups were formed to continue the work for which the foundations were laid in the above mentioned three workshops:

1. A technical oriented group of subject matter and standardisation experts that were tasked to shape the outcomes of the three workshops into a specification that serves as the base for i) developing a practical and pragmatic evaluation methodology for the assessment of RTTI data quality based on the 5-Star Rating Specification, ii) establishing an accreditation scheme for issuing the 5-Star Ratings and maintaining a global reference database for assessed entities.

Please note that participation in the technical group is limited to experienced subject matter experts and by invitation only.

2. A stakeholder groups tasked with continuing the consensus-building, increase the outreach of the 5-Star Rating and guide the work of the technical group by e.g. defining priorities for new use cases to be added to the 5-Star Rating Specification at a later stage.

Please note that participation in the Stakeholder Involvement Group is open to any relevant party and interested organisation may contact the TISA Executive Office via eo@tisa.org for participating in this group.

Standardisation Group (subject matter and standardisation experts only)	Stakeholder Involvement Group (open to any relevant party)
City of Amsterdam	Aramis
CROW	BeMobile
Danish Road Directorate (DRD)	City of Amsterdam
Flemish Road Authorities (Vlaamse Overheid)	City of Helmond (NL)
GEWI AG	Danish Road Directorate (DRD)
HERE Technologies	Flemish Road Authorities (Vlaamse Overheid)
National Road Traffic Data Portal (NDW)	GEWI AG
Swedish Transport Agency (Trafikverket)	Google Maps
TomTom	HERE Technologies
Traveller Information Services Association (TISA) ASBL	National Road Traffic Data (NDW)
	Swedish Transport Agency (Trafikverket)
	TomTom
	Traveller Information Services Association (TISA) ASBL

Table 2 – Contributors to the creation of this document

1.10. Outlook and Next Steps

The RTTI 5-Star Rating Specification is a living guide that will continue to grow and adapt. Upcoming developments will fine-tune how the assessment quality, add new data types, and tackle data-sharing challenges. Regular updates and stakeholder input will ensure the specification stays useful and effective in promoting high-quality RTTI services. The aim is to set a path for constant improvement, helping RTTI services across the world reach their full potential.

The original intention of the ITS Service Providers was to have a specification that could serve as an assessment tool and easily conducted as a self-assessment by Road Authorities and Operators. This objective is still maintained but it should also be envisaged that Road Authorities and Operators may wish to use a suitable 3rd party assessment body to carry out the assessment for them. In the future, a separated but connected document to this specification will be published that will define the recommend methodologies to correctly and effectively conduct the evaluations and assessments to determine the quality level of speed limit, road work and road closure data. This document will be made freely available to TISA members and available to purchase for other stakeholders.

1.11. Use of Specification for EU RTTI 2022/670 Minimum Quality Requirements

The objective of EU RTTI 2022/670 is to improve the accessibility, exchange, re-use and update of data required for the provision of high quality and continuous real-time traffic information services across the European Union. There are several sections of the regulation where it is stipulated stakeholders across the value chain need to work together to define minimum quality requirements notably paragraph 2b in Articles 4-7, paragraph 1g in Articles 8-9, paragraph 1d in Article 10 and paragraph c in Article 11.

Recital 21 describes the objective and process as follows: *Member States and ITS stakeholders should be encouraged to cooperate to agree on common definitions of data quality with a view to use common data quality indicators throughout the traffic data value chain, such as the completeness, accuracy and up-to-dateness of the data, the acquisition method and location referencing method used, as well as quality checks applied. They should also be encouraged to work further to establish associated methods of quality measurement and monitoring of the different data types. Member States should be encouraged to share with each other their knowledge, experience and best practices in this field in the on-going and future coordination projects.*

TISA supports the use of this specification as the official minimum quality requirements for speed limit, road work and road closure data and this document will be made publicly available free of charge to enable this. In the absence of a formal approval process described in EU 2022/670, Member States and ITS stakeholders will need to decide together how this specification can be used and what the corresponding approval/endorsement process will look like.

1.12. International Relevance and Global Uptake

The development of the TISA RTTI 5-Star Rating Specification resonates beyond Europe, as similar efforts are underway worldwide to harmonise traffic data provision and ensure consistent quality. A notable example is the recent Austroads report Approach to Standardised Road Agency Data Provision for Safe and Efficient Journeys Using Harmonised Access Points (AP-R738-25). This work introduces the concept of Harmonised Access Points (HAPs) for Australia and New Zealand, a model inspired by the European framework for National Access Points but adapted to the local governance context.

The Austroads programme began in 2023 and is structured in four reports: an internal review of European approaches (including Safety Related Traffic Information and Data for Road Safety, with reference both TISA and NAPCORE), an internal industry consultation activity with major data providers, a recently published public summary, and a forthcoming final practical guide to support implementation by road authorities. The concepts applied in this programme explicitly build on the TISA Traffic and Travel Information Value Chain (2012), demonstrating the lasting global influence of TISA's work on RTTI quality and governance.

By aligning datasets with the requirements of the Australasian New Car Assessment Program (ANCAP) Speed Limit Information Function (SLIF), which in turn reflects the European Euro-NCAP standards, Austroads ensures international compatibility in safety-related use cases. The consideration by Australian and New Zealand road authorities to this approach highlights both the urgency of harmonised, quality-driven data provision and the recognition of European models as a practical foundation.

NOTE: Austroads does not propose a rating mechanism to value a data source on a scale. Their approach is compliance- and guidance-driven, not performance-evaluated like our 5-Star model.

This parallel, large-scale initiative underlines the global relevance of the RTTI 5-Star Rating Specification as a framework that not only supports compliance in Europe but also inspires comparable developments worldwide.

NOTE: The public report can be downloaded with a free Austroads account from:
https://austroads.gov.au/publications/connected-and-automated-vehicles/ap-r738-25

2. SPECIFICATION TERMINOLOGIES

2.1. Terms and Definitions

In the world of Real-Time Traffic Information (RTTI), having a shared understanding of key terms is crucial. This chapter will break down some of the most important concepts and terminology encountered when working with RTTI and its 5-star rating specification. Whether you're a Road Authority, a Service Provider, or simply interested in how to make roads smarter and safer, this guide will help you get to grips with the language of RTTI.

The RTTI 5-Star Rating Specification adopts a terminology approach based on existing, internationally recognised sources, while maintaining a global perspective to ensure broad applicability. Definitions included in this chapter are either used directly in the evaluation methodology or required for stakeholder understanding across the RTTI value chain.

To ensure both consistency and interoperability, this specification references and is informed by the following frameworks:

- European Union Delegated Regulation (EU) 2022/670 – for regulatory definitions on RTTI and National Access Points.
- NAPCORE Data Dictionary – for harmonised data semantics in the European NAP ecosystem.
- DATEX II (CEN/TS 16157) and TN-ITS (CEN/TS 17268) – as the main data modelling standards for event and attribute-level road information.
- mobilityDCAT-AP – for metadata profiles relevant to dataset cataloguing in APs.
- INSPIRE, UNECE vehicle classifications, ISO/TC 204 and Open Geospatial Consortium (OGC) standards – for global alignment with transport, geospatial and mobility terminology. Applications outside of Eruope can use WGS84 as well.

Where definitions diverge across these frameworks, this document adopts the version that best supports clarity, quality assessment, and implementation feasibility for RTTI data providers and users. Terms not directly used in the evaluation model have been omitted to ensure focus and readability.

Academic and Research Institutions

Institutions that contribute through research, innovation, and analysis to enhance RTTI data quality and standardisation.

Access Point

A centralised platform established to facilitate the exchange of traffic and travel data.

NOTE: It serves as a single point of access for Service Providers and other stakeholders to retrieve high-quality, standardised RTTI data. The AP is essential for ensuring that the data is consistently available across different regions and services.

NOTE: National Access Point (NAP), Mobility Data Hub, and Harmonized Access Point are terms for the same concept.

Access Restrictions / Conditions

A regulatory condition limiting access to a road segment based on parameters such as vehicle type, weight, time of day, or environmental zones.

NOTE: Unlike full road closures, access restrictions allow selective entry under specific conditions. These are not covered under this version of the specification.

Accuracy

1. [As an adjective] how closely the data represents the real-world situation, this can be accuracy in space (location) and accuracy in time (freshness / timeliness), or temporal accuracy.

NOTE: With real-world situation the road situation a road user encounters is meant. This is not a legal document / paper plan.

2. [As a criterion] absolute accuracy in meters of the referenced location of the published event/road attribute with respect to the actual location (EIP 2019), additionally, temporal accuracy involves the level of synchronization between the recorded or reported event time and the actual occurrence of the event. This includes aspects such as data freshness, with minimal delay between the occurrence and the update.

NOTE Accuracy is about the exactness of the information, such as the precise location of an incident or the speed limits on a specific road segment. Accurate data is critical for ensuring that drivers receive trustworthy and actionable information, helping them make better decisions on the road.

Application Programming Interface

A set of protocols and tools for building software and applications.

NOTE: In the context of RTTI, APIs are used to facilitate the exchange of traffic data between different systems, such as between an Access Point and a navigation Service Provider. APIs enable real-time communication and integration of RTTI data into various applications.

Circular Error Probable

A measure used to define the accuracy of GNSS-based location data.

NOTE: In the context of RTTI, it indicates the radius of a circle within which 50% of the actual GNSS measurements fall. A smaller CEP value means greater accuracy in pinpointing the location of traffic events or conditions.

Completeness

1. [In general] the extent to which RTTI data covers all necessary information relevant for a reported event.

2. [As a criterion] In general: the percentage of the events which are known to be correctly detected and published by type/class, time and location (EIP 2019). For static speed limits: the proportion of the relevant road network for which valid and usable speed limit information is available. This is typically measured per Functional Road Class (FRC) and indicates how fully the static dataset covers the expected scope.

NOTE: In this document, completeness applies to both, event data and static data like speed limits, though the interpretation and metrics differ. For events, it's about attribute presence; for static data, it's about coverage.

NOTE: It ensures that every aspect of the traffic situation is reported, from major road closures to minor incidents. For example, if there's roadwork that could affect traffic flow, completeness means including all details about its location, duration, and impact. 0% would mean the event contains none of the necessary pieces of information and 100% all the necessary information. Some examples of these pieces of information are start & stop time, location, direction, schedule, effect and cause.

Correctness

The degree to which the attributes of an RTTI event (e.g. roadworks, closure) accurately reflect reality. This includes key elements such as location, timing, event type, and any additional relevant metadata.

NOTE: Calculation of correctness: 100% minus the % of published events/road attributes which are known to be NOT correct, con-cerning the actual occurrence of type/class (EIP 2019).

NOTE: In advanced use cases, each attribute may carry a different weight based on its impact on downstream applications (e.g., navigation, traffic rerouting, emergency response). For example, incorrect road direction may have more severe consequences than a missing vehicle classification. These weighted correctness models can be implemented as part of a use-case specific Evaluation Methodology.

Contraflow Situation

A situation in which traffic is occupying the part of the road reserved for the opposite direction.

Data / Content Provider

Organisation or entity that generates and supplies traffic-related data, such as road conditions, speed limits, and real-time updates and/or aggregate supplementary content for RTTI services, including weather conditions, construction updates, or incident alerts.

Data Distributor

Intermediary that facilitates the dissemination of RTTI data to Service Providers or end users, often operating through platforms like Access Points.

Data Format

Structure for organising and encoding information to ensure consistent interpretation and interoperability during communication between systems.

NOTE: A standardised data format allows feed users not to write interpreters per feed. For criteria, DATEX II version 3 will be the preferred format.

Data Exchange Specification for Traffic Management and Information

A standardised format for exchanging traffic and travel information between systems.

NOTE: It ensures that RTTI data is shared in a consistent manner, promoting interoperability and seamless data integration. DATEX II is widely used across Europe for traffic management and information services.

Data Holder

Legal or natural person or entity that holds the rights to share or grant access to data, in accordance with applicable laws.

Data User

Road authorities, Operators, tolling entities, Service Providers, and others who use data to create RTTI services or related mobility solutions.

Digital Map Producer

Entity responsible for creating and updating digital maps by integrating static and dynamic data to support navigation and RTTI services.

Dynamic Data

Information that changes frequently or near real-time, including details about current traffic conditions, such as accidents, weather-related road conditions, and temporary roadworks.

NOTE: Dynamic data is crucial for providing up-to-date information that can help drivers avoid congestion and choose the best routes.

Functional Road Class

A classification system used to categorise roads based on their importance and function. There are multiple classifications on road class in use.

NOTE: Lower FRC levels indicate roads with more significant traffic volumes and strategic importance, such as motorways. Understanding FRC is vital for RTTI, as it helps prioritise data accuracy and completeness for the most critical roadways.

Fusion engine

A fusion engine is a system that combines data from multiple sources into a single, consistent output used in RTTI services.

NOTE: Fusion engines follow structured computational processes and may include components such as map matching, temporal alignment, or confidence scoring. They are essential for blending static and dynamic datasets into reliable, service-ready information.

Global Positioning System

A satellite-based navigation system that provides location and time information.

NOTE: In RTTI, GNSS is essential for accurately determining the positions of vehicles and traffic events. GNSS data is used to track real-time movements and provide precise location information to drivers and traffic management systems.

Holder of In-Vehicle Generated Data

Entity that collects, aggregates, and manages data generated by vehicles or onboard devices for RTTI purposes.

Industry Stakeholder and Association

Organisations advocating for best practices, collaboration, and the implementation of RTTI standards across the industry.

Intelligent Speed Assistance

A driver assistance system designed to help drivers adhere to speed limits.

NOTE: It uses RTTI data to provide real-time feedback on the current speed limit and can even intervene to prevent speeding. This technology plays a significant role in improving road safety by reducing the likelihood of accidents caused by excessive speed.

ITS Solution Provider

Company that develops and supplies technical tools and platforms required for collecting, processing, and distributing RTTI data.

Linear Referencing

Location referencing using WSG84 points along a measured line.

NOTE: The best linear referencing depicts the length, form, position, and bearing/heading of the traffic event with the highest accuracy.

Location Referencing

Standardised method for identifying and conveying geographic positions or locations.

NOTE: Failed map matching due to unclear location referencing is one of the most common reasons for missing incidents. This guideline favours location referencing OpenLR as it is the offers the best combination of compatibility, precision and flexibility. However, the best feeds offer more than one location referencing to cover the weak spots of other standards.

Long-term Event

Planned activities like scheduled construction or maintenance, e.g. spanning days to months, with less frequent updates.

NOTE: The distinction between short-term and long-term events lies in predictability and duration—short-term events are reactive and immediate, while long-term events are proactive and pre-scheduled.

OpenStreetMap

A free, editable map of the world being created by a collaborative project.

NOTE: It provides a valuable source of static data for RTTI services, including road layouts, classifications, and speed limits. By integrating OSM data, RTTI services can enhance their coverage and accuracy, especially in areas where other data sources may be limited.

Public Authority

Public body responsible for regulatory compliance, setting quality standards, and ensuring the alignment of RTTI services with broader public policy goals.

Qbench

A method that measures the quality of Traffic Flow information.

Real-Time Traffic Information

Data live and static, as well as updates about traffic conditions, such as congestion levels, accidents, roadworks, and closures ultimately, it's the data that is used to build RTTI services upon.

NOTE: This information is disseminated to users, typically through navigation systems or traffic management centres, to help them make real-time decisions about their travel routes. RTTI aims to enhance road safety and efficiency by providing accurate and timely traffic data.

Relevance

How pertinent and useful the information is for the end-users.

NOTE: For RTTI data to be relevant, it must address the immediate needs of drivers, such as providing information on current traffic jams, accidents, or road closures. It's about ensuring that the data provided helps users make informed travel decisions.

Road Authority

Any public authority responsible for the planning, control or management of roads falling within its territorial competence.

Road Operator

Any public or private entity that is responsible for the maintenance and management of the road and traffic flows.

RTTI Service Provider

Entity that creates and delivers real-time traffic information services to end users by processing and distributing data from various sources.

Service Level Agreement

A contract between a Service Provider / supplier and a customer / user that outlines the expected level of service, including the quality and timeliness of data delivery.

NOTE: In RTTI, SLAs ensure that Service Providers meet specific standards for data accuracy, completeness, and availability, providing users with reliable traffic information.

Short-term Event

Unplanned or emergency activities like minor repairs or accident-related disruptions, typically lasting hours to a few days. These require more frequent updates.

NOTE: The distinction between short-term and long-term events lies in predictability and duration—short-term events are reactive and immediate, while long-term events are proactive and pre-scheduled.

Static Data

Information that doesn't change frequently, such as speed limits, road geometry, or permanent road closures.

NOTE: This data forms the foundation for many RTTI services, providing a baseline that is combined with dynamic data to offer a complete picture of current road conditions.

Technology Enabler

Organisation providing infrastructure, such as communication networks and location-based services, that support RTTI systems.

Timeliness

How quickly data is collected, processed, and made available to users.

NOTE: Figure 11 clarifies the differences between update cycle and timeliness.

Tolling Operator

Public or private entity taking the role of toll Service Provider or toll charger as defined in Directive (EU) 2019/520 of the European Parliament and of the Council.

Traffic Management Centre

A facility that monitors and manages traffic flow, incidents, and road conditions.

NOTE: It serves as a central hub for collecting, analysing, and disseminating RTTI data to drivers, Service Providers, and other stakeholders. TMCs play a crucial role in maintaining efficient and safe road networks by providing real-time traffic management.

Transport Protocol Experts Group

A standard used for delivering traffic and travel information, including RTTI.

NOTE: It allows for the efficient and effective dissemination of real-time data to end-users, ensuring compatibility across different platforms and services. TPEG plays a key role in making RTTI data accessible and usable for a wide audience.

Update Cycle

1. [As a time interval] time interval for refreshing and updating published events/road attributes (~ reporting period).

2. [As a process] periodically refreshing, modifying and publishing data so that it is accessible by 3rd parties.

NOTE: Figure 11 clarifies the differences between update cycle and timeliness.

Use of Specification

[As a criterion] The degree to which RTTI data uses a consistent and agreed method to represent events, based on a recognised data standard.

NOTE: While formats like DATEX II support flexibility in how events can be described, this flexibility can lead to inconsistent encoding across feeds. For instance, different Road Operators might use different structures to represent road closures, making it hard for Service Providers to interpret them reliably. This criterion rewards the consistent application of event models, profiles, and schemas to avoid ambiguity and ensure high interoperability.

Vehicle Classification

The vehicle classification in delivered data according to the UNECE standards (7).

NOTE: Relevant vehicle classifications referenced in this document are described in Table 3.

Category	Description
L	**Motor vehicles with less than four wheels [but does include light four-wheelers]**
L1	A two-wheeled vehicle with an engine cylinder capacity in the case of a thermic engine not exceeding 50 cm³ and whatever the means of propulsion a maximum design speed not exceeding 50 km/h. (Electric bicycle)
L2	A three-wheeled vehicle of any wheel arrangement with an engine cylinder capacity in the case of a thermic engine not exceeding 50 cm³ and whatever the means of propulsion a maximum design speed not exceeding 50 km/h. (Auto rickshaw)
L3	A two-wheeled vehicle with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm³ or whatever the means of propulsion a maximum design speed exceeding 50 km/h. (Motorcycle)
L4	A vehicle with three wheels asymmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm³ or whatever the means of propulsion a maximum design speed exceeding 50 km/h (motor cycles with sidecars).
L5	A vehicle with three wheels symmetrically arranged in relation to the longitudinal median plane with an engine cylinder capacity in the case of a thermic engine exceeding 50 cm³ or whatever the means of propulsion a maximum design speed exceeding 50 km/h. (Motorized tricycle)
L6	A vehicle with four wheels whose unladen mass is not more than 350 kg, not including the mass of the batteries in case of electric vehicles, whose maximum design speed is not more than 45 km/h, and whose engine cylinder capacity does not exceed 50 cm³ for spark (positive) ignition engines, or whose maximum net power output does not exceed 4 kW in the case of other internal combustion engines, or whose maximum continuous rated power does not exceed 4 kW in the case of electric engines. (Golf cart, Mobility scooter)
L7	A vehicle with four wheels, other than that classified for the category **L6**, whose unladen mass is not more than 400 kg (550 kg for vehicles intended for carrying goods), not including the mass of batteries in the case of electric vehicles and whose maximum continuous rated power does not exceed 15 kW. (Microcars)
M	**Vehicles having at least four wheels and used for the carriage of passengers**
M1	Vehicles used for carriage of passengers, comprising not more than eight seats in addition to the driver's = 9.(Larger Than Standard Car e.g.: London Cab / E7 Type Vehicle 8 seat + Driver.)
M2	Vehicles used for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum mass not exceeding 5 tonnes. (Bus)
M3	Vehicles used for the carriage of passengers, comprising more than eight seats in addition to the driver's seat, and having a maximum mass exceeding 5 tonnes. (Bus)
N	**Power-driven vehicles having at least four wheels and used for the carriage of goods**

Category	Description
N1	Vehicles used for the carriage of goods and having a maximum mass not exceeding 3.5 tonnes. (Pick-up Truck, Van)
N2	Vehicles used for the carriage of goods and having a maximum mass exceeding 3.5 tonnes but not exceeding 12 tonnes. (Commercial Truck)
N3	Vehicles used for the carriage of goods and having a maximum mass exceeding 12 tonnes. (Commercial Truck)
O	**Trailers (including semi–trailers)**
O1	Trailers with a maximum mass not exceeding 0.75 tonnes.
O2	Trailers with a maximum mass exceeding 0.75 tonnes, but not exceeding 3.5 tonnes.
O3	Trailers with a maximum mass exceeding 3.5 tonnes, but not exceeding 10 tonnes.
O4	Trailers with a maximum mass exceeding 10 tonnes.

Table 3 – Vehicle classifications listed

2.2. Abbreviated Terms

For the purposes of this document, the following abbreviated terms apply.

Abbreviation	Meaning
AI	Artificial Intelligence
AP	Access Point
API	Application Programming Interface
CEDR	Conference of European Directors of Roads
CEP	Circular Error Probable
CP	Content Provider
DATEX II	Data Exchange Specification for Traffic Management and Information
EM	Evaluation Methodology
EU	European Union
FRC	Functional Road Class
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System
HDV	Heavy-Duty Vehicle
ISA	Intelligent Speed Assistance
ITS	Intelligent Transport Systems
MAVT	Multi-Attribute Value Theory
MCDA	Multi-Criteria Decision Analysis
NAP	National Access Point

Abbreviation	Meaning
OGC	Open Geospatial Consortium
OSM	OpenStreetMap
QR	Quality Rating
RDS-TMC	Radio Data System-Traffic Message Channel
RTTI	Real-Time Traffic Information
SLA	Service Level Agreement
SP	Service Provider
TISA	Traveller Information Services Association
TMC	Traffic Management Centre
TN-ITS	Transport Network Intelligent Transport Systems
TPEG	Transport Protocol Experts Group
UNECE	United Nations Economic Commission for Europe

Table 4 – List of abbreviated terms used

3. PRIORITY USE CASES

The focus on **Speed Limits**, **Roadworks**, and **Road Closures** as a prioritised subset is a strategic and practical decision for several key reasons. These areas directly impact real-time traffic management and are critical for both road safety and efficiency, making them essential building blocks for the RTTI 5-star Rating Specification.

Figure 4 – Higher RTTI 5-Star Rating Leads to Safer Roads

3.1. Use Case Prioritisation

High Impact on Traffic Flow and Safety

Speed Limits, Roadworks, and Road Closures are key factors that influence daily traffic flow and road safety. Having accurate, timely, and reliable information on these elements helps drivers make safer and more informed decisions.

Incorrect or outdated speed limit data could lead to unsafe driving conditions, and unexpected road closures can cause significant delays and congestion. Addressing these core issues first ensures that the most critical aspects of real-time traffic information are covered.

Relevant Regulatory Requirements

Speed limits, roadworks, and road closures fall within the required scope of the Delegated Regulation (EU) 2022/670. They are also referenced in Annex III of the revised ITS Directive 2023/2661.

As mentioned in the Foreword, this specification could be used to help support the implementation of the aforementioned regulations, however it should not be seen as the official minimum quality requirements.

Foundational Data for More Advanced Use Cases

These three categories serve as the baseline for more complex RTTI applications, such as real-time incident detection, navigation, and Advanced Driving Assistance Systems (ADAS). By first ensuring the quality of speed limits, roadworks, and closures, Road Operators create a reliable foundation that enables future advancements in Intelligent Transport Systems (ITS).

The structured management of these three aspects makes it easier to extend to other RTTI areas such as traffic incidents and congestion management, which are part of the broader scope of the ITS sector.

3.2. Starting Point Rationale

Clear, Measurable Criteria

Speed Limits, Roadworks, and Road Closures provide data that can be **objectively measured** in terms of accuracy, timeliness, completeness, and location precision. This makes them ideal candidates for establishing the 5-Star Rating System, where each star level is tied to progressively stricter criteria.

For example, the 3-Star Rating sets achievable targets for Road Authorities (e.g., weekly updates for speed limits), while the 5-Star Rating pushes for more frequent, real-time updates (e.g., daily or even hourly for roadworks).

Balanced Entry Point for Road Operators

Starting with this subset offers a **realistic starting point** for many Road Operators who might be overwhelmed by the potential work involved in building a full-fledged RTTI implementation. By focusing on these three core areas, Road Authorities can improve their RTTI services without needing to invest heavily in every possible aspect of real-time traffic management upfront.

This approach allows gradual progress, building toward full compliance and higher quality RTTI services over time, instead of imposing unachievable goals from the outset.

Broad Stakeholder Benefits

These categories of data are **beneficial for all stakeholders**: from Road Operators ensuring safety, to ITS Service Providers offering improved navigation services, to end-users who rely on accurate and timely traffic information to plan their journeys. It aligns the interests of both public and private actors, fostering greater adoption of RTTI standards and technologies.

Alignment with User Experience

From the road user's perspective, receiving up-to-date information on speed limits, roadworks, and closures greatly improves navigation, reduces congestion, and enhances safety. Focusing on these areas first ensures the **best possible user experience** — an important factor for encouraging the use of RTTI services.

Summarising, focusing on Speed Limits, Roadworks, and Road Closures is an optimal starting point for implementing the RTTI 5-Star Rating Specification because these areas are:

- Critical for road safety and traffic management.
- Mandated by the EU regulation.
- Provide a clear and measurable foundation for RTTI quality specification.
- And ensure realistic, manageable goals for Road Operators to achieve before tackling more complex RTTI requirements.

3.3. Accuracy Challenges

The accuracy of data is often compromised due to:

- Inaccurate location referencing.
- Inaccurate GNSS position readings caused by GNSS jamming and spoofing.
- Missing or non-updated signs in the source systems.
- Inconsistent databases across National Road Authorities (NRAs).
- Spatial accuracy, wrong location(s)
- Accuracy in time, wrong time(s)

This issue is particularly crucial for supporting Intelligent Speed Assistance (ISA) systems from both a technical and legal perspective. The RTTI 5-Star Rating Scheme seeks to define clear accuracy requirements.

During the workshops, it was identified that defining accuracy from a spatial perspective is a major challenge. It has been suggested that for a 3-Star Rating, the accuracy requirement should be 10 meters CEP (Circular Error Probable), meaning that 50% of GNSS measurements must fall within a 10-meter radius of the true value. Figure 5 illustrates that a less significant road typically lies within the 10 meters CEP.

When a Service Provider is taking in any data into its systems, they will need to do a vast amount of processing steps before this is ready for distribution to Tier 1 suppliers / end users. Step 1 in the process is checking if the input data is 'sane'. As any logic further down the fusion process, for example the map-matching process (where on the map is this particular event) will suffer from 'insane' data: garbage in leads to garbage out.

For this reason, RTTI Service Providers all work with so called ‘intake protocols’; these are a set of requirements demanding the right quality level of their suppliers.

There is also a growing concern over GNSS jamming and spoofing around the world. This is largely due to an increasing dependency on GNSS for critical applications, the widespread availability of interference devices, ongoing military tensions, and numerous real-world incidents that have shown just how easily these attacks can be executed. As a result, there's been a stronger emphasis on developing countermeasures, improving GNSS security, and exploring alternative technologies like multi-constellation GNSS, inertial navigation systems, and terrestrial-based PNT (positioning / navigation) solutions.

GNSS jamming and spoofing are significant concerns in the context of field tests, particularly when assessing systems like Intelligent Speed Assistance (ISA) that rely on satellite-based localisation for accurate speed limit identification.

GNSS jamming involves deliberate (could be accidental) interference that disrupts the reception of GNSS signals. This interference can result in the loss or degradation of positional accuracy, causing systems that depend on satellite data to lose their ability to precisely determine vehicle location. This may lead to erroneous interpretations of road data, such as incorrect speed limits being displayed or recorded.

In France, several reports have highlighted GNSS disruptions near military airfields and naval bases. The French government and military are known to utilise GNSS jamming as part of training exercises or for security measures to protect critical infrastructure from drone incursions or unwanted surveillance. For example, military airbases like the [Mont-de-Marsan Air Base] and [Bretagne’s Landivisiau Naval Air Base] have routine exercises involving the use of electronic warfare measures, including GNSS jamming. Such activities can unintentionally disrupt GNSS devices within the vicinity of these airfields, leading to loss of GNSS signal for vehicles operating in the area.

GNSS spoofing is a more sophisticated threat (mostly deliberate), where false GNSS signals are transmitted to deceive a vehicle's navigation system into believing it is in a different location. Spoofing manipulates the GNSS receiver by broadcasting counterfeit signals that mimic legitimate satellite data but provide incorrect positioning information. This can mislead systems into showing incorrect speeds or road conditions and compromise the validity of a test scenario. Sometimes spoofing occurs by accident, e.g. when a test system emits signals into the public domain, or when GSM towers emit signals that are close to or within the GNSS bands which could be perceived as legitimate signals by GNSS receivers.

Both jamming and spoofing can have severe implications for any systems reliant on GNSS data. Understanding and mitigating these risks are crucial for the accurate use of GNSS data in real-world environments.

Accuracy requirements (plural) come in different flavours.

3.3.1. Accuracy in Several Dimensions

Accuracy is a key topic when real time traffic information services. Accuracy in time (freshness of data) but also accuracy in space (the spatial perspective: location precision of events). This immediately explains why RTTI is a multi (4) dimensional topic.

3.3.1.1. Spatial Accuracy

This paragraph aims to explain the various considerations when discussing accuracy in space (location). As the specification suggests; higher quality data will fall under a higher star rating. This is a direct relation with the accuracy in space.

It is important to realise that certain features concern a point location, and others concern a so-called line location or ‘stretch’. Think of a speed limit sign having a single location (there where the pole comes out of the ground). Or a road work setup that covers a few kilometres on a lane on a major highway.

When talking about point locations during the workshops, it was identified that defining the location-accuracy of static speed limits is a major challenge. It has been suggested that for a 3-Star Rating, the accuracy requirement should be 10 meters CEP (Circular Error Probable), meaning that 50% of GNSS measurements must fall within a 10-meter radius of the true value.

Figure 5 is only showing a 10 meters CEP in a horizontal setting, but the challenge is even bigger when map-matching input data, as many major roads at some stage overlap other roads.

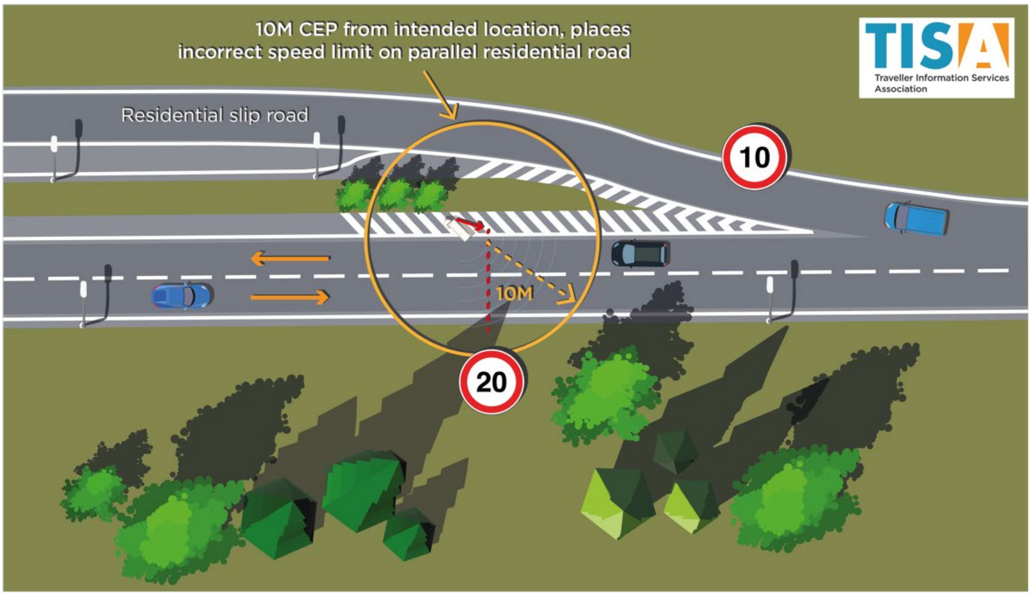


Figure 5 – Road width compared to 10m Circular Error Probable

At many critical places where major infrastructure meets, the only real solution is to elevate certain parts of infrastructure creating a bridge / tunnel / fly-over situation, see illustrations Figure 6 and Figure 7. Finally, the same -vertical challenge- with roads over-head, occurs in mountainous areas and often near river crossings. Important to realise is that stacked roads often have on and off ramps to move to another level; this increases the need for more accurate data.

Figure 6 – Gravelly Hill Interchange, (Spaghetti junction) – Birmingham (UK)

Figure 7 – 2 Major highways intersecting with double fly-over configuration

The mismatch is potentially bigger than anticipated, which could lead for significant errors downstream in the fusion process or even in the (automated) vehicle if wrong data makes it that far down the chain.

One other way to think about this is to have a linear referencing and treat a point location, let's say a speed limit, as a line across the road. And then allow for a certain inaccuracy compared to that line, this is shown on Figure 8.

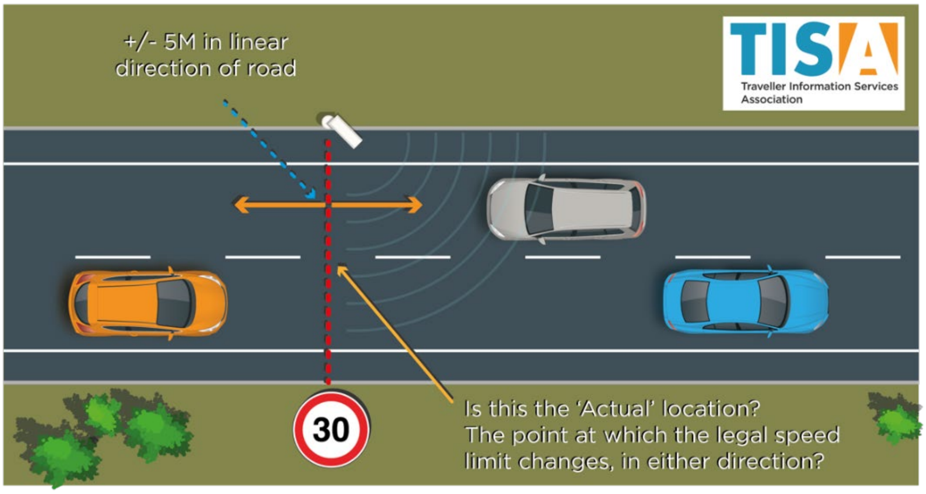


Figure 8 – Linear referencing with a certain inaccuracy allowed

Although this is in some cases better than the CEP approach as it's less likely to be matched on a parallel road. But can still be wrongly matched to the aforementioned, elevated infrastructure.

A solution to that is to include the bearing / driving direction in the data. This helps with matching the speed limit to the relevant stretch of road, at the right location and in the correct driving direction.

To date the number of **parallel** highways stacked on top of each other are so limited that all Service Providers have specific rules on how to deal with that. Location + bearing is the best way to go.

In Figure 9, it's clearly visualised that even when a bearing is a few degrees off, it will allow to be matched to the correct road, in this example west (270 degrees); even though the bearing here could be between 255 and 285 degrees (±15 degrees), and not only on the correct road, but also concerning the correct driving direction, and in this case it's not even needed to know whether this is a left hand driven region or right hand driven country as it's concerning the driving direction.

Working with a point location with a bearing is a great way of getting location data from A to B in a map supplier agnostic and map version agnostic way.

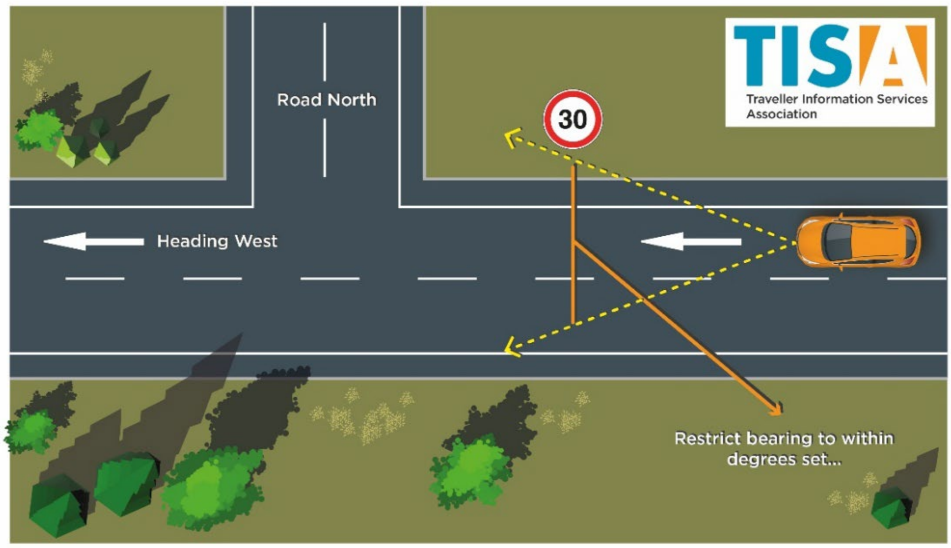


Figure 9 – Point location referencing with a bearing specified

So far, we've covered point locations; however, the same is true for line locations or so-called stretches or zones. For example, roadworks. These consist of a start location and an end location. When these two locations are both supplied with a bearing it's nearly impossible to fail the map matching. In case of longer zones e.g. long roadworks, there might be multiple paths possible between the start and end location of the roadworks, this can be mitigated by having via points (intermediate points). These points help ensure the receiving end uses the same path as intended at the source, which is especially useful at complex intersections, on and off ramps and stacked roads. It's best if all these via points also have a bearing indicated and in case of multiple via points that they are sorted from the start to the end. (OpenLR caters for all this by design).

What is very important when working with line locations is that the start and end locations don't overlap with junctions / on and off ramps as the impact of that could be enormous. For example, a highway closure that overlaps the next on-ramp not allowing people to navigate back onto a highway as their system has information that it's still closed. In Germany this can lead to a detour through a rural area of over 25KM or closing a few meters too many in Norway can lead to an unplanned on-ramp closure of a bridge causing people to take a 40KM detour. The opposite is also true; when the off-ramp is closed mistakenly this will result in suboptimal routes as well.

With the current penetration and continued adoption of RTTI services these kinds of errors affect most road users. And we should strive to minimise this where and when possible. It's good to realise there will be a growing number of users of RTTI data.

The selection of Functional Road Classes (FRC) 1–6 for the RTTI 5-Star Rating Specification was based on a practical consensus during workshops held from 2022 to 2024. These classes represent the most critical parts of the road network for safety and routing efficiency, which also aligns with the Delegated Regulation (EU) 2022/670 and the current capabilities of road authorities. To ensure wide applicability and interoperability, the working group agreed to use the OpenStreetMap (OSM) road classification as a best practice. While slight variations may exist across countries, OSM remains the most widely adopted and globally aligned standard, increasingly supported by map makers and public institutes. Starting with FRC 1–6 using this shared classification offers a pragmatic foundation for high-impact RTTI services and future scalability.

3.3.1.2. Accuracy in Time

It is key for accuracy to understand the impact of time delay vs. distance covered and the comparison of the difference of distance travelled in 1 second and in 3 seconds.

Vehicle velocity	Distance travelled in 1 sec	Distance travelled in 3 sec	Delta (2 seconds)
30 km/h	8,33 m	24,99 m	16,66 m
50 km/h	13,88 m	41,64 m	27,76 m
70 km/h	19,44 m	58,32 m	38,86 m
80 km/h	22,22 m	66,66 m	44,44 m
90 km/h	25,00 m	75,00 m	50,00 m
100 km/h	27,77 m	83,31 m	55,54 m
120 km/h	30,55 m	91,65 m	61,10 m
130 km/h	36,11 m	108,33 m	72,22 m

Table 5 – Distance travelled in Time

For years, several factors within the RTTI domain affect the freshness of RTTI data: the time for a navigation system to reflect reality. This is key to success for route planning, and so important that certain Service Providers have traffic incidents predictions operating as a service since 2012.

The fresher RTTI data is the more beneficial.

The 5-Star Rating Specification focuses on the data flow from a Road Authority / Operator to Service Providers see the entire chain in Figure 10 , that shows the data flow from Road Authorities to Road Users (in some cases Road Operators are also users of the enriched data). Steps illustrated in the figure can be found in Table 6.

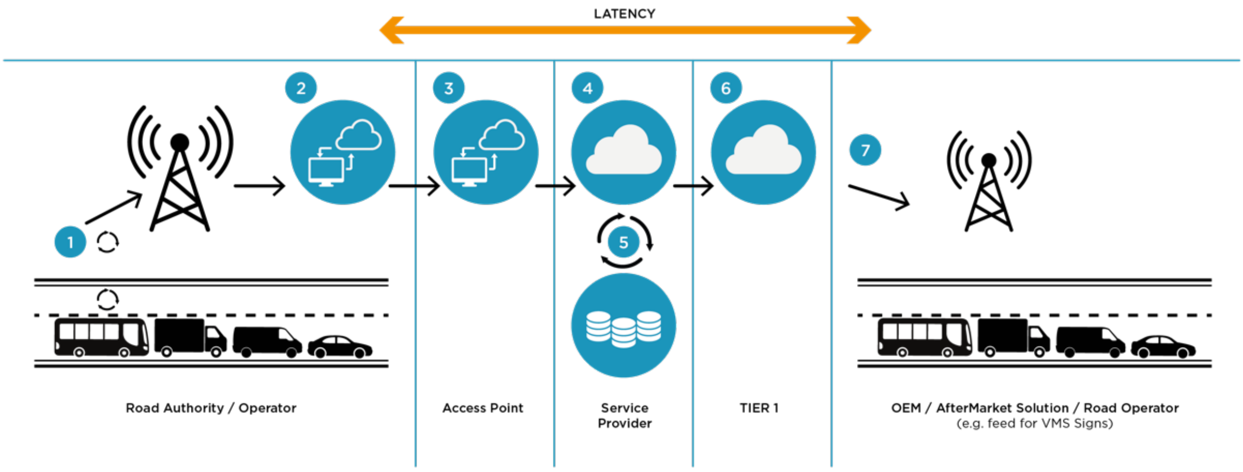


Figure 10 – Data flow from Road Authorities to Road Users

Step index	Step description	Comment
1	Observation on the road	In this example road speeds via loop data but could be any other observation. The time between occurrence and observation is out of scope and cannot be measured.
2	Transmission to aggregator	Optional yet common. Although not mandatory it's frequently used to aggregate data from multiple sources. This offers the aggregator to merge data from different geographic origin, and various formats. They can enhance the overall completeness of data before it moves to the access point. It is important that this step doesn't impact the freshness negatively. When it comes to best practices; also not mandatory is the use of real-time data pipelines and the ability to prioritise low-latency data like; also, direct transmission protocols like MQTT[4] can help reduce delays in this step.
3	Transmission to access point (AP)	Main role of the AP is to deal with vast amounts of data and exposing this data via a standardised interface. The data refresh range typically ranges from seconds to hours, depending on infrastructure and type of data (static vs dynamic). Those who operate an AP are encouraged to have some kind of information classification scheme in place to help create awareness of which data is more time critical than other. This can also help with decision around the quality control check which could incur delay in transmission. This gate keeper that needs to balance data quality with freshness and is therefore responsible for a delicate act which should not be underestimated. Also, the API can be built in such a way that It's aware of the last data sent to the Service Provider and it will only send the changes since that last successful transfer. This minimises the amount of duplicate data being sent. NOTE: In some cases, the Access Point does not handle the actual data but is merely the portal for metadata.

[4] https://mqtt.org/

Step index	Step description	Comment
4	Retrieval by Service Provider	Another crucial step in the process is the retrieval of data by the Service Providers. There is no legal prescription on a pull or a push mechanism; however, in the industry a pull mechanism via REST[5] APIs is the most common implementation. The frequency of these pull requests does directly influence the overall data freshness. Service providers often work with dynamic update intervals which can differ based on, for example, geography, time of day, supplier, type of data. When a Service Provider has a proper request – response with an AP (or with the data provider in case the Access Point only offers meta data) and only get the delta of changes in each new request it will save valuable resources (computing power and time) in the fusion process to deal with only that data that is relevant at that time.
5	Processing within the Service Provider	Various steps and timings variable per use case.
6	Delivery to / via Tier 1	This can be optional in aftermarket solutions.
7	Visible to end user / system	Not all information will be visible per se, but can be used 'under water' for navigation decisions, ISA, etc.

Table 6 – Steps of data flow from Road Authorities to Service Providers

It is important to understand the differences between update cycle and timeliness[6]. The following illustration should help to understand the differences and impact:

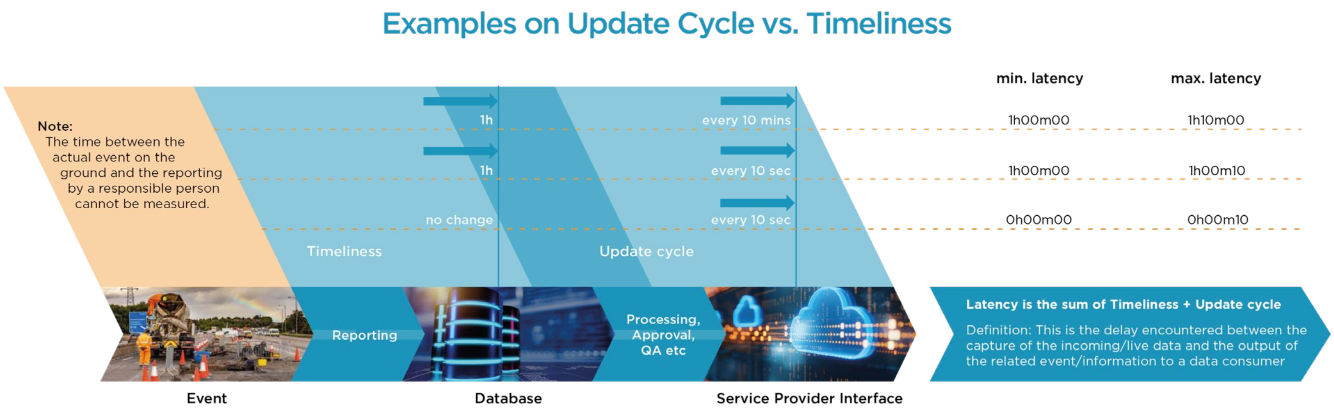


Figure 11 – Update Cycle vs Timeliness

3.4. Speed Limits

This involves ensuring the accuracy of static speed limit data across different road types. The criteria here emphasise high accuracy in data location and updates, along with timeliness and completeness. Static speed limits are regulatory constraints set for specific road segments and are typically determined by Road Authorities or Operators. They remain constant and are not influenced by dynamic factors like weather or traffic conditions. These limits are communicated through physical road signs or legal regulations,

[5] https://en.wikipedia.org/wiki/REST
[6] In EU RTTI, real-time traffic information services need to be accurate to provide the best possible information to end users in terms of reliability and timeliness, see (EU) 2022/670 (18).

making their accurate mapping essential for compliance, road safety, and effective navigation services. Temporary speed limits, for example a speed reduction during road works, are not part of this section.

NOTE: These examples (and others in this chapter) are for understanding purposes only. The actual and complete overview of the star rating and the values are covered in Chapter 4 (Criteria, Rating Levels and Requirements for the Use Cases).

Star Rating	Level of Service
★★★☆☆	The data is updated **weekly** with **90% accuracy and completeness**. Location accuracy allows a margin of **10 meters**, which is sufficient for most navigation systems. This level helps Road Authorities maintain reasonably up-to-date and reliable speed limit data, without the need for constant updates.
★★★★★	Speed limit data is updated **every 24 hours**, with **99% accuracy and completeness**. The location accuracy is within **1 meter**, making sure digital maps reflect real-world conditions almost immediately. This high precision ensures the best user experience for navigation and automated systems.

Table 7 – Speed limits example of Levels of Service

NOTE This table is illustrative. See section 2.1 for definitions (including Accuracy) and sections 4.1-4.4 for the formal criteria and thresholds per use case.

3.5. Roadworks

Roadworks refer to activities that involve maintenance, construction, or repair on the road network and that may temporarily affect traffic flow. These can be categorised into:

- Planned Roadworks: Pre-arranged activities announced well in advance by the responsible authority. These typically involve high levels of accuracy in mapping affected road lanes, predefined update cycles, and detailed notifications to stakeholders.
- Unplanned Roadworks: Emergency or unforeseen activities, often triggered by incidents like infrastructure damage or utility failures. These require more flexible updates due to their reactive nature.

NOTE**:** While Unplanned Roadworks are “unplanned” from a scheduling perspective, they typically still require some form of authorisation or notification by competent authorities. Activities that occur without such approval, such as, "obstacle on the road" or "dangerous location" (e.g. but not limited to, temporary slippery road, obstacles/people/debris on the road etc), are not classified as unplanned roadworks in this specification but may fall under Safety-Related Traffic Information (SRTI) categories.

Within unplanned roadworks, a distinction is made between scheduled and unscheduled cases. Scheduled unplanned roadworks are events that arise suddenly but still allow for very short-term planning, such as emergency utility repairs that begin within hours. Unscheduled roadworks refer to urgent interventions like burst pipes or collapsed infrastructure that require immediate action, often without the possibility of prior notice or coordination. These are typically recorded only after the work has already begun.

Roadworks are classified as such when at least one lane in the driving direction remains open to traffic. If all lanes in the driving direction are blocked, the event transitions into a road closure, with the roadworks acting as the event-cause. In other words, roadworks are considered roadworks as long as transit in the driving direction remains possible; once that is no longer the case, the situation is classified as a road closure, where the roadworks can serve as the event-cause.

Accurate roadworks data must include the location (with directional / lane-level precision for higher ratings), expected and actual timeframes. Data timeliness, completeness, and accuracy are essential to ensure adherence to RTTI 5-star rating criteria.

Star Rating	Level of Service
★★★☆☆	Updates for planned roadworks are made **every 24 hours**, with **80% accuracy**. **Unplanned** works are reported **every 10 minutes**. The system provides basic lane-level data to allow drivers to avoid major disruptions. This specification balances operational feasibility with the need to provide reasonably up-to-date information.
★★★★★	Planned roadworks are updated **hourly**, with **90% accuracy**. **Unplanned** works are reported **within one minute.** Lane-level data is detailed, specifying exact lane closures and changes, allowing users to plan routes efficiently with minimal delays.

Table 8 – Roadworks example of Levels of Service

A 5-Star System, for instance, mandates updates as frequent as hourly, with 90% accuracy in identifying affected lanes.

NOTE: This classification does not include *moving roadworks* (e.g. snow maintenance, grass cutting, or sweeping) where slow-moving maintenance vehicles temporarily occupy a lane without establishing a fixed work zone. These are typically managed under separate operational categories and may not meet the static impact threshold defined for roadworks in this specification.

3.6. Road Closures

This covers both full and partial road closures (e.g. bi-directional and uni-directional), planned or unplanned. The criteria for road closure data focus on the ability to reflect changes accurately and rapidly.

Star Rating	Level of Service
★★★☆☆	Planned closures are updated at least **every 12 hours,** with **90% accuracy**. Unplanned closures are updated **within 12 hours**. This level of accuracy and timeliness ensures that road users receive updates for major disruptions, although not in real time.
★★★★★	For planned closures, updated **hourly**, with **99% accuracy**. Unplanned closures are reflected in real-time **within one minute**, ensuring users receive the most current and reliable information available.

Table 9 – Roadworks example of Levels of Service

Road closure occurs when the entire road or section of the road becomes impassable in a specific direction. These closures prevent general traffic from traveling in the given direction, making alternative routes necessary. Road closures are typically pre-planned (City Marathon, Christmas market, planned big maintenance) but can also be unplanned due to unforeseen events, such as infrastructure failure, accidents, natural disasters like flooding, wildfires etc. This classification applies even if the road remains open only for specific groups, such as residents or authorised vehicles.

Roadworks refer to scheduled maintenance, construction, or repair activities affecting parts of the roadway. At least one lane remains operational in the direction of travel, allowing vehicles to pass, though possibly at reduced capacity. If all lanes are affected, such that travel in the direction is no longer possible, the situation escalates to a road closure.

NOTE: This specification does not cover partial road closures, such as lane closures, unless they are directly caused by roadworks. Lane closures resulting from other causes, such as accidents, emergencies, or temporary obstructions, fall outside the scope of this specification. The focus remains on full closures, where the entire road or direction of travel becomes impassable and requires alternative routing, and roadworks, defined as construction, maintenance, or repair activities on a roadway or its surrounding infrastructure that may result in lane closures, provided at least one lane in the driving direction remains open to traffic.

Unplanned roadworks are currently limited to higher road classes because these roads have the greatest impact on traffic flow and safety. Events on lower road classes are often short in duration, less disruptive, and not consistently available from data providers. The focus is on areas where timely updates are most critical, and data quality can be assured. Expansion to other road classes may be considered in future versions.

Both road closures and roadworks require immediate communication to ensure Service Providers can incorporate this in the real time feeds. For roadworks, notifications ideally include start/stop times, root cause and lane-level details, with at least one lane preserved for travel in the affected direction.

NOTE: A road closure refers to a complete restriction of traffic in at least one driving direction. This does **not** include *access restrictions*, such as time-based limits, vehicle-type exclusions, or weight regulations. These fall under a separate data category: *access restrictions / conditions*.

NOTE: While road closures are often announced or triggered by infrastructure works or emergencies, they typically still require authorisation or formal notification by competent authorities. Situations where access is entirely blocked without such notification, such as spontaneous flooding, landslides, or unreported incidents, are not classified as road closures in this specification but may fall under Safety-Related Traffic Information (SRTI) categories (e.g. “hazardous location” or “impossible to pass”). Once competent authorities consider the blockage to be “managed” it is classified as unplanned road closure within the scope of this specification.

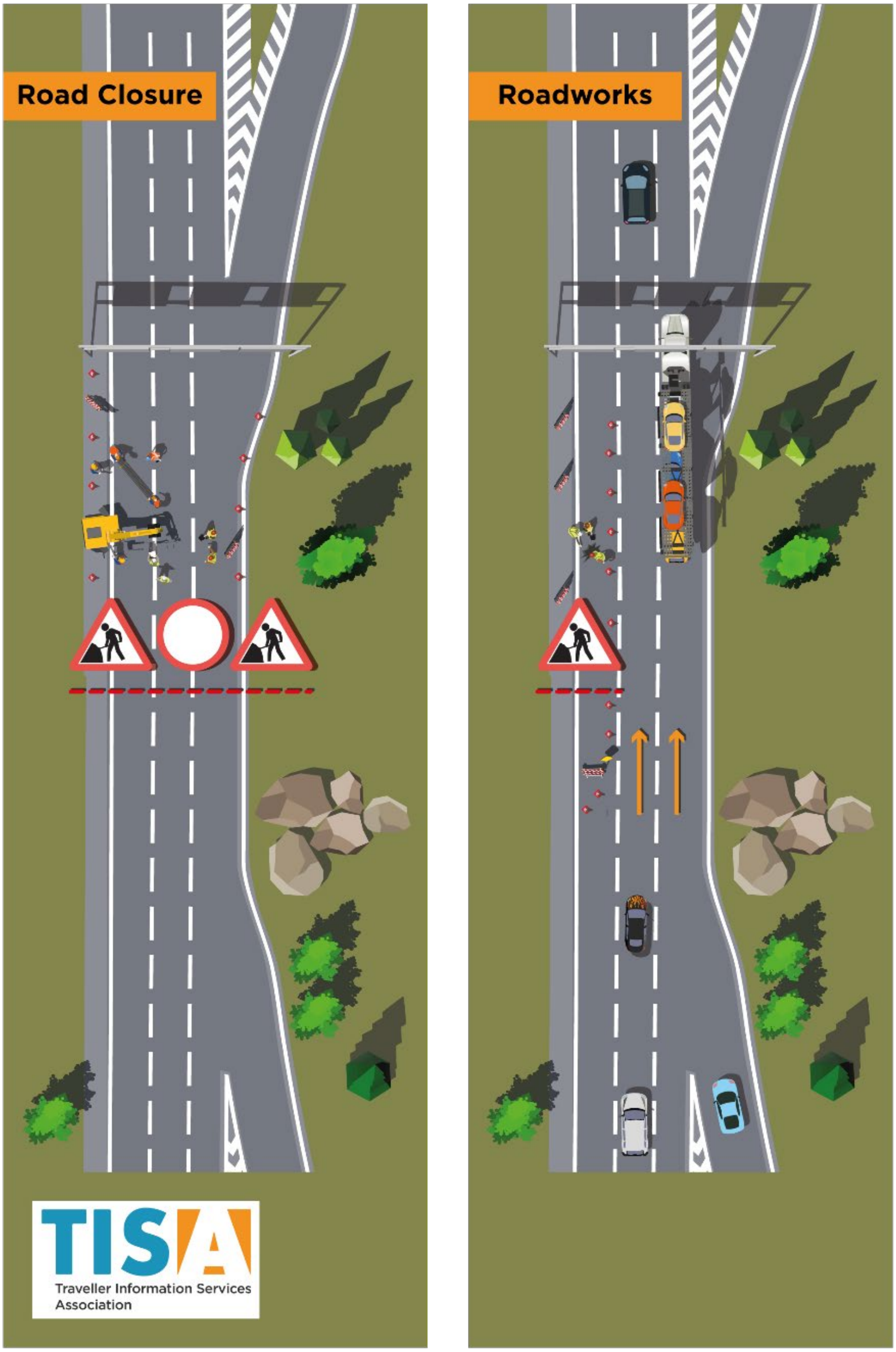


Figure 12 – Road Closure vs Roadworks

3.7. Example

3.7.1. All Easter City Centre Measures

Example of a situation mentioned in section 3.6 where the road is closed for most traffic, but exceptions are made for locals and logistics. Amsterdam in the Netherlands is very crowded during holiday seasons, including Easter. The city takes measures to ensure quality of life in the city centre through road closures. To establish road closures with legal status, temporary signs are placed on the streets. On many locations there is a traffic controller with a removable barrier to guide traffic.

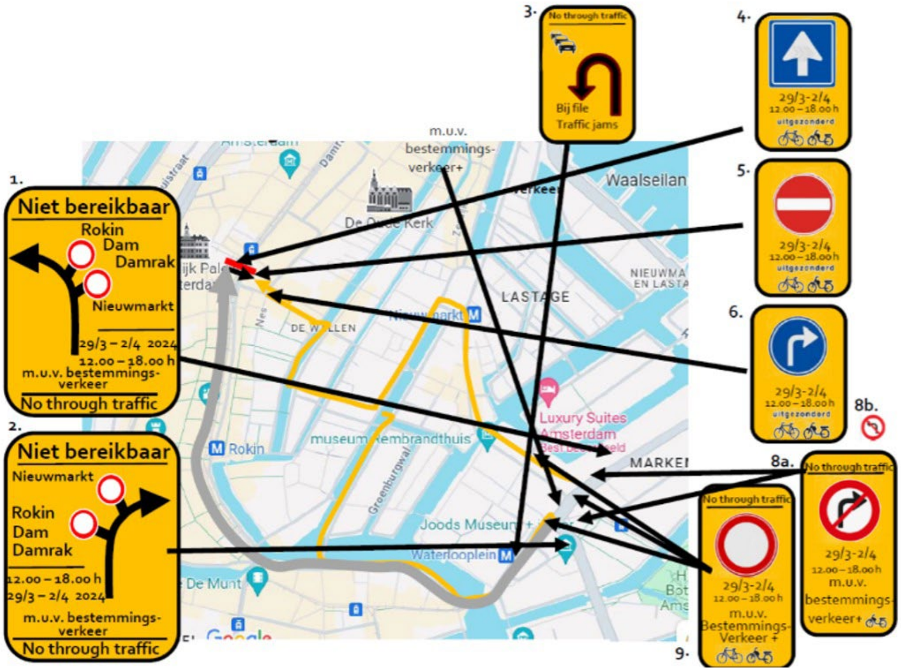


Figure 13 – Easter city centre measures in Amsterdam

4. CRITERIA, RATING LEVELS AND REQUIREMENTS FOR THE USE CASES

4.1. Criteria for Evaluating RTTI Data Quality

The different use cases use different criteria for evaluation. This is an overall table of the criteria used to evaluate the different use cases:

Type of data quality requirement	Static Speed Limit	Planned road-works	Unplanned roadworks	Planned full road closure	Unplanned full road closure
Terminology & Definition	x	x	x	x	x
Data Format Used	x	x	x	x	x
Use of Specification	x	x	x	x	x
Location Referencing	x	x	x	x	x
Linear Referencing	x	x	x	x	x
Direction Defined FRC3-6	x	x	x	x	x
Update Cycle	x	x	x	x	x
Timeliness	x	x	x	x	x
Pre-announcement	x	x		x	
FRC1-6 Accuracy Circular Error Proba-ble (CEP)/ Linear Travel Direction	x				
FRC1-6 Correctness	x				
FRC1-6 Completeness	x				
Vehicle Classification	x	x			
Speed limit type (as per definition in the ISA regulation, including road sign catalogue)	x				
FRC1-4 Accuracy Correctness Com-pleteness		x	x	x	x
FRC5-6 Accuracy Correctness Com-pleteness		x		x	x
RTTI Event Message ID		x	x	x	x
Secure API Access		x	x	x	x
Outdated Messages Deleted from Feed		x	x	x	x
Availability Short Term Events		x	x		
Road Type		x	x		
Validity		x	x	x	
Lane level attribute		x		x	
Vehicle Type Classification				x	x
Cause type					

Table 10 – Criteria for evaluating RTTI Data Quality

4.2. Detailed Description of 1-Star to 5-Star Levels

Each of the five-star rating categories is distinguished by distinct qualities. The following table provides an overview and detailed characteristics of each category.

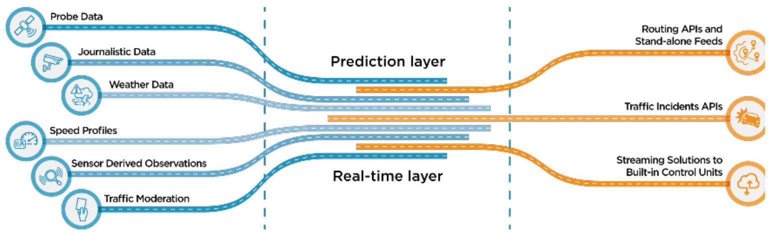
★ ★★	★★★ ★★★★ ★★★★★
If the data is below the agreed minimum quality level, there is no guarantee the data will be used by ITS Service Providers. If Data Providers score low on 'critical' quality parameters, then it will be unfortunately impossible for Service Providers to use the data in production. On the contrary, if the score is low because of specific quality parameters deemed only important or uncritical use in production may still be possible. However, in addition to use in live operational RTTI services towards end users, there are some in-house service development uses like KPI calculation, historical analysis, experimental features where low scoring data could still be used internally by ITS Service Providers.	If the data meets the commonly agreed minimum quality level or higher, ITS Service Providers will use the data: • Subject to company specific product requirements • Subject to validated quality score (w/o 3rd party assessment) • Data is sourced via the National Access Point (NAP) • Data is never published as is, always validated with other sources in ITS Service Providers' fusion engines.  • If data quality degrades over time and goes below a minimum quality level, Service Providers may stop using it (giving feedback to data provider).

Table 11 – Commitment to use SL, RW, RC data

High acceptance criteria for the third class pose a significant risk of countries questioning their ability to deliver data according to the TN/ITS specification, potentially obstructing implementation; therefore, to reduce this risk, the requirements for 3-Stars rate represent the minimal level for the commitment to use that data by Service Providers.

It should be noted that the overall star-rating for a dataset or feed is assigned in accordance with the Evaluation Methodology (currently under development) and is based on a consideration of the individual star ratings across the criteria depicted in Table 11. Table 12 provides a general textual description of how the star ratings for individual criteria within a feed can be interpreted.

Rating	Explanation	Characteristics
★☆☆☆☆	The delivered data performs the minimum quality level with a limited detailedness and high inaccuracy. Data may not be used fully or partially by ITS Providers.	• High level of missing or incomplete data. • Inaccurate content. • Lack of adherence to data standards and formats. • Data is very high-level and lack granularity.
★★☆☆☆	The delivered data performs useful foundation with an inadequate detailedness and many areas to improve. Data may not be used fully or partially by ITS Service Providers.	• Moderate level of missing or incomplete data. • Higher accuracy of the delivered content. • Partial adherence to data standards and formats. • Data is mostly high-level with limited granularity.

Rating	Explanation	Characteristics
★★★☆☆	The delivered data performs quality on acceptable minimum level, fulfilling the basic requirements in format, detailedness and accuracy. ITS Service Providers commit to use the data with further processing in accordance with the requirements defined in Table 11.	• Low level of missing or incomplete data. • Acceptable accuracy of the delivered content. • Adherence to data standards and formats. • Data performs a good level of granularity.
★★★★☆	The delivered data performs high quality levels with a high detailedness and accuracy. ITS Service Providers commit to use the data with further processing in accordance with the requirements defined in Table 11.	• High level of data completeness. • High accuracy of the delivered content. • Adherence to data standards and formats. • Data performs at a high level of granularity, delivering significant details.
★★★★★	The delivered data performs the highest level of quality delivering the most accurate and complete content. ITS Service Providers commit to use the data with further processing in accordance with the requirements defined in Table 11.	• Very high level of completeness in the delivered data. • High accuracy of the delivered content. • Adherence to data standards and formats. • Data performs the highest level of granularity, delivering the most detailed content.

Table 12 – Descriptions of Star Rating Levels

4.3. Value added with Data Quality levels

In addition to defining the rating levels, this specification also considers the underlying attributes that determine data quality. For each attribute, the explanation sets out why it is relevant to the overall performance of RTTI services and why progressively higher scores provide added value. A consolidated overview of these explanations is provided in Annex II.

4.4. Structured Scoring Method

The Real-Time Traffic Information (RTTI) 5-Star Rating plans to use a structured scoring methodology grounded in the field of decision science, specifically, in what's known as Multi Criteria Decision Analysis (MCDA). This field is widely applied in policy design, engineering, urban planning, and transportation, whenever complex choices must be made by weighing multiple, often conflicting, criteria.

One of the most accessible and well-established approaches within MCDA is called Multi Attribute Value Theory (MAVT). It offers a practical way to evaluate and compare options when there is no single "right" answer, but rather, a need to systematically balance different quality aspects.

4.4.1. A practical decision-making framework

The MAVT-based method used here works as follows:

- A set of criteria is defined to reflect what matters most in data quality.
- Each criterion is scored on a common scale, from poor to excellent (i.e. 1-5).
- Each criterion is given a weight to reflect its relative importance (low, medium, high, critical).
- The final score is calculated as a weighted average, providing an overall performance indicator.

This approach makes it easy for all stakeholders, from road authorities to service provides; to understand how different aspects of data contribute to the overall quality rating. It's also transparent, repeatable, and scalable, which is essential for long time, cross-border applications.

4.4.2. Benefits

The 5-star rating scheme is widely recognized and easy to understand. However, behind that simplicity must lie a robust calculation method, one that ensures fairness, avoids bias, and reflects gradual progress.

By using a weighted scoring model, the RTTI rating ensures that:

- Improvement in any one area contributes to the overall rating: but not disproportionately.
- All relevant dimensions are considered together, rather than focusing on a single indicator.
- The model supports the difference between weighted attributes and makes sure critical values are recognized as such
- There is a clear benchmark for progress, helping stakeholders prioritize investment.

4.4.3. Rounding

An important feature of this system is that star ratings are not rounded up. If the overall weighted score of a dataset results in a 2.9, this does not automatically qualify it for a 3-star rating. Instead, the logic is that such a dataset, although clearly on its way, has not yet reached the threshold for 3-star quality.

This distinction preserves the integrity of the system and encourages continuous improvement. It ensures that each star level reflects a minimum standard being fully met, not nearly met.

An example of a scoring table can be found in section 10 (Annex 3: Example of a 5-star scoring matrix). The exact scoring logic and formulae will be detailed out in the RTTI 5* Rating - Evaluation Methodology, which is currently under development.

4.5. Requirements for Each Level Per Use Case

The subsequent sections of this chapter delineate the specific requirements for each five-star rating level across various use cases. For the first use case Static Speed Limits, the quality requirements apply to all legally valid static speed limits on the road network. This full coverage obligation is driven by the **General Safety Regulation (EU) 2019/2144**, to ensure the availability of such data to support vehicle safety systems most notably Intelligent Speed Assistance (ISA) EU 2021/1958.

In contrast, further use cases in this specification (e.g. Roadworks, Road Closures) may apply requirements to specific subsets of the data, such as particular road classes or regions, allowing implementers to focus quality efforts where they yield the most value. This helps ensure consistent uptake and usability of high-quality data across services, even when complete coverage is not legally required.

4.5.1. Data segmentation

Data holders and / or data distributors are encouraged to segment their highest-quality data (e.g., FRC 1-2) separately to allow these segments to reach a higher star rating. This way lack of data coverage in other Functional Road Classes (FRCs) will not penalize the rating of segments that meet higher quality levels.

This guidance applies across all use cases, including both Planned and Unplanned Roadworks and Road Closures.

4.5.2. Requirements for Static Speed Limits

Speed Limits are defined as the minimum information required for describing the speed limits (minimum and/or maximum) that apply on a road network link given a set of applicable conditions. (Source NAPCORE Data Dictionary April 2024).

Static speed limits are usually an attribute of the map. Every road in Member states of the EU open to motorised vehicles has a speed limit, even when there is no explicit sign. Information on accurate speed limits is crucial for Intelligent Speed Assistant (ISA) imposed by the General Safety Regulation (GSR) and are mandatory in all new vehicles since June 2024. It is important to get a continuous feed of updates pointing to the change (update, new, deleted).

Static Data - Speed Limit	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	High	Self-defined	Self-defined	According to EU ISA Regulation 'Applicable Speed Limit'	According to EU ISA Regulation 'Applicable Speed Limit'	According to EU ISA Regulation 'Applicable Speed Limit'
Data Format Used	High	Bespoke local format	Bespoke local format	TN-ITS (Via DATEX II Part 14)	TN-ITS (Via DATEX II Part 14)	TN-ITS (Via DATEX II Part 14)
Use of Specification	High	Specification instructions only used as guide – ad hoc implementation used	Specification instructions only used as guide – ad hoc implementation used	Consistent use of specification	Consistent use of specification	Consistent use of specification
Location Referencing	High	Basic GNSS INSPIRE (8) co-ordinates	Basic GNSS INSPIRE (8) co-ordinates	Basic GNSS INSPIRE (5) co-ordinates	OpenLR	OpenLR
Linear Referencing	Critical	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Critical	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Low	Quarterly	Monthly	Weekly	Daily	Daily
Timeliness	Medium	Max 3 months old	Max 1 month old	Max 1 week old	Max 1 day old	Max 1 day old
Pre-announcement	Low	None	None	> 1 day ahead	> 1 week ahead	> 1 week ahead
FRC1-6 Accuracy in Linear Travel Direction	Critical	<30m	<20m	<10m	<5m	<1m
FRC1-6 Correctness	High	>80%	>80%	>90%	>95%	>99%
FRC1-6 Completeness	Medium	>80%	>80%	>90%	>95%	>99%
Vehicle Classification	Medium	M1 + N1	M1 + N1	M1-3 and N1-3	M1-3 and N1-3	M1-3 and N1-3
Speed limit type (as per definition in the ISA regulation (Figure 14) including road sign catalogue)	Critical	Implicit and Explicit	Implicit and Explicit	Implicit and Explicit	Implicit and Explicit	Implicit + Explicit + Conditional

Table 13 – Requirements for Static Speed Limits

Example Pre-announcement (time-based): A road segment will change the speed limit from 120 to 100 on 01-Oct-2025 at 00:00. Keep 120 as the active limit until that timestamp and also publish the upcoming 100 with a start time of 2025-10-01T00:00, at least one week in advance to meet the 4–5 star requirement.

Speed limit types for Table 13 are defined in Table 14. Examples are shown in Figure 14.

Speed Limit Type	Definition	Example
Explicit	Explicit speed limits are clearly indicated by road signs that display a specific speed limit value, such as 50 km/h or 30 mph. These signs are easily visible to drivers and provide a direct instruction on the maximum allowable speed for that section of the road.	A speed limit sign on a highway indicating a maximum speed of 100 km/h is an explicit speed limit.
Implicit	Implicit speed limits are not directly posted on signs but are understood based on the type of road, road infrastructure, or other contextual cues. Drivers must infer these limits from their surroundings rather than from explicit signage.	In many residential areas, there might not be any posted speed limit signs, but drivers are expected to adhere to a standard residential speed limit, which is often lower than on main roads. Similarly, entering a city might imply a lower speed limit compared to rural highways.

Table 14 –Speed Limit Types Defined

What some refer to as *contextual cues* such as, legal default limits, environmental zones, or jurisdictional overrides, are included under implicit speed limits in this specification. These limits are inferred from legal context and road environment, rather than direct signage.

Explicit	Implicit	Conditional
Speed limit which shows a permanent or temporary numerical value on a traffic sign (incl. digital speed limits shown on a VMS)	Speed limit which does not show a numerical value (implicit non-numerical traffic sign) or shows a strikethrough numerical value (implicit numerical traffic sign)	Specifies a conditional maximum legal speed limit on a road which only applies under certain circumstances (i.e. time of day, weather or traffic conditions)

Figure 14 – Speed Limit Type Examples

4.5.3. Requirements for Roadworks

4.5.3.1. Requirements for Planned Roadworks

Dynamic Data – Planned Roadworks	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	High	Self-defined	Self-defined	See 3.5 Roadworks	See 3.5 Roadworks	See 3.5 Roadworks
Data Format Used	High	Bespoke local format or DATEX II	Only DATEX II (version 2)		Only DATEX II (version 3)	Only DATEX II (version 3 or higher, compliant with the related reference profile)
Use of Specification	High	Specification instructions only used as guide –ad hoc implementation used			Consistent use of specification (DATEX II EU reference profiles per data category (9))	
Location Referencing	High	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	OpenLR or TMC	OpenLR
Linear Referencing	Critical	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Critical	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Medium	Weekly	Every 3 days	Daily	Max 6 Hours	Hourly
Timeliness	Critical	Max 1 week	Max 3 days	Max 24 hours	Max 6 Hours	Max 1 Hours
FRC1-4 **Accuracy** **Correctness** **Completeness**	Critical	 <1km >70% >70%	 <500m >75% >75%	 <250m >80% >80%	 <100m >85% >85%	 <50m >90% >90%
FRC5-6 **Accuracy** **Correctness** **Completeness**	Critical	 <200m >60% >60%	 <100m >65% >65%	 <50m >70% >70%	 <25m >75% >75%	 <10m >80% >80%
RTTI Event Message ID	Critical	Message IDs may change for same event	Message IDs may change for same event	Same specific event ID for same event (stable)	Same specific event ID for same event (stable)	Same specific event ID for same event (stable)
Secure API Access	Medium	Non-secured	Non-secured	Secured	Secured via https	Secured via https

Dynamic Data – Planned Roadworks	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Outdated Messages Deleted from Feed	Low	Max 4 Weeks	Max 3 Weeks	Max 2 Weeks	Max 1 Week	Max 24 Hours
Availability Short Term Events	Low	Yes	Yes	Yes	Yes	Yes
Road Type	Low	Generic roadworks only	Generic roadworks only	Lane level including narrow lanes	Lane level including narrow lanes	Which lane is closed, lane-width reduction (narrow/full), lane-level speed limit changes
Validity	Low	Start/stop times available	Start/stop times available	Schedules available[7]	Schedules available[7]	Schedules available[7]
Vehicle Classification	Low	M1 + N1	M1 + N1		M1-M3, N1-N3	M1-M3, N1-N3

Table 15 – Requirements for Planned Roadworks

Example for Road Type: a 1-star rating may apply when a road authority provides only generic roadworks information, such as "roadworks on highway A2", with a start and end location and start and end time. without indicating further details on road type, like which lanes are affected it's minimal but meets the basic threshold. A 3-star rating or higher could reflect data that includes lane-level detail, such as "roadworks from km 45.0 to km 47.5 in the right lane, remaining lane width 2.5 m", offering usable input for routing and traffic impact estimation.

[7] One example of such schedule could be: "*Mon-Fri 22:00-06:00*".

4.5.3.2. Requirements for Unplanned Roadworks

Dynamic Data – Unplanned Roadworks	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	High	Self-defined	Self-defined	Harmonised Definition Required (TISA proposed Definition)	Harmonised Definition Required (TISA proposed Definition)	Harmonised Definition Required (TISA proposed Definition)
Data Format Used	High	Bespoke local format or DATEX II	Bespoke local format or DATEX II	DATEX II (version 2)	DATEX II (version 3)	DATEX II (version 3 or higher, compliant with the related reference profile)
Use of Specification	High	Specification instructions only used as guide – ad hoc implementation used	Specification instructions only used as guide – ad hoc implementation used	Consistent use of specification (DATEX II EU reference profiles per data category)	Consistent use of specification (DATEX II EU reference profiles per data category)	Consistent use of specification (DATEX II EU reference profiles per data category)
Location Referencing	High	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	OpenLR or TMC	OpenLR
Linear Referencing	Critical	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Critical	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Medium	Every 3 days	Daily	Every 10 Minutes	Every 5 minutes	Every 1 Minute
Timeliness	Critical	Max 3 days	Max 24 hours	Max 10 minutes	Max 5 minutes	Max 1 minute
FRC1-4 **Accuracy**	Critical	<1km >70%	<500m	<250m	<100m	<50m
Correctness **Completeness**	Critical	>70%	>75% >75%	>80% >80%	>85% >85%	>90% >90%
RTTI Event Message ID	Critical	Message IDs may change for same event	Message IDs may change for same event	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)
Secure API Access	Medium	Non-secured	Non-secured	Secured via https	Secured via https	Secured via https
Outdated Messages Deleted from Feed	Low	Max 4 Weeks	Max 3 Weeks	Max 2 Weeks	Max 1 Week	Max 24 Hours
Availability Short Term Events	Low	Scheduled roadworks only	Scheduled roadworks only	Scheduled and un-planned roadworks	Scheduled and un-planned roadworks	Scheduled and un-planned roadworks
Road Type	Low	Generic roadworks only	Generic roadworks only	Lane level including narrow lanes	Lane level specific	Lane level specific

Dynamic Data – Unplanned Roadworks	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Validity	Low	Start/stop times available	Start/stop times available	Schedules available[8]	Schedules available[8]	Schedules available[8]

Table 16 – Requirements for Unplanned Roadworks

When defining incident types related to roadworks, such as distinguishing between narrow lanes, lane closures, or contraflow situations etc., it is highly recommended to refer to the "Recommended Reference Profiles - RTTI" (10). Specifically, the sections on Lane Closures, Roadworks, and Temporary Traffic Management Measures provide comprehensive guidelines that are established as the standard reference. These profiles offer detailed descriptions and criteria that can assist in accurately categorising and managing various road work scenarios.

Roadworks can be safety hazards for drivers and workers alike. Parts of a well-defined roadworks message are detailed in chapter 8.

NOTE: Validity periods (start and end times) are required for all roadworks, including unplanned ones.

For unplanned roadworks, the start time is often known (when the event begins) and the end time may initially be undefined or estimated. This is acceptable and expected. What matters for quality is that:

- A validity structure exists (even with placeholder end times like “until further notice”)
- Updates occur when more precise timing becomes available

Regarding the use of multiple records for phased events, yes, this is possible. Fine-grained scheduling can be achieved via:

- Separate validity periods per record (e.g., lane closures shifting over time)
- Progressive updates to a single record with changing schedule fields

This structure aligns with both DATEX II modelling principles and the concept of progressive clarity and accuracy over time.

[8] One example of such schedule could be: “*Mon-Fri 22:00-06:00*”.

4.5.4. Requirements for Closures

Many road closures are basically roadworks where all lanes are closed. The relevant data for closures are contained in the three first main points for roadworks (Clear location referencing with OpenLR and/or polylines, Start and stop times and Impact Definition).

Road closures can occur for a variety of reasons beyond roadworks, such as events, protests, car-free Sundays etc. The relevant data for closures are consistent with the first three main points for roadworks: clear location referencing with OpenLR and/or polylines, start and stop times, and impact definitions. This ensures that the necessary information is accurately captured for all types of road closures.

When defining incident types related to road closures, it is highly recommended to refer to the "Recommended Reference Profiles - RTTI" (10). Specifically, the sections on Road Closure and Bridge Closure provide comprehensive guidelines that are established as the standard reference. These profiles offer detailed descriptions and criteria that can assist in accurately categorising and managing various road and bridge closure scenarios.

4.5.4.1. Requirements for Planned Full Road Closure

Dynamic Data – Planned Road Closure	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	High	Self-defined	Self-defined	Harmonised Definition Required (TISA to proposed Definition)	Harmonised Definition Required (Can TISA Help?)	Harmonised Definition Required (Can TISA Help?)
Data Format Used	High	Bespoke local format or DATEX II	Bespoke local format or DATEX II	DATEX II (version 2)	DATEX II (version 3)	DATEX II (version 3, compliant with the related reference profile)
Use of Specification	High	Specification instructions only used as guide – ad hoc implementation used	Specification instructions only used as guide – ad hoc implementation used	Consistent use of specification (DATEX II EU reference profiles per data category)	Consistent use of specification (DATEX II EU reference profiles per data category)	Consistent use of specification (DATEX II EU reference profiles per data category)
Location Referencing	High	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	OpenLR or TMC	OpenLR
Linear Referencing	Critical	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Critical	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Medium	Every 3 days	Daily	Twice Daily	Every 3 Hours	Every 5-60 Minutes

Dynamic Data – Planned Road Closure	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Timeliness	Critical	Max 3 days	Max 24 hours	Max 12 hours	Max 3 Hours	Max 5-60 Minutes
FRC1-4 **Accuracy** **Correctness** **Completeness**	Critical	<250m >80% >80%	<100m >85% >85%	<50m >90% >90%	<25m >95% >95%	<10m >99% >99%
FRC5-6 **Accuracy** **Correctness** **Completeness**	Critical	<50m >70% >70%	<20m >75% >75%	<10m >80% >80%	<5m >85% >85%	<1m >90% >90%
RTTI Event Message ID	Critical	Message IDs may change for same event	Message IDs may change for same event	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)
Secure API Access	Medium	Non-secured	Non-secured	Secured via https	Secured via https	Secured via https
Outdated Messages Deleted from Feed	Low	Max 4 Weeks	Max 3 Weeks	Max 2 Weeks	Max 1 Week	Max 24 Hours
Validity	Low	Start/stop times available	Start/stop times available	Schedules available[9]	Schedules available[9]	Schedules available[9]

Table 17 – Requirements for Planned Road Closure

4.5.4.2. Requirements for Unplanned Full Road Closure

Dynamic Data – Unplanned Road Closure	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	High	Self-defined	Self-defined	Harmonised Definition Required (TISA to Propose Definition)	Harmonised Definition Required (Can TISA Help?)	Harmonised Definition Required (Can TISA Help?)

[9] One example of such schedule could be: "*Mon-Fri 22:00-06:00*".

Dynamic Data – Unplanned Road Closure	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Data Format Used	High	Bespoke local format or DATEX II	Bespoke local format or DATEX II	Only DATEX II (version 2)	Only DATEX II (version 3)	Only DATEX II (version 3, compliant with the related reference profile)
Use of Specification	High	Specification instructions only used as guide – ad hoc implementation used	Specification instructions only used as guide – ad hoc implementation used	Consistent use of specification (DATEX II EU reference profiles per data category)	Consistent use of specification (DATEX II EU reference profiles per data category)	Consistent use of specification (DATEX II EU reference profiles per data category)
Location Referencing	High	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	Strong preference for OpenLR over TMC	Strong preference for OpenLR over TMC	Only OpenLR
Linear Referencing	Critical	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Critical	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Medium	Every 3 days	Daily	Every 10 Minutes	Every 5 minutes	Every 1 Minute
Timeliness	Critical	Max 3 days	Max 24 hours	Max 10 minutes	Max 5 minutes	Max 1 minute
FRC1-4 **Accuracy** **Correctness** **Completeness**	Critical	<250m >80% >80%	<100m >85% >85%	<50m >90% >90%	<25m >95% >95%	<10m >99% >99%
FRC5-6 **Accuracy** **Correctness** **Completeness**	Critical	<50m >70% >70%	<20m >75% >75%	<10m >80% >80%	<5m >85% >85%	<1m >90% >90%
RTTI Event Message ID	Critical	Message IDs may change for same event	Message IDs may change for same event	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)	Same specific message ID for same event (stable)
Secure API Access	Medium	Non-secured[10]	Non-secured[10]	Secured via https	Secured via https	Secured via https

[10] This is not concerning personal data and as it's less than 3-Star Rating, it is not guaranteed to be picked up. However, this document should not be seen as specification for future system implementations, and a non-secure API is always ill-preferred.

Dynamic Data – Unplanned Road Closure	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Outdated Messages Deleted from Feed	Low	Max 4 Weeks	Max 3 Weeks	Max 2 Weeks	Max 1 Week	Max 24 Hours
Vehicle Type Classification	Low	No detail on applicable vehicle type	No detail on applicable vehicle type	Vehicle type specific (i.e. only applicable for HDV)	Vehicle type specific (i.e. only applicable for HDV)	Vehicle type specific (i.e. only applicable for HDV)
Cause Type	Medium	no explanation provided	no explanation provided	explanation provided	explanation provided	explanation provided

Table 18 – Requirements for Unplanned Road Closure

5. DATA DELIVERY, FORMATS AND PROTOCOLS

5.1. The Functional Aim of Access Points

Around the world, governments and mobility providers are working to make traffic and travel data more accessible, reliable, and useful. The aim is the same everywhere: safer roads, smoother journeys, and lower environmental impact. In Europe, this has taken shape through specific legal frameworks like the ITS Directive and Delegated Regulation (EU) 2022/670, which set rules for sharing and improving real-time traffic data. While the regulation applies to EU Member States, the principles behind it—open data access, consistent quality, and collaboration across sectors—are globally applicable and already influencing practices beyond Europe.

Access Points are defined to be the one stop portal for Service Providers to find all relevant datasets and available in the data categories regulated and providing ways how to access this data by a registry or by providing the datasets as a data-portal. In addition to the datasets themselves, Access Points also provide essential metadata, such as the star rating of a dataset or the external URL where the data is hosted if it’s not stored on the Access Point itself. This helps data consumers assess quality and locate resources efficiently, even in decentralised environments.

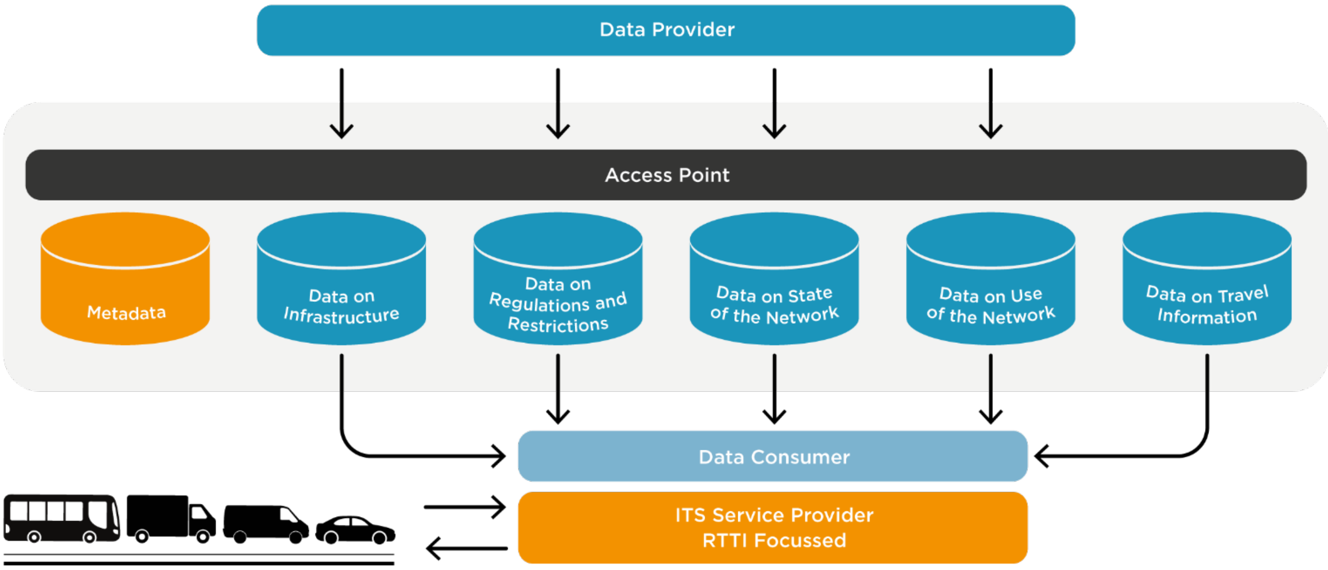


Figure 15 – Data flow from Data Provider to Data Consumer through NAPs

5.1.1. Workflow How to Get Access to Data by ITS Service Providers

The starting point of any Access Point is the metadata registry. Here all datasets and their characteristics in terms of datatype, geographical scope, source, owner, conditions of use, etc. can be found.

The operational process of an AP is illustrated in Figure 16 and is generally described with the following steps.

1. The Data holder register their metadata in the Access Point Metadata registry.
2. Interested Service Providers consult the metadata registry of available datasets and find details about the services of their interest. One piece of information is how and where to register for receiving the data of their interest.
3. SP's register for data delivery to the specific service if needed. In case of anonymous open data provision, registration is not required. Moreover, in other cases the initial interaction of data providers and consumers happens outside the Access Point (a relevant report of NAPCORE will be soon published).

4. The flow of data from data holder to ITS Service Provider becomes operational.

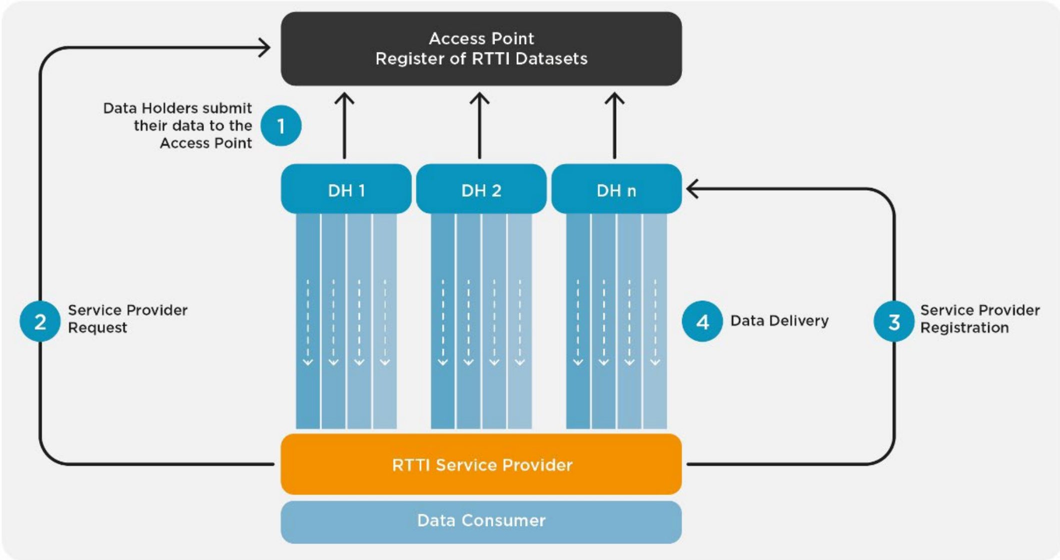


Figure 16 – Data flow from Data Provider to Data Consumer through Access Points

5.1.2. The Data Supply

It is up to the Access Point policy whether the data can be consumed from the source directly or a DataPortal function is available where the data is made available in technical terms.

The following section describes the scenarios according to which the data supply can take place. Section 5.2 addresses the functions where the DATEX II (or any other valid format) data supply is direct from data holder to ITS Service Provider. Whereas section 5.3 addresses the scenarios with a DataPortal in place. The DataPortal function is often a collaboration of public authorities to create efficient and shared services or national datasets that are required because national interest.

There is also the possibility that within one country a hybrid situation exists, where some data holders provide the DATEX II datasets directly to Service Providers, and other via the DataPortal.

5.2. Delivery Scenario: Direct Data Delivery

In this scenario, the data delivery is direct between each data holder and Service Provider.

Responsibility	Data Holder	Data Portal	Service Provider
Publish data	x		
Publish right formats	x		
Manage consistency and quality	x		
Aggregate datasets of same type			x

Table 19 – Functional responsibilities in case of direct data delivery

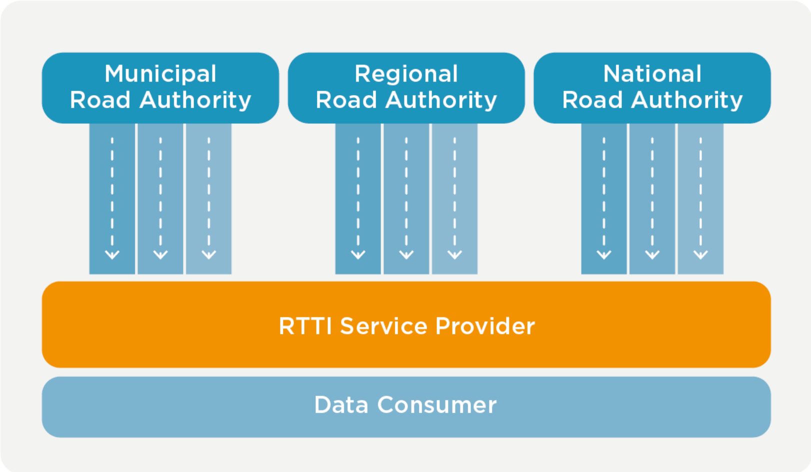


Figure 17 – Data flow in case of direct data delivery

5.3. Delivery Scenario: Central Data Portal

5.3.1. Data Holders Providing Data, Merging is Done by SP

The central data platform could be on the same platform as the Access Point registry, but that is not a prerequisite.

Responsibility	Data Holder	Data Portal	Service Provider
Publish data	x		
Publish right formats		x	
Manage consistency and quality	x		
Aggregate datasets of same type			x

Table 20 – Functional responsibilities in case of a central data portal, aggregation by Service Provider

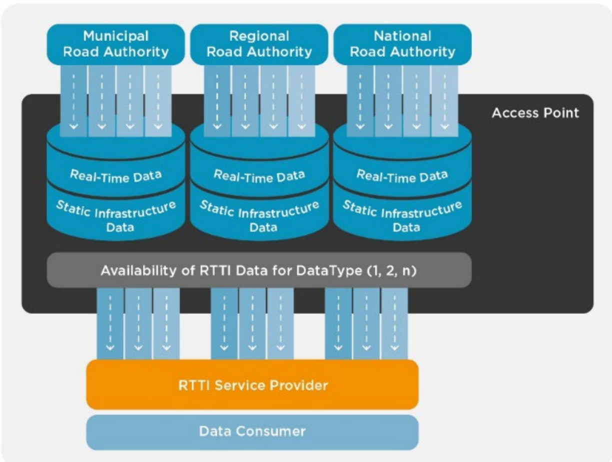


Figure 18 – Data flow in case of a central data portal, aggregation by Service Provider

5.3.2. Data Holders Providing Data, Aggregation is Done by Data Portal

In the context of intelligent transport systems, a data access point , often referred to as a National Access Point (NAP), Harmonised Access Point (HAP), or Mobility Data Hub,serves as a centralised digital platform through which transport and mobility data is made discoverable, accessible, and reusable. Its core function is to facilitate efficient and secure data exchange between data providers (such as Road Authorities, traffic operators, and public agencies) and data users, including navigation Service Providers, researchers, and digital mobility platforms. These access points typically host or reference datasets on traffic conditions, incidents, infrastructure status, and regulations, supporting both real-time services and historical analysis. While terminology and governance models vary globally, the common objective remains the same: to improve data interoperability, foster innovation, and enable smarter, safer, and more sustainable mobility services through structured, transparent, and scalable data sharing.

To streamline the exchange of real-time traffic data, a centralised data portal—such as the National Access Point (NAP) or Harmonised Access Point (HAP) —should handle aggregation. Data holders, including Road Authorities and Operators, upload their datasets directly to the portal, where standardisation and consolidation occur according to agreed quality metrics.

Aggregation in the context of the RTTI 5-Star Rating Specification adds value by enabling the fusion of diverse data sources into a more complete and actionable dataset, which supports higher service quality and broader network coverage. Conversely, separation, such as separating low-quality from high-quality data, helps increase uptake of data, increases transparency, allows targeted processing, and prevents lower-rated inputs from diluting the reliability of RTTI services.

This model simplifies interactions between data holders and Service Providers while promoting consistency through centralised quality checks and aggregation rules[11].

Responsibility	Data Holder	Data Portal	Service Provider
Publish data	x		
Publish right formats		x	
Manage consistency and quality	x	x	
Aggregate datasets of same type		x	
Account registration and source data			x

Table 21 – Functional responsibilities in case of a central data portal, aggregation by data portal

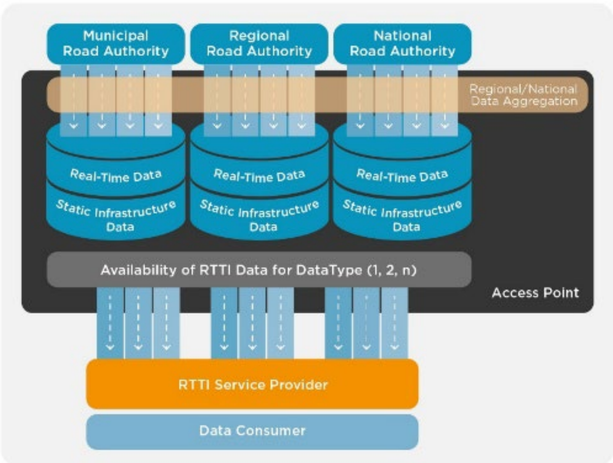


Figure 19 – Data flow in case of a central data portal, aggregation by data portal

[11] This is in line with (EU) 2022/670, Article 6, 1.
For the purpose of facilitating the provision of compatible, interoperable, and continuous real-time traffic information services across the Union, Road Authorities, Road Operators, holders of in-vehicle generated data and Service Providers shall provide the data on the state of the network listed in the Annex they collect in DATEX II (EN 16157, CEN/TS 16157 and subsequently upgraded versions) format. Any update to this data shall be carried out pursuant to Article 10. If additional or alternative standards are to be defined, the following conditions shall apply:
— Member States shall cooperate in order to define these additional or alternative standards;
— digital machine-readable formats shall be compatible with existing standards referred to in the first sentence of this paragraph.

5.4. Approved Data Formats

EU: DATEX II (dynamic) and TN-ITS (static) with mobilityDCAT-AP metadata per NAPCORE guidance; rest of world: other formats may be accepted at Service Providers' discretion, subject to interoperability and service quality.

5.4.1. DATEX II

DATEX II is a standardised protocol designed for the exchange of traffic and travel information among traffic management centres, Service Providers, and other stakeholders. It is widely adopted across the Member States of the EU to ensure interoperability and efficient data sharing within Intelligent Transport Systems (ITS).

The protocol is platform-independent, allowing implementation across various systems without compatibility issues. DATEX II uses a structured data model, defined using the Unified Modelling Language (UML) and translated into an XML schema for practical application. This model allows for structured extensions through defined mechanisms—Level A uses the standard model, Level B introduces UML-based extensions that remain interoperable, and Level C enables separate models that support local needs but are not interoperable with A/B.

A key feature of DATEX II is its extensibility, enabling users to create extensions to the standard model to meet specific requirements while maintaining backward compatibility. This adaptability is essential for evolving traffic management and information services.

The DATEX II protocol is the preferred standard for the exchange of dynamic data, including roadworks, road closures, hazards, and dynamic speed limits, as it ensures high accuracy and real-time updates. Dynamic data requires frequent updates and a robust framework for communication between Road Operators and Service Providers. Static data, such as railway crossings and static speed limits, is typically better suited for protocols designed for less frequently updated information, like TN-ITS, which focuses on the seamless sharing of infrastructure data between national Road Authorities and Service Providers.

As part of broader efforts to support the evolution of DATEX II, the Netherlands National Data Warehouse for Traffic Information (NDW) has published a detailed conversion guide from DATEX II v2.3 to v3, reflecting practical mapping between their national profile and the latest European model. This initiative offers valuable insights and practical examples for stakeholders considering or planning a transition to DATEX II v3, especially those needing to align local implementations with EU-wide standards. The guide is publicly accessible at: https://docs.datex2.eu/user-guide/Conversionv2_v3/

5.4.2. TN-ITS

TN-ITS is a protocol designed to facilitate the exchange of spatial road data between Road Authorities and map providers. It aims to ensure that digital maps are updated with the latest road attribute changes, enhancing Intelligent Transport Systems (ITS) applications such as navigation, traffic management, and automated driving.

The protocol supports the frequent sharing of changes in road attributes from authoritative sources in a harmonised manner. This ensures that digital maps reflect the most current road conditions, which is crucial for applications relying on accurate and up-to-date information. TN-ITS is recognized by the European Commission as a standard for seamless road data exchange.

TN-ITS employs a structured data model and a standardised interface for data sharing. This model is designed to be extensible, allowing for the inclusion of additional road attributes as needed. The protocol also supports the integration of various data sources, ensuring comprehensive and reliable updates.

5.4.3. Geo Package Format

Although this is not in scope of the regulations; it should be mentioned here for consideration in a future version of the standard: Geo Package Format.

GeoPackage is an open, standards-based, platform-independent, portable, self-describing, and compact format for transferring geospatial information. Developed by the Open Geospatial Consortium (OGC), it is designed to store vector features, tile matrix sets of imagery, raster maps, and metadata within a single SQLite database file.

GeoPackage, compared to alternatives like XML formats, adds significant value when managing large-scale geospatial data. For instance, Sweden's use case replacing 3,000 fragmented XML files with GeoPackage demonstrates how this format efficiently consolidates data into a single SQLite database. This reduces the complexity, and storage demands while maintaining high performance, particularly important for large datasets such as those required by the Inspire Directive (8).

GeoPackage's extensibility allows for advanced functions like the inclusion of additional metadata or tile matrix sets, optimising data exchange across platforms. Unlike XML, which often requires parsing and splitting into smaller files to be manageable, GeoPackage eliminates the need for such preprocessing, allowing direct data access without conversion. This facilitates faster updates, fewer errors, and more efficient handling of massive datasets, which is crucial for applications like real-time traffic monitoring.

In summary, GeoPackage simplifies workflows, reduces operational overhead, and ensures data is readily accessible, which is particularly beneficial when managing a large-scale geospatial data set.

5.4.4. European Union and Rest of World

Within the EU, RTTI data should be supplied using DATEX II for dynamic content and TN-ITS for static attributes, with metadata published via mobilityDCAT-AP through National/Common Access Points, consistent with the EU framework's reliance on recognised standards and agreed location-referencing methods.

Outside the EU, other widely used, road-focused formats may be accepted at the discretion of Service Providers, provided interoperability with the core model is preserved, mandatory attributes and quality thresholds are met, and Service Providers confirm they can process the format without degrading service quality. Relevant examples include GeoJSON (WGS-84 and common in open data portals), Shapefile (SHP) (still widely used in legacy systems), OpenLR (location referencing in non-map-bound services), and ISO 14825/GDF (applied in navigation and automotive contexts).

In addition, several well-established broadcast and hybrid formats continue to play a role in the global RTTI ecosystem. TMC remains in use where FM-based distribution dominates (e.g. North America, Australia, parts of Asia), while TPEG is increasingly adopted for its flexibility across multiple media. Japan's VICS system represents a specialised national solution using FM, infrared, and microwave transmission. These formats fall outside the approved EU scope but are recognised as relevant in international RTTI service provision.

5.5. Protocols for Data Exchange

In line with best practices for Real-Time Traffic Information (RTTI) systems, simplicity is key when selecting protocols for data exchange. This approach ensures ease of implementation and increases uptake of data by the various Service Providers. As advised by experts, the recommendation is to focus on two or three widely accepted protocols that are well accepted and understood by the industry.

The TN-ITS and DATEX II protocols are established standards for real-time traffic information and infrastructure data sharing across the Member States of the EU. While these protocols handle most data exchanges effectively, simplicity in implementation remains paramount. RESTful APIs are increasingly used in modern systems for their lightweight, scalable design, making them a preferred method for handling requests between systems in real-time traffic environments.

National Access Points (11), as mandated by EU regulations, play a crucial role in ensuring access to real-time traffic data across Member States. Tools like those covered by NAPCORE help standardise access points, ensuring all stakeholders can find and access necessary data efficiently. Additionally, the mobilityDCAT-AP specification (see latest draft (12), and latest specification (13)) offers a standardised framework for metadata (the process of sharing information about the data, rather than the data itself. Metadata provides a structured description of the content, format, quality, and context of data, which helps systems understand and interpret the data consistently) exchange, supporting data discoverability and re-use. By using frameworks like mobilityDCAT-AP, various systems can understand and interpret data in a uniform way, regardless of the source. This enables the re-use of data by ensuring that metadata (information describing the data itself) is standardised and accessible.

In the context of RTTI services, this is important because it allows various stakeholders (e.g., Road Authorities, Service Providers) to easily find, share, and integrate data from multiple sources. This results in faster, more accurate traffic information, ultimately increasing the uptake by ease of integration. Without standardised metadata exchange, it would be more difficult to ensure that data is properly categorised and accessible across different platforms, leading to inefficiencies and potential errors.

In summary, focusing on simplicity and adopting well-established protocols such as TN-ITS, DATEX II, and REST APIs aligns with industry best practices. This ensures seamless data exchange across platforms while minimising complexity for all involved stakeholders. In line with ongoing harmonization efforts within the ITS domain, recently a formal agreement was signed between the DATEX II and TN-ITS communities to align data models and facilitate interoperability between dynamic (DATEX II) and static (TN-ITS) road data. This collaboration supports seamless data exchange and is especially relevant for Access Points tasked with handling both data types.

5.6. Data Protection and Privacy Compliance

The RTTI Specification is aligned with data protection laws, such as General Data Protection Regulation (GDPR) (14) in the EU, emerging requirements under the European Data Act, and equivalent principles in global data protection laws such as the California Consumer Privacy Act (CCPA) and Japan's Act on the Protection of Personal Information (APPI) Protecting personal data and ensuring user privacy are foundational requirements for all stakeholders involved in RTTI services. For Service Providers, this is a given in their existing practices. However, for data owners within the scope of the RTTI Specification, this may represent a new consideration.

To achieve compliance:

- **Anonymisation**: All personal data, such as vehicle location data or user-specific information, must be anonymised or pseudonymised (e.g., using rotating keys) before processing or sharing. Entities dealing with data must ensure full compliance with applicable data protection regulations and refer to official guidance, such as that from the European Data Protection Board (EDPB) or equivalent national authorities, for implementation-specific requirements.
- **Purpose limitation**: Data collected for RTTI must only be used for its intended purposes, with clear transparency provided to downstream users.
- **Security measures**: Data holders and Service Providers must implement secure transmission and storage practices to prevent unauthorised access.
- **Governance**: Access Points play a critical role in overseeing compliance, acting as trusted interfaces for data sharing.
- **Data Ownership and Sovereignty**: Data originators (typically Road Authorities or delegated operators) retain control over how their data is shared and reused. This includes defining licensing terms and asserting sovereignty over the datasets in line with FAIR principles (Findable, Accessible, Interoperable, Reusable).
- **Legal Interoperability and Multi-jurisdictional Use**: As RTTI data flows cross national borders, it is vital to ensure legal compatibility between jurisdictions. The principles outlined here should align with global best practices and respect bilateral or multilateral data agreements.

This approach ensures that RTTI services, from data collection point, meet the high standards of trust, security, and privacy. Embedding strong data governance alongside technical quality helps ensure RTTI services remain lawful, trusted, and fit for both operational and strategic mobility needs.

6. ROLE OF EMERGING TECHNOLOGIES

6.1. How AI and Automation Can Enhance RTTI Data Quality

In the context of emerging technologies, Artificial Intelligence (AI) and automation present significant opportunities to enhance RTTI data quality.

Moreover, AI can assist in drafting and evolving the RTTI 5-star rating specification. Subject matter experts, who may not have extensive experience in technical writing, can leverage AI to create documents that maintain a consistent tone and language style. This capability ensures that the specification and its derivatives are accessible and readable, facilitating broader adoption and a clearer understanding among diverse stakeholders.

By integrating AI and automation into the RTTI framework, the quality and clarity of data can be improved but also foster a more collaborative and informed environment among all parties involved in the provision of real-time traffic information.

Emerging technologies like AI and automation can enhance the efficiency and reliability of RTTI data processes, but they do not replace the need for human oversight, legal clarity, or stake-holder collaboration.

Supporting Data Quality

High-quality RTTI relies on agreements and trust. Technologies can support this by:

- Flagging anomalies or outdated data.
- Speeding up updates through predictive analytics.
- Assisting with validation using data fusion from multiple sources.

These tools help improve accuracy, completeness, and timeliness - the core elements of the 5-star rating.

Human-Centered Governance

All technology use must be grounded in clear rules, with human validation to ensure fairness, legal compliance, and shared interpretation.

Forward-Looking, Not Replacing

While automation will grow in importance, its role is to support - not substitute - stakeholder dialogue and structured agreements. Trust, transparency, and legal responsibility remain the foundation of quality RTTI.

6.2. Possible Future Trends in RTTI Standardisation

Table 22 and Table 23 summarise the foreseeable future trends in RTTI standardisation. These trends reflect a future where RTTI standardisation and automotive technology converge, leading to more efficient, safe, and user-centric transportation systems. The possible top-down initiatives by co-legislators could set the regulatory framework, while the likely bottom-up technological advancements will push the capabilities of RTTI systems to new heights.

Trend	Explanation
AI-Enhanced Traffic Management	Integration of AI in RTTI Standards: co-legislators could push for the inclusion of AI and machine learning models to enhance traffic prediction, incident detection, and route optimisation. This would involve setting standards for the use of AI in processing and interpreting RTTI data to provide more accurate and timely information.
Standardisation for Autonomous Vehicles	Regulatory Frameworks for FSD and RTTI: As autonomous driving technologies like Tesla's Full Self-Driving (FSD) become more prevalent, co-legislators could likely develop standards for integrating RTTI into autonomous vehicle systems. This includes specifying how RTTI data should be used for navigation and decision-making in self-driving cars.
Integration with Sustainable Energy and EV Infrastructure	Green Routing and Energy Optimisation: Expect regulations that encourage RTTI systems to integrate with EV charging infrastructure and promote eco-friendly routing options. This aligns with OEM trends focusing on sustainable energy management, ensuring routes are optimised for energy consumption and charging station availability.
Data Privacy and Ethical AI Use:	Guidelines on Data Collection and Usage: As AI becomes more integrated into RTTI systems, there will be a greater emphasis on ethical AI use and data privacy. Co-legislators might establish strict guidelines for collecting, processing, and using traffic data to protect user privacy and ensure transparency in AI decision-making.
Dynamic and Personalised RTTI Services	Personalised Traffic Information Delivery: Future regulations might promote RTTI systems that offer personalised data services based on user preferences and driving behaviour, enhancing the user experience. This involves setting standards for data personalisation while ensuring consistency and accuracy.

Table 22 – Future trends in RTTI Standardisation, top-down

Trend	Explanation
Advanced AI and Neural Networks	Integration of AI in RTTI Standards: Co-legislators might push for the inclusion of AI and machine learning models to enhance traffic prediction, incident detection, and route optimisation. This would involve setting standards for the use of AI in processing and interpreting RTTI data to provide more accurate and timely information.
Unified Autonomous Driving Platforms	Integration of FSD Features: Features like 'Smart Summon' and 'Auto park' indicate a move towards more autonomous vehicle functions being tightly integrated with RTTI. Future cars will use RTTI data not just for navigation but for executing autonomous manoeuvres such as parking and lane changes.
In-Car Augmented Reality (AR) Systems	AR-Enhanced Navigation: With advancements in in-car AR, RTTI data will be directly overlaid on the driver's view, offering more immersive and intuitive navigation experiences. This requires highly accurate RTTI data to be integrated seamlessly into AR displays.
Expansion of Vehicle-to-Everything (V2X) Communication	Vehicle and Infrastructure Communication: V2X will be crucial for RTTI, allowing vehicles to communicate with each other and with road infrastructure. This communication provides real-time updates on road conditions and traffic incidents, enhancing the overall RTTI ecosystem
Predictive Maintenance and Vehicle Health Monitoring	Real-Time Alerts and Diagnostics: With companies like Bridgestone introducing features like mobile app notifications for tire service, RTTI systems could evolve to include vehicle health monitoring data. This information will be integrated into navigation and telematics systems to suggest optimal routes based on vehicle condition and maintenance needs.
Enhanced User Interfaces and Voice Command Integration	Intelligent and Adaptive User Interfaces: Future RTTI will be integrated into advanced user interfaces, including voice-activated controls and predictive search functionalities. This aligns with car makers roadmaps for a more intuitive and interactive in-car experience.
IoT and Smart Infrastructure Integration	Data from Smart Cities and IoT Devices: Integration of RTTI with IoT-enabled infrastructure like smart traffic lights, sensors, and connected road signs will provide more granular and dynamic traffic data. This will enhance the RTTI ecosystem by allowing vehicles to receive and respond to real-time road and traffic information.
Blockchain for Secure Data Sharing	Decentralised Data Management: Blockchain technology could be used in RTTI to ensure data integrity and secure sharing between different entities, enhancing trust and reducing the risk of tampering with traffic data.

Table 23 – Potential future trends in RTTI Standardisation, bottom-up

7. SUMMARY AND OUTLOOK

7.1. Summary of the RTTI 5-Star Rating Specification

The RTTI 5-Star Rating Specification represents a framework designed to enhance the quality, accessibility, and interoperability of real-time traffic data. It provides a structured methodology for assessing data at multiple levels, from static data such as speed limits to dynamic data including roadworks and closures. While the specification aligns closely with Delegated Regulation (EU) 2022/670 to support those european stakeholders that must comply with it, its scope and relevance are not limited to Europe. The framework has been designed as a globally applicable reference model, offering benefits for all stakeholders seeking to improve the reliability and consistency of RTTI services.

This specification builds on existing datasets and fosters collaboration among stakeholders, including road authorities, ITS solution providers, and researchers. It prioritises high-value use cases (Speed Limits, Roadworks, and Road Closures) establishing a solid foundation while leaving room for future expansion. Adopting this rating system not only supports compliance where required but also drives improvements in road safety and traffic efficiency worldwide, while creating a basis for emerging use cases such as EV routing that can contribute to environmental sustainability.

The RTTI 5-Star Rating is not a new concept introduced in isolation. It builds on a long history of public authority initiatives, including European projects and platforms such as EasyWay I & II[12] (2007–2012), EIP, EIP+ (2010–2016), and EU-EIP[13] (2016–2021). These programmes laid essential groundwork for traffic management and data quality improvement, notably through deployment guidelines and Quality Packages for RTTI and SRTI. From them emerged key principles such as multi-level quality considerations — completeness (what is promised) and correctness (how well it is done).

The RTTI 5-Star Rating system carries these principles forward, updating them into a consistent, scalable methodology for evaluating real-time traffic data quality. Developed through dedicated TISA workshops between 2022 and 2025 and shaped by consensus among both public and private stakeholders, the system represents the natural evolution of long-term efforts to harmonize, evaluate, and enhance traffic information services.

As the RTTI 5-Star Rating Specification continues to evolve, it is clear that while the initial focus on Speed Limits, Roadworks, and Road Closures lays a strong foundation, additional critical use cases will need to be addressed to fully meet future service and policy needs. These next steps will be essential to ensure that the framework remains relevant, scalable, and able to support innovation across the RTTI ecosystem globally.

7.2. Key Takeaways from the RTTI 5-Star Rating Specification

- One of the most commendable aspects of the RTTI 5-Star Rating Specification is its emphasis on **collaboration** between governments and Service Providers. Rather than prescribing every specific detail, TISA foresees an **adaptive approach**, fostering consensus among stakeholders. This flexibility is key to ensuring that the specification remains relevant over time, avoiding the pitfalls of rigid, overly prescriptive guidelines that might quickly become outdated or incorrect as technology evolves.
- The timeline for implementation strikes a practical balance for the commercial sector, where swift adoption of new standards and specifications is generally more feasible. However, for governments—especially those dealing with multiple jurisdictions, such as central and local authorities—the timelines present a significant challenge. Coordinating data sharing and RTTI standard compliance across different geographic regions and administrative levels requires more complex integration processes and interagency collaboration. This is particularly true for countries where data is managed independently by local or regional governments rather than through a centralised national system.

[12] https://www.its-platform.eu/DGs2012/

[13] https://www.its-platform.eu/wp-content/uploads/ITS-Platform/AchievementsDocuments/Quality%20Frameworks/EU%20EIP%204.1_SRTI%20RTTI%20Quality%20Package%202019-05-15.pdf

- The specification's design acknowledges the varying capabilities of stakeholders, offering flexibility in how these goals are achieved while still maintaining a clear path toward improvement in real-time traffic information services. That said, the success of this initiative will largely depend on how effectively governments and Service Providers can align their efforts, sharing responsibilities and overcoming logistical challenges to meet the quality standards set forth in the regulation.

7.3. Specification Updates That Stakeholders Can Expect

To support the cooperation of road operators and ITS service providers, this quality framework aims to foster trust, transparent cooperation, and innovation, ensuring data quality improvements directly benefit all road users. It incorporates aspects of important core functionalities, such as for static data or for the Access Points, plus three Priority Use Cases (PUC). TISA acknowledges that these three PUCs mark only the beginning of continuous evolution of the QR standard. Nevertheless, it was of utmost importance for all involved stakeholders to have a stable and broadly agreed starting point, even if the scope is currently limited. As mentioned on page 6, after the pilot evaluation phase has concluded the specification will be updated in a version 1.1 to incorporate the suggested improvements based on real-world practical implementation by different stakeholders. For gradually expanding the scope in a controlled manner, the following rolling-wave planning was agreed.

3. A specification for an Evaluation Methodology (EM) will be developed, that provides fundamental approaches, statistical methods and detailed implementation instructions for how to measure the data quality and derive a star rating for a given data set, geographic region and time. Publication for the EM specification is scheduled for late 2025.

This first version of the EM specification will reference to the core functionality and the first three Priority Use Cases (PUC1 "Static speed limits", PUC2 "Roadworks" and PUC3 "Road closures").

4. Additional three Priority Use Cases (PUC4, PUC5, PUC6) will be added to the next version (2.0) of the QR specification, scheduled for publication early 2026. Core functionality will be reviewed and, if needed, modified or expanded in version 2.0.
5. The EM specification will be amended to also cover the three new Priority Use Cases (PUC4, PUC5, PUC6). Publication is to be expected end of 2026.
6. In parallel, during 2026, the assessment processes will be developed and established, assessment organisations will be nominated, and an accreditation scheme will be set up so that, after the first assessments have been performed, star ratings can be issued and published.

This rolling-wave planning[14] continues until all relevant Use Cases have been addressed in both QR and EM as well as all required assessment processes are established. If all relevant Use Cases are covered, the process may be paused until new PUC are proposed while the assessment processes continue. If needed, the QR and EM updating can resume at any given time. Further, previously defined Use Cases can be revisited and updated if required.

Figure 20 provides an overview of the entire process.

[14] To allow the necessary developments in the field of data accessibility and standardisation to take place, a phased implementation should be considered. This phasing should provide a feasible and gradual increase in geographical coverage and accessibility to data, see (EU) 2022/670 (10).

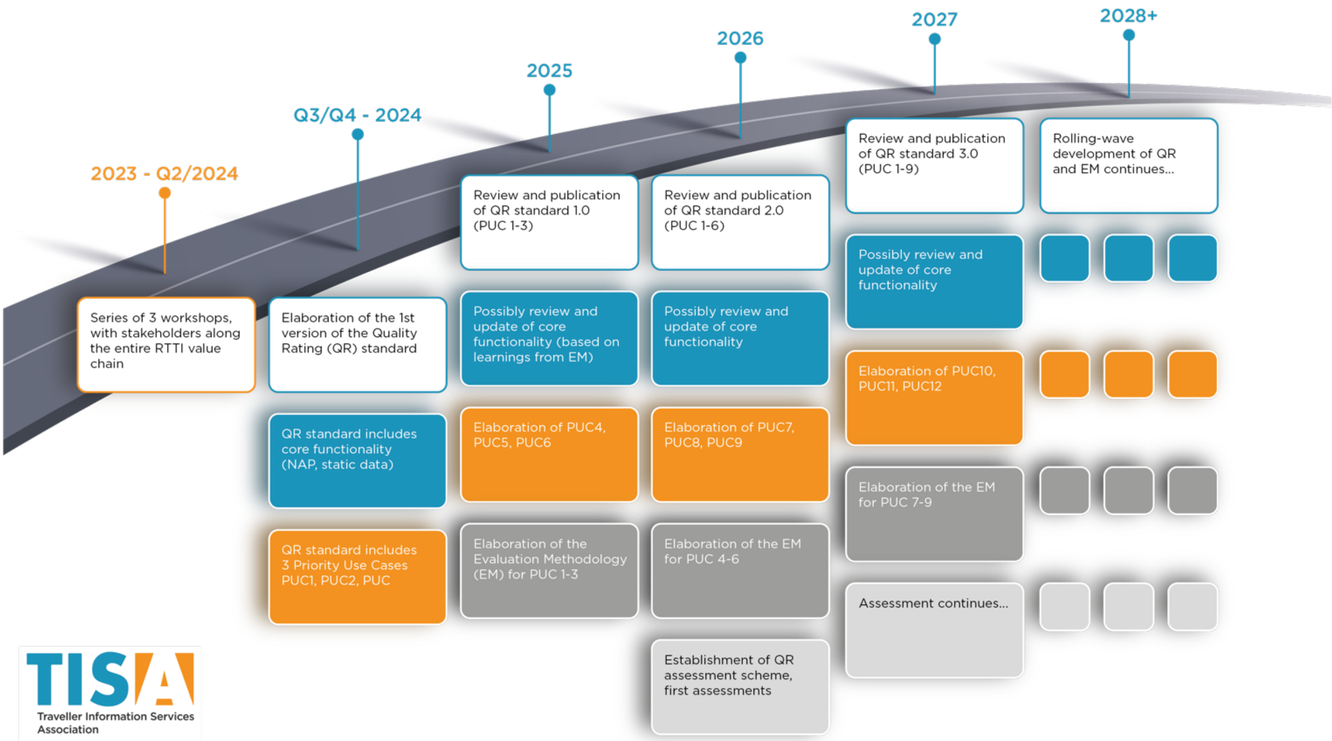


Figure 20 – Phased approach to the development of this document

It is important to note that this version 1.0 marks a cornerstone, on which the Evaluation Methodology rests like a pillar. Adding more corner stones and pillars provides the required stability for adding the assessment process like beams and the accreditation scheme like a roof, building a stable and solid house for future high-quality RTTI services that are ever so important for the mobility of global road users.

7.3.1. Importance of These Use Cases

- **Safety and Efficiency**: Each use case has a direct impact on road safety and traffic efficiency. Knowing about incidents, road-works, and congestion in real time helps drivers make better decisions and avoid danger or delays.
- **Compliance**: In the EU context, the Delegated Regulation requires that these data types form part of real-time traffic information services. By adopting this specification, member states are supported in meeting those obligations. Beyond Europe, applying the same principles helps ensure alignment with international best practices, creating consistency across borders and enhancing the overall value of RTTI services.

In summary, while Speed Limits, Roadworks, and Road Closures provide an excellent foundation for RTTI services and this (version of) the specification, adding these other essential use cases will ensure the system covers all aspects of real-time traffic management, keeping drivers informed and roads safer.

7.3.2. Future Priority Use Cases That Will Be Addressed at a Later Stage

While the three Priority Use Cases Speed Limits, Roadworks, and Road Closures provide a solid starting point for the RTTI 5-Star Rating Specification, there are several other important areas that will be addressed in future updates of this Quality Rating specification. To start with, the following use cases will be considered:

Traffic Incidents

This includes data on accidents, vehicle breakdowns, and obstacles that affect traffic flow. Quick and accurate updates are crucial to help road users avoid delays and further accidents. The regulation places a strong emphasis on ensuring road users have access to this information as soon as possible.

Traffic Regulations and Restrictions

This involves reporting on things like access restrictions (e.g., low-emission zones or time-dependent vehicle bans). These can have a major impact on certain types of vehicles, especially trucks or commercial vehicles. Changes in regulations must be communicated clearly to ensure compliance and smooth traffic operations.

Weather-Related Hazards

Weather conditions like fog, ice, or floods can quickly create dangerous situations on the road. Real-time warnings about these hazards allow drivers to adjust their routes or driving behaviour to stay safe. This is especially important in regions prone to severe weather.

Congestion and Traffic Flow

Up-to-date information on traffic congestion, including estimated travel times and delays, helps drivers plan the fastest routes and avoid jams. This is critical not only for improving road efficiency but also for reducing fuel consumption and emissions.

In which order these (and potentially other) Use Cases will be addressed is subject to discussion in the relevant stakeholder groups (see Stakeholder Involvement Group in Chapter 1.9). This group is open to all relevant stakeholders and any interested party can be invited to this group by contacting the TISA Executive Office via eo@tisa.org.

8. ANNEX 1: PARTS OF A WELL-DEFINED ROADWORKS MESSAGE

8.1. Clear Location Referencing with OpenLR and/or Polylines.

Map-matching failure is the most common cause for a trimmed message.

8.1.1. Example of OpenLR Referencing in DATEX II Format

More than one OpenLR binary may be included in the location extension, if they are necessary to represent the location accurately or if an event needs to be defined by a group of linear locations. OpenLR values can also be defined manually if the feed provider cannot implement an encoder.

The following element would be contained inside a “situationRecord” section.

```
<groupOfLocations>
  <locationContainedInGroup xsi:type="Linear">
    <locationExtension>
      <openlr>
        <binary version="3">CwiVbSRvaQEI/EwVChwBdzkL</binary>
      </openlr>
    </locationExtension>
  </locationContainedInGroup>
</groupOfLocations>
```

NOTE: for an approximate decoding of the above mentioned OpenLR string please visit: https://demo.tomtom.com/ and paste the binary encoded element there.

8.1.2. Example of TMC Referencing Using AlertC in DATEX II Format

The following element would be contained inside a “situationRecord” section.

```
<groupOfLocations>
  <locationContainedInGroup xsi:type="Linear">
    <supplementaryPositionalDescription>
      <lengthAffected>297.0</lengthAffected>
    </supplementaryPositionalDescription>
    <alertCLinear xsi:type="AlertCMethod4Linear">
      <alertCLocationCountryCode>8</alertCLocationCountryCode>
      <alertCLocationTableNumber>17</alertCLocationTableNumber>
      <alertCLocationTableVersion>9.7</alertCLocationTableVersion>
      <alertCDirection>
        <alertCDirectionCoded>negative</alertCDirectionCoded>
      </alertCDirection>
      <alertCMethod4PrimaryPointLocation>
        <alertCLocation>
          <specificLocation>55311</specificLocation>
        </alertCLocation>
        <offsetDistance>
          <offsetDistance>538</offsetDistance>
        </offsetDistance>
      </alertCMethod4PrimaryPointLocation>
      <alertCMethod4SecondaryPointLocation>
        <alertCLocation>
          <specificLocation>55313</specificLocation>
        </alertCLocation>
        <offsetDistance>
          <offsetDistance>1518</offsetDistance>
        </offsetDistance>
      </alertCMethod4SecondaryPointLocation>
    </alertCLinear>
  </locationContainedInGroup>
</groupOfLocations>
```

8.2. Start and Stop Times

It is very common to have long term roadworks without start and stop times which, if unaccompanied by effects in traffic, makes it very difficult for the feed user to determine if the hazard is there.

8.2.1. Example for the Definition of Start and Stop Times in DATEX II Format

The following element would be contained inside a “situationRecord” section

```
<validity>
  <validityStatus>active</validityStatus>
  <validityTimeSpecification>
    <overallStartTime>2024-09-30T13:12:00Z</overallStartTime>
<overallEndTime>2024-10-02T13:12:00Z</overallEndTime>
  </validityTimeSpecification>
</validity>
```

8.2.2. Example for Start and Stop Times with Daily and Weekly Schedules in DATEX II Format

The following example shows an event that happens for a whole month but only at nighttime (22:00 to 6:00) on weekends.

```
<validity>
  <validityTimeSpecification>
    <overallStartTime>2024-07-01T22:00:00+02:00</overallStartTime>
    <overallEndTime>2024-07-31T06:00:00+02:00</overallEndTime>
    <recurringTimePeriodOfDay xsi:type="TimePeriodByHour">
      <startTimeOfPeriod>22:00:00</startTimeOfPeriod>
      <endTimeOfPeriod>06:00:00</endTimeOfPeriod>
    </recurringTimePeriodOfDay>
    <recurringDayWeekMonthPeriod>
      <applicableDay>saturday</applicableDay>
      <applicableDay>sunday</applicableDay>
    </recurringDayWeekMonthPeriod>
  </validityTimeSpecification>
</validity>
```

8.3. Impact Definition

Accurately defining the impact of roadworks is crucial for ensuring the safety and efficiency of traffic flow. This includes specifying the number of lanes affected, clearly indicating which lanes are impacted, and detailing any changes to lane width. Additionally, it is important to identify contraflow situations, alternate traffic control measures, and any lane-level speed limit changes. Properly defining these impacts helps traffic management systems and road users to better understand and navigate the affected areas.

8.3.1. Example for the Definition How Many Lanes are Closed in DATEX II Format

The following element would be contained inside a “situationRecord”, by defining a lane number in “impact” section:

```
<impact>
  <numberOfLanesRestricted>1</numberOfLanesRestricted>
<impact>
```

8.4. Clear Indication Which Lanes are Affected

8.4.1. Example for Definition Which Lane is Affected in DATEX II Format

The following element would be contained inside a “supplementaryPositionalDescription” and can define additional information about location in “carriageway” section:

```
<supplementaryPositionalDescription>
  <carriageway>
    <carriageway>mainCarriageway</carriageway>
    <originalNumberOfLanes>2</originalNumberOfLanes>
    <lane>
      <laneNumber>1</laneNumber>
    </lane>
  </carriageway>
</supplementaryPositionalDescription>
```

8.5. Clear Indication if the Lane Width is Affected.

8.5.1. Example for Definition if the Lane Width is Affected in DATEX II Format

'ResidualRoadWidth' inform about total width of the combined operational lanes in the specified direction (Road Width of lanes that are not affected).

```
<residualRoadWidth>7</residualRoadWidth>
```

8.6. Whether it is a Contraflow Situation

8.6.1. Example for Definition When Contraflow Situation is Present in DATEX II Format

"Contraflow" type is used when two-way traffic is temporarily sharing a single carriageway.

```
<roadOrCarriagewayOrLaneManagementType>contraflow</roadOrCarriagewayOrLaneManagementType>
```

8.7. Whether There is Alternate Traffic Controlled by a Temporary Traffic Light in DATEX II Format

8.7.1. Example for Definition When There is Alternate Traffic Controlled by a Temporary Traffic Light

This type is used when Traffic is being controlled by temporary traffic lights (red-yellow-green or red-green).

```
<generalNetworkManagementType>temporaryTrafficLights</sigeneralNetworkManagementType>
```

Or

This type is used when Traffic is being controlled to move in alternate single lines. This control may be undertaken by traffic lights or flagman.

```
<roadOrCarriagewayOrLaneManagementType>singleAlternateLineTraffic</ roadOrCarriagewayOrLaneManage-
mentType>
```

8.8. Information About Lane-level Speed Limit Changes

8.8.1. Example of Definition Lane-level Speed limit changes due to roadworks in DATEX II format

Lane level for speed limit changes can be defined as it was described in section 8.4 Clear Indication Which Lanes are Affected.

```
<speedManagementType>speedRestrictionInOperation</speedManagementType>
<temporarySpeedLimit>50.0</temporarySpeedLimit>
```

8.9. Direction specified

8.9.1. Example of Direction Specified in DATEX II Format

There are multiple ways to define direction in the Datex II format. For more information refer to Datex II official documentation.

```
<alertCDirection>
  <alertCDirectionCoded>both</alertCDirectionCoded>
</alertCDirection>
```

9. ANNEX 2: EXPLANATION OF PARAMETERS AND THEIR VALUE

Table 24 provides a structured summary of the RTTI data quality parameters, highlighting their purpose, the added value of higher scores, and their impact across defined use cases.

Quality Parameter	What It Means	Why It's Important	Why Higher Scores Are Needed	Impact of lower rating
Terminology & Definition	Use of clearly defined and harmonised terms across all datasets.	Prevents misinterpretation and ensures consistency between parties.	Higher scores ensure maximum uptake and, where applicable, adhering to the law.	-
Data Format Used	The technical structure in which the data is provided.	Determines compatibility with processing systems.	Standard formats reduce data parsing errors and allow fast integration into (existing) workflows.	The risk with a local format is that not all information is filled in hence context might be wrong or open for misinterpretation.
Use of Specification	Whether the format or method aligns with a recognised specification.	Specifications used ensure interoperability across platforms.	Specification use guarantees predictable structure, speeding up validation and quality checks and allowing these checks to be recurrent without change.	Specification instructions only and more risk of misalignment e.g. details on the correct road / lane information cannot be shared in a unified way.
Location Referencing	How the physical position of the event is described.	Critical for correctly placing an event on a digital map.	More precise referencing means less misalignment and misrouting, especially in complex networks.	Exact location will be harder to match correctly on target map and systems might fuse with wrong data as a result.
Linear Referencing	Linear referencing represents locations as measurements along a linear feature, like a road, using distances or offsets from a known starting point, enabling continuous data representation	improves data management, supports dynamic segmentation, and aligns with the linear nature of networks, making it ideal for traffic and mapping systems to efficiently detect and process changes.	Better contextual placement of long events like speed limits, roadworks or closures.	-

Quality Parameter	What It Means	Why It's Important	Why Higher Scores Are Needed	Impact of lower rating
Direction Defined FRC3-6[15]	Whether the direction of travel is included for lower-class roads.	Necessary for correct map matching on bidirectional roads.	Reduces risk of misplacement on wrong carriageway or road segment.	When the direction isn't defined from the source the risk is that during fusion either the wrong direction or both directions are affected in towards road users which doesn't match reality.
Update Cycle	Frequency with which the data source updates its content.	Ensures that changes are reflected promptly.	Higher update frequency reflects real-time conditions more accurately.	With a low update cycle, it will take a long time for changes / corrections are announced making more road users experience wrong data in their systems.
Timeliness	The delay between the event occurrence or update and its availability to users.	Time-sensitive events like closures lose relevance if delayed.	Higher timeliness enables sooner and better (re)routing and incident avoidance.	When data submitted is very old the reality might be different by the time it reaches road users.
Pre-announcement	Whether an event is published before it starts (e.g. for planned Speed limit changes).	Enables updated in digital maps and proactive rerouting as well as early announcement / warnings.	Higher scores help reduce disruption through early communication to systems and, ultimately, road users.	Not having pre-announcements will make it impossible for navigation solutions to anticipate on planned changes.
Accuracy	The degree to which the data correctly reflects the location in the physical road.	Enables precise integration into routing, alerting, and planning algorithms.	Higher location accuracy improves user confidence and system reliability.	Lower accuracy makes that information could overlap unaffected road segments causing unnecessary warning or obsolete rerouting causing stress on neighbouring infrastructure that can be prevented.
Correctness	The truthfulness of the reported data, free from errors or false positives.	Incorrect data can mislead systems and users and possibly trigger wrong (re)routing.	A higher score reduces the risk of misinformation and inappropriate user (re)actions.	If less data is correct the road user trust is immediately affected.

[15] Note on Functional Road Classes (FRC): While FRC 1-6 were agreed upon as the common scope during the workshop consensus, here the focus is on FRC 3-6. Directionality, in relation to Roadworks and Road Closures have greater impact at lower road classes hence having direction defined is a benefit for granular RTTI quality differentiation for these road classes. FRC 1-2, are generally unidirectional.

Quality Parameter	What It Means	Why It's Important	Why Higher Scores Are Needed	Impact of lower rating
Completeness	The extent to which all relevant data elements (e.g. roadworks, speed limits) are available.	Missing data can cause sub optimal routing or leave users uninformed.	A higher score means more complete data, enabling consistent and dependable services downstream.	If less data is complete the road user trust is immediately affected.
Vehicle Classification	Whether data includes vehicle-type relevance (e.g. cars, buses).	Ensures speeds and routing are correctly applied per vehicle type.	Enables personalised navigation and compliance with legal and routing restrictions.	If there is no proper vehicle classification present in the data, unaffected road users might receive irrelevant warnings / alerts.
Speed Limit Type	Whether the speed limit is explicit (clearly shown by a sign) or implicit (derived from context, e.g. leaving a built-up area).	Explicit limits reduce ambiguity, while implicit limits require correct contextual interpretation	Higher scores ensure consistent interpretation across systems, avoiding unsafe / illegal speed advice.	Directly related to ISA requirements.
Availability	The percentage of time the data source is accessible, and its uptime guarantees a 24/7 setup.	RTTI services depend on uninterrupted access to data feeds.	Higher availability supports round-the-clock operations and service quality.	Lower availability makes the data source less reliable. As it's unclear on the receiving end if no availability means there is no update, or a system is down. (better to have an available system that confirms there are no changes)
RTTI Event Message ID	A unique identifier for each event published in the data feed.	Essential for tracking, updating, and deleting events throughout systems.	Higher scores ensure robust lifecycle management of traffic messages including root cause analysis in case of issues.	Changing IDs might cause problems with continuity in downstream systems, either in service providers, Tier 1 or end user systems, making duplicated events, or causing data overhead by retransmitting unchanged information.
Secure API Access	Whether access to the data feed is encrypted and authenticated.	Prevents unauthorised access and data tampering.	Higher security increases trust.	Non secured interfaces are prone to data tampering. The impact (for example fake major road closures) could be significant as the reach of service providers is very big.

Quality Parameter	What It Means	Why It's Important	Why Higher Scores Are Needed	Impact of lower rating
Outdated Messages Deleted from Feed	Whether expired or resolved messages are removed promptly from a feed.	Prevents obsolete data from confusing systems or users. Decreases overhead.	Increases relevance and helps clarity of the feed; higher scores reduce system-level "noise".	Lower rating will cause much more overhead for all users of the data source.
Availability Short Term Events	Presence of temporary disruptions (e.g., sudden Roadworks) in the feed.	Ensures urgent events are communicated rapidly.	Improves response to critical but short-lived incidents, supporting real-time rerouting.	Even though these types of events are short lived; not having them available means that the road users miss relevant information during their journey, this directly affects trust in information as well as increases the risk of incidents.
Road Type	Classification of the road (motorway, regional, urban, etc.).	Some data is more critical or applicable on certain road types.	Higher resolution of classification supports tailored data relevance and prioritisation.	Only having generic information might affect road users that shouldn't be affected, e.g. an unnecessary detour, or lack thereof.
Validity	Start and duration for an event remains accurate and actionable.	Ensures the digital event is only active when it's relevant in the real world.	Accurate intermittent validity periods represent reality in the best possible way.	Rought validity information like start and end time or a roadwork is more often wrong than correct. As often working hours are only a subset of the day / week.
Lane Level Attribute	Whether data specifies affected lanes rather than just the whole road.	Lane-level detail is crucial in complex road layouts.	Enables precision routing and better driver information in tight or multi-lane environments.	Not having this information available might cause unneeded rerouting. Or prevent rerouting when needed.
Cause Type	Classification of the event cause (e.g., roadworks, accident, weather).	Enables better filtering and prioritisation, helps understand forecasting a trend.	Higher granularity supports user relevance and various treatment in services (e.g. a collapsed bridge will affect throughput for a long time and affect both RTTI and map systems, where a small flooding could be resolved quickly and even occur regularly).	Not having contextual information could cause poor filtering and lack of prioritisation, not yielding the desired outcome.

Table 24 – Explanation of quality parameters and values

10. ANNEX 3: EXAMPLE OF A 5-STAR SCORING MATRIX

Dynamic Data – Planned Roadworks	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★	weight	max score	Test scoring	Critical	High
Terminology & Definition	**high**	Self-defined	Self-defined	Harmonised Definition Required (TISA proposed Definition)			3	15	2		2
Data Format Used	**high**	Bespoke local format or DATEX II	Only DATEX II (version 2)	Only DATEX II (version 3)		Only DATEX II (version 3, compliant with the related reference profile)	3	15	2		2
Use of Specification	**high**	Specification instructions only used as guide – ad hoc implementation used	Unified use of specification (DATEX II EU reference profiles per data category (6))				3	15	2		2
Location Referencing	**high**	Basic GNSS INSPIRE coordinates	Basic GNSS INSPIRE coordinates	Strong preference for inclusion of OpenLR over TMC	Strong preference for OpenLR over TMC	Only OpenLR	3	15	2		2
Linear Referencing	**critical**	Polylines	Polylines	Polylines	Polylines	Polylines	4	20	3	3	
Direction Defined FRC3-6	**critical**	Not referenced	Not referenced	Referenced	Referenced	Referenced	4	20	3	3	
Update Cycle	**medium**	Weekly	Every 3 days	Daily	Max 6 Hours	Hourly	2	10	3		
Timeliness	**critical**	Max 1 week	Max 3 days	Max 24 hours	Max 6 Hours	Max 1 Hours	4	20	3	3	
FRC1-4											
Accuracy	**critical**	<1km	<500m	<250m	<100m	<50m	4	20	3	3	
Correctness	**critical**	>70%	>75%	>80%	>85%	>90%	4	20	3	3	
Completeness	**critical**	>70%	>75%	>80%	>85%	>90%	4	20	3	3	
FRC5-6											
Accuracy	**critical**	<200m	<100m	<50m	<25m	<10m	4	20	3	3	
Correctness	**critical**	>60%	>65%	>70%	>75%	>80%	4	20	3	3	

Dynamic Data – Planned Roadworks	Weighing	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★	weight	max score	Test scoring	Critical	High
Completeness	**critical**	>60%	>65%	>70%	>75%	>80%	4	20	3	3	
RTTI Event Message ID	**critical**	Message IDs may change for same event	Message IDs may change for same event	Same specific event ID for same event (stable)	Same specific event ID for same event (stable)	Same specific event ID for same event (stable)	4	20	3	3	
Secure API Access	**medium**	Non-secured	Non-secured	Secured	Secured via https	Secured via https	2	10	3		
Outdated Messages Deleted from Feed	**low**	Max 4 Weeks	Max 3 Weeks	Max 2 Weeks	Max 1 Week	Max 24 Hours	1	5	3		
Availability Short Term Events	**low**	Scheduled roadworks only	Scheduled roadworks only	Scheduled roadworks	Scheduled roadworks	Scheduled roadworks	1	5	3		
Road Type	**low**	Generic roadworks only	Generic roadworks only	Lane level including narrow lanes	Lane level including narrow lanes	Lane level including narrow lanes	1	5	3		
Validity	**low**	Start/stop times available	Start/stop times available	Schedules available (e.g. Mon-Fri 22:00 – 06:00)	Schedules available (e.g. Mon-Fri 22:00 – 06:00)	Schedules available (e.g. Mon-Fri 22:00 – 06:00)	1	5	3		
Lane level attribute	**low**	not available	not available	which lane is closed	which lane is closed, lane-width reduction (narrow/full), lane-level speed limit changes		1	5	3		
Vehicle Classification	**low**	M1	M1 + N1 + N2	M1-M3, N1-N3	M1-M3, N1-N3 also, for alternatively powered vehicles i.e. EV and unclassified e-bikes / cargo bikes / pedelecs		1	5	3		
								310	2,81	3	2
									Total score		
									2,00		

critical	4
high	3
medium	2
low	1

Table 25 – Example of a 5-star scoring matrix

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21. ***European Union Law Glossary.*** **[Online] This glossary includes terms related to EU law, which can be helpful when navigating regulations like the DR COMMISSION DELEGATED REGULATION (EU) 2022/670.**

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Document Control Sheet

Document Title	RTTI 5-Star Rating Specification
Status	Final version for publication
TISA - RTTI 5-Star Rating Steering Workgroup	Armis Group, Be-Mobile, City of Amsterdam, City of Helmond, Danish Road Directorate, Federal Roads Office FEDRO, GEWI AG, Google Maps, Graphmasters, HERE Technologies, NDW, Stichting CROW, Swedish Transport Administration, TomTom, Vlaamse Overheid, Xouba
TISA - RTTI 5-Star Rating Technical Workgroup	Be-Mobile, City of Amsterdam, Danish Road Directorate, Federal Roads Office FEDRO, GEWI AG, Graphmasters, HERE Technologies, NDW, Roughan & O'Donovan, Stichting CROW, Swedish Transport Administration, TomTom, TripService, Vlaamse Overheid, Xouba
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Editor	TISA (Abel Gabor)
Review	Stellenbosch University - Smart Mobility Lab (Dr. M.M. Bruwer | Pr Eng, Dr. C.B. Visagie PhD | Pr Eng)

Version history of this document

Version	Date	Implemented changes
0.9	2025/01/20	Final draft for external review.
1.0	2025/10/24	Final version for publication.

Disclaimer

This RTTI 5-Star Rating Specification represents a consensus-based framework, co-developed by road authorities, public operators, ITS service providers, and technical experts under the facilitation of TISA. It is the result of a multi-year collaboration grounded in the principles of transparency, mutual trust, and shared responsibility across the RTTI value chain.
While this document is not a formal specification under Article 6 of Directive 2010/40/EU or the Commission Delegated Regulation (EU) 2022/670, it serves as a practical and widely supported reference architecture. The specification reflects operational best practices derived from real-world deployments and is intended to support the implementation of global real-time traffic information services, particularly through Access Points.
Much like TPEG, which originated as an industry-driven effort and later matured into an ISO standard, this RTTI 5-Star Rating Specification is envisioned as a foundational step toward formal standardization. It provides actionable guidance for improving data quality, fostering alignment between data providers and service integrators, and ultimately strengthening the reliability and cross-border continuity of RTTI services.
Future alignment with recognized European and international standardization bodies (e.g., CEN, ISO) remains an open and encouraged pathway, to ensure that this initiative continues to evolve in harmony with broader regulatory and technical frameworks.