

Report on the obligations and roles imposed by the European Commission's updated RTTI Regulation and ITS Directive

Tomi Laine, Ilkka Kotilainen



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Tekijät Tomi Laine, Ilkka Kotilainen Traficon Oy			
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<p>Tiivistelmä</p> <p>Euroopan komissio julkaisi 2.2.2022 uudistetun delegoidun asetuksen (EU 2022/670) tosiaikaisia liikennetietoja (RTTI-asetus) koskevien EU:n laajuisten palvelujen tarjoamisesta. Lisäksi Euroopan parlamentti ja neuvosto hyväksyivät 22.11.2023 uuden direktiivin EU/2023/2661, jolla päivitettiin älyliikennedirektiivin mukaista sääntelyä. Toimenpiteillä komissio pyrkii entisestään vauhdittamaan tieliikenteen datan saatavuutta ja vaihtoa sekä loppukäyttäjäpalvelujen kehitystä. Tämän selvityksen tavoitteena oli selkeyttää muuttuneen EU-regulaation vaikutuksia eri sidosryhmien velvoitteisiin sekä niiden suhdetta kansalliseen lainsäädäntöön.</p> <p>Euroopan komission regulaatio tieliikenteen staattisten ja dynaamisten tietojen osalta laajenee merkittävästi seuraavien viiden vuoden kuluessa. Vuoden 2025 alussa voimaan tuleva RTTI-asetus laajentaa olemassa olevien koneluettavien tietojen julkaisun velvoitteita koko Euroopan Unionin tieverkolle ja tuo velvoitteiden piiriin uusia sidosryhmiä myös yrityssektorilta. Päivitetty älyliikennedirektiivi laajentaa edelleen velvoitteet koskemaan välttämättömiä sääntöjä ja rajoituksia, välttämättömiä verkon tilaa koskevia tietoja sekä turvallisuuteen liittyviä tietoja niiltä osin, kuin tiedot ovat "taustalla olemassa". Regulaation muutokset ovat verrattain laajoja, ja siksi niiden toimeenpanoon sekä toimeenpanon valvontaan on kohdistettava nykyistä enemmän asianomaisten toimijoiden resursseja.</p> <p>RTTI-asetuksen ja Älyliikennedirektiivin velvoitteiden toimeenpanon kannalta keskeinen toimenpide on sellaisen kansallisen yhteyspisteen suunnittelu ja toteuttaminen, joka mahdollistaa velvoitteiden alaisille sidosryhmille heitä koskevien velvoitteidensa täyttämisen. Suunnittelussa on keskeistä huomioida uusien sidosryhmien suuri määrä, tietolajit ja niiden ominaispiirteet sekä jo olemassa olevat julkisin varoin ja markkinaehtoisesti toteutetut koontikannat. Kansallisen yhteyspisteen käyttö tulisi olla sidosryhmän kannalta mahdollisimman yksinkertaista ja helppoa.</p> <p>Kansallisen yhteyspisteen organisointiin liittyvät kysymykset tulisi ratkaista välittömästi ja käynnistää ratkaisun toiminnallinen ja tekninen suunnittelu. Suomessa on olemassa kansallinen yhteyspiste voimassa olevien RTTI-velvoitteiden johdosta, mutta uuden asetuksen vaatimukset täyttävän kansallisen yhteyspisteen tulee olla toiminnassa 1.1.2025 ja sidosryhmille tulisi varata riittävä aika omien tietosisältöjen viemiseksi yhteyspisteeseen kyseiseen määräaikaan mennessä.</p> <p>On selvää, että monien sidosryhmien resurssit velvoitteiden täyttämiseen ovat niukat. Toisaalta nykytila ja siten myös tarvittavat toimenpiteet ovat sidosryhmien joukossa varsin samankaltaisia. Onkin suositeltavaa, että sidosryhmät, kuten kunnat, tekevät keskenään yhteistyötä, jakavat tietoa parhaista käytännöistä ja tarvittaessa hankkivat tarvitsemiaan ostopalveluja yhteisesti synergian maksimoimiseksi. Valvojan viranomaisen ja mahdollisesti muiden valtion organisaatioiden tulisi edistää tällaisen yhteistyön syntymistä ja tarjota omaa asiantuntemustaan toimijoiden käyttöön, jotta kehitystyö olisi mahdollisimman tuottavaa ja tuloksellista.</p>			
Yhteyshenkilö Anna Schirokoff	Raportin kieli Englanti	Luottamuksellisuus Julkinen	Kokonaissivumäärä 84
Jakaja Liikenne- ja viestintävirasto Traficom	Kustantaja Liikenne- ja viestintävirasto Traficom		

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Författare Tomi Laine, Ilkka Kotilainen Traficom Ab			
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Sammandrag <p>Europeiska kommissionen publicerade den 2 februari 2022 en reviderad delegerad förordning (EU 2022/670) vad gäller tillhandahållande av EU-omfattande realtidstrafikinformatjänster (RTTI-förordningen). Dessutom godkände Europaparlamentet och rådet den 22 november 2023 det nya direktivet EU/2023/2661, genom vilket regleringen enligt direktivet om intelligenta transportsystem uppdaterades. Genom dessa åtgärder försöker kommissionen påskynda tillgången till och utbytet av data inom vägtrafiken samt utvecklingen av slutanvändartjänster. Målet med denna utredning var att klargöra hur den förändrade EU-regleringen påverkar olika intressentgruppers skyldigheter och deras förhållande till den nationella lagstiftningen.</p> <p>Europeiska kommissionens reglering av statiska och dynamiska data om vägtransporter utvidgas avsevärt under de kommande fem åren. RTTI-förordningen, som träder i kraft i början av 2025, utvidgar skyldigheterna att publicera befintlig maskinläsbara data till hela Europeiska unionens vägnät och skyldigheterna omfattar nya intressentgrupper även inom företagssektorn. Det uppdaterade direktivet om intelligenta transportsystem utvidgar skyldigheterna vidare till att omfatta nödvändiga regler och begränsningar, nödvändiga data om nätstatus och säkerhetsrelaterade data i den utsträckning som informationen "är underliggande". Regleringsändringarna är jämförelsevis omfattande och därför måste de berörda aktörernas resurser i större utsträckning än för närvarande riktas till genomförandet och övervakningen av genomförandet av dem.</p> <p>En viktig åtgärd för genomförandet av skyldigheterna enligt RTTI-förordningen och direktivet om intelligenta transportsystem är planeringen och genomförandet av en sådan nationell kontaktpunkt som gör det möjligt för de intressentgrupper som omfattas av skyldigheterna att fullgöra sina skyldigheter. Vid planeringen är det viktigt att beakta det stora antalet nya intressentgrupper, datatyperna och deras särdrag samt de befintliga samlingsdatabaserna som genomförts med offentliga medel och på marknadsvillkor. Användningen av den nationella kontaktpunkten ska vara så okomplicerad och så lätt som möjligt för intressentgruppen.</p> <p>Frågor som gäller organiseringen av den nationella kontaktpunkten ska lösas omedelbart och en funktionell och teknisk planering av lösningen inledas. Det finns en nationell kontaktpunkt i Finland på grund av de gällande RTTI-skyldigheterna, men en nationell kontaktpunkt som uppfyller kraven i den nya förordningen ska vara i drift den 1 januari 2025, och det ska reserveras tillräckligt med tid för intressentgrupperna att lämna in sitt eget datainnehåll till kontaktpunkten inom denna tidsfrist.</p> <p>Det är uppenbart att många intressentgrupper har knappa resurser för att fullgöra sina skyldigheter. Å andra sidan är nuläget och därmed också de åtgärder som behövs mycket likartade bland intressentgrupperna. Det rekommenderas därför att intressentgrupperna, såsom kommunerna, samarbetar sinsemellan, utbyter information om bästa praxis och vid behov skaffar behövliga köptjänster gemensamt för att maximera synergien. Tillsynsmyndigheten och eventuellt andra statliga organisationer ska främja uppkomsten av sådant samarbete och erbjuda aktörerna deras sakkunskap för att utvecklingsarbetet ska vara så produktivt och resultatrikt som möjligt.</p>			
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<p>Abstract</p> <p>On 2 February 2022, the European Commission published the reformed Commission Delegated Regulation (EU) 2022/670 with regard to the provision of EU-wide real-time traffic information services (RTTI Regulation). In addition, the European Parliament and Council approved Directive (EU) 2023/2661 on 22 November 2023 to update the deployment of the ITS Directive. The purpose of these measures is to accelerate the availability and exchange of road traffic information and the development of end user services. This report aims to clarify the impact of the amended EU regulation on the obligations of different stakeholders and their relation to national legislation.</p> <p>The Commission's regulation of static and dynamic road traffic information will expand significantly in the next five years. Entering into force at the beginning of 2025, the RTTI Regulation will expand the existing obligations regarding the publication of machine-readable data to cover the entire EU road network and add new stakeholders, also from the business sector, within the scope of the obligations. The updated ITS Directive will expand the obligations further to concern crucial rules and restrictions, crucial network status information and safety-related information, when the "underlying" information exists. The changes to the regulation are relatively extensive and their implementation and monitoring will require an increased amount of resources from the actors concerned.</p> <p>Regarding the implementation of the RTTI Regulation and the ITS Directive, a key measure is to design and build a national access point that allows the stakeholders subject to the obligations to fulfil their obligations. In the design process, it is essential to recognise the large number of new stakeholders, the categories of information and their characteristics, and the existing aggregated databases implemented by public funds or on market terms. The use of the national access point should be as easy and simple as possible for the stakeholders.</p> <p>The issues related to the organisation of the national access point should be solved immediately and the solution's functional and technical design process should be launched as soon as possible. There is an existing national access point in Finland, necessitated by the current RTTI obligations. However, a national access point that complies with the new obligations must be made available by 1 January 2025. The stakeholders must be provided with enough time to transfer their data content to the access point by this deadline.</p> <p>It is clear that many stakeholders have scarce resources to fulfil the obligations. On the other hand, the current situation and the required measures to be taken are rather similar from the stakeholders' point of view. Stakeholders, such as municipalities, are recommended to cooperate and share their best practices with each other and, if necessary, acquire together the outsourced services they need to maximise synergy. The supervisory authority and other relevant state organisations should support the development of such cooperation and offer their own expertise to the stakeholders to achieve productive and cost-effective results.</p>			
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ALKUSANAT

Tosiikaisten liikennetietojen muuttunut EU-regulaatio astuu voimaan vaiheittain vuosina 2025-28. Velvoitteet digitaalisessa koneluettavassa muodossa olevien tietojen julkaisemiseksi laajenevat koko tieverkolle (ml. kuntien katuverkko) ja uusiin sidosryhmiin, kuten kuntiin, palveluntarjoajiin, ajoneuvon tuottaman datan haltijoihin sekä lataus- ja tankkausalan sidosryhmiin. Päivittynyt älyliikennedirektiivi laajentaa velvoitteita edelleen vuoden 2025 lopusta alkaen ”taustalla oleviin tietoihin”, joihin liittyy digitointivelvollisuus silloin kun datan haltija katsoo tiedon olevan tienkäyttäjälle merkityksellistä. Tosiikaiset liikennetiedot pitävät sisällään myös staattisia liikenteen infrastruktuuria ja sääntöjä ja rajoituksia koskevia tietoja, joiden tuottamisvelvollisuudet ovat pääosin olleet voimassa jo kansallisen lainsäädännön puitteissa.

Regulaation velvoitteiden täyttäminen on laaja työ, joka edellyttää aiempaa enemmän panostuksia sekä velvoitteiden alaisilta toimijoilta että toimeenpanoa valvovalta toimivaltaiselta viranomaiselta Traficomilta. Keskeistä on myös tarjota sidosryhmille selkeät ohjeet ja asiantuntijatuki toimenpiteiden toteuttamiseksi tehokkaasti. Ensimmäisenä toimenpiteenä on toteuttaa kansalliseen yhteyspisteeseen tarvittavat muutokset, jotta sidosryhmien on mahdollista täyttää omat velvoitteensa. Kansallisesta yhteyspisteestä voi muodostua liikennetiedon kattava näyteikkuna ja markkinapaikka, joka helpottaa datan löytämistä ja sen uudelleenkäyttöä ja siten edesauttaa erilaisten loppukäyttäjäpalvelujen laadun ja vaikuttavuuden parantamista.

Tässä työssä on pyritty luomaan selkeä kuva regulaation kokonaisuudesta ja tarjoamaan oikeat tulkinnat vaatimuksista siten, että jatkotoimenpiteiden yksityiskohtainen suunnittelu olisi mahdollista. Työ on luonteeltaan taustaselvitys, eikä siinä esitetyt toimenpiteet ole työhön osallistuneiden organisaatioiden virallisia näkemyksiä.

Selvityksen tilasivat Traficom, Väylävirasto ja Fintraffic. Selvityksen ohjausryhmään kuuluivat Anna Schirokoff, Janne Huhtamäki, Martin Johansson ja Risto Öörni Traficomista, Jari Myllärinen, Petri Antola ja Mikko Kaskanpää Väylävirastosta, Olli Rossi, Jani Kariniemi ja Mika Ahvenainen Fintrafficista sekä Antti Paasilehto ja Atte Riihelä Liikenne- ja viestintäministeriöstä. Selvityksen laadinnasta vastasivat Tomi Laine ja Ilkka Kotilainen Traficom Oy:stä.

Työ julkaistiin alun perin suomeksi (Traficomin tutkimuksia ja selvityksiä 20/2024). Tämä englanninkielinen raporttiversio on tarkoitettu käytettäväksi eurooppalaisessa yhteistyössä, joten tästä versiosta on poistettu alkuperäisiä, vain kansallisia näkökulmia käsitteleviä osia.

Helsinki, 16. elokuuta 2024

Anna Schirokoff
Johtava asiantuntija
Liikenne- ja viestintävirasto Traficom

FÖRORD

Den förändrade EU-regleringen om realtidstrafikinformationstjänster träder i kraft stegvis under 2025–2028. Skyldigheterna att offentliggöra data i digital maskinläsbar form utvidgas till hela vägnätet (inkl. kommunernas gatunät) och till nya intressentgrupper, såsom kommuner, tjänsteleverantörer, innehavare av data som producerats av fordon samt intressentgrupper inom laddnings- och tankningssektorn. Det uppdaterade direktivet om intelligenta trafiksystem utvidgar skyldigheterna ytterligare från och med slutet av 2025 till "underliggande information", till vilken hör en digitaliseringskyldighet när datainnehavaren anser att informationen är betydelsefull för vägtrafikanterna. Realtidstrafikinformationen innehåller också statistiska data som gäller trafikens infrastruktur och regler och begränsningar, och vars produktionskyldigheter i huvudsak redan varit i kraft inom ramen för den nationella lagstiftningen.

Fullgörandet av skyldigheterna enligt regleringen är ett omfattande arbete som förutsätter större satsningar än tidigare både av de aktörer som omfattas av skyldigheterna och av den behöriga myndigheten Traficom som övervakar genomförandet. Det är också viktigt att erbjuda intressentgrupperna tydliga anvisningar och sakkunnigstöd för att genomföra åtgärderna effektivt. Den första åtgärden är att genomföra de nödvändiga ändringarna i den nationella kontaktpunkten för att det ska vara möjligt för intressentgrupperna att fullgöra sina skyldigheter. Den nationella kontaktpunkten kan bli ett omfattande skyltfönster och en marknadsplats för trafikinformation som underlättar sökbarheten och återanvändningen av data, och bidrar därmed till att förbättra kvaliteten och effektiviteten hos olika slutanvändartjänster.

I detta arbete har man strävat efter att skapa en tydlig bild av regleringens helhet och erbjuda rätt tolkning av kraven så att det är möjligt att planera de fortsatta åtgärderna i detalj. Arbetet är en bakgrundsutredning till sin karaktär och de åtgärder som föreslås i det är inte officiella synpunkter från de organisationer som deltagit i arbetet.

Utredningen beställdes av Traficom, Trafikledsverket och Fintraffic. I styrgruppen för utredningen ingick Anna Schirokoff, Janne Huhtamäki, Martin Johansson och Risto Öörni från Traficom, Jari Myllärinen, Petri Antola och Mikko Kaskenpää från Trafikledsverket, Olli Rossi, Jani Kariniemi och Mika Ahvenainen från Fintraffic samt Antti Paasilehto och Atte Riihelä från kommunikationsministeriet. Tomi Laine och Ilkka Kotilainen från Traficom Ab ansvarade för utarbetandet av utredningen.

Arbetet publicerades ursprungligen på finska (Traficoms forskningsrapporter och utredningar 20/2024). Denna engelska version av rapporten är avsedd att användas i europeiskt samarbete, så de ursprungliga delarna som endast handlar om nationella perspektiv har tagits bort från denna version

Helsingfors den 16 augusti 2024

Anna Schirokoff
Ledande sakkunnig
Transport- och kommunikationsverket Traficom

FOREWORD

The amended EU regulation on real-time traffic information will enter into force gradually between 2025 and 2028. The obligations regarding the publication of information in digital, machine-readable format will expand to concern the entire road network (incl. municipal street network) and new stakeholders, such as municipalities, service providers, holders of vehicle-generated data and stakeholders in the charging and refuelling sector. The updated ITS Directive will extend the obligations further to cover “underlying data” starting from the end of 2025. This data must be digitised when the data holder deems the data to be relevant to the road users. Real-time traffic information includes static information concerning traffic infrastructure, rules and restrictions. For the most part, the obligations to produce this information are already in force within the national legal framework.

The fulfilment of the regulation obligations demands a great deal of work, requiring higher contributions from both the operators subject to the obligations and the competent authority supervising the implementation, i.e. Traficom. Furthermore, it is key to provide the stakeholders with clear instructions and expert support to implement the required measures in a cost-effective manner. The first step is to make the necessary changes to the national access point to enable the stakeholders to fulfil their respective obligations. The national access point may become a showcase and marketplace for traffic information that facilitates the retrieval and reuse of data and, consequently, supports the improvement of the quality and effectiveness of end user services.

This report aims to create a clear picture of the regulation as a whole and provide the correct interpretations of the obligations to enable the detailed planning of follow-up measures. This is a background study and the measures proposed in it are not the official positions of the organisations involved in the project.

The report was commissioned by Traficom, the Finnish Transport Infrastructure Agency and Fintraffic. The steering group of the study consisted of Anna Schirokoff, Janne Huhtamäki, Martin Johansson and Risto Öörni from Traficom, Jari Myllärinen, Petri Antola and Mikko Kaskenpää from the Finnish Transport Infrastructure Agency, Olli Rossi, Jani Kariniemi and Mika Ahvenainen from Fintraffic, and Antti Paasilehto and Atte Riihelä from the Ministry of Transport and Communications. The report was prepared by Tomi Laine and Ilkka Kotilainen from Traficom Ltd.

The report was originally published in Finnish (Traficom Research Reports 20/2024). This English report version is intended to be used in European collaboration, therefore some original sections considering only national viewpoints have been removed from this version.

Helsinki, 16 August 2024

Anna Schirokoff
Chief Adviser
Finnish Transport and Communications Agency Traficom

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1 Definitions

Holder of vehicle-produced data	Any entity engaged in in-vehicle generated data collection, aggregation or other types of processing to fulfil privacy requirement
Data holder	Any legal person, data subject or public or private entity who has the right to grant access to or to share the data types under its control, in accordance with applicable Union or national law
Data user	Any service provider or other operator that reads data on the provider's interface by machine and utilises the data to develop its own service
Data update	Any modification of the existing data, including its deletion or insertion of new or additional elements
Digiroad	A national road and street network information system that compiles the centreline geometry and key qualities of the Finnish road and street network
Digitraffic	A service provided by Fintraffic that offers real-time traffic information on the Finnish road network, rail traffic and maritime transport
FRAND	(Fair, Reasonable and Non-Discriminatory) conditions are licence terms negotiated in good faith, allowing access to services or data in exchange of a fair reward, under the same or similar terms as determined with other users. The terms may also be applied to free data and services.
Machine-readable data	A file format structured in such a way that software applications can easily identify, recognise and extract datasets, individual data and their structures from it
Traffic circulation plan	Permanent traffic control measures designed by traffic control authorities to manage and control traffic circulation due to permanent and frequent disruptions in traffic
Metadata	A structured description of the contents of the data facilitating the discovery and use of this data
NAP	A national access point is an access point set up by a Member State to which stakeholders with public service obligations are obligated to send data of the categories of data subject to regulation they produce. The NAP can be either a catalogue-type service that displays the key metadata of stakeholder data and the address on the actual interface or a service that also contains the actual machine-readable interface

Service provider	Any public or private entity that offers services providing real-time traffic information and that does not only forward data to data users
Recital	An introduction to a Commission Directive or Delegated Regulation that states the objectives of the Regulation, specifies its scope of application and gives rules of interpretation, i.e. defines the law's framework of interpretation
RTTI	Real-time Traffic Information the content, disclosure and use of which have been regulated in Commission Delegated Regulation (EU) 2022/670. RTTI contains information on the static road network and its properties as well as the use and traffic situation of the dynamic network.
RTTI Regulation	Commission Delegated Regulation (EU) 2022/670 of 2 February 2022 supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the provision of EU-wide real-time traffic information services
SRTI	Safety-related Traffic Information, i.e. road safety related minimum universal traffic information. Any safety-related traffic data collected, compiled and processed by public and/or private road operators and/or service providers provided to end users via any channel of distribution, the content of which has been specified in Commission Delegated Regulation (EU) 886/2013.
Underlying information	Information within the scope of this Directive that has been determined to be relevant for informing road and ITS users, in particular by road authorities where they are responsible for such information
Crucial data type	Data types which are considered crucial for the benefit of increased reliability of real-time traffic information services, supporting safe and efficient door-to-door travel and future mobility services
Access point	A digital interface where data, together with the corresponding metadata, is made accessible for re-use to data users, or where the sources and metadata of these data are made accessible for re-use to data users
ITS Directive	Directive of the European Parliament and of the Council amending Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport

2 Introduction

2.1 Background

On 2 February 2022, the European Commission published Delegated Regulation (EU) 2022/670 with regard to the provision of EU-wide real-time traffic information services (so-called RTTI Regulation) under the Directive of the European Parliament and of the Council amending Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport (so-called Intelligent Transport Services Directive or ITS Directive). This is an updated version of the Delegated Regulation to replace Regulation 2015/962. In contrast to the earlier Regulation, the updated Regulation concerns the entire road network used for motor traffic, excluding private roads. The Regulation is in force and it shall be applied from 1 January 2025 onwards. The scope of application of the new Regulation includes some new data categories and it sets new obligations for service providers, among others.

In addition, the European Parliament and Council approved Directive (EU) 2023/2661 on 22 November 2023 to update the deployment of the ITS Directive. The updated directive obligates road operators to produce certain data categories subject to the directive in a digital, machine-readable format. The obligations concern partly the same data categories as the RTTI Regulation.

2.2 Objective

The objective of this report is to examine each article of the new RTTI Regulation in detail and, where necessary, provide unambiguous interpretations of the text and specifications of the individual data types. In addition, the report discusses the amendments to the production and distribution of real-time traffic information and safety-related traffic information introduced by the updated ITS Directive. The report on the earlier RTTI Regulation (2015/962) (Laine, 2019), the EU's ongoing NAPCORE project's Data Dictionary (2023) and Finnish and European experts and authorities were utilised in the interpretation, where applicable. Furthermore, this report outlines and describes current European cooperation projects related to e.g. the development and application of the DATEX II and TN ITS standards (e.g. NAPCORE project and recommended reference profiles) and uniform data quality definitions.

Finally, the report compiles the obligations concerning both highway networks and municipal street networks in a simple table. The measures to be taken by each stakeholder were listed in chronological order by due date.

2.3 Limitations

This report concerns only the following data and services:

- The data types specified in the Annex to the RTTI Regulation
- The data category classes listed in Annex III to the ITS Directive
 - Data concerning the provision of EU-wide road traffic information and navigation services
 - Data concerning events or conditions detected relating to road safety and road safety related minimum universal traffic information
- The ITS services specified in Annex IV to the ITS Directive ('Road safety related minimum universal traffic information service')

The report focuses on RTTI data categories but it also discusses SRTI data categories insofar as the updated ITS Directive introduces changes to obligations concerning these data categories.

The report does not include an extensive account of the current state of different data types. It does not set a national target for the development of data resources or include a concrete action plan for data production. The report does, however, include questions or issues to be addressed for the next steps of the process.

3 Requirements of the Delegated Regulation with regard to the provision of EU-wide real-time traffic information services (RTTI)

3.1 General

The European Commission considered it necessary to issue an updated Delegated Regulation with regard to EU-wide services processing real-time traffic information. According to the Commission, the use of intelligent transport systems is accelerating across the Union. Therefore, the use of intelligent transport systems must be supported continuously by increasing access to current and new data categories that are relevant to the provision of services. In addition, the Commission has deemed it necessary to expand the geographical scope of the Regulation. The purpose of the update is to ensure efficient use of data in end-user services. The updated Regulation will, to some extent, amend the requirements concerning the entire information chain.

The Regulation entered into force in May 2022 and shall apply from 1 January 2025 onwards.

3.2 National access points

Article 3 of the Regulation requires that *each Member State shall set up a national access point that shall constitute a single point of access for data users to the data, including data updates, provided by the data holders and concerning the territory of a given Member State*. The Article allows the use of national access points set up under the earlier RTTI Regulation or other provisions of the ITS Directive for the purposes of implementing the updated Regulation. The Article also allows the use of a joint access point set up by two or more Member States.

In the justification for the Delegated Regulation, the Commission elaborates its view on national access points by stating that *Member States should regroup the existing public and private access points in a single point enabling access to all the types of relevant available data that fall within the scope of these specifications*. The Commission's aim appears to be a situation where all the data types specified in the Regulation are accessible through a single access point.

Currently, data categories subject to the RTTI Regulation are shared from two separate national access points in Finland: static data from Digiroad and dynamic data from Digitraffic. In other words, there is no 'single access point' or 'single regrouped access point' in Finland. Thus, it could be determined that the solution used in Finland is not in line with the Commission's objective.

Article 3 also states that the national access points must offer discovery services to data users allowing for the search of the requested data using the contents of the corresponding metadata. For this purpose, public and private data holders shall ensure that they provide the metadata in order to allow data users to discover and use datasets via national access points.

The current Digiroad does not offer a metadata-based discovery service that the user could use to search for the data they need and access data properties. The current Digitraffic does not provide a data discovery service based on metadata.

This can be estimated to be a defect that hinders the intended use of the national access points.

With regard to the existing national access points, another challenge is the fact that they do not serve as an access point for the data of new stakeholders with obligations (see chapter 3.3). Instead, they only publish the data of road operators and Fintraffic.

Article 3 also states that *any entity providing data via the national access point can do so by proxy in accordance with applicable agreements, for example through a third party database or aggregator. This does not relieve the original data holder of responsibilities regarding the quality of the original data being provided.*

3.3 Accessibility, exchange and re-use of data

Articles 4–7 describe the requirements concerning the opening, format and re-use of data in different data categories.

The target groups subject to the obligations and the permitted data model standards have been compiled in the following table.

Table 1. Target groups subject to the obligations and permitted standards in the RTTI Regulation by data category.

Data category	Target groups subject to the obligations	Permitted standards
Data on infrastructure	Road authorities, road operators (Finnish Transport Infrastructure Agency and municipalities in Finland), tolling operators, and recharging and refuelling-related stakeholders	The format of the INSPIRE data specification on transport networks, TN-ITS (CEN/TS17268 and subsequently upgraded versions) DATEX II (EN 16157, CEN/TS 16157 and subsequently upgraded versions)
Data on regulations and restrictions	Road authorities, road operators, tolling operators	DATEX II (EN 16157, CEN/TS 16157 and subsequently upgraded versions) TN-ITS (CEN/TS 17268 and subsequently upgraded versions)
Data on the state of the network	Road authorities, road operators, holders of in-vehicle generated data and service providers	DATEX II (EN 16157, CEN/TS 16157 and subsequently upgraded versions)
Data on the real-time use of the network	Road authorities, road operators, service providers, holders of in-vehicle generated data, and recharging and refuelling-related stakeholders	DATEX II (EN 16157, CEN/TS 16157 and subsequently upgraded versions)

With regard to standards, the Regulation states that if additional or alternative standards are to be defined, Member States shall cooperate in order to define these standards and the standards shall be compatible with existing standards referred to above.

The articles concerning all four data categories require that *the data and the corresponding metadata including information on the quality thereof shall be accessible for exchange and re-use by any data user within the Union on a non-*

discriminatory basis, following minimum quality requirements (to be determined separately with stakeholders), and within a time-frame fitting to the reliable and effective use of the data to create real-time traffic information. All data and metadata must be accessible via the national or common access point. Furthermore, data users using the data and data holders shall collaborate in order to ensure that any inaccuracies related to the data are signalled without delay to the data holder. In practice, this means that the national access point must provide the contact information of the holders of different pieces of data or another channel through which feedback on data quality can be directed to the right entity.

It is noteworthy that the obligation to publish data on different data categories through the national access point applies to many private companies, such as re-charging and refuelling-related stakeholders, holders of in-vehicle generated data and service providers. The obligation concerns data that exists in a digital, machine-readable format. The Regulation's recital elaborates on this requirement by stating that *with respect to the re-use of data held by private data holders, the rules established by this Regulation do not impose sharing data free of charge. Data held by private data holders may be subject to licence agreements to regulate their re-use.* Thus, the information of the existence and properties of data should be made public but commercial licensing terms may be applied to the provision of data. In addition, some of the data categories include other requirements for the value chain. These requirements have been compiled in the table below.

Table 2. Obligations in the RTTI Regulation related to value chain cooperation by data category.

No	Data category	Requirement
1	Data on regulations and restrictions and data on temporary traffic management measures (part of 'Data on the state of the network')	Service providers shall process and include, without additional costs to the end-user, in the relevant services they provide, all traffic circulation plans, traffic regulations and restrictions, and any temporary traffic management measures developed by the competent authorities and made accessible via the national or common access point in a digital machine-readable format.
2	Data on the state of the network Data on the real-time use of the network	For the purpose of providing appropriate information directly to the end-users and optimising road maintenance and road safety, road authorities and road operators may request holders of in-vehicle generated data and service providers to provide the data types on the state of the network they collect and update pursuant to Article 10. Where, in response to a request from a road authority or road operator, the data holder makes the data accessible, FRAND (Fair, Reasonable And Non-Discriminatory) conditions shall apply.
3		Data on the state of the network that has been archived by road authorities or road operators may be used for purposes of road infrastructure safety management and network-wide road safety assessments. Unless prohibited by licence agreements, this data shall be made accessible for exchange and re-use, on a non-discriminatory basis, via the national or common access point referred to in Article 3.
4		Within the limits of applicable licence agreements, predictive data on the state of the network that has been computed by road authorities or road operators shall be made accessible for exchange and re-use, on a non-discriminatory basis, via the national or common access point referred to in Article 3.

Requirement 1 obliges service providers to publish data on regulations and restrictions and data on temporary traffic management measures via the national access point. This requirement applies to both services provided by authorities and relevant traffic information services provided by private operators. The end-users must not incur additional costs due to the publication of data. This is an important requirement that ensures that the data in question is actually published in the end-user services. If the service provider's own database contains e.g. a different speed limit than the data published by the road operator, the service provider shall inform the road operator of the inaccuracy of the data and demand it to be updated.

However, the first requirement must be interpreted so that the obligation applies to services that already make the corresponding data categories accessible to the end-users (i.e. relevant services). In this case, stakeholders are responsible for identifying relevant services but the supervisory authority should also be prepared to carry out checks to ensure the requirement is met. Services specialised in providing e.g. only road weather services should not be obliged to publish the data in question, as this data is not relevant to the provision of the service.

Requirement 2 enables road operators and road authorities to request holders of in-vehicle generated data and service providers to provide data on the state of the network and real-time data of network use (e.g. road closure, roadworks, disruptions, weather conditions) when they aim to optimise road maintenance or road safety. In that case, the so-called FRAND principle,¹ which means *fair, reasonable and non-discriminatory conditions negotiated in good faith, allowing access to services or data in exchange of a fair reward, under the same or similar terms as determined with other users*, shall apply to the provision of data to authorities. In practice, this means that, under the Regulation, authorities should have access to company data published via the national access point, in exchange of a fair reward, under the same or similar licensing terms as determined with the company's other customers. In the justification for the Regulation, the Commission also encourages Member States and relevant stakeholders to define the common FRAND terms applicable to the re-use of the relevant data types for the execution of these public tasks.

Requirement 3 means that when an authority is in possession of data it has produced itself or obtained by other means, the authority is obliged to publish this archived historical data via the national access point, unless prevented by licensing terms.

Requirement 4 obliges road operators and authorities to publish their predictive data (this may include e.g. traffic volume predictions or road weather forecasts) via the national access point pursuant to the applicable licensing terms. In other words, the requirements do not apply to only real-time information, but also predictive data.

¹ FRAND: Fair, Reasonable And Non-Discriminatory

3.4 Requirements for updating data

Articles 8–11 lay down provisions on updating data in different data categories.

The Regulation obliges data holders to update their data directly with regard to the user and without wasting time and service providers to process data updates without delay. Real-time traffic information must be updated or deleted as soon as possible after the traffic situation has changed.

The updates of the data on infrastructure and data on regulations and restrictions shall concern as a minimum the following parameters:

- the type of data concerned by the update
- the location of the condition concerned by the update
- the type of update (modification, insertion or deletion)
- the description of the update, containing the updated values and fields and updated information, and where relevant, the reasons for replacing the out-dated values and fields
- the date on which the data has been updated
- the date and time when the change in a given condition has occurred or is planned to occur
- the quality of the data update as defined in quality requirements that Member States shall agree upon in cooperation with relevant stakeholders.

The updates of the data on the state of the network and data on the real-time use of the network shall concern as a minimum the following parameters:

- the type of data concerned by the update and, where appropriate, a short description of it
- the location of the event or condition concerned by the update
- the period of occurrence of the event or condition concerned by the update (does not apply to the data of the real-time use of the network)
- the quality of the data update as defined in quality requirements that Member States shall agree upon in cooperation with relevant stakeholders.

DATEx II and TN-ITS support the delivery of the updated information by standardised means, but they are not suitable for the processing of the data on infrastructure. This is discussed in more detail in chapter 7.

The Regulation allows the use of different location determination methods for the purpose of updating data, provided that they are standardised or otherwise widely used and generally accepted methods and enable unambiguous decoding and interpretation of that location.

Any inaccuracies in updates must be corrected in a timely manner.

3.5 Assessment of compliance

According to Article 12, Member States shall assess whether the requirements set out in Articles 3 to 11 are complied with by the data holders and data users.

In order to proceed to the assessment, the competent authorities of Member States (Traficom in Finland) may request from any data holders and data users the following documents:

- *a description of the data, digital map or real-time traffic information services they provide as well as the information on the quality thereof and the conditions of re-use of these data*
- *an evidence-based declaration of compliance with the requirements set out in Articles 3 to 11.*

In this respect, the requirement of the assessment of compliance is identical to the earlier RTTI Regulation (2015). As part of the common European EU EIP project, harmonised forms of declaration of compliance were prepared. These forms can be recommended to be used insofar as they cover all the requirements of the updated Regulation. They make reporting easier for service providers operating in multiple countries. There are separate versions of the form for road operators and service providers. It may be necessary to create a separate form for the new operator groups, such as recharging and refuelling-related stakeholders.

The Regulation also obliges Member States to carry out random inspections of the accuracy of information given in the declarations of compliance. Traficom has yet to perform such random inspections.

3.6 Reporting

Article 13 obliges Member States to provide the Commission with information related to e.g. the availability of data types and the geographical scope of the data accessible via the national access point, networks and the quality of data. In addition, Member States must report the results of the assessment of compliance and any changes to the national or common access point.

The reports shall be provided every three years by submitting the Commission's reporting template (ITS Progress Report).

3.7 Transitional provisions and entry into force

The Regulation entered into force in May 2022 and shall apply from 1 January 2025 onwards. An exception to this are the reporting obligations in Article 13, which entered into force on 1 January 2023. The Regulation will enter into force gradually so that the Regulation shall apply as follows from 1 January 2025 onwards:

- with regard to 'crucial' data types (see chapter 5), the Regulation shall apply to the entire road network that is publicly accessible to motorised traffic, with the exception of private roads
- with regard to other data types, the Regulation shall apply to the comprehensive trans-European road network (TEN-T network), motorways that are not part of the TEN-T network, and the primary road network designated by each Member State.

The transition period will end on 31 December 2027. Thus, as of 1 January 2028, the Regulation will be applied to the entire European road network for all data types. From the date of application, 1 January 2025, the Regulation shall replace the earlier RTTI Regulation (EU) 2015/962.

4 Requirements of the updated ITS Directive

4.1 Key changes and their justifications

The objective of the ITS Directive adopted in 2010 was to accelerate the coordinated deployment of intelligent transport systems in road traffic. Member States were obliged to ensure the availability of data in line with the Directive insofar as the data was available in a digital machine-readable format. In addition, Member States were obliged to provide information services within their scope of application in accordance with the Directive insofar as the services are already provided or introduced after the adoption of the Directive.

As the use of many ITS services, such as safety-related information services and intelligent speed adaptation, has become more common, the EU decided to update the ITS Directive on 23 November 2023. The update entails some key amendments to the regulation of intelligent transport systems. This report discusses only the changes to the Directive that concern the accessibility of real-time (RTTI) and safety-related (SRTI) traffic information and the required services.

The introduction to the updated Directive states as follows:

The mandatory provision of certain ITS services and crucial data in machine-readable format is considered necessary to ensure both continued availability of such data and continued delivery of such services across the Union. It implies that the underlying information to be reflected in the machine-readable data already exists, irrespective of the format or medium in which it is presented.

For example, only when competent authorities issue an adverse weather warning for the traffic (e.g. on the radio or an overhead gantry) does the underlying information exist.

The Directive does not prescribe whether specific traffic information needs to be created (e.g. creating traffic circulation plans), nor under which circumstances a safety-related warning should be issued. All of this remains at the discretion of the competent authorities, which implies that differences apply in practice. This is also natural because e.g. the need for and benefits of a warning for slippery streets vary in different parts of Europe.

In addition, the mandatory provision of certain ITS services and crucial data does not require investments in the road-side equipment of the network.

Data types and services, the provision of which should be made mandatory under this Directive and its Annexes III and IV, should be identified on the basis of the specifications adopted by the Commission by means of delegated acts supplementing the earlier Directive (incl. RTTI and SRTI Regulation).

The obligation to convert data from a non-digital format to a digital machine-readable format will enter into force gradually to apply firstly to new or updated data and secondarily older, existing data. This obligation will expand gradually to concern the entire road network. For requirements concerning data in the urban nodes of the TEN-T network, Member States are given the option to limit the reach to specific roads by applying the traffic volume threshold value of 7,000 vehicles/day. This is discussed in more detail in chapter 6.

Profiling of standards might be needed to provide for a common approach of implementation.

In order to reach the objectives of the updated Directive, the Commission may issue new Delegated Regulations to e.g. amend the list of data types for which Member States are to ensure the availability of data. However, it is important to note that the Commission is only authorised to amend the data categories already listed in the Annex to the Directive (and not allowed to create new data categories). In addition, the Commission is not authorised to expand the geographical scope of application of the data categories.

4.2 Changes to the requirements concerning the availability of data

Member States shall ensure that, where the underlying information already exists, data is available for the geographical coverage for each data type set out in Annex III.

Member States shall ensure that data corresponding to underlying information created or updated on or after the date set out in the third column of Annex III is made available via the national access point without delay. This means that any new or updated data that exists in any format must be made available in a digital format if the data is created or updated after that date. The dates set out in the Annex depend on the data type and network section and they are listed in chapter 6.

Member States shall also ensure that, unless otherwise provided for in Annex III, other data corresponding to all existing underlying information, created or updated before the date set out in the fourth column of that Annex, is made available without delay after that date. This is the date by which all existing data must be made available in a digital format and shared regardless of the time of creation.

Where no date is set out in the fourth column of Annex III, the applicable dates shall be defined by means of a delegated act adopted under Article 7. Member States shall ensure the accessibility of those data via the national access points by the same date.

The deadlines pursuant to this paragraph shall apply only to existing infrastructure. For infrastructure completed at a later date, those deadlines shall be understood to be the dates of completion.

4.3 Requirements for ITS services

Member States shall ensure that the ITS services specified in Annex IV are deployed for the geographical coverage by 31 December 2026. The service referred to in the Annex is a 'safety-related information service,' i.e. a road safety related minimum universal traffic information service, whose geographical scope must cover at least the trans-European core highway network and the comprehensive trans-European road network (TEN-T network). The Annex defines safety-related information services as follows:

- *the availability and accessibility of accurate data on safety-related events and conditions needed for safety-related traffic information and incident management services;*

- *the deployment or use of the means to detect or identify safety-related events and conditions;*
- *the identification and use of a standardised list of safety-related traffic events ('universal traffic messages') which should be communicated to ITS users free of charge;*
- *the compatibility and the integration of 'universal traffic messages' into ITS services for real-time traffic and multimodal travel information.*

The aforementioned specification for safety-related traffic events is given in chapter 5.3.

The aforementioned specifications are the minimum requirements for 'universal traffic information' related to safety-related traffic events, provided to all users free of charge where possible.

4.4 Other

The Commission has the power to issue delegated acts to amend the list of data types required in Annex III. Amendments may be made only based on a cost-benefit analysis.

The updated Directive also introduces numerous changes concerning e.g. the development of C-ITS services. Not all changes have been analysed in this context, as the report focuses on changes related to RTTI and SRTI information and services.

5 Specification of data types

5.1 Overview

Figure 1 shows the data types in the RTTI Regulation and SRTI Regulation by data category. There are two categories: crucial and other. Crucial data types mean *data types which are considered crucial for the benefit of increased reliability of real-time traffic information services, supporting safe and efficient door-to-door travel and future mobility services*. Due to their importance, crucial data types must be made available prior to other data types. For the same reason, they have been included in the updated ITS Directive.

The ITS Directive's requirements for the digitisation and opening of data apply only to the RTTI data types classified as 'crucial' in the RTTI Regulation. EU regulation does not require other data types to be made available in a digital format.

The updated ITS Directive applies to all data types included in the 2013 SRTI Regulation.

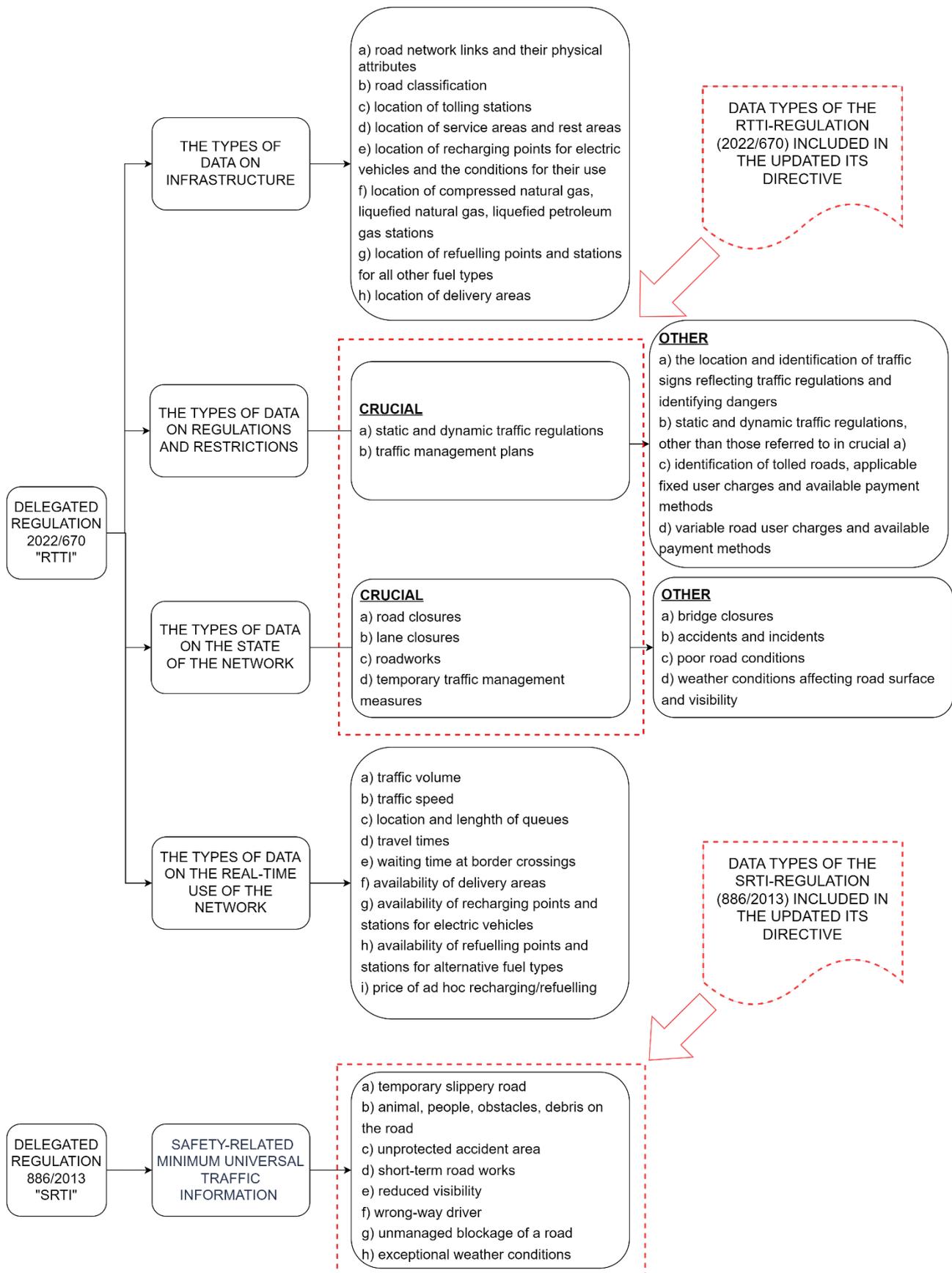


Figure 1. Data types specified in the Delegated RTTI Regulation (2022/670) and SRTI Regulation (886/2013) and their connection to the updated ITS Directive.

5.2 Detailed specification and interpretation of RTTI data types

The Directive or Delegated Regulation does not include a detailed specification for most data types. In addition, several data types may include a variety of use cases. The next chapters 5.2.1–5.2.6 describe the data types by data category, their detailed specification given in the Delegated Regulation (if applicable), the data type definitions in the Data Dictionary developed as part of the NAPCORE project or examples of data type content and a data type’s equivalent term in Digiroad (Digiroad 2022) or Digitraffic. The examples are based on the content of the reference profiles recommended in the DATEX II information model, the NAPCORE project, Crow’s account of the RTTI Regulation (Crow Kennisplatform 2022), and the opinions of Finnish and international experts. These examples should not be taken as decisive or definite but only as indicative.

5.2.1 The types of data on infrastructure

The following table lays down the specifications, potential interpretations and examples of data type content.

Table 3. Types of data on infrastructure, their specifications and an assessment of their current inclusion in Digiroad.

Data type [detailed description if given in the Regulation]	NAPCORE definition	Interpretations, examples	Inclusion in Digiroad
a) road network links and their physical attributes:			
i) geometry	the minimum information required for representing in a centerline or more precise manner the geometry of a road network’s links that connect two positions and therefore form a continuous path (without branches)	-	centreline as line material
ii) road width	the minimum information required for indicating the width of a road network’s links	-	roadway width
iii) number of lanes	the minimum information required for indicating the number of lanes of a road network’s links		the number of lanes by direction
iv) gradients	the minimum information required for indicating the degree of inclination (or the rate ascent/descent) of a road network’s links	-	No link data available. The z coordinate for the link breakpoint is available.
v) junctions	the minimum information required for identifying the location of a junction and its relationship with the remaining entities of the road network (i.e., road network links)	-	the location and number only available for interchanges. At-grade junctions are not included in the material.
b) road classification	the minimum information required for distinguishing the links of a road network encompassing form of way, functional, or other concerns	-	administrative and functional class, road link type
c) location of tolling stations	the minimum information required for disseminating the	-	not in use in Finland

	location (e.g., coordinates of a specific point, location along a linear element, mileage) of toll-booths (physical or virtual) collecting automatically or manually tolls from passing traffic		
d) location of service areas and rest areas	the minimum information required for identifying the location of a) places where vehicles are allowed to park and b) places (typically along motorways) where drivers can stop, rest, and get access to available service facilities (alternatively expressed as rest areas)	-	service location and type (incl. rest areas), car park information, no commercial services.
e) location of recharging points for electric vehicles and the conditions for their use	the minimum information required for disseminating the geographic location of charging infrastructure (charging pools), dedicated to electric vehicles, including the exact position of charging points along with the conditions for their use	-	no [information available in the aggregate database of Suomen sähköautoilijat ry]
f) location of compressed natural gas, liquefied natural gas, liquefied petroleum gas stations	the minimum information required for disseminating the geographic the location of compressed natural gas, liquefied natural gas, liquefied petroleum gas and hydrogen refueling stations	-	no
g) location of refuelling points and stations for all other fuel types	Not processed	includes petrol and diesel stations	no
h) location of delivery areas	the minimum information required for identifying the physical location of designated points along a road network or road link reserved for loading/unloading operations	these include parking areas reserved for goods transport in the road and street network, such as timber loading areas. The Regulation does not appear to apply to logistics centres and similar places outside the road or street area.	Marine and loading terminals as well as railway stations' unloading areas are found.

It is worth noting about the classification of the road network links that there is no single uniform standardised way to classify the road network in Europe (NAP-CORE 2024).

5.2.2 The crucial types of data on regulations and restrictions

The following table lays down the specifications, potential interpretations and examples of data type content.

Table 4. Types of data on regulations and restrictions, their specifications and an assessment of their current inclusion in Digiroad.

Data type [detailed description if given in the Regulation]	NAPCORE definition	Interpretations, examples	Inclusion in Digiroad
a) static and dynamic traffic regulations, where applicable			
i) access conditions for tunnels	Not processed	vehicle dimensions or e.g. transport of dangerous substances	'Maximum permitted' limits as link information Restrictions on the transport of dangerous substances
ii) access conditions for bridges		vehicle dimensions and mass	'Maximum permitted' limits as link information
iii) permanent access restrictions		may apply to specific vehicle categories (e.g. trucks, bicycles, etc.)	'Maximum permitted' limits as link information Restrictions on the transport of dangerous substances
iv) speed limits	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.	includes variable speed limits	speed limit/winter speed limit as link information No variable speed limits as type information. (real-time information of variable speed limits is available in Digi-traffic)
v) freight delivery regulations	the minimum information required for disseminating regulations for delivering freight, such as designation of certain road segments or areas, loading/unloading permissions, and time-related restrictions	may contain restrictions for selected vehicle types	vehicle-specific restriction as link information (28 vehicle categories)
vi) overtaking bans on heavy goods vehicles	dynamic information disseminating the prohibition of overtaking by heavy goods vehicles on a road segment	both static and dynamic	no link information but available as traffic sign information
vii) weight/length/width/height restrictions	Not processed	-	'Maximum permitted' limits as link information
viii) one-way streets	Not processed	-	direction of travel in Digiroad
ix) boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for	Not processed	may include e.g. environmental zones, restrictions related to air quality deviations	Not in widespread use in Finland.

circulation in regulated traffic zones			
x) direction of travel on reversible lanes	dynamic information disseminating the active direction of travel on a reversible lane of a road segment		In Finland, this information is only provided for temporary tunnel arrangements
b) traffic circulation plans permanent traffic control measures designed by traffic control authorities to manage and control traffic circulation due to permanent and frequent disruptions in traffic	the minimum information required for disseminating and describing the content of plans that are developed by local authorities to control and guide traffic flows in response to known and recurring traffic conditions as well as in consideration of seasonality effects and existing limitation and constraints (e.g., existence of school zones)	an extensive concept that may include traffic control plans, plans to increase the safety of school routes or plans based on the functional classification of the road network.	Not in widespread use in Finland. Alternate route plans can be included in this data type.

The digitalisation of traffic regulations and conveying of this information to vehicles have been developed based on a functional concept created as part of the METR project facilitated by ISO/TC 204/WG19. The standardisation is still in progress, and some of the required formats have yet to be defined. It is necessary to monitor the standardisation process closely and be prepared to set up the required national elements, operators and areas of responsibility to ensure reliable digitalisation of traffic regulations.

The access restrictions on bridges, tunnels and other such constructions are maintained in a register provided by the Finnish Transport Infrastructure Agency. In addition, some municipalities maintain their information in this register.

Information on restrictions is also available through traffic sign data. Digiroad has a function that converts point-form traffic sign data into line-form rule information. At the moment, this function is available for speed limits, vehicle-specific restrictions, restrictions on the transport of dangerous substances, roadworks and parking bans. In the future, this function may be expanded to cover other data types indicated by traffic signs that require a link-level presentation. The function also covers municipal street network restrictions.

Traffic circulation plans are a data type that is based on the RTTI Regulation and used little at the moment. It is a means of 'digital traffic management' and its purpose is to have digital navigation take into account the network hierarchy and various restrictions, such as areas that are sensitive in terms of road safety (e.g. school routes). This data type is estimated to have great potential for influencing the network control of traffic circulation through navigation services. The implementation of traffic circulation plans requires cooperation involving the entire value chain and commercial operators' will to adopt and implement the concept in their own services. The Regulation obliges service providers to take into account road operators' traffic circulation plans in their end-user services. Service providers have identified their obligations but require the concept implementation to be harmonised at information-model-level to facilitate integration.

The NAPCORE project has undertaken to clarify and harmonise traffic circulation plans and temporary traffic management measures (see the next chapter). NAPCORE's Data Dictionary (NAPCORE 2023) states that traffic circulation plans

contain strategies and measures to indicate e.g. road sections that certain user groups (such as heavy transport) should avoid to ensure smooth traffic and meet the regional targets set for emissions reduction or improved safety. **These measures concern a long-term control policy and are therefore static data.** Road operators may, however, update the content of the measures periodically.

5.2.3 Other types of data on regulations and restrictions

The following table lays down the specifications, potential interpretations and examples of data type content.

Table 5. Other types of data on regulations and restrictions, their specifications and an assessment of their current inclusion in Digiroad.

Data type [specification in the Regulation, if available]	NAPCORE definition	Interpretations, examples	Inclusion in Digiroad
a) the location and identification of traffic signs reflecting traffic regulations and identifying dangers			
i) access conditions for tunnels	the minimum information required for disseminating the location, type, and direction of warning signs (or panels) reflecting various traffic regulations and potential hazards on the road	statutory or physical restrictions/limits	location and attributes of all traffic signs
ii) access conditions for bridges		statutory or physical restrictions/limits	
iii) permanent access restrictions		statutory or physical restrictions/limits	
iv) other traffic signs reflecting traffic regulations		other traffic regulations in force on specific road sections	
b) static and dynamic traffic regulations, where applicable, other than traffic regulations referred to in point (2)	Not processed	digital description of all current traffic regulations The METR project will produce more detailed specifications.	
c) identification of tolled roads, applicable fixed user charges and available payment methods	the minimum information required for indicating that tolls are apply on a road segment as well as for disseminating information about the applicable road user charges and available payment methods.	Location of tolled roads, terms of use and payment methods	Not in use in Finland
d) variable road user charges and available payment methods, including retail channels and fulfilment methods	dynamic information disseminating variable road user charges responding to a congestion pricing policy scheme and the available payment methods	Roads subject to variable user charges and their attributes	Not in use in Finland

5.2.4 The crucial types of data on the state of the network

The Delegated Regulation defines the data category to mean *data that describes temporary situations which could prevent or slow travel or can inform the end-user in dangerous situations.*

Table 6. The crucial types of data on the state of the network, their specifications and an assessment of their current inclusion in Digitraffic.

Data type [detailed description if given in the Regulation]	NAPCORE definition	Interpretations, examples	Inclusion in Digitraffic
a) road closures	dynamic information disseminating the closure of a road segment of any type	used both on open sections and in tunnels	yes, included in the traffic information feed
b) lane closures	dynamic information disseminating the closure of a lane of a road segment of any type	used both on open sections and in tunnels	yes, included in the traffic information feed
c) roadworks	dynamic information disseminating that roadworks take place on a road segment	The DATEX II recommendation profile includes many different road building and maintenance measures, such as road surfacing, repairs, road marking, snow ploughing, etc.	yes, roadworks reported by a roadworks notification show up on the roadworks feed. Not all maintenance measures are shown on this feed.
d) temporary traffic management measures temporary measures intended to solve a given traffic disturbance and designed for example to control and guide traffic flows	dynamic information disseminating temporary traffic management measures reflecting the current state or condition of a particular section of a road network, which can change over time dynamically due to several factors (e.g., road works, weather conditions, special events)	A wide range of different management measures, including the road operator's network control measures, e.g. use of an alternate route. A studded tyre ban may also be indicated like this. Variable speed limits are not included in this category.	not included at the moment.

The Data Dictionary developed in the NAPCORE project described the scope and content of temporary traffic management measures in more detail (NAPCORE 2023). The purpose of these measures is to provide traffic management solutions for certain, possibly pre-determined scenarios, e.g. heavy congestion or closure of an important route to traffic due to abnormal weather conditions or a serious accident. NAPCORE defines the scope of temporary traffic management measures to be

- major traffic accidents
- congested traffic
- extreme weather conditions
- natural or technological catastrophes
- special events (sports, cultural, leisure) resulting in unusually high traffic volumes, capacity constraints, or a major displacement of road users.

Traffic management measures may be used both proactively and reactively depending on the situation. NAPCORE has also defined key content components for these measures. These include location data on route closures, information on diversionary routes and information on other traffic management measures, such as speed limits. A measure is deactivated in accordance with its nature when the situation is over.

The difference between temporary traffic management measures and traffic circulation plans seems to be that the former are used temporarily for the duration of a specific situation, whereas the latter are permanent or recurrent actions.

As far as is known, no such temporary traffic management measures have been applied in Finland that would require public information, although various measures have been used e.g. in the traffic management of harbours and sports halls. In Finland, temporary traffic management measures could be used to inform about alternative routes in the event of a closure of a main road in the main road network or the planned closures of road tunnels in the event of accidents or maintenance.

5.2.5 Other types of data on the state of the network

The Delegated Regulation defines the data category to mean *data that describes temporary situations which could prevent or slow travel or can inform the end-user in dangerous situations*.

Table 7. Other types of data on the state of the network, their specifications and an assessment of their current inclusion in Digitraffic.

Data type [detailed description if given in the Regulation]	NAPCORE definition	Interpretations, examples	Inclusion in Digi-traffic
a) bridge closures	dynamic information disseminating the closure of a road segment corresponding to a bridge	temporary closure of a bridge to traffic (e.g. draw bridges, other disruptions)	yes, included in the traffic information feed
b) accidents and incidents	dynamic information disseminating the occurrence of an accident/incident on a road segment	information on traffic accidents, broken vehicles and other disruptions.	yes, included in the traffic information feed
c) poor road conditions	dynamic information disseminating the prevalence of poor conditions on a road segment	The DATEX II recommendation profile contains various weather-related scenarios (e.g. ice, snow) and other possible conditions (e.g. surfacing in poor condition, insufficient road markings). In Finland, applicable to e.g. surfacing damaged by frost in spring.	Temporary weight limits due to frost damage appear on the traffic information feed
d) weather conditions affecting road surface and visibility	dynamic information indicating current weather conditions affecting road surface and visibility and, thus, implying accident hazards for road users	Interpretation: Weather and road conditions that may impact the travel time, comfort and safety but which do not increase the risk of accident significantly or directly. The provision of information on such conditions is regulated according to the SRTI category.	Not included as DATEX II event data Road weather stations' information, weather camera photos and road weather forecasts are shared via Digi-traffic.

It is worth noting that the data types in the category of safety-related traffic information (SRTI) include unprotected accident area, reduced visibility, temporary slippery road and exceptional weather conditions. The EU Regulation does not specify when a specific situation should be reported as an RTTI event and when as an SRTI event.

This report has identified requests for action made to regional contractors based on road user notifications (e.g. "Road User's Line" or Fintraffic's mobile service) as a potential source for the provision of 'poor road conditions' information.

5.2.6 The types of data on the real-time use of the network

The Delegated Regulation defines the data category to mean *data that describes the current use of the road network and usage options on the road network*. This data category can be interpreted to mean that the data types are limited to data that describes the real-time use of the network.

Table 8. The types of data on the real-time use of the network, their specifications and an assessment of their current inclusion in Digitraffic.

Data type [detailed description if given in the Regulation]	NAPCORE definition	Interpretations, examples	Inclusion in Digitraffic
a) traffic volume	dynamic information indicating the number of vehicles, typically distinguished into light and heavy vehicles, passing through a specific point within a specified time period per direction	Real-time traffic volume information that may be based on different measuring methods, such as loops (LAM)	yes, LAM data
b) traffic speed	dynamic information indicating the travel speed of vehicles passing from a specific point or along a specific link of a road network within a given time interval	Real-time traffic speed information that may be based on different measuring methods, such as loops (LAM)	yes, LAM data
c) location and length of traffic queues	dynamic information indicating the point of a traffic queue dissipation and its total length	-	no
d) travel times	dynamic information indicating the time required for observed vehicles to cross a specific road segment or to travel from a given point to another over a specified route under prevailing traffic conditions	-	no
e) waiting time at border crossings	the total average time required for observed vehicles to wait between their arrival at the queue (if any) and departure from a border crossing	the data is applied only at border stations located outside the EU.	no, border station data is not shared at the moment
f) availability of delivery areas	dynamic information reflecting the availability of designated places along a road network reserved for loading/unloading operations	real-time information on the availability of delivery areas	no
g) availability of recharging points and stations for electric vehicles	dynamic information reflecting the state and status of charging points for electric vehicles	recharging points in use and their availability	no
h) availability of refuelling points and stations for alternative fuel types	Not processed	-	no
i) price of ad hoc recharging/refuelling	Not processed	-	no

It is worth noting that the obligation to provide real-time data on the use of the network via the national access point also applies to commercial operators, many of which have real-time information about travel times and e.g. queue lengths. In this case, however, commercial terms are applied to the disclosure of data.

5.3 Specification of SRTI data types

The Commission Delegated Regulation on road safety related minimum universal traffic information (SRTI Regulation, 886/2013) entered into force in October 2013. The Regulation provides unambiguous specifications for eight data types. The specifications help, to some extent, interpret which factors decide whether a specific traffic condition falls within the scope of SRTI information or RTTI information. The subject has also been addressed in cooperation between TISA, the Data for Road Safety ecosystem, the DATEX II community and the C2C Communication Consortium, which have decided to limit the provision and transfer of safety-related information to concern only a certain sub-group of potential traffic conditions. This could be the best premise for defining the Finnish practices for producing SRTI reports and RTTI reports. This limitation of event and condition types has been described in the following table. It is important to note that SRTI data must include a statement that the event in question reduces road safety. The ITS Directive states that each Member State may independently determine the limit values for local conditions.

The update to the ITS Directive did not amend the definition of the content of safety-related information but introduced the obligation to digitise and share traffic data by the deadline set, if the underlying data exists.

Fintraffic Road already produces some of the safety-related information required by the Regulation. However, information on these types of events is shared on the general traffic information feed without an indication of it concerning safety-related events pursuant to the DATEX II recommendation profile.

Regarding short-term roadworks, the Finnish Transport Infrastructure Agency receives real-time location and measure information from contractors through the Harja system. In addition, Digitraffic receives the information and publishes it as open data via Digitraffic. The file format is JSON, which is not an information model compliant with the SRTI Regulation.

Table 9. Data types in the SRTI Regulation, their detailed specification, the definition of event and condition types, and an assessment of their current inclusion in Digitraffic.

Data type	Detailed specification in the Regulation	Definition of event and condition type	Inclusion in Digitraffic
temporary slippery road	Any unforeseen condition of the road surface which makes it slippery for a certain amount of time, causing low adherence of the vehicle to the road	Flooding; Danger of aquaplaning; Surface water hazard; Slippery road; Mud on road; Loose chippings; Oil on road; Petrol on road; Ice; Black ice; Snow drifts; Icy patches	not produced at the moment
animal, people, obstacles, debris on the road	Any situation where animals, debris, obstacles or people are positioned on the road where one would not expect to find them so that an emergency manoeuvre might be required to avoid them	Objects on the road; Obstructions on the road; Shed loads; Fallen trees; Avalanches; Rockfalls; Landslips; Animals on the road; People on roadway; Children on roadway; Cyclists on roadway; Large animals on roadway; Herds of animals on roadway; People throwing objects onto the road; Broken down vehicles; Vehicle on fire	Part of the traffic information feed (not identified as safety-related information)
unprotected accident area	Area where an accident has occurred and which has not yet been secured by the competent authority	Unprotected accident area(s); Accident; Accident involving bus; Accident involving lorry	Part of the traffic information feed (not identified as safety-related information)
short-term roadworks	Temporary road works that are carried out on the road or on the side of the road and which are indicated only by minimum signing because of the short-term nature of these works	Clearance work; Maintenance work; Slow moving maintenance vehicle(s); Road marking work; Rescue and recovery work; Snowploughs in action	Information on the completed road maintenance work and the vehicle's last location and task is provided. Some roadworks types do not show up on the feed.
reduced visibility	Visibility affected by any condition that reduces the sight range of drivers and which might affect safe driving	Visibility reduced; Smoke hazard; Dense fog; Patchy fog; Blowing snow; Serious fire; Fog	not produced at the moment
wrong-way driver	A vehicle travelling on the wrong side of a divided carriageway against the oncoming traffic	Vehicle(s) on wrong carriageway	Part of the traffic information feed (not identified as safety-related information)
unmanaged blockage of a road	Any blockage of a road, partial or total, which has not been adequately secured and signposted	Blocked; Bridge blocked; Tunnel blocked; Exit blocked; Connecting carriageway blocked; Entry blocked	Part of the traffic information feed (not identified as safety-related information)
exceptional weather conditions	Unusual, severe or unseasonal weather conditions which might affect safe driving	Heavy snowfall; Heavy rain; Storm force winds; Strong winds; Crosswinds; Strong winds affecting high-sided vehicles; Hail; Thunderstorm	not produced at the moment

6 Obligations for different parts of the network concerning the digitalisation and opening of data

6.1 Interpretation of the obligations

6.1.1 *Machine-readable data*

The Delegated Regulation on RTTI information states the following in section 19 of the introduction:

'These specifications should not oblige any stakeholder to start collecting any data that they are not already collecting or to digitise any data that is not already available in a digital machine-readable format.'

This is an important limitation that means that operators subject to the obligations are not obliged by the Regulation to start collecting or digitising data that is not already available in a digital format.

The obligation also applies to data that exists in digital machine-readable format but has not been shared through the interface or in any other way to the users. In other words, the obligation applies to any existing digital machine-readable data specified in the Annex to the Regulation.

The Delegated Regulation does not provide a detailed definition for 'digital machine-readable data.' However, the Finnish legislation does define the machine-readable format. The Act on Information Management in Public Administration (906/2019, section 2) defines the machine-readable format as follows:

'a file format structured in such a way that software applications can easily identify, recognise and extract datasets, individual data and their structures from it.'

The Helsinki Region Infoshare website defines machine-readability as follows (www.hri.fi):

Machine-readability means that data has been constructed in a systematic format (e.g. JSON, XML, CSV) so that a machine can process the data. For example, the PDF format is not a machine-readable format since even though humans can read it, a machine may not be able to read and interpret it.

The introduction to the EU Directive 2013/37/EU17 also provides a definition for machine-readability, providing additional insight into the interpretation of the term:

'A document should be considered to be in a machine-readable format if it is in a file format that is structured in such a way that software applications can easily identify, recognise and extract specific data from it. Data encoded in files that are structured in a machine-readable format are machine-readable data. Machine-readable formats can be open or proprietary; they can be formal standards or not. Documents encoded in a file format that limits automatic processing, because the data cannot, or cannot easily, be extracted from them, should not be considered to be in a machine-readable format.'

Member States should where appropriate encourage the use of open, machine-readable formats.'

Thus, machine-readability is subject to a requirement that software must be able to read and interpret the data without manual work, which makes it easy to utilise data and automate it by software. Another requirement is that a file can be opened by multiple software, allowing for a wide range of uses.

Machine-readability requires data structuredness. In practice, this means that data can be presented in a table format with the measured quantity as the column heading and the measured values (e.g. at different points of time or in different locations) listed on the rows. Consequently, file formats like PDF or docx are not machine-readable. HTML5 enables the creation of machine-readable websites. Out of geographic data formats, ESRI Shape and GEOJSON are machine-readable formats (https://www.turku.fi/sites/default/files/atoms/files//datan_avaajan_pikaopas.pdf).

Digitality, on the other hand, means the production, storage and processing of data in a numerical format (with bits).

Digital machine-readable data means data structured in such a way that software applications can easily identify, recognise and extract datasets, individual data and their structures from it

Machine-readable file formats include

- JSON, XML, CSV, ESRI SHAPE, GEOJSON
- Some HTML files

Machine-readable file formats do not include

- PDF, DOCX

Universally used interface technologies suitable for the distribution of machine-readable data are (www.opendata.fi):

- REST; an architectural style that uses the HTTP standard. The typical file formats include JSON and XML.
- WebSocket; a protocol that enables the circulation of real-time browser and server data in both directions. The typical file formats include MQTT and GTFS-RT.
- GraphQL; enables widespread and complex queries. Open standard in development. Own query language. Similar to databases' SQL query language.
- WSDL/SOAP; WSDL is an XML-based file that describes what the network service does. The file format is XML.
- WMS; an interface for loading a map formed by geographic data as images. The images may be in different formats. E.g. as PNG, JPEG, GIF or vector graphics in e.g. SVG and WebCGM format.
- WFS; an interface for searching, querying and editing geographic data items.

The above specification provides stakeholders with a framework of which current data resources fall within the obligations set in the RTTI Regulation.

In a typical situation, a stakeholder, e.g. a municipality, has data in a digital machine-readable format but it has not been described with the data model standards permitted by the Regulation. The permitted information models include DA-TEX II, Inspire and TN-ITS and any other information models compliant with these standards. In such a situation, the Regulation shall be interpreted so that **the stakeholder is obliged to convert the data into a standard-compliant format and share it via the national access point**. This interpretation has been given in e.g. the NAPCORE workshop's 'implementation of the revised RTTI Delegated Regulation' material of 1 February 2023 (NAPCORE 2023):

'No obligation to collect or digitise data, but data transformations & enrichments may be necessary to meet format requirements!'

The RTTI Regulation or the updated ITS Directive do not set formal requirements for the quality of data or the improvement of the quality of data. Instead, they require Member States and stakeholders to collaborate on defining common standards for the quality of data.

This report interprets that stakeholders are not obliged to enrich data to improve its quality but share data in its existing quality. Possible measures to improve the quality of data, outside the scope of the obligation, include for example:

- aggregation of different data resources to produce a regulated data type (e.g. aggregating data on a municipality's street network to a terrain model to produce road link gradient data)
- development of procedures and support tools to specify data content
- building of analytics to convert raw data into a regulated data type (e.g. conversion of a traffic light system's sensor data into traffic volume data).

For the sake of clarity, data on the public area usage rights (e.g. roadworks) has not been interpreted in this report to mean data on roadworks referred to in the Regulation. Therefore, road works permit information does not fall within the scope of application of the obligations laid out in the Regulation. Many municipalities process road works permits to use public areas in a digital system, but this information is too inaccurate time-wise to be useful for purposes of traffic information as it is. A contractor may e.g. apply a permit for a period of six months but carry out the actual work over two weeks. In such a situation, the inaccurate information would be misleading and could lead to users losing confidence in public information. On the other hand, converting the information to a usable format would require changes to processes and tools equivalent to investments, which the Regulation does not require.

Although many municipalities currently use processes that do not generate roadworks data in compliance with the Regulation, the development and commissioning of working processes and tools is recommended to improve traffic information.

6.1.2 **Underlying information**

The reformed ITS Directive that entered into force in 2023 amends the obligations and **makes the provision of certain *crucial* data listed in Annex III to the Directive in a machine-readable format mandatory** (see Figure 1). This is an obligation to digitise and convert this data into a machine-readable format. The obligation shall apply when **the underlying information to be reflected in the machine-readable data already exists, irrespective of the format or medium** in which it is presented.

The Directive defines 'underlying information' as follows:

'information within the scope of this Directive that has been determined to be relevant for informing road and ITS users, in particular by road authorities where they are responsible for such information.'

'Underlying information' consists of any information generated by a stakeholder's activities regardless of whether the information is currently conveyed to users via a communication channel, but in such a way that the obligation is limited to specific data types and different parts of the road network (see chapter 6.2-6.3).

A good example of underlying information is the regulations and restrictions set by a road operator for the road network under its management, which are communicated to the road users e.g. by traffic signs. The purpose of regulations and restrictions is clear, as the road operator has deemed it necessary to set them for the road network and action against them may lead to consequences for the road user. This is underlying information relevant to the road users. Such information, insofar as it contains data types listed in Annex III to the updated ITS Directive, must be made available via the national access point in future.

An example of dynamic data is data generated by road weather stations. If a friction value measured at a specific road weather station indicates that the road surface is dangerously slippery, this is considered to be 'underlying information' and the holder of data is obliged to report the condition in line with the ITS Directive (SRTI event), if the road operator or other holder of data deems the information relevant to road users.

The Directive authorises the road operator or other holder of data to assess the relevance of the underlying information to road users. If information, irrespective of its format, is deemed relevant in terms of road safety or e.g. route planning, the operator should make it available in a digital format and share it via the national access point. The relevance to road users may vary depending on the area. For example, in Finland, road users are more used to slippery winter conditions than people in Southern Europe.

It is worth noting that the obligation is not only limited to road operators and road authorities. The obligation concerns all operators that collect and manage data relevant to road users within the scope of the Directive. Road operators are typical holders of data on regulations and restrictions, but safety-related traffic information (SRTI) is also collected by other operators and service providers.

Chapters 6.2 and 6.3 discuss the obligations concerning the highway network and municipal street networks laid down in the RTTI Regulation and the updated Directive. It is important to note that the Directive's obligation to digitise data only

applies to the crucial data types of the RTTI Regulation and SRTI data. The digitisation obligations of municipalities are rather limited. The obligation to digitise data applies only to 'cities in the urban nodes' of the TEN-T network and, even then, only to 'crucial data on regulations and restrictions,' and no 'crucial data on the state of the network,' which includes data on road or lane closures or roadworks. In other words, EU regulation does not oblige TEN-T urban nodes or municipalities outside them to produce data on roadworks in a digital format. However, it is possible that e.g. a temporary speed limit has to be set due to roadworks, which is included in 'crucial regulations and restrictions' and subject to a digitisation obligation concerning urban nodes in the TEN-T network.

6.2 Parts of the road network in EU regulation

6.2.1 RTTI Regulation (2022/670)

The obligations of the RTTI Regulation enter into force in the first phase and apply to the network illustrated in the figure below as well as to crucial data types for the entire network, with the exception of private roads. The network consists of the trans-European core network, the comprehensive network, and the motorways and main roads that are not part of these networks (pursuant to the Arterial Route Decree 2018).

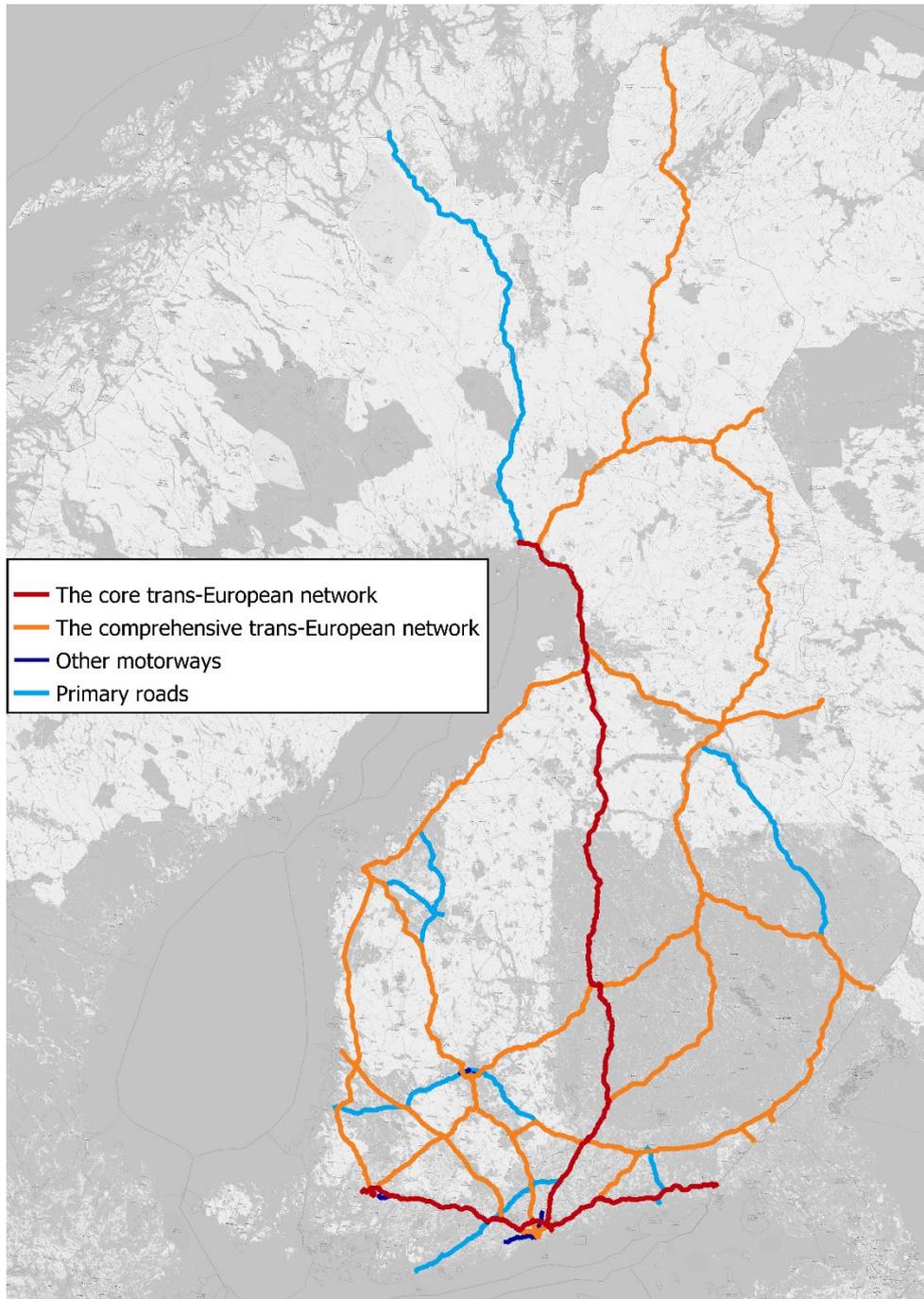


Figure 2. A road network compliant with the RTTI Regulation subject to obligations entering into force in the first phase.

6.2.2 RTTI data in the updated ITS Directive

The obligations concerning the RTTI data types of the ITS Directive (to produce data in a digital format and publish underlying information) concern only the road network parts depicted in the figure below.

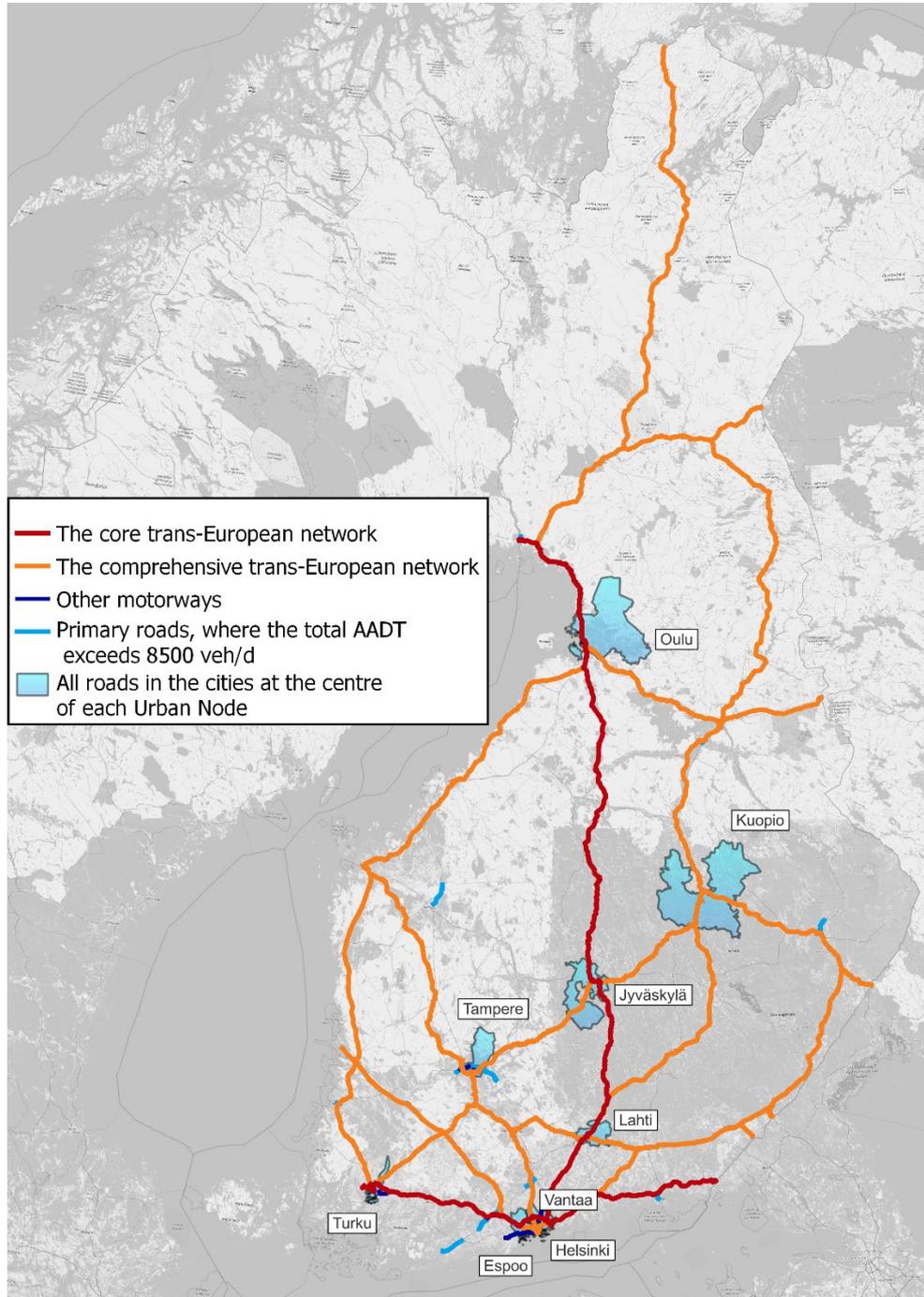


Figure 3. The ITS Directive’s RTTI obligations concerning different parts of the road network.

Of the arterial road network compliant with the Aerial Route Decree, only the parts with an average daily volume of more than 8,500 vehicles fall within the scope of EU regulation. The locations of these road sections are rather fragmented and the total length is short. The urban nodes in the EU TEN-T Regulation to be reformed in spring 2024 are Helsinki (incl. Espoo, Vantaa, Kauniainen), Turku,

Lahti, Tampere, Jyväskylä, Kuopio and Oulu. The obligations of the Directive do not apply to other municipalities in this respect.

6.2.3 **SRTI data in the updated ITS Directive**

The obligations concerning the SRTI data types of the ITS Directive (to produce data in a digital format and publish underlying information) concern only the trans-European core network, the comprehensive network and the motorways and main roads that are not part of these networks depicted in the figure below. The obligation to produce SRTI data does not concern municipal street networks.



Figure 4. The ITS Directive's SRTI obligations concerning the road network.

6.3 RTTI-related requirements for national roads

6.3.1 Data on infrastructure

Data on infrastructure is only subject to national legislation and the obligations of the RTTI Regulation. The updated ITS Directive did not expand the obligations concerning these data types. Currently no gradient data is generated, but there is also no obligation to do so.

Data in this category that is not available through the national access point includes

- location of recharging points for electric vehicles and the conditions for their use
- location of compressed natural gas, liquefied natural gas, liquefied petroleum gas stations
- location of all other fuel types.

This data should be made available via the national access point by the deadlines set insofar as the stakeholders have the data in a digital machine-readable format.

Table 10. Requirements for data on infrastructure in the RTTI Regulation and the ITS Directive concerning the highway network.

			Obligations concerning highways		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
1) The types of data on infrastructure:					
a) road network links and their physical attributes:	i) geometry	Digiroad Act	Comprehensive trans-European road network, other motorways, main roads 1 January 2025	n/a	n/a
	ii) road width	Digiroad Act			
	iii) number of lanes	Digiroad Act			
	iv) gradients				
	v) junctions	Digiroad Act			
b) road classification	Digiroad Act				
c) location of tolling stations					
d) location of service areas and rest areas	Digiroad Act				
e) location of recharging points for electric vehicles and the conditions for their use					
f) location of compressed natural gas, liquefied natural gas, liquefied petroleum gas stations					
g) location of refuelling points and stations for all other fuel types					
h) location of delivery areas	Digiroad Act				
			The entire road network that is publicly accessible to motorised traffic (incl. other highways, municipal street network), with the exception of private roads 1 January 2028		

6.3.2 Data on regulations and restrictions

The updated ITS Directive introduced more extensive requirements concerning regulations and restrictions. Stakeholders are now obliged to make the specified data types available in a digital machine-readable format. Regarding the highway network, the listed data types already exist in Digiroad insofar as regulations or restrictions are used in Finland.

Table 11. Requirements for data on crucial regulations and restrictions in the RTTI Regulation and the ITS Directive concerning the highway network.

			Obligations concerning highways		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
2) The crucial types of data on regulations and restrictions					
a) static and dynamic traffic regulations, where applicable	i) access conditions for tunnels	Digiroad Act	The entire road network that is publicly accessible to motorised traffic (incl. other highways, municipal street network), with the exception of private roads 1 January 2025	Core highway network 31 December 2025	Core highway network 31 December 2027
	ii) access conditions for bridges	Digiroad Act		Comprehensive trans-European network, other motorways and other main roads with an average daily volume of over 8,500 vehicles, all roads in urban nodes 31 December 2026	Comprehensive trans-European network, other motorways and other main roads with an average daily volume of over 8,500 vehicles, all roads in urban nodes 31 December 2028
	iv) speed limits	Digiroad Act			
	vi) overtaking bans on heavy goods vehicles			Trans-European core network, comprehensive trans-European network, other motorways and other main roads with an average daily volume of over 8,500 vehicles, all roads in urban nodes 31 December 2026	elaborated in the Delegated Regulation
	vii) weight/length/width/height restrictions	Digiroad Act			
	iii) permanent access restrictions	Digiroad Act		all roads in urban nodes 31 December 2026	elaborated in the Delegated Regulation
	v) freight delivery regulations				
	viii) one-way streets	Digiroad Act		n/a (applies to the street network)	n/a (applies to the street network)
	ix) boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones			Trans-European core network, comprehensive trans-European network, other motorways and other main roads with an average daily volume of over 8,500 vehicles, all roads in urban nodes 31 December 2026	elaborated in the Delegated Regulation
	x) direction of travel on reversible lanes			n/a (not in use in Finland)	n/a (not in use in Finland)
b) traffic circulation plans			Trans-European core network, comprehensive trans-European network, other motorways and other main roads with an average daily volume of over 8,500 vehicles, all roads in urban nodes 31 December 2028	elaborated in the Delegated Regulation	

In the table above, the data types have been organised in a different order than in the RTTI Regulation to make the requirements easier to visualise.

Table 12. Requirements for data on other regulations and restrictions in the RTTI Regulation and the ITS Directive concerning the highway network.

			Obligations concerning highways		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
3) Other types of data on regulations and restrictions					
a) the location and identification of traffic signs reflecting traffic regulations and identifying dangers	i) access conditions for tunnels	Road Traffic Act	Comprehensive trans-European road network, other motorways, main roads 1 January 2025 The entire road network that is publicly accessible to motorised traffic (incl. other highways, municipal street network), with the exception of private roads 1 January 2028	n/a	n/a
	ii) access conditions for bridges	Road Traffic Act			
	iii) permanent access restrictions	Road Traffic Act			
	iv) other traffic signs reflecting traffic regulations	Road Traffic Act			
b) static and dynamic traffic regulations, where applicable, other than traffic regulations referred to					
c) identification of tolled roads, applicable fixed user charges and available payment methods					
d) variable road user charges and available payment methods, including retail channels and fulfilment methods					

6.3.3 Data on the state of the network

Crucial data on the state of the network is currently produced by Fintraffic Road for road and lane closures and roadworks. Data on temporary traffic management measures is not produced at the moment. This category includes e.g. data on alternative routes used in situations where a main road is closed to traffic. Currently, this data is not available in a machine-readable format. The obligation to make this data available in a digital format will enter into force in the comprehensive TEN-T network on 31 December 2028. By this date, the data must be made available in DATEX II format via the national access point.

Because the events and conditions in this data category are usually short-term by nature, they are subject to the requirement for 'new or updated data.'

Table 13. Requirements for crucial data on the state of the network in the RTTI Regulation and the ITS Directive concerning the highway network.

		Obligations concerning highways			
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
4) The crucial types of data on the state of the network					
a) road closures			The entire road network that is publicly accessible to motorised traffic (incl. other highways, municipal street network), with the exception of private roads 1 January 2025	Trans-European core highway network 31 December 2025	not applicable
b) lane closures				Comprehensive trans-European highway network 31 December 2026	
c) roadworks				Trans-European core highway network and comprehensive network 31 December 2028	not applicable
d) temporary traffic management measures					

Other data on the state of the network are subject to the obligation to publish data in a digital machine-readable format. Currently, data is provided on bridge closures, traffic accidents and incidents as well as weight limits due to frost damage (poor road conditions).

No standard data is published on weather conditions. This is an area for improvement. It is also necessary to define when to publish an SRTI event and when an RTTI event for weather and road conditions. This issue should be clarified further through European collaboration.

Table 14. Requirements for other data on the state of the network in the RTTI Regulation and the ITS Directive concerning the highway network.

		Obligations concerning highways			
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
5) Other types of data on the state of the network					
a) bridge closures			Comprehensive trans-European road network, other motorways, main roads 1 January 2025	n/a	n/a
b) accidents and incidents					
c) poor road conditions					
d) weather conditions affecting road surface and visibility			The entire road network that is publicly accessible to motorised traffic (incl. other highways, municipal street network), with the exception of private roads 1 January 2028	n/a	n/a

6.3.4 Data on the real-time use of the network

Data on the real-time use of the network is only subject to the obligation to publish data in a digital machine-readable format. The data on traffic volume and speed, based on induction loops, is in machine-readable format, so it should be converted into a format compliant with DATEX II for parts of the network by 1 January 2025.

Stakeholders providing recharging services for electric vehicles should publish the availability and price information of recharging points for the main road network via the national access point by 1 January 2025. Some operators have this data in a digital machine-readable format. Similarly, the availability and price information of recharging points providing alternative fuel types should be published.

Table 15. Requirements for the real-time use of the network in the RTTI Regulation and the ITS Directive concerning the highway network.

			Obligations concerning highways		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
6) The types of data on the real-time use of the network					
a) traffic volume			Comprehensive trans-European road network, other motorways, main roads 1 January 2025	n/a	n/a
b) traffic speed					
c) location and length of traffic queues					
d) travel times					
e) waiting time at border crossings					
f) availability of delivery areas					
g) availability of recharging points and stations for electric vehicles					
h) availability of refuelling points and stations for alternative fuel types					
i) price of ad hoc recharging/refuelling					

6.4 RTTI-related requirements for municipal street networks

6.4.1 Data on infrastructure

The RTTI Regulation obliges municipalities and other stakeholders to open all data on infrastructure available in a digital machine-readable format for the municipal street network by 1 January 2028. If a municipality has no data in a machine-readable format, it will not be obliged to digitise its data under the updated ITS Directive. It must be noted, however, that national legislation provides requirements for the digitisation of some data types as well.

Table 16. Requirements for data on infrastructure in the RTTI Regulation and the ITS Directive concerning the street network.

			Obligations concerning municipal streets				
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)			
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available		
1) The types of data on infrastructure:							
a) road network links and their physical attributes:	i) geometry	Digiroad Act	1 January 2028	n/a	n/a		
	ii) road width	Digiroad Act					
	iii) number of lanes	Digiroad Act					
	iv) gradients						
	v) junctions	Digiroad Act					
b) road classification	Digiroad Act						
c) location of tolling stations							
d) location of service areas and rest areas	Digiroad Act						
e) location of recharging points for electric vehicles and the conditions for their use							
f) location of compressed natural gas, liquefied natural gas, liquefied petroleum gas stations							
g) location of refuelling points and stations for all other fuel types							
h) location of delivery areas	Digiroad Act						

6.4.2 Data on regulations and restrictions

The following table outlines the obligations of municipalities concerning the data types on crucial regulations and restrictions. This is the only RTTI data category in which 'urban node' municipalities are obliged to make all 'underlying data' available in a digital format. Member States may limit the obligation to only concern streets with an average daily volume of over 7,000 vehicles. The national legislation to be updated will address this rule. In the table, the data types have been organised in a different order than in the RTTI Regulation to make the requirements easier to visualise.

The urban nodes have been defined in chapter 6.2.2. The obligation to digitise data does not apply to other municipalities.

Since the obligations concerning the digitisation of data on regulations and restrictions have been advanced by the national Digiroad legislation, it is possible that many municipalities are already publishing information via Digiroad.

Table 17. Requirements for data on crucial regulations and restrictions in the RTTI Regulation and the ITS Directive concerning the street network.

			Obligations concerning municipal streets		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
2) The crucial types of data on regulations and restrictions					
a) static and dynamic traffic regulations, where applicable	i) access conditions for tunnels	Digiroad Act	1 January 2025	All streets in urban nodes 31 December 2026	All streets in urban nodes 31 December 2028
	ii) access conditions for bridges	Digiroad Act			
	iv) speed limits	Digiroad Act			
	vi) overtaking bans on heavy goods vehicles				
	vii) weight/length/width/height restrictions	Digiroad Act			
	iii) permanent access restrictions	Digiroad Act		All streets in urban nodes 31 December 2026	elaborated in the Delegated Regulation
	v) freight delivery regulations			All streets in urban nodes 31 December 2025	All streets in urban nodes 31 December 2027
	viii) one-way streets	Digiroad Act		All streets in urban nodes 31 December 2026	elaborated in the Delegated Regulation
	ix) boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones			n/a (not in use in Finland)	n/a (not in use in Finland)
	x) direction of travel on reversible lanes			All streets in urban nodes 31 December 2028	elaborated in the Delegated Regulation
b) traffic circulation plans					

With regard to the new data types, the Commission has foreseen the possibility of establishing a more specific schedule for the digitisation of 'underlying data' in future updates to the delegated regulations.

The following table contains the requirements concerning other data on regulations and restrictions. The obligations concern only the opening of data available in a digital machine-readable format. However, the obligation to digitise traffic signs is already in force in Finland within the framework of the Road Traffic Act.

Table 18. Requirements for data on other regulations and restrictions in the RTTI Regulation and the ITS Directive concerning the street network.

			Obligations concerning municipal streets		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
3) Other types of data on regulations and restrictions					
a) the location and identification of traffic signs reflecting traffic regulations and identifying dangers	i) access conditions for tunnels	Road Traffic Act	1 January 2028	n/a	n/a
	ii) access conditions for bridges	Road Traffic Act			
	iii) permanent access restrictions	Road Traffic Act			
	iv) other traffic signs reflecting traffic regulations	Road Traffic Act			
b) static and dynamic traffic regulations, where applicable, other than traffic regulations referred to					
c) identification of tolled roads, applicable fixed user charges and available payment methods					
d) variable road user charges and available payment methods, including retail channels and fulfilment methods					

6.4.3 Data on the state of the network

The following table summarises the requirements concerning data on the state of the network, divided into crucial and other data on the state of the network. Here as well, the obligations concern only the opening of data held by municipalities in a digital machine-readable format, even though the ‘crucial’ data types are also included.

Table 19. Requirements for data on the state of the network in the RTTI Regulation and the ITS Directive concerning the street network.

			Obligations concerning municipal streets		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
4) The crucial types of data on the state of the network					
a) road closures			1.1.2025	n/a	n/a
b) lane closures					
c) roadworks					
d) temporary traffic management measures				n/a	n/a
5) Other types of data on the state of the network					
a) bridge closures			1 January 2028	n/a	n/a
b) accidents and incidents					
c) poor road conditions					
d) weather conditions affecting road surface and visibility					

In municipalities, roads or lanes are usually closed to traffic due to public events. If a municipality has information of road closures and their timing in a digital format (e.g. in a map service), the information must be published via the national access point. Similarly, if a municipality has precise information of roads undergoing roadworks and their timing in a digital format, the information should be published via the national access point. This report interprets that the obligation does not apply to general information found in a road works permit system.

With regard to traffic accidents and incidents (that may lead to a road or lane closure), large cities have agreed with Fintraffic Road to release a traffic announcement of major incidents affecting main streets. This data is currently shared via Digitraffic. If a municipality has no agreement on the provision of information with Fintraffic, it is not obliged to provide information under EU regulation.

6.4.4 Data on the real-time use of the network

The following table shows the requirements for data on the real-time use of the network. The obligations concern only the opening of data available in a digital machine-readable format.

Many municipalities use a traffic light central control system that can produce real-time data on traffic volumes in a digital machine-readable format. The sensor data provided by the system may also be used to analyse traffic congestion. The Regulation is interpreted to mean that the obligation to open data only applies to municipalities that have already processed the data collected by the traffic light system to produce digital data on traffic volumes or congestion.

Table 20. Requirements for the real-time use of the network in the RTTI Regulation and the ITS Directive concerning the highway network.

			Obligations concerning municipal streets		
		National legislation	RTTI Regulation (2022/670)	ITS Directive (update 2023)	
Category	Data type structure	Data on the network attributes must be produced and opened	Data in a digital machine-readable format must be opened:	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
6) The types of data on the real-time use of the network					
a) traffic volume			1 January 2028	n/a	n/a
b) traffic speed					
c) location and length of traffic queues					
d) travel times					
e) waiting time at border crossings					
f) availability of delivery areas					
g) availability of recharging points and stations for electric vehicles					
h) availability of refuelling points and stations for alternative fuel types					
i) price of ad hoc recharging/refuelling					

6.5 SRTI-related requirements

The updated ITS Directive expands the stakeholders' obligations to concern ensuring the availability of data and the deployment of ITS services with regard to safety-related data. This is an obligation to digitise and open this data to a machine-readable interface. The obligation shall apply when the underlying information to be reflected in the machine-readable data already exists, irrespective of the format or medium in which it is presented. A closer interpretation can be found in chapter 6.1.2.

The Directive does not lay down provisions on the conditions under which a safety warning should be issued (e.g. should a safety warning be given due to snowfall). Safety warnings are given at the discretion of competent authorities, which means that the practices vary.

The obligation to provide ITS and crucial data in a digital machine-readable format does not require investments in the road-side equipment of the network to collect additional data. This provision is interpreted so that investments are also not required in other data collection methods, e.g. purchasing data from the market.

With regard to safety-related traffic information, the obligations to provide data concern only the TEN-T network and other motorways but not the rest of the main road network or municipal street networks. Municipalities are not obliged to publish safety-related traffic information even if they had them in a digital format.

Table 21. The obligations of the ITS Directive concerning the digitisation and opening of road safety related minimum universal traffic information. The obligations to provide data concern only the TEN-T network and other motorways but not the rest of the main road network or municipal street networks.

Data type	Geographic scope	Underlying data must be digitised and made available if the data is new or updated data	All underlying data must be digitised and made available
temporary slippery road	Trans-European core highway network and comprehensive network as well as other motorways not part of this network	31 December 2025	Not applicable [this is of no significance because these data types are dynamic data with a very short life cycle]
animal, people, obstacles, debris on the road			
unprotected accident area			
short-term roadworks			
wrong-way driver			
unmanaged blockage of a road			
reduced visibility	Trans-European core highway network and comprehensive network as well as other motorways not part of this network	31 December 2026	Not applicable [this is of no significance because these data types are dynamic data with a very short life cycle]
exceptional weather conditions			

6.6 Road safety related minimum universal traffic information service

The updated ITS Directive requires each Member State to establish a road safety related minimum universal traffic information service by 31 December 2026. The service shall cover, at the very least, the trans-European core highway network and the comprehensive network, and the service shall be provided free of charge.

At the time of this report, there was no certainty of what functional or other requirements have been set for the service. The matter should be examined in more detail through European cooperation. According to the initial interpretation, Fintraffic's liiketilanne.fi service and the mobile application F-mobiili, among others, meet these requirements.

7 Harmonisation and quality requirements of data

7.1 Metadata standards

Metadata is often defined to be 'data on data.' Metadata is descriptive data, the purpose of which is to facilitate the use of data. The discoverability and accessibility of different operators' data resources is an integral part of the digitalisation of traffic and mobility. Data resources, such as the national access point referred to in the RTTI Regulation, often include data based on a specific area or theme, e.g. data on the state of the Finnish highway network. The harmonised organisation, description and management of data improve the availability and re-usability of data further.

The purpose of metadata standards, which have been developed for various uses, is to enable and facilitate the development of compatible tools and services by determining how metadata should be created and managed. The European ITS Platform (EU EIP), which has studied metadata standards related to traffic and mobility previously, has proposed the establishment of a trans-European metadata catalogue. EU EIP mentions the DCAT, DCAT-AP and CKAN standards, which will be discussed in more detail in the following chapters. (EU EIP SA46, mobilityDCAT-AP, Duval 2001)

There was no joint European approach to metadata in traffic and mobility data portals or intelligent transport systems until NAPCORE created a metadata schema for European national access points. NAPCORE published the schema as the mobilityDCAT-AP metadata specification that contains the metadata description in a human- and machine-readable format. MobilityDCAT-AP is compatible with the earlier European DCAT-AP specification. The specifications re-use the terms of the DCAT standard and add specifications related to a certain purpose of use. NAPCORE's Metadata working group has been responsible for the management of the metadata specification's mobilityDCAT-AP management. (NAPCORE mobilityDCAT-AP, mobilityDCAT-AP)

DCAT (Data Catalog Vocabulary) is an RDF (Resource Description Framework), i.e. a standard model for data exchange online, and its aim is to facilitate the interoperability of data lists published online. The DCAT standard is maintained by W3C (World Wide Web Consortium). DCAT-AP (DCAT Application Profile for Data Portals in Europe) is a metadata record specification that describes public sector data sets in Europe and improves the semantic interoperability of European data portals. DCAT-AP supports data retrieval between access points. (DCAT, DCAT-AP)

The initial traffic information quality specification of TISA and commercial service providers determines the use of metadata pursuant to the DCAT-AP as the minimum quality level of national access points. (TISA Workshop 12 March 2024)

In Finland, Fintraffic has developed the metadata of the Digitraffic service in accordance with DCAT-AP.

7.2 Standard information models

The requirements of the RTTI Regulation for the usability, exchange and re-use of data have been laid out in chapter 3.3. According to the obligations, standards and specifications, such as the INSPIRE data specifications on transport networks, TN-ITS (CEN/TS17268 and subsequently upgraded versions) or DATEX II (EN 16157, CEN/TS 16157 and subsequently upgraded versions), must be used in the delivery of data.

Supplementary or alternative standards may be used if the Member States work closely together to define them and they are compatible with the aforementioned standards. The Regulation also includes specifications on updating data.

This chapter describes the aforementioned standards and specifications in more detail and discusses e.g. the NAPCORE survey on the shortcomings in the data standards used in national access points (incl. INSPIRE, TN-ITS and DATEX II) and the recommendations for an improved service level and interoperability in Europe. The data categories in the report concern the delegated regulations under the ITS Directive (2010/40/EU). The data categories have been reported in detail in Annex I to the report. In addition, future changes to the standards and specifications and their use are assessed. (NAPCORE work item 2.2.1)

7.2.1 **INSPIRE**

INSPIRE (Infrastructure for Spatial Information in Europe) is an EU Directive (2007/2/EC) that entered into force in 2007. Its purpose is to establish a European spatial information infrastructure to improve the discoverability, availability and interoperability of spatial information in Europe. Clarifying regulations and rulings have been made for the following areas of the Directive: metadata, interoperability, network services, data-sharing, and monitoring and reporting. The Finnish national legislation on the infrastructure for spatial information (421/2009) is based on European INSPIRE legislation.

The spatial information material of the INSPIRE Directive has been divided into themes, containing 34 topics, in Annexes I-III to the Directive. Annex I contains the topic 'Transport networks', which covers road, rail, air and water transport networks and related infrastructure.

In addition to the legally binding requirements of the Directive (Directive and Regulations), i.e. Member States' implementation requirements, there are non-legally binding technical guidelines that clarify how the legal obligations can be fulfilled in practice. The technical guidelines also include guidelines and recommendations for road networks. (European Commission INSPIRE Legislation, INSPIRE Technical Guidance documents)

In the NAPCORE project, the INSPIRE data categories specified in the RTTI Regulation (962/2015) to be part of the scope of application, i.e. static data, were analysed. In the analysis, the following areas of the data category 'road network links and their physical attributes' were available: geometry, road width, number of lanes and junctions. In addition, the gradient can be derived from the height information. The information on toll payment methods was not supported. In addition, the network nodes and change points can be derived from the transport

stops and change places, but public transport stops cannot be described. (NAPCORE work item 2.2.1)

With regard to data updates, INSPIRE is the only one supporting specification, including standards, for road network links and their physical attributes. However, it should be mentioned that **INSPIRE contains some shortcomings in the provision of the description, date and time, and quality of data updates.** (NAPCORE work item 2.2.1)

7.2.2 TN-ITS

TN-ITS (Transport Network ITS Spatial Data Deployment ERTICO innovation Platform) has released a technical specification that describes the exchange of data on changes in road attributes, with a focus on static data. The specification is maintained by European Standardization Organisation CEN, which has published the standard TN-ITS CEN TS 17268. TN-ITS is utilised especially by creators of digital maps to keep the maps up to date. (TN-ITS)

The Finnish Transport Infrastructure Agency provides a TN-ITS interface pursuant to CEN/TS 17268:2018, through which some modifications to Digiroad material are published once in 24 hours. In the interface, the modification details are conveyed to the users as dataset-XML files, in accordance with the standard, which form the location with the OpenLR library. The modifications are published once in 24 hours. Thanks to the interface, the users are not required to download the entire Digiroad material periodically and they can keep their own material up to date in the TN-ITS interface. The interface takes into account changes in the highway network and municipal street networks.

The Finnish Transport Infrastructure Agency's TN-ITS interfaces cover the majority of the data types on regulations and restrictions.

In the NAPCORE project, the TN-ITS data categories specified in the RTTI Regulation (962/2015) to be part of the scope of application, i.e. static data, were analysed. The analysis results point out that although TN-ITS could be used in the description of the road network's physical attributes to some extent, their description is still outside the scope of application of TN-ITS according to NAPCORE and there are better applicable standards available. The other data categories described in Annex I to the report have been supported relatively well, although the data update descriptions were lacking for all data categories. (NAPCORE work item 2.2.1)

7.2.3 DATEX II

DATEX II is an information model for road transport data in Europe. DATEX II is one of the key standards regulating the provision of road transport data and it is widely considered in the European delegated regulations concerning intelligent transport services. DATEX II supports the transfer of the following data in a digital format (DATEX II):

- state of traffic/real-time use of the road network
- state of the road network (accidents)
- safety-related traffic information
- traffic management measures
- traffic regulations

- (lorry) parking
- refuelling and recharging infrastructure and its real-time availability.

The DATEX II publications and their specifications have been described below in Table 22. In addition, Table 23 provides examples of the data categories in the RTTI Regulation (2022) and potential applicable DATEX II publications as well as identified shortcomings. (DATEX II)

Table 22 DATEX II publications and their specifications.

DATEX II publication	Specification
Common	Rules for top level model packages and classes
LocationReferencing	collection of information related to specifying locations within a road network
SituationPublication	An identifiable instance of a traffic/travel situation comprising one or more traffic/travel circumstances...
Road Traffic Data	Traffic data and weather data
VMS	VMS messages and status information...
ControlledZones	Information on controlled zones...
Energy	Infrastructure for vehicle energy supply
Facilities	information about a facility... site, building, structure, service...
Status and Fault	system status and for faults of traffic related infrastructure field devices.
Traffic Regulations	machine interpretable traffic regulations
TMPlan	(will follow soon)
Traffic Signals	(will follow soon)
UVAR	(will follow soon) Note: UVAR box

Table 13. Examples of the data categories in the RTTI Regulation (2022) and potential applicable DATEX II publications as well as identified shortcomings.

RTTI data category	Data type examples	Example of DATEX II publications
1) The types of data on infrastructure	road network links and their physical attributes, etc.	No compatible publications identified.
2) The crucial types of data on regulations and restrictions	static and dynamic traffic regulations, etc.	[Traffic regulations], [UVAR], [ControlledZones] etc.
3) Other types of data on regulations and restrictions	location of traffic signs, static and dynamic regulations, etc.	[Traffic regulations], [ControlledZones] etc.
4) The crucial types of data on the state of the network	road and lane closure, roadworks, etc.	[SituationPublication (SRTI)] etc.
5) Other types of data on the state of the network	accidents and incidents, etc.	[SituationPublication (SRTI)] etc.
6) The types of data on the real-time use of the network	traffic speed, volume, queues, etc.	[Energy], [Road Traffic Data] etc.

In the NAPCORE project, the DATEX II data categories specified in the RTTI Regulation (962/2015) to be part of the scope of application were analysed. No data types on infrastructure specified in the RTTI Regulation (2022) can be found in DATEX II. The other data categories described in Annex I to the NAPCORE report have been supported relatively well. DATEX II supports data updates (insertion/update/removal) but it requires the use of exchange publication. Updates can also be obtained from version numbers. The update description can also be identified through data (e.g. comparing the previous and current speed limit). Update quality description is not supported. (NAPCORE work item 2.2.1)

DATEX II has published recommended reference profiles for the previous RTTI Regulation (2015) but they are not available for the most recent RTTI Regulation (2022). DATEX II schemas can be created with the Schema Generation Wizard tool.

At the ITS Europe 2023 conference and after it (2024) in a press release, DATEX II and TN-ITS committed to the objective of combining and harmonising the standards in the future. (DATEX II and TN-ITS)

7.3 Quality criteria and quality requirements

7.3.1 *Quality specifications of the Data for Road Safety ecosystem for SRTI data*

In late 2023, the Data for Road Safety (DFRS) ecosystem published a documentation for **the self-declaration of the quality of data** related to road safety in the ecosystem. The purpose of the self-declaration is to provide the publishers of data with guidelines for the expected quality levels of data and the labelling of quality. The quality levels are easy to interpret by data users.

The quality level of data is given separately for each message. DFRS is also working on the declaration of the general quality level of its partners' data in the future. The aim is to have each operator publishing data in the ecosystem to declare the quality of its data.

DFRS (2023) has published the following four self-declarations on the quality levels requirements (situation in 2/2024). The objective is to publish self-declarations for all eight event and condition types specified in SRTI legislation by summer 2024 (discussion Henrik Segesten, Volvo, DFRS Group C L3 Data usage and validation, Lead).

- Short Term Road Works Warning Data (Version 1.0)
- Unprotected Accident Area Warning Data (Version 1.1)
- Temporary Slippery Road Warning Data (Version 1.0)
- Obstacle on Road Warning Data (Version 1.0)

The quality levels of data in the DFRS ecosystem are divided into two categories:

- Level A: certain
- Level B: probable

The quality level 'certain' or 'probable' is entered as the value of the DATEX II SituationRecord attribute 'probabilityOfOccurrence.' The quality level is provided for all SRTI messages related to road safety in accordance with the DATEX II recommended reference profiles (RRP). The table below shows an example of the quality requirements for spatial information for the four data types published by summer 2024.

Table 24. The Data for Road Safety ecosystem's quality requirements for spatial information for four road safety related data types.

SRTI data type	Quality attributes/trigger conditions: The maximum deviation in the location of the starting and end point should be	Quality characteristic: The event must include the lanes concerned and if the side of the road is affected	Message parameters: Locations must be published as an OpenLR line string or OpenLR point along line
Short-term road-works	25 m (level A) 5 km (level B) , events with no defined starting and end point, road section impacted (e.g. snow ploughs, mobile maintenance work)	Yes	Yes
Unprotected accident area	25 m (level A) 1 km (level B)	Yes	Yes
temporary slippery road	500 m (level A) 5 km (level B) , events with no defined starting and end point, road section to be specified (e.g. black ice)	Yes, 95% of the time the location must be precise	Yes
Obstacles on the road	25 m (level A) 1 km (level B)	Yes, 95% of the time the location must be precise	Yes

7.3.2 TISA's 5 star rating for the quality specification of RTTI data

Road traffic information service providers that are part of TISA (Traveller Information Services Association) have proposed a five-star quality rating system for road operators providing RTTI data. The rating system was inspired by the EURO NCAP crash test rating system. In the system, the quality level of data is indicated by 1 to 5 stars. The objective of the system is to increase the understanding of the minimum quality requirements for different data types. (TISA Workshop 12 March 2024)

The minimum quality requirement for data provided by road operators is three stars. Service providers agree to use data provided by a road operator that meets the minimum quality requirement pursuant to company-specific product specifications, while also typically merging data from other sources. If data does not meet the requirements of the minimum quality level (1 or 2 stars), service providers are not committed to using the data. If the quality of data changes, companies may stop using it and file a notification with the data provider. (TISA Workshop 12 March 2024.)

The quality assessment process takes place in two phases in the value chain

- the road operator carries out an independent quality assessment according to instructions provided
- the service provider using the data may rate the quality of data based on an assessment commissioned from a third party.

Figures 5 and 6 below show an example of the quality assessment of static speed limit data. The minimum requirement of three stars is indicated with a yellow box.

RTTI 5 Star Rating Scheme – Static Speed Limit

Static Data - Speed Limit	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
Terminology & Definition	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	Bespoke local format	Bespoke local format	DATEX II / TN-ITS (Datex Part 14) (version widely used)	DATEX II / TN-ITS (Datex Part 14) (version widely used)	DATEX II / TN-ITS (Datex Part 14) (version widely used)
Use of Standard	Standard instructions only used as guide – ad hoc implementation used	Standard instructions only used as guide – ad hoc implementation used	Unified use of standard	Unified use of standard	Unified use of standard
Location Referencing	Basic GPS INSPIRE coordinates	Basic GPS INSPIRE coordinates	Preference for OpenLR over basic GPS INSPIRE coordinates	Preference for OpenLR over basic GPS INSPIRE coordinates	Preference for OpenLR over basic GPS INSPIRE coordinates
Linear Referencing	Polylines	Polylines	Polylines	Polylines	Polylines
Direction Defined FRC3-6	Not referenced	Not referenced	Referenced	Referenced	Referenced
Update Cycle	Quarterly	Monthly	Weekly	Daily	Daily
Timeliness	Max 3 months old	Max 1 month old	Max 1 week old	Max 1 day old	Max 1 day old
Pre-announcement	None	None	> 1 day ahead	> 1 week ahead	> 1 week ahead
FRC1-6 Accuracy Circular Error Probable (CEP) Linear Travel Direction	<30m	<20m	<10m	<5m	<1m

Figure 5. The instructions on TISA's 5-star RTTI quality rating for static speed limit data provided by road operators. The yellow box indicates the minimum quality requirement of three stars. (1/2)

Static Data - Speed Limit	★☆☆☆☆	★★☆☆☆	★★★☆☆	★★★★☆	★★★★★
FRC1-6 Correctness	>80%	>80%	>90%	>95%	>99%
FRC1-6 Completeness	>80%	>80%	>90%	>95%	>99%
Vehicle Classification	M1	M1 + N1 + N2	M1-3 and N1-3	M1-3 and N1-3	M1-3 and N1-3 Official speed limit for alternatively powered vehicles i.e. EV and unclassified e-bikes / cargo bikes / pedelecs
Speed limit type (as per definition in the ISA regulation, including road sign catalog)	Implicit and Explicit	Implicit and Explicit	Implicit and Explicit	Implicit and Explicit	Implicit + Explicit + Conditional

Figure 6. The instructions on TISA's 5-star RTTI quality rating for static speed limit data provided by road operators. The yellow box indicates the minimum quality requirement of three stars. (2/2)

It is recommended that the Finnish Transport Infrastructure Agency and Fintraffic, which are responsible for the quality of most RTTI data in Finland, take an active role in the development of these quality specifications in future. The requirements may have a significant impact on data production processes and the influence of data produced by authorities through the market. The RTTI Task Force serves as the forum.

8 Roles and responsibilities of different operators

8.1 National authorities together

8.1.1 *Overview of actions*

The fundamental issue to resolve is the nature of the national access point for SRTI and RTTI data and how to make sure it meets the requirements of EU regulation and serves data users in the best way possible. The RTTI Regulation states that 'every Member State shall set up a national access point.'

The future national access point(s) must be able to provide access to the crucial data types specified in the RTTI Regulation for the entire road network and access to all data types from the TEN-T road network, other motorways and main roads by the end of 2024. The access point must be able to process data provided by various stakeholders, such as municipalities, service providers and holders of in-vehicle generated data and recharging and refuelling-related stakeholders, e.g. metadata, and enable the discovery of the data. The current national access points, Digitraffic and Digiroad, do not support standard metadata or search functions. The FINAP service, established to meet the requirements of the Act on Transport Services and the EU MMTIS Regulation, includes the required metadata and search functions.

The Regulation does not lay down requirements for aggregated databases. However, crucial data on regulations and restrictions is already aggregated nationally in Digiroad. When it comes to the use of data, it would be a great relief to also provide, at the very least, crucial data types through the national access point in one interface. Thereby, it would be useful to consider the need for aggregated databases for crucial data on the state of the network. This data includes road and lane closures, roadworks and temporary traffic management measures.

Market-based aggregated databases have already been established for data collected by recharging and refuelling-related stakeholders. This development should be continued to be utilised in future. In addition, in its own data ecosystem, Fintraffic and its stakeholders have prepared a list of so-called TOP 15 data. This is data the development of which is essential for the market. In the first place, it is important to focus the development of aggregated databases on these data types.

One of aggregated databases' benefits over decentralised interfaces is that it enables the automatic validation of data and monitoring of the accuracy and coverage of data.

Currently, there are no traffic circulation plans in use in Finland. In order to develop digital traffic management, it would be useful to get involved in the definition of traffic circulation content within the framework of European cooperation projects (potentially RTTI Task Force) and then use the concept in various applications. There should be a national organisation responsible for monitoring the development of the concept and its gradual deployment.

8.1.2 Proposal for the implementation of a national access point

At the moment, the Finnish Transport Infrastructure Agency's Digiroad and Fintraffic's Digitraffic serve as the national access points for real-time traffic information. Digiroad is a national aggregate database for static data produced by road operators in compliance with national legislation, and it contains the interfaces needed for the distribution of data. Digitraffic is an open data distribution service and interface that contains real-time traffic and weather information provided mainly by Fintraffic. It contains information on road, rail and maritime traffic. Digitraffic also has real-time data provided by other operators, such as road maintenance contractors.

The new RTTI Regulation expands the scope of application of the Regulation significantly. All Finnish municipalities, public and commercial providers of traffic information services and holders of in-vehicle generated data as well as recharging and refuelling-related stakeholders will be subject to the Regulation and they shall publish the metadata of data resources available in a digital machine-readable format they hold as well as information on the requirements for the use of the data via the national access point. Additionally, the National Access Point must be provided with search functionalities.

The current national access points have not been designed for the purpose required by the new Regulation (access point for various stakeholders) and they do not contain the metadata of data resources. If the current national access points were to be preserved with adjustments, the end result would be disorganised, as Digiroad and/or Digitraffic would contain both actual interfaces and simple links to other interfaces.

Based on the analysis, the report author recommends the establishment of a catalogue-type national access point to which both the current aggregate databases and interfaces (incl. Digiroad and Digitraffic) and other stakeholders' data resources and interfaces would be linked. In this way, the national access point would meet the requirements of the RTTI and SRTI Regulations.

In order to meet the requirements of the Act on Transport Services and the EU MMTIS Regulation, Traficom has commissioned a traffic service catalogue (www.finap.fi) from Fintraffic. The service contains metadata on different stakeholders' data resources (however, the data is not compliant with any specific standard) and the required search functions. The recommended solution is to extend the coverage of the current traffic service catalogue to also cover the data types specified in the RTTI and SRTI Regulations. This would set up a single national access point in Finland, covering all the data categories subject to the ITS Directive. This solution would clarify the process at the national level and set up a single 'marketplace' for traffic information in Finland, which enables different types of users to find the traffic and traffic service information they need easily. The solution could also take advantage of the brand value of FINAP. An alternative to this solution would be the establishment of a parallel 'traffic data catalogue' alongside the existing FINAP.

A catalogue-style national access point makes it possible to create new national aggregate databases at a later time. These databases would compile data on e.g. the traffic circulation plans or roadworks, from municipal street networks and the highway network.

The solution has been visualised in Figure 8.

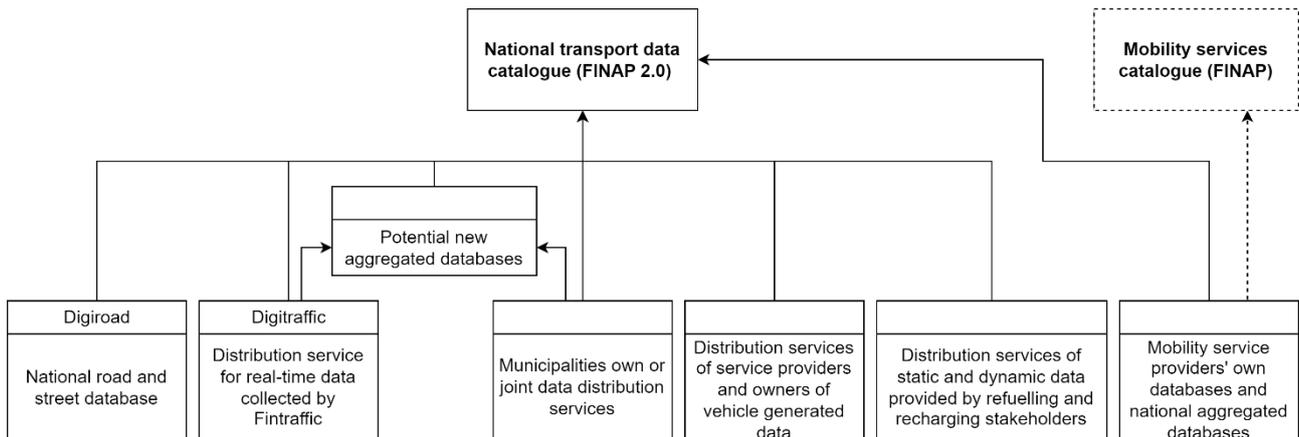


Figure 7. A proposal for combining the national access points into a single traffic data catalogue.

A catalogue-style national access point is estimated to work well in the future, when new data resources are likely to appear alongside the existing data resources due to e.g. the ongoing development of a digital twin. This solution is more flexible than the current process, in which Digiroad and Digitraffic serve as the national access points.

A single centralised national access point would also be useful to the administrative branch in the monitoring and reporting of the development of the digitalisation of services. The service would provide an overview of the national provision of each data type and the number of data holders in the different areas of application within the scope of the ITS Directive. It would be reasonable to include special reporting features for the competent authority in the service. Naturally, the monitoring would require that the requirements laid down in the Regulations are implemented successfully and the stakeholders send their data to the national access point. In the design of the service, special attention should be paid to its usability and making entering information into the service easy.

8.2 Competent authority

According to the RTTI Regulation, *Member States shall assess whether the requirements set out in Articles 3 to 11 are complied with by the data holders and data users to which these articles apply.* The competent authority is responsible for carrying out the assessment of compliance. In Finland, this authority is Traficom.

The compliance assessment consists of two related parts or phases:

- The competent authority may request from operators concerned the following documents:
 - o a description of the data, digital map or real-time traffic information services they provide as well as the information on the quality thereof and the conditions of re-use of these data
 - o an evidence-based declaration of compliance with the requirements set out in Articles 3 to 11.

- The competent authority shall randomly check the correctness of the declarations of compliance.

The competent authority defines its policy for requesting declarations independently. European authorities have prepared uniform practices for the aforementioned monitoring activities in various cooperation projects, e.g. NAPCORE. The benefit of the uniform practices is that it is easier for international service providers operating in multiple countries to give their declarations in Europe. Therefore, it is recommended to implement these practices in Finland as well.

Both operators who collect and provide data and operators who use data may give a separate declaration, as both groups are subject to the obligations. NAPCORE has prepared uniform declaration forms for different types of operators, such as road operators, service providers and producers of digital maps.

One way to obtain declarations from operators providing data is to require an operator to give the declaration of compliance at the same time when the operator makes data and the corresponding metadata available via the national access point. Countries such as Denmark and Germany intend to switch to this solution. This type of digital 'declaration form' would also enable the organised monitoring of the national access point and the data available through it, which supports reporting to the European Commission.

Data users may also be requested to provide declarations of compliance. At first, the measures can be targeted at large international operators. However, it is not worthwhile to set providing access to the actual data resources as a condition for giving the declaration, since data sources have many users other than the actual providers of information services (e.g. research institutes and design companies). The current policy on open data promotes the widespread use of data the best.

Since the new RTTI Regulation adds many new stakeholders to the scope of the obligations and thus modifies e.g. the requirements set for the national access point, the supervisory authority is recommended to start conducting random inspections from 2025 onwards. The random inspections should target the major operators in each operator category. The operator implementing the national access point should also be inspected. It is recommended to follow the joint European instructions and practices developed through cooperation projects, such as NAPCORE, to conduct the random inspections.

The declarations of compliance and random inspections are supervisory tools referred to in the RTTI Regulation, but they also require human resources. In addition to these measures, it is recommended to consider the use of automated digital solutions.

8.3 Finnish Transport Infrastructure Agency

The Finnish Transport Infrastructure Agency is the administrator of the national road and street data network system Digiroad, which is one of the two current national access points for RTTI data. Digiroad manages and shares static data concerning the entire road and street network. Digiroad contains the actual interfaces.

The needs for change identified in the content of Digiroad data:

- Indicating road sections equipped with a variable speed limit system in speed limit data, so that users can find the current speed limit for the road section concerned in the Digitraffic interface. This requires further investigation and dialogue with service providers. This action is recommended but not mandatory.
- The monitoring of the European METR work, i.e. specification of digital traffic regulations, and the measures related to its implementation pursuant to a separate plan.

In addition, the Finnish Transport Infrastructure Agency should address certain shortcomings concerning the publishing of updates to static data. According to the RTTI Regulation, data holders shall ensure that data updates are processed 'within a timeframe fitting to the reliable and effective use of the data in real-time traffic information services.' In other words, it is not sufficient to update the database (Digiroad) on a regular basis, but the updates must be published in a separate interface to allow users to better respond to the changes to the data.

Currently, Digiroad is missing the updates for the following types of data on infrastructure:

- road network links and their physical attributes
 - geometry (basically a road link)
 - road width
 - number of lanes
- road classification
- location of service areas and rest areas.

Article 8 of the RTTI Regulation requires the following updates to be published for changed data:

- the type of data concerned by the update
- the location of the condition concerned by the update
- the type of update (modification, insertion or deletion)
- the description of the update, containing the updated values and fields and updated information, and where relevant, the reasons for replacing the outdated values and fields
- the date on which the data has been updated
- the date and time when the change in a given condition has occurred or is planned to occur
- the quality of the data update (as described in the separate quality requirements).

This report identified a need to develop a separate interface for updated data on infrastructure. The type of update message and interface as well as potential standard to be used should be investigated further separately.

Regarding the updating of data on crucial regulations and restrictions, the Finnish Transport Infrastructure Agency's TN-ITS interfaces have a relative good coverage. The execution does not cover all static data specified in the Regulation. For example, not all traffic sign types have been indicated. Thus, the Finnish Transport Infrastructure Agency is recommended to expand the coverage of data types published in the TN-ITS interface to cover at least the attribute and restriction data that is most widely used in Finland. The Finnish Transport Infrastructure Agency's current practice is to publish Digiroad updates in the TN-ITS interface once in 24 hours, which meets the requirement for real-time updates well.

The Finnish Transport Infrastructure Agency is the road operator responsible for providing the 'underlying' data types referred to in the SRTI Regulation 886/2013. The obligation on data availability targets 'public and private road operators and/or service providers,' whose responsibility it is to share and exchange the data they collect. The Finnish Transport Infrastructure Agency and the Centres for Economic Development, Transport and the Environment (ELY Centres) have developed the HARJA system, in which the former receives maintenance vehicle location and task data from contractors' information systems. This data is transferred directly from contractors to Fintraffic's Digitraffic, in which the data is published in JSON format as open data. Currently, the shared data includes e.g. tasks related to winter maintenance and road marking.

Pursuant to the ITS Directive, this data must be made available in the DATEX II format and shared via the national access point.

The following table summarises the actions required of the Finnish Transport Infrastructure Agency.

Table 25. A summary of actions required of the Finnish Transport Infrastructure Agency.

No	Action	Deadline
1	Publication of updates of data on infrastructure (investigation, design, execution) <ul style="list-style-type: none"> - TEN-T network, motorways, main roads - entire road network, incl. streets 	31 December 2024 31 December 2027
2	Publication of metadata of standards concerning Digiroad data via the national access point	31 December 2024
3	Implementation of a metadata-based search function in Digiroad (if Digiroad is kept as a national access point)	31 December 2024
4	Extending the data published in the TN-ITS interface to cover all data types concerning regulations and restrictions (e.g. traffic signs related to regulations and restrictions)	31 December 2024
5	A report of the provision of warnings on 'short-time roadworks' that are currently not produced by the HARJA system.	31 December 2025

8.4 Fintraffic

Fintraffic produces SRTI data types and certain dynamic RTTI data types that have been defined in the current Act on Transport Services. In addition, Fintraffic is responsible for the maintenance and development of the Digiroad service, which is the current national access point for dynamic data. The needs for change identified concerning Fintraffic's services are discussed below.

The updated Regulation lays down the following changes concerning SRTI data:

- The obligation to provide data will extend to cover all event types specified in SRTI recommendations (see chapter 5.3). Fintraffic holds this data in some format, e.g. Traffic Management Finland's information, measurement data generated by road-side equipment or other data sources. The data must be made available via the national access point by 31 December 2025-2026, depending on the data category. The solutions will be designed in more detail in the Digitie project, which is already in progress.
- Information and warnings provided by means of road-side signs and variable warning signs must be converted into DATEX II messages by 31 December 2025–31 December 2026, depending on the data category.
- Implementation of a minimum-level traffic information service required by the ITS Directive; in practice, new SRTI-classified warnings in both the liikennetilanne.fi service and the Fintraffic mobile application by 31 December 2026.

During the development of SRTI data production, it is reasonable to update to DATEX II version 3.4. and switch to the recommended reference profiles defined through European cooperation to make the re-use of data easier. At the same time, it would be reasonable to start using OpenLR as the location reference model for DATEX II messages instead of ALERT-C. This change would eliminate the need to maintain a separate TMC location point system and make it easier to extend the reach of the services to cover e.g. municipal street networks (not all municipalities maintain a TMC location point system).

The updated Regulation lays down the following changes concerning RTTI data.

- Provision of data on weather conditions affecting road surface and visibility as a feed compliant with the DATEX II model for the TEN-T network, other motorways and main roads by 31 December 2024 and for the entire highway network by 31 December 2027.
- Provision of real-time data on traffic volume and speed produced with induction loops as DATEX II messages for the TEN-T network, other motorways and main roads by 31 December 2024 and for the entire highway network by 31 December 2027.
- Provision of data on temporary traffic management measures, such as alternative routes, in compliance with the DATEX II standard. Alternative routes may be used due to accidents and planned events, for example, during the closure of a highway tunnel due to maintenance, or public events, such as cycling competitions. The starting point should be to use the recommended reference profile. This requires further investigation on the users' wishes for the content. Since this data is not currently available in a machine-readable format, the obligations to digitise the data will enter into force on 31 December 2028.
- Adding of standard metadata to all RTTI content in Digitraffic by 31 December 2024.
- The development and deployment of data quality indicators and adding data on quality to metadata pursuant to the regulation. Fintraffic should take an active role in the quality development work of the RTTI Data Task Force and deploy the criteria and quality measurement methods developed through European cooperation. Reaching the minimum quality level may require significant changes to the data production processes and systems over the next few years, e.g. with regard to data on roadworks. However, the regulation does not directly require quality to reach a certain level.

The regulation does not require the use of the most recent DATEX II version or recommended reference profiles. In order to ensure that the feeds it produces are used as widely as possible in different services, Fintraffic is recommended to update its feeds for the existing data types to the models and formats recommended by TISA and service providers. Similarly to the provision of SRTI data, it is justified to use OpenLR as the location reference model.

The following table summarises the actions required of Fintraffic.

Table 26. A summary of actions required of Fintraffic.

No	Action	Deadline and scope
1	Adding of metadata pursuant to the DCAT-AP standard to all RTTI and SRTI content in Digitraffic	31 December 2024 Entire road network
2	Detailed definition of data on weather conditions affecting road surface and visibility (RTTI) and conversion into DATEX II format. Provision of real-time data on traffic volume and speed produced with LAM points in DATEX II format.	31 December 2024 TEN-T network, other motorways and main roads 31 December 2027 Entire highway network
3	The obligation to provide SRTI data will extend to cover all event types specified in SRTI recommendations (see chapter 5.3), data related to which Fintraffic holds as underlying data. Deployment of the standard information model.	31 December 2025, with the exception of data on reduced visibility and exceptional weather conditions 31 December 2026 Requirement: TEN-T network and other motorways Recommendation: at least the entire main and secondary highway network
4	Conversion of information and warnings provided by means of road-side signs and variable warning signs into DATEX II messages.	31 December 2025, with the exception of data on reduced visibility and exceptional weather conditions 31 December 2026 Requirement: TEN-T network and other motorways
5	Indication of new SRTI-classified warnings in both the liikennetilanne.fintraffic.fi service and Fintraffic's mobile application	31 December 2026
6	Provision of data on temporary traffic management measures, such as alternative routes, in compliance with the DATEX II standard. The data is currently not available in a digital machine-readable format, but exists as 'underlying data.'	31 December 2028
7	All shared data is to be made available in the formats recommended by TISA and service providers. DATEX II version 3.4, recommended reference profiles and OpenLR as the location method.	Recommendation
8	The development and deployment of data quality indicators and adding data on quality to metadata pursuant to the Regulation. Fintraffic should take an active role in the quality development work of the RTTI Data Task Force and deploy the criteria and quality measurement methods developed through European cooperation.	Recommendation

8.5 Centre for Economic Development, Transport and the Environment (ELY Centres)

ELY Centres are responsible for the maintenance of data on their respective highway networks in the Velho system. Digiroad retrieves data on highways from Velho automatically. This report did not identify any required changes to these responsibilities.

The updated ITS Directive introduces ELY Centres the obligation to ensure that their 'underlying data' is made available in a digital format and shared via the national access point. This obligation will enter into force gradually according to the following table.

Table 27. Crucial data types on regulation and regulations to be digitised and published in accordance with the ITS Directive.

Data type	Scope/deadline
Road closures	Trans-European core highway network 31 December 2025
Lane closures	
Roadworks	Comprehensive trans-European highway network 31 December 2026
Temporary traffic management measures	Trans-European core highway network and comprehensive network 31 December 2028

ELY Centres produce underlying data in the process of granting permits to close a road or lane to traffic or use temporary traffic management measures. However, events such as public events like cycling competitions do not typically impact the TEN-T network.

In connection with roadworks contracts acquired by an ELY Centre, it is essential to make sure the contractor is clearly contractually obligated to produce information on events that may affect traffic. At the moment, contractors working in the highway network are obliged to file a roadworks notification in Fintraffic's roadworks notification service and, if necessary, notify Traffic Management Finland directly of the roadworks event. Fintraffic is responsible for the processing and distribution of the data it receives. No regulation-based needs for change have been identified regarding this process.

8.6 Municipalities

Municipalities' obligations consist of the digitisation obligations laid down in national legislation, i.e. the Digiroad Act and Road Traffic Act, and the obligations of the RTTI Regulation that concern only data that exists in a digital machine-readable format. In addition, cities defined as 'urban nodes' in the TEN-T Regulation are subject to the digitisation obligations of the new ITS Directive for data types on 'crucial regulations and restrictions.' The TEN-T Regulation to be adopted in 2024 names the following cities as urban nodes: Helsinki (incl. Espoo, Vantaa, Kauniai-nen), Turku, Lahti, Tampere, Jyväskylä, Kuopio and Oulu. The requirement concerns the entire municipal street network, but it may be nationally made to apply only to streets with an average daily volume of over 7,000 vehicles.

The obligations of municipalities and their deadlines have been listed in the following table by data category. The data types in the data categories have been described in chapter 5. Because there are many data categories and data types and the responsibility for the maintenance of data is distributed among multiple persons within an organisation, it is recommended that the municipality carry out a comprehensive inventory of the current status of the data types in the first instance. In the inventory, it should be determined what data exists in a digital machine-readable format and what data is in an 'underlying' format, since these two categories are subject to different obligations. Additionally, it is recommended that municipalities identify and implement the practices to manage static data and transfer it to Digiroad from the municipalities' own information systems in accordance with the instructions and best practices of the Finnish Transport Infrastructure Agency.

Table 28. A summary of actions required of municipalities.

No	Action [mandatory act]	Deadline and scope
1	<p>Publication of data on street network attributes, access restrictions, other attributes and user-supporting items in Digiroad.</p> <p>[Digiroad Act]</p>	<p>The obligation entered into force in 2003.</p> <p>The entire street network of all municipalities</p>
2	<p>Publication of data on traffic control equipment (incl. traffic signs, traffic lights, traffic paint).</p> <p>[Road Traffic Act]</p>	<p>The obligation entered into force in 2020.</p> <p>The entire street network of all municipalities</p>
3	<p>Publication of data types on crucial regulations and restrictions and crucial data on the state of the network, insofar as the data is available in a digital machine-readable format, via the national access point in a standard format. Provision and publication of data-related metadata in accordance with the DCAT-AP standard.</p> <p>[RTTI Regulation]</p>	<p>31 December 2024</p> <p>The entire street network of all municipalities (excl. private roads)</p>
4	<p>Digitisation of data on crucial regulations and restrictions, insofar as the data is 'underlying,' and delivery of this data to the national access point.</p> <p>For the most part, the data types in this category are already subject to national legislation (actions 1–2). EU regulation extends the obligation to apply to the following data types:</p> <ul style="list-style-type: none"> - freight delivery regulations - boundaries of restrictions, prohibitions or obligations with zonal validity, current access status and conditions for circulation in regulated traffic zones - traffic circulation plans <p>With regard to this data, the digitisation obligation starts to apply when a municipality deploys the regulations or means in question and starts to generate 'underlying data.'</p> <p>Provision and publication of data-related metadata in accordance with the DCAT-AP standard.</p> <p>[ITS Directive]</p>	<p>One-way streets 31 December 2025</p> <p>Other data types in the category 31 December 2026, with the exception of traffic circulation plans 31 December 2028</p> <p>Only urban nodes referred to in the TEN-T Regulation:</p> <p>Helsinki, Espoo, Vantaa, Kauniainen Turku Lahti Tampere Jyväskylä Kuopio Oulu</p> <p>The entire street network of the cities mentioned, unless there is a national obligation concerning streets with an average daily volume of over 7,000 vehicles.</p>
5	<p>Publication of data types on infrastructure, other data types on regulations and restrictions, other data types on the state of the network, and data types on real-time use of the network, insofar as the data is available in a digital machine-readable format, via the national access point in a standard format.</p> <p>Provision and publication of data-related metadata in accordance with the DCAT-AP standard.</p> <p>[RTTI Regulation]</p>	<p>31 December 2027</p> <p>The entire street network of all municipalities (excl. private roads)</p>

The crucial data on regulations and restrictions includes UVAR-type traffic restriction zones and traffic circulation plans. These are digital traffic management measures that are currently barely in use in Finland. However, the measures have a great potential to promote objectives related to road safety and emissions reduction. It is recommended that municipalities, together with e.g. the Association of Finnish Local and Regional Authorities, investigate the potential applications of these measures in their respective street network and deploy them.

In addition to the obligations, especially large urban regions are recommended to start develop the digitalisation and distribution of data types that are known to be relevant to road users and that service providers would like to have access to, regardless of whether the digitisation obligations apply to the cities' street networks. A good example of these data types is extensive and long-term roadworks that affect not only road traffic but also the users of public transport and bicycle and pedestrian traffic. The recommended solution is to utilise the tools already in use in the highway network and possibly a centralised service provider together with the contractual obligations of contractors.

8.7 Recharging and refuelling-related stakeholders

8.7.1 *Data on the recharging points for electric cars*

The RTTI Regulation obliges stakeholders to make the following data on the recharging points for electric cars available via the national access point:

- location of recharging points for electric vehicles and the conditions for their use (e.g. recharging point type)
- availability of recharging points (recharging points in use and their availability)
- price of ad hoc recharging.

The obligation applies to operators that already have this data in a digital machine-readable format. Currently, many recharging-related stakeholders have the data in a digital machine-readable format, e.g. on their own website. The RTTI Regulation obliges these stakeholders to convert their existing data into a standard information model compliant with the RTTI Regulation (e.g. the DATEX II Energy Infrastructure information model is available [here](#)) and make the data and the corresponding metadata available via the national access point. The obligation will enter into force in two phases:

- By 31 December 2024 for the comprehensive trans-European road network (TEN-T network), motorways not included in the trans-European road network, and main roads
- by 31 December 2027 for the entire road network, with the exception of private roads.

The fulfilment of the obligations requires that national authorities set up a national access point suitable for processing these data types.

With regard to recharging points, data on the recharging infrastructure is already compiled on market terms in the [Latauskartta](#) database provided and maintained by Suomen Sähköautoilijat ry. However, this aggregate database only contains static data on recharging points and not all the data types required by the Regulation. There is also no certainty of the scope of the database in terms of public

recharging points. Nevertheless, because the database is clearly valuable to service providers, it is worth considering the alternative that Suomen Sähköautoilijat ry would expand the current aggregate database to also process dynamic data types and build a DATEX II version of the database and an interface for the distribution of data. The Regulation does not oblige Suomen Sähköautoilijat ry to do so, as the organisation is not an operator referred to in the Regulation. It could be noteworthy that the market-based operator is not obliged to share the data in its aggregate database with users free of charge, but it can apply its own commercial licensing conditions to the service.

Recharging-related stakeholders with no existing data in a digital machine-readable format are not obliged by the RTTI Regulation to digitise and share data.

The EU AFIR Regulation, which entered into force on 13 April 2024, also introduces obligations regarding e.g. payment, pricing and the number of recharging points as well as the opening of data. The RTTI Regulation provides the specifications to be followed in the opening of data. This report does not discuss the AFIR Regulation.

8.7.2 Refuelling-related stakeholders

The RTTI Regulation obliges stakeholders to make the following data on refuelling points available via the national access point:

- location of compressed natural gas, liquefied natural gas, liquefied petroleum gas stations
- location of refuelling points and stations for all other fuel types
- availability of refuelling points and stations for alternative fuel types
- price of refuelling.

The obligation concerns operators and data types that exist in a digital machine-readable format. The RTTI Regulation obliges these stakeholders to convert their existing data into a standard information model compliant with the RTTI Regulation (e.g. the DATEX II Energy Infrastructure information model is available [here](#)) and make the data and the corresponding metadata available via the national access point. The obligation will enter into force in two phases:

- By 31 December 2024 for the comprehensive trans-European road network (TEN-T network), motorways not included in the trans-European road network, and main roads
- by 31 December 2027 for the entire road network, with the exception of private roads.

Additionally, market-based aggregate databases and information services have been established for data on the location of refuelling points and price of different fuels in Finland. Stakeholders can fulfil their obligations by utilising the existing aggregate databases, which would make the re-use of the data easier. The data must be converted into a standard format in accordance with the RTTI Regulation.

8.8 Service providers and holders of vehicle data

Under the RTTI Regulation, service providers (both public and private) and holders of in-vehicle generated data shall, insofar as they collect data on the state of the network and data on the real-time use of the network (see chapter 5 for definitions) and this data is available in a digital machine-readable format, send data concerning their data offering to the national access point. The data must be made available in a standard format (DATEX II), and corresponding metadata must be published. The data must be made available *within a time-frame fitting to the reliable and effective use of the data to create real-time traffic information. Exchange and re-use of the data may be subject to terms and conditions determined by the private data holder.* In practice, this means that data holders must state that they are collecting certain data types, describe the data content in the metadata and publish the data via the national access point. The actual data distribution interface may be located in the operator's own system.

The obligation will enter into force in two phases:

- By 31 December 2024 for the comprehensive trans-European road network (TEN-T network), motorways not included in the trans-European road network, and main roads
- by 31 December 2027 for the entire road network, with the exception of private roads.

The updated ITS Directive does not impose digitisation obligations to these operators in this regard.

The corresponding obligation regarding SRTI data has been in force since 2013. For now, Tomtom is the only service provider that has informed the national supervisory authority of the SRTI data it collects and provides.

There are several companies in the Finnish market that collect e.g. data on traffic speed, queue locations and travel times. These data types, among others, fall within the scope of the obligations. Operators and service providers collecting data on weather and road conditions exist both in the private and public sector (e.g. Finnish Meteorological Institute). The obligation concerns all these operators.

9 Implementation, communication and cooperation

9.1 Implementation

The Commission's regulation of static and dynamic road traffic information will expand significantly in the next five years. The purpose of these measures is to accelerate the availability and exchange of road traffic information and the development of end user services. Entering into force at the beginning of 2025, the RTTI Regulation will expand the existing obligations regarding the publication of machine-readable information to cover the entire EU road network and add new stakeholders, also from the business sector, within the scope of the obligations. The updated ITS Directive will expand the obligations further to concern mandatory rules and restrictions, mandatory network status information and "underlying" safety-related information. Unlike in the past, road operators are now obliged to make this data available in a digital format regardless of the current format of the data if the data is deemed to be relevant to road users. In Finland, the obligations introduced by this digitisation obligation focus on the TEN-T network, because the obligation to digitise the municipal street network is limited to data on regulations and restrictions that has been regulated by national legislation for a while. In any case, the changes to the Regulation are relatively extensive and their implementation and monitoring will require an increased amount of resources from the operators concerned.

Regarding the implementation of the RTTI Regulation and the ITS Directive, a key measure is to design and build a national access point that allows the stakeholders subject to the obligations to fulfil their obligations. In the design process, it is essential to recognise the large number of new stakeholders, the data types and their attributes, and the existing aggregate databases implemented by public funds as well as on market terms. The use of the national access point should be as easy and simple as possible for the stakeholders.

The issues related to the organisation of the national access point should be solved immediately and the solution's functional and technical design process should be launched as soon as possible. The national access point must be active by 31 December 2024, and stakeholders must be provided with enough time to transfer their data content to the access point by this deadline.

Chapter 8 describes the actions to be taken by each stakeholder to fulfil their obligations. For many stakeholders, the nature of the actions to be taken depend on the data types they have in a digital machine-readable format. Thus, it is not possible to provide a general list of the actions required. Every operator must determine their actions based on an inventory of their current state.

It is clear that many stakeholders have small resources to fulfil the obligations. On the other hand, the current situation and the required measures to be taken are rather similar from the stakeholders' point of view. Stakeholders, such as municipalities, are recommended to cooperate and share their best practices with each other and, if necessary, acquire together the outsourced services (e.g. converting data into a digital format in accordance with the Regulation) they need to maximise synergy. The supervisory authority and other relevant state organisations should support the development of such cooperation and offer their own expertise to the stakeholders to achieve productive and cost-effective results.

9.2 Communications plan

The Ministry of Transport and Communications and the competent authority Traficom are responsible for informing the stakeholders concerned of the obligations of EU regulation. It is recommended to use existing institutions and cooperation forums with suitable communication channels and capacity to organise events on the subject to communicate with the stakeholders.

It may be necessary to produce operator-specific communications material in an electronic format. It would also be appropriate to create a frequently asked questions (FAQ) section on the Traficom website or the national access point, for example. This requires expert resources.

At the start of the communication, it is important to establish a schedule for the availability of the national access point and state when the national access point will be ready to receive stakeholder data and how the data will be published.

9.3 Pan-European projects and ecosystems

There are several ongoing joint projects and forums of authorities and other stakeholders in Europe, including NAPCORE, RTTI Task Force, TISA and the Data for Road Safety ecosystem. These forums facilitate discussion on the interpretation of the requirements of the updated directive and regulations as well as the related best practices. The Finnish authorities should ensure active participation in the key forums and coordinate the exchange of information about Finland's national stands on matters and the implementation of practices and policies in Finnish development work. Because many forums process a number of matters concerning different national authorities and stakeholders, it would be important to address the issue of exchanging information in a suitable format.

Key factors include the development of information model standards, the development of uniform quality criteria and minimum quality requirements and the best practices in the implementation of regulation. The issues to be solved later in cooperation highlighted during the preparation of this report include:

- Possible functional requirements for the SRTI information service required by the ITS Directive. The question is: does Fintraffic's Liikennetilanne service and F-mobiili mobile service meet the requirements set.
- Implementation of national access points so that it is easy for data users to give feedback on the quality of data to the right stakeholder.
- The needs of service providers concerning national aggregate databases for dynamic RTTI data. It is necessary to, in cooperation with international providers of information services, define which dynamic data types should be prioritised in the establishment of a national aggregate database in the same way static data has now been compiled in Digiroad.
- The monitoring of the development of the RTTI data types 'traffic circulation plans' and 'traffic management measures' (which are currently little used in Finland) and the related information model standardisation through European cooperation forums, such as RTTI Task Force. When road authorities and service providers have reached a mutual understanding of the harmonised content and applications of these data types, their deployment should be accelerated by preparing clear national guidelines.

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Annex 1 Summary of the justification for amending the Delegated Regulation (EU) 2022/670 'RTTI'

The recital of the Delegated Regulation indicates several Commission objectives and policies that the Commission strives to advance through the actual text of the Regulation (articles and annexes). This recital supports the correct interpretation of the actual text of the Regulation. The key points of the recital have been summarised below. The text is based on the Regulation but it has been edited and re-grouped slightly to make it more readable.

General objectives and policies

- the specifications should apply to the ITS applications and services when these are deployed without prejudice to the right of each Member State to decide on the deployment of such applications and services on its territory
- with respect to the re-use of data held by private data holders, the rules established by this Regulation do not impose sharing data free of charge. Data held by private data holders may be subject to licence agreements to regulate their re-use.
- Member States should apply these specifications to the entire road network, with the exception of roads not owned by a public road or transport authority
- the specifications do not oblige any stakeholder to start collecting any data that they are not already collecting or to digitise any data that is not already available in a digital machine-readable format. The specific requirements regarding the updates of data should only apply to the data that is actually collected and available in a digital machine-readable format.

Objectives and policies concerning the distribution of data

- In order to facilitate the easy exchange and re-use of data for the provision of services, operators collecting data should make the data, corresponding metadata and information on the quality of the data discoverable and accessible to other operators via the national or common access point.
- The access point can take the form of a repository, registry, web portal or similar depending on the type of data. National or common access points may also point to other locations where the data can be accessed, without hosting the data itself.
- Member States should regroup the existing public and private access points in a single point enabling access to all the types of relevant available data that fall within the scope of these specifications.
- Member States may continue using the access points set up under (the earlier RTTI Regulation) Delegated Regulation (EU) 2015/962 and they should be free to decide to use the access points established under other delegated acts adopted under Directive 2010/40/EU as the national access points for the data falling within the scope of this Regulation.
- In order to allow users to cost-efficiently discover the relevant data, it is necessary to properly describe the content and structure of this data using appropriate metadata.

Objectives and policies concerning standards and technology

- it is important that the specifications are aligned to the relevant data categories and data types, covering multiple possible sources of the data and technology used to create or update the data.
- In order to develop a harmonised and seamless provision of real-time traffic information services, Member States should rely on existing technical solutions and standards, provided by the European and international standardisation organisations, such as DATEX II (CEN/TS 16157 and subsequently upgraded versions) and ISO standards. For data types for which no standardised format is available, Member States and stakeholders should be encouraged to cooperate in order to reach an agreement on data definition, data format and metadata.
- The use of different location referencing methods should continue to be allowed.

Objectives and policies concerning the value chain

- The accessibility and regular update of data by road authorities and road operators are essential for enabling the production of up-to-date and accurate digital maps that are a key asset for reliable ITS applications.
- The digital map producers should be encouraged to integrate relevant data updates into their existing maps and map update services in a timely manner.
- In order to comply with public policies such as road safety, service providers and digital map producers should collaborate with public authorities to correct inaccuracies in their data.
- To improve the benefits for road users in terms of increased road safety and less traffic congestion, these services should also reflect the priorities of road authorities, as expressed e.g. through digitally accessible traffic circulation plans.
- These specifications should not oblige road authorities or road operators to define or implement traffic circulation plans and temporary traffic management measures.
- They should not oblige service providers to share any of their data with other service providers. Service providers should be free to conclude commercial agreements between themselves for the re-use of relevant data.
- 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. 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.
- It is acknowledged that the use of data and real-time traffic information services generated by private service providers and holders of in-vehicle generated data can represent a cost-effective way for road authorities and road operators to improve traffic management, road safety as well as infrastructure management and maintenance. Common FRAND terms should be used by public authorities when receiving these data or services for the above-mentioned tasks, in order to lower the barriers for access and create transparency on the conditions for re-use. Member States and relevant stakeholders are

encouraged to define the common FRAND terms applicable to the re-use of the relevant data types for the execution of these public tasks.

- Private service providers may use data collected by road authorities and road operators as input data for their own real-time traffic information services. The specific terms and conditions applicable for such re-use of these data should be left to the parties concerned without prejudice to the provisions of Directive (EU) 2019/1024.
- Certain data types provided by road authorities and road operators, such as traffic circulation plans, traffic regulations and restrictions and temporary traffic management measures, should be re-used (i.e. published to end users) by private service providers in order to ensure the accessibility for road users to the relevant information via real-time traffic information services.

Finnish Transport and Communications Agency

Traficom

PO Box 320, FI-00059 TRAFICOM, Finland

tel. +358 29 534 5000

traficom.fi

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