16/797-ST16	Version EN10.3 Annex
RISC 107	Origin EN
13.11.2025	Status: NA

Railway Interoperability and Safety Committee

Working document

Draft Commission Implementing Regulation

on a technical specification relating to the telematics subsystem of the rail system in the European Union for interoperability of data sharing in rail transport and repealing Regulations (EU) No 454/2011 and (EU) No 1305/2014

EUROPEAN
COMMISSION

Brussels, XXX
[…](2025) XXX draft

ANNEX

ANNEX

to the

COMMISSION IMPLEMENTING REGULATION

on a technical specification relating to the telematics subsystem of the rail system in the European Union for interoperability of data sharing in rail transport and repealing Commission Implementing Regulation (EU) No 1305/2014 ('TAF TSI') and Commission Implementing Regulation (EU) No 454/2011 ('TAP TSI')

ANNEX

TABLE OF CONTENT

1. COMMON REQUIREMENTS

1.1. Essential requirements

(1) The essential requirements of the subsystem 'telematics applications for passenger and freight services' referred to in point 1 (b), third indent, of Annex II to Directive (EU) 2016/797 and described in point 2.6 of that Annex are laid down in Appendix F to this Annex in accordance with point 2.7 of Annex III to that Directive.

(2) In addition to the levels of integrity and dependability set out in the specifications referenced in Appendix C, index [104], [1] and [106], for the storage or sharing of data pursuant to this Regulation as referred to in the column 'Safety' of Appendix F, data holders and data recipients may apply additional levels where such data is intended to be used for the safety of operations not covered by the control command and signalling subsystems.

(3) Additional levels of integrity and dependability for data stored or shared pursuant to this Regulation intended to be used for the safety of operations are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex. Where data stored or shared pursuant to this Regulation is intended to be used in operation by telematics stakeholders for the safety of operations, suitable additional levels of integrity and dependability shall be set out in their safety management system based on common safety methods for risk evaluation and assessment and specified through agreement. Such an agreement shall not constitute an obstacle to access the network.

(4) Additional levels agreed by telematics stakeholders shall be delivered within the process managed by the Agency referred in Article 5 of Directive (EU) 2016/797.

1.2. Common reference data[1]

(1) The procedure for the assignment of codes referred to in Article 9 is set out in the specifications referenced in Appendix C, index [103].

(2) The Agency shall manage common reference data in accordance with Articles 8 and 9 and the specifications referenced in Appendix C, index [103] and grant access to those data for use under the conditions of the EUPL 1.2 licence.

1.2.1. Organisation reference data

(1) The data presentation of an organisation code shall comply with the specifications referenced in Appendix C, index [1].

(2) Until 31 December 2025, a specific range of organisation codes shall be reserved for organisations falling within the scope of this Regulation.

[1] Common reference data relating to ticketing aspects are specified in point 4.8.

1.2.2. Location reference data

(1) Any reference to a geographical point necessary for data sharing pursuant to this Regulation shall be identified with a single location code.

(2) The data presentation of a location code shall comply with the specifications referenced in Appendix C, index [1].

1.3. Cybersecurity

For the purposes of Article 7(2), each telematics stakeholder shall:

(a) implement cybersecurity risk-management measures in accordance with Directives (EU) 2022/2555[2] and (EU) 2022/2557[3] of the European Parliament and of the Council;

(b) use public key infrastructure ('PKI') in accordance with the specifications referenced in Appendix C, index [106];

(c) use communication protocols belonging to the Transmission Control Protocol / Internet Protocol (TCP/IP) suite.

1.4. Data presentation

(1) The Agency shall ensure semantic versioning of the ERA Ontology referred to in Article 7, the specifications of which are referenced in Appendix C, index [1]. The Agency shall ensure access to all applicable versions for use under the conditions of the EUPL 1.2 licence.

(2) The Agency shall ensure through the change control management procedure referred to in Article 12 that the ERA Ontology is compatible with the following data catalogue elements and includes them as subsets:

(a) the technical specifications referenced in Appendix C, index [105], for the purposes of the processes referred to in Article 2(1), points (a) and (b);

(b) the technical specifications referenced in Appendix C, indexes [P.7], [B.5], [B.10], and [B.14], for the purposes of the processes referred to in Article 2(1), point (c).

(3) Data, objects and messages shared pursuant to this Regulation shall be serialised in a format mutually agreed upon by the involved stakeholders that comply with the subsets listed in point 1.4(2), as included in the ERA Ontology.

---

[2] Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union , amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (NIS 2 Directive) (OJ L 333, 27.12.2022, p. 80, ELI: http://data.europa.eu/eli/dir/2022/2555/oj).

[3] Directive (EU) 2022/2557 of the European Parliament and of the Council of 14 December 2022 on the resilience of critical entities and repealing Council Directive 2008/114/EC (OJ L 333, 27.12.2022, p. 164, ELI: http://data.europa.eu/eli/dir/2022/2557/oj).

(4) The sequence of the messages to be exchanged pursuant this Regulation shall comply with the specifications referenced in Appendix C, index [100].

1.5. Data quality criteria

For the purposes of identifying a deficiency in data quality as part of the quality assurance check referred to in Article 10, paragraphs (4) and (5), a telematics stakeholder shall measure the deviation of quality from the nominal value (%) set out for each criteria, and where relevant take corrective action aiming at meeting this value.

1.5.1. Accuracy

(1) Data shared pursuant to this Regulation shall be recorded once as primary data without any intermediate processing, transformation or aggregation by the data holder, that is to say the telematics stakeholder which generated the data. Telematics stakeholders shall be given access to primary data in accordance with Article 4.

(2) The accuracy of the data shall be measured as the percentage of the values stored as part of the reference data referred to in points 1.2, 3.3 and 4.8 that are correct in comparison with the actual value of the primary data.

(3) The nominal accuracy is 100%.

1.5.2. Completeness

(1) Before sharing data, the data holder shall ensure that its telematics applications check the completeness and compliance of the data shared against the metadata referred to in Article 8.

(2) The data recipient, that is to say the telematics stakeholder using the data, shall ensure that its telematics applications check the completeness and compliance of the data used against the metadata.

(3) The completeness of the data shall be measured as the percentage of mandatory data fields that contain values.

(4) The nominal completeness is 100%.

1.5.3. Consistency

(1) The data holder shall ensure that its telematics applications operate in accordance with the business rules established by the data holder to guarantee data consistency.

(2) Where data consistency needs to be checked against different sources and versions of the reference data referred to in points 1.2, 3.3 and 4.8, the data holder shall implement validation procedures before interface data are generated or a new data version becomes operational. The data duplicated from the reference data shall be validated against the business rules.

(3) The data holder shall be identified through its organisation code as part of the data it shares.

(4) The consistency of the data shall be measured as the percentage of matching values across tables, and records, and across processes.

(5) The nominal consistency is 100%.

1.5.4. Timeliness

(1) Telematics stakeholders shall share up-to-date data.

(2) The data holder shall ensure that its telematics applications enable data updates as soon as they are available. The data holder shall set out response times for enquiries and user types in the detailed specifications of its telematics applications.

(3) The timeliness of the data shall be measured as the percentage of data shared within a specified threshold time frame.

(4) Data timeliness shall comply with threshold requirements laid down for each function by the data holder without prejudice to applicable rules, in particular the rules for the transport of dangerous goods.

1.5.5. Uniqueness

(1) The data holder shall ensure that there are no duplicated records in the data shared. It shall identify and eliminate any redundant records in the data shared using deduplication tools, automated where possible.

(2) The uniqueness of the data shall be measured as the complement of the percentage of duplicates across tables and records to 100%.

(3) The nominal uniqueness is 100%.

1.6. Compliance assessment

Pursuant to Article 18, telematics stakeholders shall self-assess, in relation to the data shared, the compliance of the telematics applications they use to implement this Regulation against the testing procedures and the evidence-based declaration set out in Appendix D.

1.7. Telematics applications

(1) Except for the processes referred to in Article 2(1), point (c), for which the specifications set out in Section 4 apply, the application programming interfaces ('APIs') and web user interfaces ('web UIs') referred to in Article 14 that are deployed by telematics stakeholders shall comply with the specifications for common interface referenced in Appendix C, index [104].

(2) The specifications referenced in Appendix C, index [1], shall be used to ensure format validity, authenticity and integrity of received or transmitted data in relation to the information available in the common central repository referred to in Article 8. To that end, the data catalogue elements referred to in Article 7(3) and set out in point 1.4 (2) of this Annex shall be linked to the APIs and web UIs referred to in point (1).

1.7.1. Web user interfaces for capacity management, train preparation and traffic management

Aspects relating to the interoperability of web UIs in the areas of capacity management, train preparation and traffic management, pursuant to Article 14 of this Regulation, are identified

as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

1.7.2. Web user interfaces for the management of freight wagons and their load

Aspects relating to the interoperability of web UIs in the area of the management of freight wagons and their load, pursuant to Article 14 of this Regulation, are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

2. CAPACITY MANAGEMENT, TRAIN PREPARATION, AND TRAFFIC MANAGEMENT

(1) Section 2 lays down the requirements for interoperable data sharing required to carry out the processes referred to in Article 2(1), point (a).

(2) Data in the areas of capacity management, train preparation, and traffic management, shall be shared by means of an API or a web UI in accordance with Article 14 and point 1.7.

(3) In the areas of capacity management, train preparation, and traffic management of a rail transport service, telematics stakeholders subject to Article 4 shall mutually share, grant access and use, for operational and non-commercial purposes, all free-of-charge, data relating to the trains that are part of this rail transport service.

2.1. Object identifiers

2.1.1. General

(1) The main object identifiers set out in points 2.1.2 to 2.1.7 shall be shared between the different telematics stakeholders involved in a rail transport service, and consistently used by them. Those objects shall be marked with unique identifiers in the planning phase of that rail transport service and consistently used in the areas of train preparation and traffic management for that rail transport service.

(2) Object identifiers shall be in accordance with the specifications referenced in Appendix C, index [1].

2.1.2. Reference train identifier

(1) The objects referred to in points 2.1.3 to 2.1.7 shall be embedded in messages exchanged pursuant to points 2.2 to 2.8, using a unique and stable identifier of the train, that is the reference train identifier (object type ‘TR’, as part of the ‘PlannedTransportIdentifier’) for the complete lifecycle of the train and the related objects across networks.

(2) The lead railway undertaking shall specify the reference train identifier.

(3) The reference train identifier shall be in accordance with the specifications referenced in Appendix C, index [1].

(4) Where a rail transport service is operated or intended to be operated by several railway undertakings along that service, the lead railway undertaking shall coordinate

the railway undertakings operating that service by integrating the objects referred to in points 2.1.3 to 2.1.7.

2.1.3. Train object

(1) The train object ('TrainID'), linked to the reference train identifier referred to in point 2.1.2, shall be specified by the lead railway undertaking.

(2) Once consistently integrated by the lead railway undertaking responsible for coordinating the applicants for the same rail transport service, the corresponding 'TrainID' shall be sent by each applicant to the infrastructure managers involved along the route of that service by means of the following elements:

(a) the reference train identifier in accordance with point 2.1.2;

(b) the route object in accordance with point 2.1.6 and the 'path request' object in accordance with point 2.1.4;

(c) the elements of the messages relating to:

(i) capacity allocation referred to in point 2.3;

(ii) train preparation as referred to in point 2.5.

(3) The 'TrainID' describes the planned train for a rail transport service and its entire route.

2.1.4. Path request object

(1) The path request object ('PathRequestID'), linked to the reference train identifier referred to in point 2.1.2, shall be specified by the lead railway undertaking.

(2) Once consistently integrated by the lead railway undertaking responsible for coordinating the applicants for the same rail transport service, the corresponding path request object shall be sent by each applicant to the infrastructure managers involved along the route of that service.

(3) The path request object describes the details of the path requested for the planned train on the network. It shall contain, as attribute, the identifier of the lead railway undertaking. It may contain, as attribute, the expected operational train number ('OperationalTrainNumberIdentifier'). It may also contain, as attribute, the commercial train number ('RetailServiceId')

2.1.5. Path object

(1) The path object (object type 'PA', as part of the 'PlannedTransportIdentifier') shall be specified by the infrastructure manager which is responsible for corresponding path on its network.

(2) The path object shall be sent by the infrastructure manager to the applicant.

(3) The path object describes the details of the path allocated for a train. Infrastructure managers involved along the route of that train shall coordinate between themselves the path objects.

(4) Where a specific train number is specified by the applicant as part of the path request object referred to in point 2.1.4(3), the path object sent by the infrastructure manager to the applicant shall contain, as attribute, the train number assigned, which may change along the lifecycle of the path or the linked train.

2.1.6. Route object

(1) The route object (object type 'RO', as part of the 'PlannedTransportIdentifier') shall be specified by the lead railway undertaking. It refers to the geographical line of operation from a point of origin to a point of destination.

(2) Once consistently integrated by the lead railway undertaking responsible for coordinating the applicants for a single rail transport service, the route object shall be sent by the applicant to all infrastructure managers involved along the route of that service.

(3) The route object describes the minimum information about the entire route for which an infrastructure manager needs to perform its duties including the analysis of the 'path request'.

(4) The route object shall contain at least the following information:

(a) point of origin;

(b) points of handover as referred in point 2.6.2 (b);

(c) point of destination;

(d) corresponding planned dates according to the working timetable.

2.1.7. Case reference object

(1) The case reference object (object type 'CR', as part of the 'PlannedTransportIdentifier') shall be specified by the holder of that data.

(2) Where a specific object or data are used or intended to be used by a telematics stakeholder, they shall be part of a dedicated 'case reference object' subject to the process referred to in Article 11.

(3) Except for block trains referred to in point 2.6.1 (6), aspects relating to the interoperability of data sharing for the identification of shunting movements, including in rail freight service facilities, are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

2.2. Strategic management of infrastructure capacity

Aspects relating to the interoperability of data sharing for the strategic management of infrastructure capacity are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

2.3. Capacity allocation

2.3.1. General

(1) The data required and allocated pursuant to the Annex to Commission Implementing Regulation (EU) 2019/773[4] ('OPE TSI'), as referred to in Appendix A to this Annex, in relation to the capacity rights and the characteristics of the train for each section of these rights, including the sections in rail freight service facilities, are designated hereafter as 'path'.

The first paragraph of this point is without prejudice to the definition of 'train path' in Article 3, point (27), of Directive 2012/34/EU in relation to a rail transport service, and the definition of 'service facility capacity' in Article 3, point (4), of Commission Implementing Regulation (EU) 2017/2177[5], solely in relation to the sections of that rail transport service operated in a rail freight service facility.

(2) Where allocating infrastructure capacity referred to in Section 3 of Chapter IV of Directive 2012/34/EU, the messages referred to in points 2.3.2 to 2.3.9 of this Annex shall be exchanged between the applicant and the infrastructure manager or the allocation body designated in accordance with Article 7a (3) of that Directive using an API or a web UI referred to in Article 14 and point 1.7 of the Annex to this Regulation.

(3) Where allocating capacity in rail freight service facilities referred to in Article 13 of Directive 2012/34/EU and Articles 7, 8 and 9 of Implementing Regulation (EU) 2017/2177, solely in relation to the sections of a freight rail transport service subject to the allocation of a path, the messages referred to in points 2.3.2 to 2.3.9 of this Annex shall be exchanged between the applicant and the infrastructure manager or the allocation body designated for the network connected to those rail freight service facilities using an API or a web UI referred to in Article 14 and point 1.7 of the Annex to this Regulation.

(4) Aspects relating to the interoperability of data sharing for the planning of shunting movements and stabling are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

(5) In the case of multi-network processes in the area of capacity allocation that involve more than one infrastructure manager or operator of rail freight service facilities along a train route, the infrastructure managers and operators of rail freight service facilities involved shall, pursuant to Article 40(1) of Directive 2012/34/EU, coordinate their allocation processes to ensure consistency of corresponding outcomes.

---

[4] Commission Implementing Regulation (EU) 2019/773 of 16 May 2019 on the technical specification for interoperability relating to the operation and traffic management subsystem of the rail system within the European Union and repealing Decision 2012/757/EU (OJ L 139I, 27.5.2019, p. 5, ELI: http://data.europa.eu/eli/reg_impl/2019/773/oj).

[5] Commission Implementing Regulation (EU) 2017/2177 of 22 November 2017 on access to service facilities and rail-related services (OJ L 307, 23.11.2017, p. 1, ELI: http://data.europa.eu/eli/reg_impl/2017/2177/oj)

Applicants for capacity across multiple networks may use the common Union API or a common Union web UI referred to in Article 14(5) of this Regulation.

Aspects relating to the interoperability of data sharing for the coordination of multi-network processes in the area of capacity management are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

(6) Where more than one railway undertaking operates a rail transport service, the railway undertakings involved may designate the lead railway undertaking as the applicant for the overall route of that service. The lead railway undertaking shall at least ensure the coordination of the applicants and their allocation processes pursuant to Article 13(1), point (b), integrating the object identifiers referred to in point 2.1 for the overall route of that service.

(7) In the case of an intermodal transport service, the railway undertakings involved may delegate the role of lead railway undertaking or applicant to an intermodal transport operator for the overall route of corresponding freight rail transport service.

(8) In case of a short-notice request for the allocation of infrastructure capacity close to departure or during real-time operations, information relating to corresponding path shall be communicated as part of a path section modification in accordance with point 2.6.7.

The time threshold related to the remaining time until the departure of a train at the time of the request for capacity allocation from which this request is to be considered ad hoc is identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

(9) In the case of a freight rail transport service where the actual characteristics of the consignment require the path allocated to be adapted, the information contained in the 'ConsignmentNoteMessage' referred to in point 3.1.1 shall be used as part of a path section modification in accordance with point 2.6.7.

(10) Messages exchanged for the allocation of a path relating to a freight rail transport service shall contain information identifying quieter routes intended for operation, if any, in accordance with the Annex to Commission Regulation (EU) No 1304/2014[6] (NOI TSI), as referred to in Appendix A to this Annex.

(11) In the case of an intermodal transport service, the messages exchanged in accordance with points (2) and (3) for the allocation of paths for corresponding freight rail transport service shall contain information relating to the maximum profile of the intermodal loading units intended to be used for that service.

(12) The working timetable reflects the paths that are confirmed as allocated.

---

[6] Commission Regulation (EU) No 1304/2014 of 26 November 2014 on the technical specification for interoperability relating to the subsystem rolling stock — noise amending Decision 2008/232/EC and repealing Decision 2011/229/EU (OJ L 356, 12.12.2014, p. 421, ELI: http://data.europa.eu/eli/reg/2014/1304/oj).

2.3.2. Path request

(1) The ‘PathRequestMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) To request a path, the applicant shall send a ‘PathRequestMessage’ to the infrastructure managers concerned.

2.3.3. Path details

(1) The ‘PathDetailsMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) In response to a ‘PathRequestMessage’ received from an applicant in accordance with point 2.3.2, each infrastructure manager shall send a ‘PathDetailsMessage’ to specify the details of the path offered to the applicant.

2.3.4. Path confirmed

(1) The ‘PathConfirmedMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) To confirm the allocation of the path offered by an infrastructure manager in the ‘PathDetailsMessage’ referred to in point 2.3.3, the applicant shall send back the ‘PathConfirmedMessage’.

(3) Upon receipt of the ‘PathConfirmedMessage’, the receiving infrastructure manager shall acknowledge its receipt by sending the originating applicant a ‘PathDetailsMessage’ confirming the booking and integrate the corresponding path in its working timetable.

(4) Upon receipt of the ‘PathDetailsMessage’ confirming the booking, the applicant shall also send this message to the railway undertakings involved in that path and to the lead railway undertaking. In the case of a freight rail transport service, the lead railway undertaking shall forward the confirmation to freight customers.

(5) A train path confirmed by the applicant in accordance with point (1) whose confirmation of receipt has been acknowledged by the receiving infrastructure manager in accordance with point (3) is considered as allocated and corresponding capacity rights are to be considered by both parties as granted.

2.3.5. Path details refused

(1) The ‘PathDetailsRefusedMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where the path offered by the infrastructure manager in accordance with point 2.3.3 is refused, the applicant shall send back a ‘PathDetailsRefusedMessage’.

2.3.6. Path cancelled

(1) The ‘PathCanceledMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) To cancel all or part of a path that has been confirmed in accordance with point 2.3.4, the applicant shall send a 'PathCanceledMessage' to the infrastructure manager which is responsible for the capacity rights granted.

2.3.7. Path not available

(1) The 'PathNotAvailableMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a path allocated is no longer available or has been changed, the infrastructure manager responsible for the path allocated shall send a 'PathNotAvailableMessage' to the applicant as soon as it becomes aware of such a change.

(3) Where an alternative to a path that is no longer available or has been changed is available, each infrastructure manager responsible for the path allocated, or part of it, shall offer that alternative and send to the applicant a 'PathDetailsMessage' in accordance with point 2.3.3, which shall be read alongside the 'PathNotAvailableMessage' referred to in point (2). In such cases, the following conditions shall also apply:

(a) where such an alternative is offered, the applicant is not required to send a 'PathRequestMessage' under point 2.3.2;

(b) where such an alternative is not available, each infrastructure manager responsible for the path allocated, or part of it, shall immediately send the applicant a 'PathNotAvailableMessage'.

2.3.8. Receipt confirmation

(1) The 'ReceiptConfirmationMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) The recipient of the messages referred to in points 2.3.2, 2.3.3, 2.3.5, 2.3.6, and 2.3.7 shall acknowledge receipt by sending a 'ReceiptConfirmationMessage' to the telematics stakeholder which sent the original message.

2.3.9. Capacity allocation coordination process

Aspects relating to the interoperability of data for the electronic form of the information disclosed in case of conflict resolution referred to in Article 46 of Directive 2012/34/EU are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

2.3.10. Working timetable

Each infrastructure manager shall integrate the paths that are considered as allocated in accordance with point 2.3.4, points (3) and (5), and make them available as part of its working timetable data in accordance with Article 5 under the conditions of the Creative Commons BY-ND 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

2.4. Planned capacity restrictions

2.4.1. Coordination of planned capacity restrictions

Aspects relating to the interoperability of data sharing for to the coordination of planned capacity restrictions are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

2.4.2. Consultation of stakeholders affected by planned capacity restrictions

Aspects relating to the interoperability of data sharing for the consultation of stakeholders affected by planned capacity restrictions in accordance with Articles 43 and 53 of Directive 2012/34/EU are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

2.4.3. Publication of planned capacity restrictions

Aspects relating to the interoperability of data sharing for the publication of planned capacity restrictions in accordance with Articles 43 and 53 of Directive 2012/34/EU are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

2.4.4. Temporary changes to the nominal infrastructure characteristics resulting from a planned capacity restriction

The publication of temporary changes of nominal infrastructure characteristics through temporary values of the network parameters in the RINF pursuant to OPE TSI, as referred to in Appendix A to this Annex, may be automated through a common European API used to share data relating to temporary capacity restrictions in accordance with points 2.4.1, 2.4.2, and 2.4.3.

2.5. Train preparation

2.5.1. Train composition

(1) The ‘TrainCompositionMessage’ for freight rail transport services and the ‘PassengerTrainCompositionMessage’ for passenger rail transport services, referred hereafter as ‘train composition messages’, shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Any railway undertaking responsible for the operation of a train shall send a train composition message to confirm that the composed train is in running order pursuant to OPE TSI, as referred to in Appendix A, to the infrastructure manager responsible for the network of departure solely in relation to the sections of the path where the train is to run.

(3) In the case of an intermodal transport service, the freight railway undertaking responsible for the operation of a train that is part of a path arriving at a rail freight service facility where the composed train is to be unloaded shall send a ‘TrainCompositionMessage’ to the operator of that rail freight service facility.

(4) Each infrastructure manager, solely in relation to the sections of the rail transport service operated on its network according to a path, shall grant access pursuant to Articles 4 and 5 to train composition data it receives.

(5) Where an infrastructure manager grants access to train composition data pursuant to Articles 4 and 5, it shall consistently reuse the information contained in 'train composition messages' received from railway undertakings pursuant to point (2) of that point and from station managers pursuant to point 4.7.1.1(3), and grant access to that data for use under the conditions of the Creative Commons BY-NC-ND 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

(6) Where a railway undertaking shares train composition data with an infrastructure manager or an operator of rail freight service facilities in accordance with points (2) or (3), it may request that the commercial use of that data is subject to a contractual agreement unless such use is covered by the open licence used by the infrastructure manager sharing that data pursuant to Article 5 and point 2.5.1(5).

(7) Where access to train composition data is restricted from the public pursuant to Article 5, paragraphs (3) or (4), each infrastructure manager shall ensure that other telematics stakeholders can access that data pursuant to Article 4 through the common Union web UI referred in Article 5(1).

(8) In the cases referred to in Article 5(6), train composition data shall only be sent bilaterally by the railway undertaking to relevant telematics stakeholders pursuant to Article 4.

(9) Where, before or after departure, the composition of a train has been modified, the railway undertaking responsible for the operation of that train shall send an updated 'train composition message' with a reference to the location where the composition changed.

(10) Where disruption or emergencies arising during train operation entail a change in the parameters of the train composition, with possible repercussions on the train traffic data referred to in point 2.6, the railway undertaking responsible for that train shall send a new 'train composition message' or communicates the new train composition in accordance with Appendix C to the OPE TSI.

(11) The 'TrainCompositionMessage' shall contain parameters providing for compliance of the composition of the train with the specific rules for the operation of freight wagons on quieter routes pursuant to NOI TSI, as referred to in Appendix A to this Annex. The identification of quieter routes intended for operation shall be consistent with the details of the path allocated as specified in point 2.3.

(12) The 'TrainCompositionMessage' shall make it possible to identify any intermodal loading unit loaded on freight wagons.

(13) The 'TrainCompositionMessage' shall make it possible to identify freight wagons transporting dangerous goods. Where at least one freight wagon is part of a train that transports dangerous goods, the access to the train composition data shall be restricted from the public pursuant to Article 5(3) for this entire train.

(14) The 'train composition message' shall allow to identify where a rail transport service is operated for the armed forces, if relevant.

(15) The ‘PassengerTrainCompositionMessage’ shall include seating maps, at least for trains where it is possible to reserve a seat, and the location of on-board facilities such as classes, coaches accessible to PRM and bike spaces, where available.

The ‘PassengerTrainCompositionMessage’ shall constitute an appropriate format and technical means respectively within the meaning of Articles 9(3) and 10(4) of Regulation (EU) 2021/782 to grant digital access to information related to on-board services and facilities as part of information during the journey referred to in the Part II of Annex II to that Regulation and meeting corresponding obligations under Articles 9(2) and 10(5) of that Regulation.

(16) The ‘train composition messages’ shall include the information required to support the energy settlement process pursuant to Commission Regulation (EU) No 1301/2014[7] (‘ENE TSI’), as referred to in Appendix A. It shall include in particular the European vehicle number of the traction units that is part of that train and that is referred to as consumption point id of the on-board energy measurement systems pursuant to Commission Regulation (EU) No 1302/2014[8] (‘Loc&Pas TSI’), as referred to in Appendix A, and the total mass of the train. This information shall be part of the train composition message at departure time pursuant to paragraph (2), or at the latest 48 hours after departure in case of anomaly. The infrastructure manager shall share that data with relevant energy settlement systems pursuant to ENE TSI.

(17) Where the recipient of a ‘train composition message’ use the data contained in that message for the safety of operations in accordance with point 1.1, paragraphs (2) and (3), or where agreed with the data holder of that message, the recipient shall acknowledge its reception by sending a ‘ReceiptConfirmationMessage’ in accordance with the specifications referenced in Appendix C, index [1], to the original sender.

2.5.2. Train ready

(1) Where a railway undertaking responsible for the movement of a train is ready to timely access the network in accordance with the working timetable and associated allocated path, including when this path has been modified by the infrastructure manager upon request of this railway undertaking pursuant to point 2.3.1(8), the obligations laid down in this point shall be deemed to have been fulfilled.

(2) Where either Railway Mobile Radio (RMR) systems or ‘Start of mission’ procedure in ETCS L2 in accordance with the Annex to Commission Implementing Regulation

[7] Commission Regulation (EU) No 1301/2014 of 18 November 2014 on the technical specifications for interoperability relating to the energy subsystem of the rail system in the Union (OJ L 356, 12.12.2014, p. 179, ELI: http://data.europa.eu/eli/reg/2014/1301/oj).

[8] Commission Regulation (EU) No 1302/2014 of 18 November 2014 concerning a technical specification for interoperability relating to the rolling stock — locomotives and passenger rolling stock subsystem of the rail system in the European Union (OJ L 356, 12.12.2014, p. 228, ELI: http://data.europa.eu/eli/reg/2014/1302/oj).

(EU) 2023/1695[9] ('CCS TSI'), as referred to in Appendix A, are available as reported in the RINF and mandated for use by the infrastructure manager responsible for the network of departure through its network statement, the obligations laid down in point 2.5.2 shall be deemed to have been fulfilled.

(3) Where either Railway Mobile Radio (RMR) systems or 'Start of mission' procedure in ETCS L2 in accordance with the Annex to the CCS TSI, as referred to in Appendix A, are notified by the infrastructure manager responsible for the network of departure through the RINF as functions to be rolled out within 5 years after the milestone set out in Appendix G, alternatives means to the obligations laid down in points (6), (7) and (8) may be mandated for use by the infrastructure manager responsible for the network of departure through its network statement.

(4) Where a railway undertaking responsible for the movement of a train is ready to access the network following a delay compared to the working timetable and associated allocated path, it shall inform the infrastructure manager responsible for the network of departure in accordance with points (6), (7) and (8).

(5) Where a railway undertaking responsible for the movement of a train is ready to access the network in advance of the working timetable and associated allocated path, it may inform the infrastructure manager responsible for the network of departure in accordance with points (6), (7) and (8).

(6) The 'TrainReadyMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(7) Where a railway undertaking responsible for the movement of a train is to inform the infrastructure manager pursuant to OPE TSI, as referred to in Appendix A, about the status of that train in terms of its readiness to access the network, this railway undertaking shall send a 'TrainReadyMessage' before departure to the infrastructure manager responsible for the network of departure.

(8) Where the infrastructure manager receiving a 'TrainReadyMessage' pursuant to paragraph (4) uses the data contained in that message for the safety of operations in accordance with point 1.1, paragraph (3), or for energy settlement purposes, or where agreed with the sending undertaking, the infrastructure manager shall acknowledge receipt.

2.5.3. Train readiness forecast

(1) Where a railway undertaking is not ready to start a train according to the working timetable or its allocated path, including when this path has been modified by the infrastructure manager upon request of this railway undertaking pursuant to point 2.3.1(8), or is delayed due to any anomaly affecting that train or its operation having possible repercussions on the train's running prior to departure, it shall, in order to

[9] Commission Implementing Regulation (EU) 2023/1695 of 10 August 2023 on the technical specification for interoperability relating to the control-command and signalling subsystems of the rail system in the European Union and repealing Regulation (EU) 2016/919 (OJ L 222, 8.9.2023, p. 380, ELI: http://data.europa.eu/eli/reg_impl/2023/1695/oj)

provide forecast information about its readiness to access the network, send to the infrastructure manager responsible for the network of departure a 'TrainReadyMessage' bearing the status 'NotReady', including:

(a) an estimate of how long the delay will last via the elements 'TrainDelay' and 'TrainReadyTime';

(b) an assessment of its cause via the element 'DelayCause'

(2) A new 'TrainReadyMessage' shall be sent as soon as new or updated information is available.

(3) Where the infrastructure manager receiving a 'TrainReadyMessage' pursuant to paragraph (1) uses it for the safety of operations in accordance with point 1.1, paragraph (3), or where agreed with the sending undertaking, the infrastructure manager shall acknowledge receipt.

2.6. Reporting of train traffic data

2.6.1. General

(1) Whereas working timetable data reflects the paths allocated and confirmed pursuant to point 2.3, train traffic data, including information about train running and train forecast, contains the data necessary to dynamically update the working timetable.

(2) The following messages containing train traffic data, referred to hereafter as 'train traffic messages', shall be in accordance with the specifications referenced in Appendix C, index [1]:

(a) the 'TrainRunningInformationMessage' specified in point 2.6.3;

(b) the 'TrainRunningForecastMessage' specified in point 2.6.4;

(c) the 'TrainDelayCauseMessage' specified in point 2.6.5;

(d) the 'TrainRunningInterruptionMessage' specified in point 2.6.6.

(3) Infrastructure managers and operators of rail freight service facilities, solely in relation to the sections of each rail transport service operated on their network according to a path, and where relevant other data holders:

(a) shall grant access pursuant to Articles 4 and 5 to train traffic data based on the information contained in 'train traffic messages';

(b) unless not required by and bilaterally agreed with a railway undertaking, shall send 'train traffic messages' to railway undertakings in relation to the rail transport services they operate;;

(c) shall send 'train traffic messages' to other infrastructure managers in accordance with Article 4 in the case of a rail transport service subject to multi-network processes;

(d) may send 'train traffic messages' to other telematics stakeholders in accordance with Article 4, upon request of that stakeholder and where bilaterally agreed as a service.

In the cases referred to in Article 5(5), the subpoint (a) of this point shall not apply and subpoint (b) of this point shall be mandatory to apply.

(4) Where an infrastructure manager or an operator of rail freight service facilities grants access to train traffic data pursuant to Article 5, it shall consistently reuse the information contained in 'train traffic messages' and grant access to that data under conditions of the Creative Commons BY-SA 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

(5) Where the shunting and stabling of freight wagons is performed as single wagonload transport in a rail freight service facility, train traffic data shall be shared pursuant to Articles 4 and in accordance with point 3.2.1.

(6) Where freight wagons are operated as a block train in a rail freight service facility, the operator of that facility shall share train traffic data pursuant to Articles 4 and 5 based on 'train traffic messages' referred in point (2). For that purpose, a reference to the identifier of that train for the associated path departing from that facility shall be used. Where that facility is the final destination of that block train, the identifier of that train for the associated path arriving to that facility shall be used.

(7) 'Train traffic messages' shall constitute appropriate technical means within the meaning of Article 10(4) of Regulation (EU) 2021/782, of meeting the obligations under Article 10 of Regulation (EU) 2021/782, and of providing traffic and travel information of passenger rail transport services.

(8) Where an infrastructure manager or a passenger railway undertaking shares via national access points dynamic travel and traffic data in accordance with Article 5 of Commission Delegated Regulation (EU) 2017/1926, it shall consistently reuse the data contained in 'train traffic messages' and apply the specifications set out in point 4.9 (d).

2.6.2. Reporting points

Messages containing train traffic data, shall be sent at least at the following reporting points, and at any other point where the train is passing through, as agreed between the infrastructure manager or the operator of rail freight service facilities, and the railway undertaking or the intermodal transport operator in relation to a train:

(a) departure points;

(b) points where responsibility for capacity management or traffic management changes between consecutive infrastructure managers or allocation bodies, or between infrastructure managers and operators of rail freight service facilities ('point of handover');

(c) points where responsibility for the operation of a train changes between consecutive railway undertakings, intermodal transport operators, or any combination between them ('point of interchange');

(d) points where the train arrives at and departs from rail passenger stations and rail freight service facilities and any other intermediary stops scheduled;

(e) destination points.

2.6.3. Train running information

(1) The 'TrainRunningInformationMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) To report about the train position in real time pursuant to OPE TSI, as referred to in Appendix A, the infrastructure manager or the operator of rail freight service facilities shall send a 'TrainRunningInformationMessage' upon departure from and arrival of a train at reporting points.

2.6.4. Train forecast information

(1) The 'TrainRunningForecastMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) To provide information about deviations from scheduled dates and times whenever they occur pursuant to OPE TSI, as referred to in Appendix A, and therefore to provide an estimate of the date and time of departure or arrival of a train from or at a reporting point, the infrastructure manager or operator of rail freight service facilities shall send a 'TrainRunningForecastMessage'.

(3) For delays at departure point or additional delays between two reporting points that are estimated to last more than 15 minutes for freight trains or more than 5 minutes for passenger trains, or as otherwise required by the performance monitoring regime pursuant to OPE TSI, as referred to in Appendix A, a new 'TrainRunningForecastMessage' shall be sent.

(4) 'TrainRunningForecastMessage' shall make it possible to gauge, *ex post*, the accuracy of the estimate made by means of this forecast and shall include its expected accuracy in accordance with the methodology set out in Appendix E.

2.6.5. Train delay cause

(1) The 'TrainDelayCauseMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) As soon as the cause of delay is known, including in the case of a first assumption, and where there is an update on the cause of delay, the infrastructure manager or the operator of rail freight service facilities shall send a 'TrainDelay CauseMessage' to provide information about deviations from scheduled times pursuant to OPE TSI, as referred to in Appendix A, whenever they occur for that train.

2.6.6. Service disruption information

(1) The 'TrainRunningInterruptionMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) To provide information about disruption to a rail transport service ('service disruption') due to an unplanned stop, and describing this disruption and its location pursuant to OPE TSI, as referred to in Appendix A, the infrastructure manager or operator of rail freight service facilities shall send the following messages:

(a) where the length of the delay is not known: a 'TrainRunningInterruptionMessage;

(b) where the length of the delay is known:

(i) a ‘TrainRunningForecastMessage’ in accordance with point 2.6.4;

(ii) a ‘TrainDelayCauseMessage’ in accordance with point 2.6.5.

(3) To provide information about service disruption arising from the operation of a train, the railway undertaking responsible for that train shall send the messages referred to in point (2) (a) and (b) to the infrastructure manager or operator of rail freight service facilities responsible for the network where the service disruption occurred. Where relevant, the receiving infrastructure manager or operator of rail freight service facilities shall send updated information in accordance with point 2.6.1.

2.6.7. Path modification in operation

(1) In the event of modifications to a path beyond the threshold referred to in point 2.3.1(8), the infrastructure managers or operators of rail freight service facilities responsible for this path shall notify the railway undertakings concerned about the intended modifications of that path on their respective network.

(2) Without prejudice to point (3), aspects relating to the interoperability of data sharing in relation to the information referred to in point (1) are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B.

(3) If the agreed continuation of a passenger rail transport service involves the rerouting via a different route, its partial cancellation, or the removal or addition of intermediate stops, the infrastructure manager responsible for that rail transport service shall send a ‘PathDetailsMessage’, as referred to in point 2.3.3, containing information relating to the path section modification in accordance with point 2.6.1.

2.7. Historic record of train related data

To record data pertaining to the running of both passenger and freight trains pursuant to OPE TSI, as referred to in Appendix A, after train arrival at destination, each infrastructure manager and each operator of rail freight service facilities shall grant access to an historic record of the following data pursuant to Articles 4 and 5 via a common Union web user interface (‘web UI’), at the latest from 24 hours and for at least 12 months:

(a) working timetable, as referred to in point 2.3.10

(b) reference train identifier as referred to in point 2.1.2;

(c) for passenger trains only: passenger train identification number of the train as the ‘RetailServiceId’ in combination with the reference train identifier referred to in point 2.1.2;

(d) reporting locations and associated train status, as part of train running information referred to in point 2.6.3;

(e) actual running date and time, as part of train running information referred to in point 2.6.3;

(f) delay and cause of delay, if any, as part of train running information and train delay cause information referred to in points 2.6.3 and 2.6.5 respectively;

(g) train composition, as referred to in point 2.5.1, that for freight rail transport services shall be limited to:

(i) the European vehicle number of all vehicles in the train;

(ii) the position of all vehicles in the train;

(iii) in the case of intermodal transport, the type of the intermodal loading units and their identifier.

2.8. Data sharing with other stakeholders

Infrastructure managers, operators of rail freight service facilities and railway undertakings shall share data in accordance with Article 4 and the requirements laid down in Section 2 of this Annex with other telematics stakeholders responsible for managing connections with other modes of transport.

3. MANAGEMENT OF FREIGHT WAGONS AND THEIR LOAD

The provisions of this Section lay down the requirements for interoperable data sharing required to carry out the processes referred to in Article 2(1), point (b).

3.1. Electronic rail freight transport information

3.1.1. Electronic consignment note ('eCN')

(1) The 'ConsignmentNoteMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) A consignment note exchanged electronically by means of a 'ConsignmentNoteMessage' signed using means that comply with the requirements for qualified electronic seals in accordance with Regulation (EU) No 910/2014 of the European Parliament and of the Council[10] shall be considered as an electronic record of data, that is an electronic consignment note ('eCN'), equivalent to a paper-based consignment note.

(3) The electronic consignment note shall be exchanged as follows:

(a) based on consignment information provided by the freight customer to the lead railway undertaking as single point of contact, the lead railway undertaking shall send a 'ConsignmentNoteMessage' to all railway undertakings involved in the rail transport service,

[10] Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC (OJ L 257, 28.8.2014, p. 73, ELI: http://data.europa.eu/eli/reg/2014/910/oj).

(b) the lead railway undertaking may share the information contained in the 'ConsignmentNoteMessage' with the relevant telematics stakeholders pursuant to Article 4.

(4) An electronic consignment note sent pursuant to point (3) is considered sufficient for the recipients to be able to perform their parts of the contract of carriage until arrival at destination or interchange with the next stakeholder.

(5) Where the lead railway undertaking sends data to the competent authorities pursuant to Article 4 of Regulation (EU) 2020/1056 of the European Parliament and of the Council[11], it shall consistently reuse the data contained in the 'ConsignmentNoteMessage' referred to in this point, and where relevant in the 'TrainCompositionMessage' referred to in point 2.5.1.

3.1.2. Reservation, payment and invoicing systems for freight rail transport services

Aspects relating to the interoperability of data sharing and associated systems for the reservation, payment and invoicing of freight rail transport services, including services based on intermodal oriented timetable integrating buffer times and milestones in multi-modal freight terminals, are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B.

3.2. Movements of freight wagons and their load

(1) Railway undertakings involved in the same freight rail transport service operated as single wagonload transport shall mutually exchange information and individually ensure the monitoring of the location and status of the freight wagons, or set of freight wagons, for which they are responsible for the data relating to the movements of freight wagons and their load set out in points 3.2.1 to 3.2.3.

(2) The lead railway undertaking shall have an overview of the current location and status of the freight wagons or set of freight wagons, and their load, using the information provided by the railway undertakings involved in the same freight rail transport service operated as single wagonload transport.

(3) The current location and status of the load, intermodal loading units in particular, shall be monitored based on the location and status of the freight wagons onto which the load is positioned.

(4) Freight railway undertakings may contribute to the development of common Union web UIs referred to in Article 14(6) and Article 21 for granting access to data relating to the movements of freight wagons and their load. Where a group of freight railway undertakings jointly provide for use such common Union web UIs, that application shall grant access to data relating to the movements of freight wagons and their load to relevant telematics stakeholders pursuant to Article 4 and for use of

[11] Regulation (EU) 2020/1056 of the European Parliament and of the Council of 15 July 2020 on electronic freight transport information (OJ L 249, 31.7.2020, p. 33, ELI: http://data.europa.eu/eli/reg/2020/1056/oj).

that data under the conditions of the Creative Commons BY-NC-SA 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

3.2.1. Wagon running information

3.2.1.1. Geo-localisation of freight wagons

(1) Where geo-localisation devices are fitted on freight wagons, the data holder of geo-localisation based positioning data shall grant access to that data to other telematics stakeholders using these freight wagons, or where relevant other telematics stakeholders, pursuant to Article 4.

(2) Aspects relating to the interoperability of data sharing in relation to the geo-localisation-based positioning of freight wagons are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

3.2.1.2. Wagon status

(1) The 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) For telematics stakeholders involved in a freight rail transport service operated as single wagonload transport to have continuous knowledge of the current location and status of freight wagons:

(a) the railway undertaking responsible for the movement of a freight wagon or set of freight wagons shall send a 'WagonStatusMessage' to the lead railway undertaking;

(b) the lead railway undertaking shall send a 'WagonStatusMessage', upon request, to other relevant telematics stakeholders pursuant to Article 4, in particular to the other railway undertakings involved in that freight rail transport service operated as single wagonload transport.

(3) Where a telematics stakeholder sends a 'WagonStatusMessage', it shall specify to which event type that message relates to in accordance with points 3.2.1.3 to 3.2.1.13.

(4) Unless a common wagon and intermodal loading unit operation database in accordance with point 3.3.3 is available, or common Union web UIs referred in point 1.7.2 have been used, 'WagonStatusMessage' shall be exchanged bilaterally pursuant to Article 4 via a telematics application referred to in Article 14 and point 1.7.

(5) To have continuous knowledge of the current location and status of freight wagons in a freight rail transport service not operated as single wagonload transport, telematics stakeholders involved in that transport service may voluntarily apply the requirements set out in points 3.2.1.2 to 3.2.1.13 based on contractual provisions.

3.2.1.3. Wagon ready for movement

(1) The event type 'Wagon Ready To Pull' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where the loader or where relevant the filler of a freight wagon, both of which are defined in Article 3 of Directive (EU) 2016/798, have informed the lead railway undertaking that their load, if any, is ready for movement without prejudice to the role of the railway undertaking as referred to in the Article 4 of Directive (EU) 2016/798, and therefore that the freight wagon can be pulled or pushed from a specified loading or unloading location, the lead railway undertaking shall, without jeopardising the safety of the load in accordance with OPE TSI, as referred to in Appendix A to this Annex, send a 'WagonStatusMessage', with the event type 'Wagon Ready To Pull' in accordance with point 3.2.1.2 (2) of this Annex, to the outbound railway undertaking expected to pull or push that freight wagon from this location.

(3) In the case of intermodal transport, where an operator of rail freight service facilities is responsible for loading or unloading a set of freight wagons, it shall send to the lead railway undertaking a 'TrainRunningInformationMessage' referred to in point 2.6.1, subpoint (6), and in point 2.6.3, containing the location and status of the train, and confirming the train closure, that is to say that the loaded or unloaded set of freight wagons parked at the reporting point is ready for movement without jeopardising the safety of the load in accordance with OPE TSI.

(4) In other cases, aspects relating to the interoperability of data sharing in relation to the readiness of the load for movement between the loader or the filler of a freight wagon that is part of a single wagonload transport, one the one hand, and the lead railway undertaking, one the other hand, are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

3.2.1.4. Wagon pulled

(1) The event type 'Wagon Pulled' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a freight wagon has been pulled or pushed from a specified loading or unloading location, the outbound railway undertaking responsible for that freight wagon shall send a 'WagonStatusMessage' with the event type 'Wagon Pulled', in accordance with point 3.2.1.2 (2).

3.2.1.5. Wagon departure from origin

(1) The event type 'Wagon Left Origin' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a freight wagon has left with a train a rail freight service facility of origin, the outbound railway undertaking responsible for that train shall send a 'WagonStatusMessage' with the event type 'Wagon Left Origin', in accordance with point 3.2.1.2 (2).

3.2.1.6. Wagon arrival at intermediate location

(1) The event type 'Wagon Arrival' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a freight wagon arrived at a specified intermediate location with a train, the railway undertaking of arrival responsible for that train shall send a 'WagonStatusMessage' with the event type 'Wagon Arrival', in accordance with point 3.2.1.2 (2).

3.2.1.7. Wagon departure from intermediate location

(1) The event type 'Wagon Departure' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a freight wagon left a specified intermediate location with a train, the outbound railway undertaking responsible for that train shall send a 'WagonStatusMessage' with the event type 'Wagon Departure', in accordance with point 3.2.1.2 (2).

3.2.1.8. Wagon handed over

(1) The event type 'Wagon Handed Over' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where the responsibility for a freight wagon's movement has changed between successive railway undertakings and where the freight wagon has been physically handed over by the railway undertaking of arrival to the next undertaking at a specified point of interchange, the railway undertaking of arrival shall send a 'WagonStatusMessage' with the event type 'Wagon Handed Over', in accordance with point 3.2.1.2 (2).

3.2.1.9. Wagon taken over

(1) The event type 'Wagon Taken Over' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where the responsibility for a freight wagon's movement has changed between successive undertakings and where the freight wagon has been physically taken over by the railway undertaking of departure from the previous railway undertaking at a specified point of interchange, the railway undertaking of departure shall send a 'WagonStatusMessage' with the event type 'Wagon Taken Over', in accordance with point 3.2.1.2(2).

3.2.1.10. Wagon irregularity

(1) The event type 'WagonJourneyIrregularity' of the 'WagonStatusMessage' shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where an irregular event relating to the freight wagon or its load requires an action to be taken that may interrupt its transportation, the railway undertaking responsible for that freight wagon shall send a 'WagonStatusMessage' with the event type 'WagonJourneyIrregularity', in accordance with point 3.2.1.2 (2), to provide information on the event including further details about the nature of the irregularity and its consequences.

3.2.1.11. Wagon irregularity rectified

(1) The event type ‘Wagon Journey Rectified’ of the ‘WagonStatusMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a freight wagon journey irregularity has been rectified, the railway undertaking responsible for that freight wagon shall send a ‘WagonStatusMessage’ with the event type ‘Wagon Journey Rectified’, in accordance with point 3.2.1.2 (2).

3.2.1.12. Wagon arrival at destination

(1) The event type ‘Wagon Reached Destination’ of the ‘WagonStatusMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a freight wagon arrived with a train at a rail freight service facility of destination, the railway undertaking of arrival responsible for that train shall send a ‘WagonStatusMessage’ with the event type ‘Wagon Reached Destination’, in accordance with point 3.2.1.2(2).

3.2.1.13. Wagon delivered

(1) The event type ‘Wagon Delivered’ of the ‘WagonStatusMessage’ shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) Where a freight wagon has been delivered to the loading or unloading location, the railway undertaking of arrival responsible for this freight wagon or set of freight wagons shall send a ‘WagonStatusMessage’ with the event type ‘Wagon Delivered’, in accordance with point 3.2.1.2 (2).

3.2.2. Intermodal loading unit movement

Aspects relating to the interoperability of data sharing in relation to the movement of intermodal loading units are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

3.2.3. Wagon forecast information

(1) The wagon forecast message (‘AlertMessage’) shall be in accordance with the specifications referenced in Appendix C, index [1].

(2) To provide other telematics stakeholders involved in a rail transport service operated as single wagonload transport with wagon forecast information, either confirming agreed timings or notifying any changes, each railway undertaking shall send, as part of the ‘AlertMessage’, the wagon forecast information at destination (‘ActualETA’) or the wagon forecast information at point of interchange (‘ActualETI’) to:

(a) the lead railway undertaking;

(b) the next railway undertaking, if any, to which the freight wagon will be handed over at point of interchange.

(3) Each railway undertaking, shall monitor the physical transport of a load and, no later than the time of departure from the origin, or from the last point of interchange, shall

calculate wagon forecast information relating to the following event types and reporting points:

(a) at the next point of interchange: ‘wagon handed over’ specified in point 3.2.1.8;

(b) at destination: ‘wagon delivered’ specified in point 3.2.1.13.

(4) Each railways undertaking shall calculate and update wagon forecast information based at least on the following information:

(a) the information contained in the following messages received from infrastructure managers and operators of rail freight service facilities:

(i) the ‘PathDetailsMessage’ specified in point 2.3.3;

(ii) the ‘TrainRunningInformationMessage’ specified in point 2.6.3;

(iii) the ‘TrainRunningForecastMessage’ specified in point 2.6.4;

(b) the information contained in ‘ActualETA’ or ‘ActualETI’ received from the previous railway undertaking, if any, from which freight wagons were taken over at a point of interchange.

(5) Where a railway undertaking shares or grants access to wagon forecast information, it shall ensure that the quality of this information is sufficient for the lead railway undertaking to assess its accuracy in accordance with point 1.5 and the *ex post* measurement methodology set out in Appendix E.

(6) The lead railway undertaking shall compare the wagon forecast information based on ‘ActualETA’ received from a railway undertaking with the timings agreed with the freight customers (‘CommitmentETA’), and inform the railway undertakings involved (‘AlertMessage’).

3.3. Freight-specific reference data

3.3.1. General

(1) To support train preparation in accordance with point 2.5 and freight wagon operation in accordance with point 3.2.1, each vehicle keeper shall ensure rolling stock reference data sharing through standardised and federated rolling stock reference databases as referred to in point 3.3.2.

(2) To support the operation of intermodal transport in accordance with point 3.2.2:

(a) each keeper of intermodal loading units (‘ILUs’) shall ensure ILU reference data sharing through standardised and federated ILU reference databases as referred to in point 3.3.3;

(b) each keeper of freight wagons and each keeper of ILUs may ensure data sharing of the operational status of their freight wagons and ILUs through the standardised and federated freight wagon and ILU operation databases, respectively, as referred to in point 3.3.4.

(3) Telematics stakeholders responsible for freight-specific reference data pursuant to points (1) and (2) shall manage their reference data in accordance with Articles 8(4) and 10 and grant access to them for use under the conditions of the Creative Commons BY-ND 4.0 licence or any other equivalent or less restrictive open licence.

3.3.2. Rolling stock reference databases

(1) Under the coordination of the Agency, vehicle keepers shall cooperate to set up, manage and maintain standardised and federated rolling stock reference databases ('RSRDs') at Union level in accordance with the specifications referenced in Appendix C, index [103].

(2) Vehicle keepers are responsible for populating and maintaining rolling stock reference data in an RSRD in accordance with the specifications referenced in Appendix C, index [103], and shall ensure data quality. To that end, vehicle keepers shall ensure that data shared are up to date and reflect accurately the status of the processes that the vehicle shall undergo in accordance with the applicable legislation.

(3) For the purpose of point (1), vehicle keepers shall reuse in the RSRD any rolling stock reference data from the following registers:

(a) the European Vehicle Register (EVR) set up by the Agency in accordance with Article 47 of Directive (EU) 2016/797 and Commission Implementing Decision (EU) 2018/1614[12], in particular 'administrative data' referred to in point (5)(a) of this section and 'design data' referred to in point (5) (b) of this section;

(b) the European register of authorised types of vehicles (ERATV) set up in accordance with Article 48 of Directive (EU) 2016/797 and Commission Implementing Decision 2011/665/EU[13], in particular 'design data' referred to in point (5)(b) of this section.

(4) To minimise the volume of data shared for operational purposes and to increase the efficiency of freight wagon operations referred to in point 3.3.1, vehicle keepers shall ensure that RSRDs make the rolling stock reference data easily and fairly accessible to telematics stakeholders pursuant to Article 4 and under the conditions of the Creative Commons BY-ND 4.0 licence or any other equivalent or less restrictive open licence.

(5) Reference data shared in a RSRD shall be grouped as follows:

(a) administrative data:

Vehicle reference data referred to in point (3) (a) of this point, relating to the authorisation of the vehicle and its registration in accordance with Articles 21 and 22 of Directive (EU) 2016/797;

(b) design data:

---

[12] Commission Implementing Decision (EU) 2018/1614 of 25 October 2018 laying down specifications for the vehicle registers referred to in Article 47 of Directive (EU) 2016/797 of the European Parliament and of the Council and amending and repealing Commission Decision 2007/756/EC (OJ L 268, 26.10.2018, p. 53, ELI: http://data.europa.eu/eli/dec_impl/2018/1614/oj).

[13] Commission Implementing Decision 2011/665/EU of 4 October 2011 on the European register of authorised types of railway vehicles (OJ L 264, 8.10.2011, p. 32, ELI: http://data.europa.eu/eli/dec_impl/2011/665/oj).

Vehicle reference data specified in points (3) (a) and (3) (b) relating to the technical characteristics of the rolling stock, especially data required by railway undertakings for the management of capacity and traffic in relation to their trains in accordance with Section 2, and for the management of freight wagons in accordance with Section 3.

3.3.3. Intermodal loading unit reference databases

(1) Under the coordination of the Agency, keepers of intermodal loading units ('ILU keepers') shall cooperate to set up, manage and maintain standardised and federated reference databases for intermodal loading units (ILUs) in accordance with points (3), (4) and (5) and the specifications referenced in Appendix C, indexes [103] and [1].

(2) ILU keepers shall be responsible for populating and maintaining quality data in the databases referred to in point (1). To that end, ILU keepers shall ensure that data shared are up to date and reflect accurately the status of the processes that the ILU undergoes in accordance with the applicable legislation.

(3) Reference data shall be made public through the databases referred to in point (1) and shall include the following data:

(a) the identifier of ILUs, including all types of semi-trailers, in accordance with the specifications referenced in Appendix C, index [2];

(b) the ILU type (container, swap body or semi-trailer) and its compatibility with freight wagons and routes in accordance with the specifications referenced in Appendix C, index [2];

(c) relevant load characteristics, weights and dimensions.

(4) To minimise the volume of data shared for operational purposes and to increase the efficiency of ILU movements referred to in point 3.2.2, ILU keepers shall ensure that the databases referred to in point (1) make the ILU reference data easily and fairly accessible to telematics stakeholders pursuant to Article 4 and under the conditions of the Creative Commons BY-ND 4.0 licence or any other equivalent or less restrictive open licence.

(5) Reference data shared in accordance with point (3) shall be grouped as follows:

(a) administrative data:

ILU reference data relating to the certification of ILUs and their registration in accordance with the technical specifications referenced in Appendix C, index [2];

(b) design data:

ILU reference data relating to the technical characteristics of ILUs, in particular data required by operators of rail freight service facilities and railway undertakings for train preparation in accordance with point 2.5 and ILU movements in accordance with point 3.2.2.

3.3.4. Wagon and intermodal loading unit operational databases

3.3.4.1. General

(1) To ensure the tracking of train movement in accordance with point 2.6 and of freight wagon and intermodal loading unit (ILU) movement in accordance with point 3.2 and associated communications between the lead railway undertaking and other railway undertakings involved, the railway undertaking may break the train movement data shared with infrastructure managers and operators of rail freight service facilities involved and the lead railway undertaking in accordance with point 2.6 down into freight wagon movement data in accordance with point 3.2.1 and data relating to the movement of ILUs in accordance with point 3.2.2. In such cases, these data shall be shared in accordance with points (4) to (8) of this point.

(2) Operational communications between the lead railway undertaking and other railway undertaking involved shall be based on reference data shared through:

(a) the rolling stock reference databases referred to in point 3.3.2 of this Annex, in particular vehicle numbers as registered in the European Vehicle Register (EVR) in accordance with Implementing Decision (EU) 2018/1614;

(b) the ILU reference databases referred to in point 3.3.3 of this Annex, in particular ILU numbers in accordance with point 3.3.3 (3) (a) of this Annex.

(3) Train traffic data shared in accordance with point 2.6 by railway undertakings shall also be based on, when available, the operational status data of freight wagons referred to in point 3.3.4.

(4) To minimise the volume of data shared for operational purposes and for freight customer information and to increase the efficiency of the management of freight wagons and ILUs as referred to in point 3.2, each railway undertaking may cooperate to set up, manage, and maintain standardised and federated wagon and intermodal loading unit operational ('WIMO') reference databases in accordance with the specifications referenced in Appendix C, index [102].

(5) The WIMO databases shall make the operational status data of freight wagons and ILUs referred to in point 3.3.4 easily and fairly accessible to all telematics stakeholders pursuant to the Article 4(1), including vehicle keepers and fleet managers, and to the freight customers that are referred to in the contract of carriage. Corresponding data sharing shall be achieved through a telematics application in accordance with Article 14 and point 1.7.

(6) Each railway undertaking shall be responsible for populating and maintaining quality data about freight wagon status in WIMO databases. To that end, each railway undertaking shall ensure that data shared are up to date and reflect accurately the status of the processes that freight wagons and ILUs undergo pursuant to applicable legislation.

(7) The WIMO databases shall contain real-time data relating to the movement of a freight wagon or an ILU from departure until its final delivery at freight customer sidings. The data shall include wagon running information referred to in point 3.2.1 and wagon forecast information referred to in point 3.2.3.

(8) Train traffic data, wagon running and forecast information, and information relating to the movement of ILUs, shall be shared through the WIMO databases by railway undertakings at the latest at the release time of the freight wagon or the ILU by the freight customer that is referred to in the contract of carriage. The release time is the

first entry shared by the railway undertaking of departure at the rail freight service facility of origin (the ‘outbound railway undertaking’) in the WIMO databases for the movement of a freight wagon or an ILU for an identified freight rail transport service.

3.3.4.2. Loading of the freight wagon

The outbound railway undertaking shall register the status ‘loading of the freight wagon’ and grant access to it in the WIMO databases. It shall apply this status until the termination of the loading is notified to it by the freight customer that is referred to in the contract of carriage.

3.3.4.3. Loaded freight wagon on journey

The outbound railway undertaking shall register the status ‘loaded freight wagon on journey’ and grant access to it in the WIMO databases upon departure from origin, in accordance with point 3.2.1.5, of a freight wagon that is loaded.

3.3.4.4. Empty freight wagon on journey

The outbound railway undertaking shall register the status ‘empty freight wagon on journey’ and grant access to it in the WIMO databases upon departure from origin, in accordance with point 3.2.1.5, of a freight wagon that is empty.

3.3.4.5. Unloading of the freight wagon

The railway undertaking of arrival at a rail freight service facility of destination (the ‘inbound railway undertaking’) shall register the status ‘unloading of the freight wagon’ and grant access to it in the WIMO databases. It shall apply this status until the termination of the unloading is notified to it by the freight customer that is referred to in the contract of carriage.

3.3.4.6. Empty freight wagon under fleet management control

The inbound railway undertaking shall register the status ‘empty freight wagon under fleet management control’ in the WIMO databases to reflect the availability of an empty freight wagon with specified characteristics.

3.4. Data sharing with other stakeholders

Infrastructure managers, operators of rail freight service facilities and railway undertakings shall share data with other telematics stakeholders responsible for managing connections with other modes of transport in accordance with Article 4 and the requirements laid down in Section 3.

4. RAIL TICKETING IN RELATION TO PASSENGER RAIL TRANSPORT SERVICES AND RAIL PASSENGER TRAVEL INFORMATION

4.1. General

(1) The provisions of Section 4 lay down the requirements for interoperable data sharing required to carry out the processes referred to in Article 2(1), point (c), for any passenger rail transport service operated in the Union.

(2) Rights to access rail ticketing data are laid down in Articles 4 and 6.

(3) Rail ticketing data shall consist of the following:

(a) passenger timetable data specified in point 4.2;

(b) tariff data shared specified in point 4.3;

(c) data relating to conditions of carriage specified in point 4.4.

4.2. Passenger timetable data

4.2.1. Passenger timetable data

The provisions of this point apply to all passenger rail transport services.

(1) Passenger timetable data shared pursuant to Article 6(1) shall comply with the specifications referenced in Appendix C, indexes [P.2] and [P.4].

(2) The passenger timetable data shall contain at least the following information:

(a) basic principles of train variants;

(b) passenger train identification number of a train as the 'RetailServiceId' in combination with the reference train identifier referred to in points 2.1.2 to 2.1.5;

(c) different possible ways of representing days of operation;

(d) train type, brand name and, where different than rail, the associated mode of transport;

(e) rail transport service relationships;

(f) coach groups attached to trains;

(g) train joining to and splitting from;

(h) through connections with a different train identifier connected ('connecting to');

(i) through connections with change of train identifier ('change of service number');

(j) details of rail transport services, including public time of arrival, public time of departure and public passing times;

(k) stops with passenger boarding or alighting restrictions;

(l) overnight trains;

(m) crossing of time zones;

(n) pricing regime and reservation details;

(o) organisation identifier of the data holder specified in point 1.2.1;

(p) service facilities as defined in Article 3, point (11), of Directive (EU) 2012/34;

(q) accessibility of the train in accordance with point 4.4.3.1, including scheduled existence of priority seats, wheelchair spaces, universal sleeping compartments;

(r) service extras;

(s) connection times between passenger transport services specified in point 4.2.2;

(t) station list;

(u) existing direct, and indirect where known, online sales channels of distributors where live availability of rail products can be checked.

(3) Each railway undertaking, or where relevant the data holder, shall grant access to all its passenger timetable data in accordance with Article 6(1) for use under the conditions of the Creative Commons BY-NC-ND 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

(4) No later than one week after the final working timetable of a passenger rail transport service has been published by the infrastructure managers concerned, each railway undertaking concerned, or where relevant the data holder, shall grant access to the annual passenger timetable data of that service in accordance with Article 6(1).

(5) No later than three weeks before an update to the annual passenger timetable of a passenger rail transport service takes effect, each railway undertaking concerned, or where relevant the data holder, shall update the annual passenger timetable data in relation to that service in accordance with Article 6(1). The annual passenger timetable data of that service shall also be updated where it is impacted by the discontinuation of passenger rail transport services pursuant to Article 8 of Regulation (EU) 2021/782. A railway undertaking, or where relevant the data holder, may under exceptional circumstances apply emergency updates within shorter deadlines to its annual passenger timetable of a passenger rail transport service.

(6) Each railway undertaking, or where relevant the data holder, shall grant access to passenger timetable data in accordance with Article 6(1) for at least 12 months after arrival of corresponding passenger rail transport service.

(7) Where a direct passenger rail transport service, with or without intermediate station stops, is operated or intended to be operated by several railway undertakings, the lead railway undertaking designated pursuant to Article 13 shall coordinate with all other railway undertakings operating that service to aggregate passenger timetable data for all stops served by that service. For each individual part of a passenger rail transport service operated by a single railway undertaking, this undertaking shall remain responsible for granting access pursuant to Article 6 to the data aggregated by the lead railway undertaking.

(8) Passenger timetable data shared pursuant to Article 6(1) shall constitute:

(a) an appropriate format and technical means respectively within the meaning of Articles 9(3) and 10(4) of Regulation (EU) 2021/782 to grant digital access to time schedules as part of pre-journey information referred to in the Part I of Annex II to that Regulation and meeting corresponding obligations under Articles 9(1) and 10(5) of that Regulation;

(b) a digital machine-readable format within the meaning of Article 4(1), point (b), of Commission Delegated Regulation (EU) 2017/1926 to grant access digitally to timetables and planned interchanges referred to in the point 1.1(d), subpoints (v) and (vi), of the Annex to that Regulation as part of static travel data.

4.2.2. Passenger timetable data of connection times

(1) Passenger timetable data of connection times shared pursuant to Article 6(2) shall comply with the specifications referenced in Appendix C, indexes [P.2] and [P.4].

(2) The passenger timetable data of connection times shall contain at least the following information:

(a) connection times in the station (the 'default minimum connection time');

(b) connection times between different locations in the station (e.g. parts of the station, platforms), if appropriate;

(c) connection times between the station and stations in the neighbourhood, if appropriate.

(3) Each station manager, or where relevant the data holder, shall grant access to passenger timetable data of connection times in accordance with Article 6(2) for use under the conditions of the Creative Commons BY-NC-ND 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

(4) No later than one week after the final working timetable of a passenger rail transport service has been published by the infrastructure managers concerned, each station manager concerned, or where relevant the infrastructure manager or the data holder, shall grant access in accordance with Article 6(2) to the connection times that are applicable to that service for the upcoming annual passenger timetable.

(5) No later than three weeks before an update to the annual passenger timetable connection times takes effect, station managers, or where relevant infrastructure managers or data holders, responsible for those changes shall update the corresponding passenger timetable data in accordance with Article 6(2). A station manager, or where relevant an infrastructure manager or the data holder, may exceptionally apply emergency updates within shorter deadlines.

(6) Each station manager concerned, or where relevant the infrastructure manager or the data holder, shall grant access in accordance with Article 6(2) to data relating to its passenger timetable of connection times for at least 12 months after the end of validity of that data.

(7) Where a station manager, a railway undertaking, a distributor or a retailer combine or connect two or more passenger rail transport services, they shall use the connection times published in accordance with Article 6(2) and in accordance with points 4.2.2.2 and 4.2.2.3.

(8) Passenger timetable data of connection times shared pursuant to Article 6(2) shall constitute a digital machine-readable format within the meaning of Article 4(1), point (b), of Commission Delegated Regulation (EU) 2017/1926 to grant access digitally to default transfer times at interchanges referred to in the point 1.1 (d), subpoints (i) and (ii) of the Annex to that Regulation as part of static travel data.

4.2.2.1. Minimum connection times

(1) Stations managers shall establish in accordance with the following table the minimum connection times pursuant to Article 15 considering the public arrival time of the inbound passenger transport service and the public departure time of the outbound passenger transport service, including the additional time that may be required for the check-in of passengers, bicycles, or luggage:

	Minimum connection time	Party responsible	Mandatory / optional
Within one station	Default minimum connection time in a station.	Station manager, or where relevant infrastructure manager	Mandatory
	Minimum connection time for a specific type of passenger transport service operated by a specific undertaking.		Optional
	Minimum connection time for a specific type of passenger transport service, regardless of the undertaking operating that type of service.		Optional
	Minimum connection time for a specific undertaking, regardless of the type of passenger transport service.		Optional
Between two stations	Default minimum connection time between two stations.	Station managers, or where relevant infrastructure managers, that are involved	Mandatory for stations belonging to the same meta station
	Minimum connection time for a specific type of passenger transport service operated by a specific undertaking.		Optional
	Minimum connection time for a specific type of passenger transport service, regardless of the undertaking operating that type of service.		Optional
	Minimum connection time for a specific undertaking, regardless of the type of passenger transport service.		Optional

(2) For stations with a single platform that are not served by any scheduled passenger transport services other than rail, the minimum connection time in that station shall correspond to the duration of train stops in that station or be null.

4.2.2.2. Connection times within one station

Connection times applicable within a single station shall be used as follows:

(a) where a minimum connection time is established for a specific pair of outbound and inbound passenger transport services, it shall be applied by station managers, railway undertakings, distributors and retailers as the minimum connection time between those services;

(b) where a minimum connection time is established between the outbound passenger transport services of a specific undertaking in relation to a specific type of service or

brand name and the inbound passenger transport services of a specific undertaking in relation to a specific type of service or brand name, it shall be applied by station managers, railway undertakings, distributors and retailers as the minimum connection time between those specific services;

(c) where a minimum connection time is established between the outbound passenger transport services of a specific type of service or brand name and the inbound passenger transport services of a specific type of service or brand name, regardless of the operating undertakings involved, it shall be applied by station managers, railway undertakings, distributors and retailers as the minimum connection time between those specific types of services;

(d) where a minimum connection time is established between a specific outbound undertaking and a specific inbound undertaking, regardless of the type of service or brand name of the passenger transport services involved, it shall be applied by station managers, railway undertakings, distributors and retailers as the minimum connection time between the passenger transport services of those specific undertakings;

(e) where none of the conditions set out in points (a) to (d) are met, the default minimum connection time specified for that station shall be applied by station managers, railway undertakings, distributors and retailers.

4.2.2.3. Connection times between two stations

Connection times applicable between two stations shall be used as follows:

(a) where a minimum connection time is established between a specific outbound undertaking in relation to a specific type of passenger transport service or brand name and a specific inbound undertaking in relation to a specific type of passenger transport service or brand name, it shall be applied by station managers, railway undertakings, distributors and retailers as the minimum connection time between those specific services;

(b) where a minimum connection time is established between the outbound passenger transport services of a specific type of service or brand name and the inbound passenger transport services of a specific type of service or brand name, regardless of the operating undertakings involved, it shall be applied by station managers, railway undertakings, distributors and retailers as the minimum connection time between those specific types of services;

(c) where a minimum connection time is established between a specific outbound undertaking and a specific inbound undertaking, regardless of the type or brand name of the passenger transport services involved, it shall be applied by station managers, railway undertakings, distributors and retailers as minimum connection time between the passenger transport services of those specific undertakings;

(d) where a default minimum connection time is established between two stations, it shall be applied by station managers, railway undertakings, distributors and retailers as the minimum connection time between those stations;

(e) where none of the conditions set out in points (a) to (d) are met, no minimum connection time may be applied.

4.2.2.4. Calculation of connection time

Aspects relating to the interoperability of the calculation of the following aspects are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex:

(1) connection time for passengers;

(2) connection time adapted to persons with disabilities and persons with reduced mobility;

(3) connection time adapted for passengers transporting a bicycle;

(4) additional time for the check-in of passengers, bicycles or luggage.

4.3. Tariff data

4.3.1. Tariff data for passenger rail transport services

(1) Tariff data shared pursuant to Article 6(3) shall comply with the specifications referenced in Appendix C, indexes [P.3] and [B.16].

(2) For direct access to and commercial use of tariff data pursuant to the second sentence of Article 6(3), and pending the future developments listed to in Article 23, points (c) and (e), the use of other data formats fully compatible and interoperable with the specifications referenced in Appendix C, indexes [P.7] may be agreed on contractual basis.

(3) The tariff data shall contain passenger rail transport services, or part of such services, and at least the following information:

(a) all the existing tariffs and associated tables of prices, including common, special or discounted prices and travel passes, excluding those applicable to the employees of the data holder, or to employees of other companies provided they were commercially agreed as special business-to-business tariffs;

(b) information whether a price is yielded, that is subject to dynamic pricing such as yield management or capacity considerations, as well as information on the ranges applied to that price per category;

(c) a link to the applicable general and specific conditions of carriage in accordance with point 4.4;

(d) all pre-journey tariff related information necessary for retailers as set out in Annex II to Regulation (EU) 2021/782;

(e) all information necessary for issuers to issue tickets in accordance with the following specifications:

(ii) point 4.5 where the tariff is subject to an availability check;

(ii) point 4.6 for security elements;

(f) the rules for ticket issuing and ticket inspections specified in point 4.3.2.

(4) Each railway undertaking, or where relevant the data holder, shall grant access to all its existing tariff data in accordance with Article 6(3) for use under the conditions of the Creative Commons BY-ND 4.0 licence or any other equivalent or less restrictive

open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

(5) No later than one week after the final working timetable of a passenger rail transport service has been published by the relevant infrastructure managers, each railway undertaking, or where relevant the data holder, shall grant access to all the existing tariff data for that service in accordance with Article 6(3) to ensure that the service can be purchased in advance, without prejudice to other tariffs for the same rail passenger transport service which would be made available in accordance with their respective sales conditions.

(6) At least six days before a tariff update for a passenger rail transport service takes effect, and without prejudice to other tariffs for the same service which would be made accessible in accordance with their respective sales conditions, the railway undertaking, or where relevant the data holder, that is responsible for those changes, shall grant access to corresponding data in accordance with Article 6(3).

(7) Tariff data shared pursuant to Article 6(3) shall constitute:

(a) an appropriate format and technical means respectively within the meaning of Articles 9(3) and 10(4) of Regulation (EU) 2021/782 to grant digital access to conditions for all available fares as part of pre-journey information referred to in the Part I of Annex II to that Regulation and meeting corresponding obligations under Articles 9(1) and 10(5) of that Regulation;

(b) a digital machine-readable format within the meaning of Article 4(1), point (b), of Commission Delegated Regulation (EU) 2017/1926 to grant access digitally to basic common standard and special fares referred to in the point 1.2 (c)(i) and point 1.3 (a) of the Annex to that Regulation as part of static travel data.

4.3.2. Management of rules for ticket issuing and ticket inspections

(1) To implement the rules for ticket issuing and ticket inspection consistently between railway undertakings, distributors, issuers and ticket control organisations, each railway undertaking shall grant access to:

(a) the conditions of carriage specified in point 4.4;

(b) the rail ticketing and ticket check rules.

(2) Each railway undertaking, or where relevant the data holder, shall share the description of rules for ticket issuing and ticket inspection as structured data in a machine-readable format with any distributor or any issuer that is authorised to re-link to the availability of its products, as well as with ticket control organisations.

Aspects relating to the technical interoperability of corresponding data sharing are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

4.3.3. Information about the online sales channels of railway undertakings

Where a telematics stakeholder involved in journey planning as part of rail ticketing processes presents information resulting from journey planning based on data accessed under Articles 4 to 6 for rail products it is neither authorised to sell nor to distribute, it shall at least relink that information to the online sales channels referred to in point 4.2.1 (2) (u).

4.4. Conditions of carriage

4.4.1. General

(1) Data relating to the conditions of carriage shall contain the information listed in points 4.4.2 to 4.4.6.

(2) Each railway undertaking shall, for the passenger rail transport services it operates, grant access to data relating to the conditions of carriage pursuant to Article 6(1) for use under the conditions of the Creative Commons BY-NC-ND 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

(3) Each railway undertaking shall publish and display on its official website the conditions of carriage applicable to the passenger rail transport services it operates.

(4) Where a retailer presents a passenger rail transport service, it shall display on its website and mobile applications the conditions of carriage based on data it has access to in accordance with point (2) or via a link to the publication of a relevant railway undertaking in accordance with point (3).

(5) Website and mobile applications used to display the conditions of carriage pursuant to points (4) and (5) shall be perceivable, operable, understandable and robust in accordance with the requirements for accessibility set out in the specifications referenced in Appendix C, index [P.6].

(6) The presentation of the conditions of carriage shall be displayed in a clearly identified manner and shall be accessible in accordance with Article 22 of Regulation (EU) 2021/782 and the specifications laid down in the Annex to Commission Regulation (EU) No 1300/2014[14] (PRM TSI), as referred to in Appendix A to this Annex.

(7) At least six days before an update to the conditions of carriage of a passenger rail transport service takes effect, the railway undertakings responsible for those changes shall grant access to corresponding data pursuant to Article 6. The railway undertakings shall list the points which have been changed compared to the previous version. For each change, they shall maintain the access to the earlier version of the data for at least one year after it has ceased to apply.

(8) Conditions of carriages shared pursuant to Article 6(1) shall constitute:

(a) an appropriate format and technical means respectively within the meaning of Articles 9(3) and 10(4) of Regulation (EU) 2021/782 to grant digital access to general conditions applicable to the contract as part of pre-journey information referred to in the Part I of Annex II to that Regulation and meeting corresponding obligations under Articles 9(1) and 10(5) of that Regulation;

[14] Commission Regulation (EU) No 1300/2014 of 18 November 2014 on the technical specifications for interoperability relating to accessibility of the Union's rail system for persons with disabilities and persons with reduced mobility (OJ L 356, 12.12.2014, p. 110, ELI: http://data.europa.eu/eli/reg/2014/1300/oj).

(b) a digital machine-readable format within the meaning of Article 4(1), point (b), of Commission Delegated Regulation (EU) 2017/1926 to grant access digitally to the different conditions referred to in the point 1.3(a) of the Annex to that Regulation as part of static travel data.

4.4.2. Conditions for the carriage of passengers

Each railway undertaking, or where relevant the retailer, shall draw the attention of passengers to the following information relating to conditions for carriage of passengers:

(b) the railway undertaking's conditions of carriage;

(c) information about passenger rights pursuant to Article 30 of Regulation (EU) 2021/782;

(d) the accepted means of payment;

(e) sales and after-sales conditions, especially for the exchange and reimbursement of tickets;

(f) procedures for the submission of complaints without prejudice to and in compliance with Article 18 of Regulation (EU) 2021/782.

4.4.3. Conditions of carriage and assistance for persons with disabilities and persons with reduced mobility ('PRM')

4.4.3.1. Accessibility of rolling stock

Each railway undertaking, or where relevant the retailer, shall draw the attention of passengers to the following information relating to the accessibility of rolling stock:

(a) the train types and train numbers where PRM facilities are available (the line number, where specific train numbers cannot be made publicly available);

(b) the types and minimum quantities of PRM facilities in the trains as specified in the PRM TSI, referred to in Appendix A to this Annex, under normal operating conditions;

(c) the methods for requesting assistance in boarding and disembarking from trains, in particular the following information:

(i) notice period;

(ii) points of contact for requesting assistance, including the email address and telephone number of the offices for PRM assistance;

(iii) operating hours;

(iv) conditions under which assistance is provided in accordance with Articles 23 and 24 of Regulation (EU) 2021/782;

(d) the maximum size and weight of wheelchairs, including the weight of the passenger, permitted without prejudice to the PRM TSI, as referred to in Appendix A to this Annex;

(e) transport conditions for accompanying persons and/or animals;

(f) a link where the conditions of access to the station are available in accordance with point 4.4.3.2.

4.4.3.2. Accessibility of stations

(1) Each railway undertaking, or where relevant the retailer, shall draw the attention of passengers to information relating to the accessibility of stations of departure and arrival based on the accessibility data referred to in point (2), where available.

(2) The entity in charge of collecting, maintaining and exchanging accessibility data in accordance with Article 7a of the PRM TSI, shall collect, convert and transfer that data to the European railway stations accessibility database ('ERSAD') hosted by the Agency in accordance with the PRM TSI, as referred to in Appendix A to this Annex. That data shall be transferred in accordance with the format set out in the specifications referenced in Appendix C, index [B.15], of this Annex, and under the access conditions of the Creative Commons BY-NC-ND 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

4.4.4. Condition for the carriage of luggage

Each railway undertaking, or where relevant the retailer, shall draw the attention of passengers to information relating to the conditions for the carriage of luggage, including for the transport of luggage where a service for luggage registration is offered.

4.4.5. Conditions for the carriage of bicycles

(1) Each railway undertaking, or where relevant the retailer, shall draw the attention of passengers to the following information relating to conditions for the carriage of bicycles where the carriage of bicycles is offered in accordance with Article 6 of Regulation (EU) 2021/782:

(a) the types and numbers of trains on which the carriage of bicycles is available and where no train number is available for the public, the line number, including the types and the number of bicycles permitted;

(b) particular times and periods when the carriage of bicycles may be restricted, including the details of that restriction;

(c) any applicable tariffs for the carriage of bicycles;

(d) whether a specific reservation for a bicycle place in the train is required and the method to be used to reserve one, including the following:

(i) the notice period;

(ii) details of specific sales channels for the reservation of a bicycle place and operating hours, if applicable;

(e) up-to-date information on the availability of capacity for the carriage of bicycles.

(2) Each railway undertaking shall indicate if the carriage of bicycles is not offered.

4.4.6. Conditions for the carriage of cars, motorcycles and boats ('cars')

Each railway undertaking, or where relevant the retailer, shall draw the attention of passengers to the following information relating to conditions for the carriage of cars where a service for the carriage of cars is offered:

(a) the types and numbers of trains on which the carriage of cars is available;

(b) particular times and periods when the carriage of cars is available;

(c) the standard tariffs for the carriage of cars, including tariffs for the accommodation of passengers where accommodation is offered by the railway undertaking;

(d) the specific address and time for the loading of cars onto the train;

(e) the specific address and time of arrival of the train at the station of destination for the unloading of cars from the train;

(f) size, weight and other limitations for the carriage of cars.

4.5. Availability and reservations

4.5.1. General

(1) Authorisation to provide a service for confirmed personalised arrangements, namely a reservation, such as transportation, accommodation or assistance, may upon request of the distributor be part of a single transaction combining both a transport contract and one or more specified types of assistance or specific types of accommodation.

(2) Alternatively, a reservation may concern, in addition to the transport contract, only the selling of a reservation for a specified type of assistance or of any type of passenger accommodation such as a seat, couchette, sleeping compartment, priority seat or wheelchair space. It may also concern the reservation of a passenger rail transport service related to the carriage of luggage or a car or the reservation of a bicycle space.

(3) The availability of a rail product shall refer to a rail product which can be purchased by a passenger at a given point in time for:

(a) a specified type of assistance;

(b) a specified type of accommodation;

(c) the carriage of luggage, a car or a bicycle;

(d) a specific price subject to yield management.

(4) Where a tariff or a product is subject to an availability check, but is either sold out or not applicable for purchase by a passenger at a given point in time for a specific train, information about corresponding services shall remain available and offered by the distributor or the retailer upon request.

(5) A distributor shall be able to combine in a fair, transparent and non-discriminatory manner the rail products obtained from one or more railway undertakings or other distributors, independently of the railway undertakings involved. The distributor shall be able to retrieve trip information from its journey planner and determine the associated prices or range of prices for each leg of the passenger journey, either as a whole or, where applicable, for parts of it. Both the journey planner and the pricing engine of the distributor shall be able to use data accessed pursuant to Articles 4 and

6 of this Regulation. Distributors shall be able to check the availability of rail products through the attributing system of the railway undertaking, and distributors shall allow those rail products to be reserved.

(6) A retailer shall be able to combine in a fair, transparent and non-discriminatory manner the rail products obtained from one or more distributors.

(7) Where a distributor or a retailer combines rail products, it shall instruct the issuers of the corresponding tickets to report, in accordance with point 4.6, to the railway undertakings that operate the transport services related to these tickets about the tickets' combinations.

(8) Specifications relating to the combination of products by the distributor or the retailer, as well as corresponding communications between them, are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

(9) Except for the specifications relating to the APIs to be used by distributors to check the availability of or reserve a rail product that are set out in point 4.5, the specifications relating to the APIs used to distribute and sell a rail product are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

4.5.2. Availability and reservation request

(1) Any distributor shall ensure that its distribution system shares the requests from customers (retailers or clients) for availability or reservation of a specified rail product with the railway undertakings concerned through their attributing systems, in accordance with the specifications referenced in Appendix C, index [B.5][15] and based on contractual provisions.

(2) In accordance with Part III of Annex II to Regulation (EU) 2021/782, the different types of reservation requests shall be as follows:

(a) availability request;

(b) reservation request;

(c) partial cancellation request;

(d) full cancellation request.

(3) An availability request shared pursuant to paragraph (1) and Article 6(4) shall constitute an appropriate technical means within the meaning of Article 10(4) of Regulation (EU) 2021/782 to grant digital access to operations on reservation systems referred to in the Part III of Annex II to that Regulation and meeting corresponding obligations under Article 10(5) of that Regulation.

[15] For requests for availability or reservation of PRM assistance and subsequent responses, applicable specifications are instead laid down in point 4.5.4.

4.5.3. Availability and reservation response

(1) Where a request for availability or reservation has been made by a distributor in accordance with point 4.5.2, the railway undertakings concerned shall ensure that their attributing systems share a response with the requesting distribution system of this distributor for the rail product it specified and in accordance with the specifications referenced in Appendix C, index [B.5][15] and based on contractual provisions.

(2) The different types of reservation responses are as follows:

(a) reply about availability;

(b) confirmation of a reservation request;

(c) confirmation of a partial cancellation request;

(d) confirmation of a complete cancellation request;

(e) replacement proposal;

(f) negative reply.

4.5.4. Availability of and reservations for PRM assistance

(1) Each railway undertaking and each distributor shall ensure that their attributing system and their distribution system respectively allows to share data relating to the carriage and assistance of PRM in accordance with the specifications referenced in Appendix C, index [B.10].

(2) Each railway undertaking shall ensure that its attributing system allows to issue a confirmation number for the reservation of PRM assistance for each departure and arrival of each passenger rail transport service reserved. A confirmation number gives the passenger the guarantee and confidence that the assistance will be provided and establishes the accountability and responsibility of the railway undertaking for the provision of assistance.

4.5.5. Availability of and reservations for bicycle places

At least for passenger rail transport services where a reservation for bicycle places is required in accordance with Article 6(1) of Regulation (EU) 2021/782, each railway undertaking shall ensure that its attributing system is able to handle a check for the availability of or a reservation of bicycle places in accordance with the specifications laid down in points 4.5.2 and 4.5.3 of this Annex.

4.5.6. Availability and reservations for the carriage of cars

At least for passenger rail transport services offering the carriage of cars, each railway undertaking shall ensure that its attributing system is able to handle a check for the availability of or a reservation for the carriage of cars in accordance with the specifications laid down in points 4.5.2 and 4.5.3.

4.6. Tickets issuing for product distribution

The issuer is responsible to issue tickets in accordance with points 4.6.1, 4.6.2 and 4.6.3, including for the reporting of tickets it issued for a passenger transport service to the railway undertakings operating this transport service.

4.6.1. Security elements for electronic delivery

(1) Each issuer of a ticket or a reservation for a passenger rail transport service shall generate the security data in accordance with the specification referenced in Appendix C, index [B.12], as soon as the distribution status and sales transaction data have been successfully sent to the distribution system of the distributor.

(2) To ensure that the authenticity of the security elements can be checked by relevant ticket control organisations, the issuer shall create those security elements for electronic delivery using a public key infrastructure (PKI) in accordance with point 1.3.

4.6.2. Dossier reference

(1) Each issuer shall produce a dossier reference in accordance with the specifications referenced in Appendix C, index [B.5], to report the tickets or reservations it issued to the railway undertakings concerned. Each issuer shall perform the following actions:

(a) link the dossier reference with all data concerning the ticket;

(b) register the dossier reference in the attributing system of the railway undertakings concerned;

(c) include the dossier reference on the ticket or reservation of the passenger.

(2) Each issuer shall perform the process set out in point (1) as soon as the distribution status and sales transaction data have been successfully sent to the distribution system of the distributor.

4.6.3. Types and formats of tickets

(1) Each railway undertaking and ticket control organisation shall at least accept tickets issued electronically in accordance with the specifications referenced in Appendix C, index [B.11], except in the following cases:

(a) the ticket is not appropriate for the passenger journey being undertaken;

(b) the ticket control organisation has reasonable grounds to suspect fraud;

(c) the ticket is not being used in accordance with the conditions of carriage referred to in point 4.4.

(2) Each issuer shall at least be able to use one of the types and formats of ticket, in accordance with the specifications referenced in Appendix C, index [B.11], to issue a ticket for the rail product purchased to the passenger.

(3) The same types and formats of ticket shall be accepted by railway undertakings, both for sales performed by one of the railway undertakings involved (‘direct sales’) and for those performed by an independent issuer (‘indirect sales’).

4.6.4. Ticket control and ticket state modification

Ticket control organisations that have received security certificates for issued tickets from the issuer shall share ticket control data and ticket state changes with ticket issuers in accordance with points 4.6.4.1 and 4.6.4.2.

4.6.4.1. Ticket annotation

(1) The messages to retrieve tickets online (‘RetrieveTicketRequest’ ; ‘RetrieveTrainTicketRequest’) and the ticket annotation message (‘AddAnnotationRequest’) shall be in accordance with the specifications referenced in Appendix C, index [B.14].

(2) A ticket control organisation shall send to the issuer of the ticket it controls a message to retrieve this ticket online (‘RetrieveTicketRequest’ ; ‘RetrieveTrainTicketRequest’).

(3) A ticket control organisation shall send a ticket annotation (‘AddAnnotationRequest’) to the issuer of the ticket it controls and to other ticket control organisations involved in the control of this ticket.

4.6.4.2. Reimbursement or compensation request

(1) The requesting distribution system of the distributor shall send reimbursement and compensation requests on behalf of passengers to the attributing system of the railway undertakings concerned in respect of the relevant ticket or through-ticket.

(2) The structure of passengers’ reimbursement or compensation requests shall comply with Commission Implementing Regulation (EU) 2024/949[16]. The corresponding specifications for interoperable data sharing between a distributor and railway undertaking concerned are identified as an ‘open point’ in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

4.7. Rail passenger travel information during the journey

4.7.1. Information in the station

4.7.1.1. General

(1) Each station manager shall provide passengers in the station pursuant to Article 9(2) of Regulation (EU) 2021/782 with visual and spoken passenger travel information that is accessible in accordance with Article 22 of Regulation (EU) 2021/782 and the specifications laid down in the PRM TSI, as referred to in Appendix A of this Annex.

[16] Commission Implementing Regulation (EU) 2024/949 of 27 March 2024 establishing a common form for rail passengers’ reimbursement and compensation requests for delays, missed connections and cancellations of rail services in accordance with Regulation (EU) 2021/782 of the European Parliament and of the Council (OJ L, 2024/949, 2.4.2024, ELI: http://data.europa.eu/eli/reg_impl/2024/949/oj)

(2) Each station manager, or where relevant the infrastructure manager or the data holder, shall integrate information they hold in relation to the station, including platforms and where relevant platform sections, where trains are intended to stop, in accordance with the specifications referenced in Appendix C, indexes [P.2] and [P.4], of this Annex with the following information in relation to the arrival and departure of trains:

(a) train traffic based on data contained in the messages received pursuant to point 2.6;

(b) train composition based on data contained in the messages received pursuant to point 2.5.1.

(3) Each station manager, or where relevant the infrastructure manager or the data holder, shall grant access to the information integrated pursuant to point (2), to other telematics stakeholders in accordance with Article 4, and via national access points, for use under the conditions of the Creative Commons BY-ND 4.0 licence or any other equivalent or less restrictive open licence or any other equivalent or less restrictive access conditions mutually agreed upon by the involved stakeholders.

(4) The provisions of point (1) apply without prejudice to the provisions of the PRM TSI, as referred to in Appendix A of this Annex, to stations where information systems, namely voice announcement systems or dynamic visual devices as displays, are renewed, upgraded or newly installed.

(5) Each station manager, or where relevant the infrastructure manager or the data holder, shall decide in accordance with Article 15, paragraphs (3) and (4), on the following points:

(a) the type of information systems, namely voice announcement systems or dynamic visual devices as displays, installed;

(b) the point in time when the information is provided;

(c) the location in the station where the information systems are installed.

4.7.1.2. Train departures

Each station manager shall provide passengers in the station with at least the following train departure information:

(a) train type and train number;

(b) stations of destination;

(c) all intermediate station stops and their main connecting passenger transport services;

(d) departure time;

(e) departure platform or track;

(f) correspondence between platform sections and carriage numbers, including where applicable associated on-board services and facilities.

4.7.1.3. Train arrivals

Each station manager shall provide passengers in the station with at least the following train arrival information:

(a) train type and train number;

(b) stations of origin;

(c) all intermediate station stops;

(d) arrival time;

(e) arrival platform or track.

4.7.1.4. Deviations from scheduled information

(1) Where a passenger rail transport service deviates from the working timetable, the infrastructure managers concerned shall provide station managers in due time with relevant traffic and travel information and deviations from the scheduled information as set out in point (3) and in accordance with the specifications referenced in Appendix C, index [1].

(2) In the event of deviation from the scheduled information, each station manager shall provide passengers in the station with real-time running and forecast information. Corresponding deviations shall be clearly identified for the attention of the passengers in the station.

(3) Deviations from the scheduled information shall include at least the following information based on train traffic data as set out in point 2.6:

(a) delays and reasons for delay, if known, as part of the train delay cause;

(b) change of track or platform, as part of the train running information;

(c) full or partial cancellation of a train and rerouting, as part of the train journey modification information.

4.7.2. Information in the vehicle

(1) Each railway undertaking shall provide passengers within the vehicle pursuant to Article 9(2) of Regulation (EU) 2021/782 with up-to-date customer information that is accessible in accordance with Article 22 of Regulation (EU) 2021/782 and the specifications laid down in the PRM TSI, as referred to in Appendix A of this Annex. Such information shall be integrated on the basis of train traffic data contained in the messages received pursuant to point 2.6 of this Annex.

(2) The provisions of point (1) shall apply, without prejudice to the provisions of the PRM TSI, as referred to in Appendix A of this Annex, to new rolling stock and to renewed or upgraded rolling stock where information systems, namely voice announcement systems or displays, are renewed, upgraded or newly installed.

(3) Each railway undertaking shall provide passengers in the vehicle with at least the following information:

(a) at station of departure and at any intermediate station stop:

(i) the train type and number;

(ii) the final destinations;

(iii) all intermediate station stops ahead;

(iv) the scheduled arrival time at final destination and at any intermediate station stop ahead;

(b) the estimated departure time, reasons for delay, if known, and other information about the disruption;

(c) the name of the next station before arrival at any intermediate station stop;

(d) before arrival at any major intermediate station stop and at the final destination:

(i) the name of the next station;

(ii) the scheduled arrival time;

(iii) the estimated arrival time, reasons for delay, if known, and other information about the disruption;

(iv) the next main connecting passenger transport services, at the discretion of the railway undertaking.

(4) Each railway undertaking shall decide on:

(a) the type of information systems, namely displays and voice announcement systems, installed;

(b) the point in time when the information is provided;

(c) the location in a train where the information systems are installed.

4.8. Common reference data for rail ticketing

(1) The Agency shall manage the following common code lists for rail ticketing as common reference data in accordance with Articles 8 and 9 and the specifications referenced in Appendix C, index [105] and grant access to them for use under the conditions of the EUPL 1.2 licence:

(a) reference data for European reservation systems;

(b) reference data of codes for passenger timetable data;

(c) reference data of codes for tariff data;

(d) data catalogue elements;

(e) passenger code list;

(f) any other data and code lists needed for the use of the technical documents referenced in Appendix C.

(2) Common code lists for rail ticketing shall be in accordance with the specifications referenced in Appendix C, index [1].

4.9. Data sharing with other stakeholders

For the purpose of data sharing by infrastructure managers, station managers and railway undertakings with other telematics stakeholders that are responsible for the management of connections between passenger rail transport services and other modes of passenger transport and of other modes of transport managed as part of or in replacement of passenger rail transport services, the requirements laid down in Section 4 of this Annex apply to data shared

pursuant to Article 4. Such data shall be compliant only with the following specifications referenced in Appendix C:

(a) for reference locations specified in point 1.2.2: index [P.1];

(b) for passenger timetable data specified in point 4.2: indexes [P.2] and [P.4];

(c) for tariff data specified in point 4.3: indexes [P.3] and [B.16];

(d) for data relating to passenger travel information during the train journey, including dynamic travel and traffic data in accordance with Article 5 of Delegated Regulation (EU) 2017/1926: index [P.5] based on information contained in the messages referred to in point 2.6.1(1).

5. LIST OF SPECIFIC CASES

5.1. General

(1) Railway undertakings subject to a positive self-assessment in accordance with Article 18 shall not be prevented by a specific case from accessing the corresponding network.

(2) The specific cases as listed in point 5.2 describe special provisions that are needed and authorised on particular networks of each Member State and include interface requirements subject to specific cases declared in other acts adopted under Directives (EU) 2016/797 or (EU) 2016/798. Specific cases are classified as either of the following:

(a) ‘P’ case: permanent;

(b) ‘T’ case: temporary, where corresponding interoperability requirements shall be met by a specified date.

5.2. List of specific cases

There are no specific cases indicated for this TSI.

APPENDIX A
INTERFACES IN RELATION TO OTHER SUBSYSTEMS

Interfaces of the 'telematics applications' subsystem in relation to other subsystems are described below.

A.1 INTEROPERABILITY REQUIREMENTS RELATED TO ACCESSIBILITY

The table below sets out the links between the requirements in the Annex to this TSI (the 'Telematics TSI') and the Annex to Regulation (EU) No 1300/2014 (the 'PRM TSI').

Requirement	**Reference in the Telematics TSI**		**Reference in the PRM TSI**	
Facilities for persons with disabilities and persons with reduced mobility (PRM)	4.4.3.1	Accessibility of rolling stock	4.2.2	Rolling stock subsystem
Wheelchair	4.4.3.1	Accessibility of rolling stock	App. M	Wheelchair transportable by train
Accessibility data	4.4.3.2	Accessibility of stations	7.2.1.1	Inventory of assets – infrastructure
Customer information	4.4.1	Conditions of carriage	4.2.1.10	Visual information
	4.7.1	Information in the station	4.2.1.11	Spoken information
			4.2.2.7	Customer information
	4.7.2	Information in the vehicle	4.4.1	Operating rules – infrastructure subsystem
			4.4.2	Operating rules – rolling stock subsystem
	4.7.1.1(3)	Information in the station	7.1	Application of this [PRM] TSI to new infrastructure and rolling stock
	4.7.2(2)	Information in the vehicle	7.2	Application of this [PRM] TSI to existing infrastructure and rolling stock

A.2 INTEROPERABILITY REQUIREMENTS RELATED TO CAPACITY MANAGEMENT, TRAIN PREPARATION AND TRAFFIC MANAGEMENT

The table below sets out the links between the requirements of the Annex to this TSI (the 'Telematics TSI') and the Annex to Implementing Regulation (EU) 2019/773 (the 'OPE TSI').

Requirement	Reference in the Telematics TSI		Reference in the OPE TSI	
Identification of trains	2.1	Object identifiers	4.2.3.2	Identification of trains
Capacity allocation	2.3	Capacity allocation	4.2.3.1	Train planning and timetable
			4.2.3.2	Identification of trains
Temporary restrictions or modification	2.4.4	Publication of capacity restrictions	4.2.1.2.2	Route book
			4.8.1	Additional information on infrastructure
Train preparation	2.5.1	Train composition	4.2.2.5.2	Train composition
			4.2.2.7	Ensuring that the train is in running order
			Appendix J	Train composition
	2.5.2	Train ready	4.2.3.3	Train departure
Train reporting	2.5.3	Train readiness forecast	4.2.3.4.2	Train reporting
	2.6.3	Train running information		
	2.6.4	Train forecast information		
	3.2.3	Wagon forecast information	4.2.3.4.4	Operational quality
	Appendix E	Accuracy of forecast information for train and wagon movements		

	2.6.8	Historical record of train traffic data	4.2.3.5	Data recording
Freight wagon reporting	3.2.1.3	Wagon ready for movement	4.2.2.4.1	Safety of load

A.3 INTEROPERABILITY REQUIREMENTS RELATED TO NOISE

The following table sets out the links between the requirements in the Annex to this TSI (the 'Telematics TSI') and the Annex to Regulation (EU) No 1304/2014 (the 'NOI TSI').

Requirement	**Reference in the Telematics TSI**		**Reference in the NOI TSI**	
Capacity allocation	2.3	Capacity allocation	Appendix D	Quieter routes
Train preparation	2.5.1	Train composition	4.4. 7.2.2	Specific rules for the operation of wagons on quieter routes Additional provisions for the application of this TSI to existing wagons

A.4 INTEROPERABILITY REQUIREMENTS RELATED TO CONTROL-COMMAND AND SIGNALLING

The following table sets out the links between the requirements in the Annex to this TSI (the 'Telematics TSI') and in Annex I to Implementing Regulation (EU) 2023/1695 (the 'CCS TSI').

Requirement	**Reference in the Telematics TSI**		**Reference in the CCS TSI**	
Train preparation	2.5.2	Train ready	4.2.4.2	Voice and operational communication applications
			4.2.2	On-Board ETCS functionality

A.5 INTEROPERABILITY REQUIREMENTS RELATED TO ENERGY

The following table sets out the links between the requirements in the Annex to this TSI (the 'Telematics TSI') and in the Annex to Commission Regulation (EU) 1301/2014 (the 'ENE TSI').

Requirement	Reference in the Telematics TSI		Reference in the ENE TSI	
Train preparation	2.5.1	Train composition	4.2.17	On-ground energy data collecting system

A.6 INTEROPERABILITY REQUIREMENTS RELATED TO LOCOMOTIVES AND PASSENGER ROLLING STOCK

The following table sets out the links between the requirements in the Annex to this TSI (the 'Telematics TSI') and in the Annex to Commission Regulation (EU) No 1302/2014 (the 'Loc&Pas TSI').

Requirement	Reference in the Telematics TSI		Reference in the Loc&Pas TSI	
Train preparation	2.5.1	Train composition	4.2.8.2.8	On-board energy measurement system

APPENDIX B
LIST OF OPEN POINTS

The following table sets out the requirements and testing procedures for the subsystem telematics that are open points in accordance with Article 4(6) of Directive (EU) 2016/797. The testing procedures to be applied to assess compliance with those requirements are also open points.

Telematics TSI point	Open point
Requirements	
1.1	Additional levels of integrity and dependability for data to be used for the safety of operations
1.7.1	Web user interfaces for capacity management, train preparation, and traffic management
1.7.2	Web user interfaces for the management of freight wagons and their load
2.1.7(3)	Identification of shunting movements
2.2	Strategic management of infrastructure capacity
2.3.1(4)	Planning of shunting movements and stabling
2.3.1(5)	Coordination of multi-network processes in the area of capacity management
2.3.1(8)	Time threshold for ad hoc request for the allocation of infrastructure capacity
2.3.9	Capacity allocation coordination process
2.4.1	Coordination of capacity restrictions
2.4.2	Consultation of stakeholders affected by planned capacity restrictions
2.4.3	Publication of capacity restrictions

Telematics TSI point	Open point
2.6.7(2)	Path section modification
3.1.2	Reservation, payment and invoicing systems for freight rail transport services
3.2.1.1(4)	Geolocalisation-based positioning of freight wagons
3.2.1.3(5)	Load ready for movement
3.2.2	Movement of intermodal loading units
4.2.2.4	Calculation of connection times and additional times for check-in
4.3.2(2)	Management of rail ticketing and ticket check rules
4.5.1(7)	Combination of rail products by the distributor or the retailer, and communications between them
4.5.1(8)	APIs used to distribute and sell a rail product, except to check its availability or reserve it
4.6.4.2(2)	Reimbursement or compensation requests
Testing procedures	
Appendix D.3.B(1)	Testing procedures for tariff data
Appendix D.3.C(1)	Testing procedures for availability check and reservation

APPENDIX C
LIST OF REFERENCED STANDARDS AND TECHNICAL DOCUMENTS

C.0 SEMANTIC VERSIONING OF TECHNICAL DOCUMENTS

(1) While only baseline versions of technical documents are listed below, where the maintenance of a technical document triggers a minor or a maintenance release, it may be issued by the Agency as an acceptable means of compliance in accordance with Article 12(2).

(2) Where an update of a technical document triggers a new baseline, that update shall include an indicative transition period for application pending further revision of this Regulation updating the references listed in Tables C.1 to C.4.

C.1 LIST OF COMMON REFERENCED TECHNICAL DOCUMENTS

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[1]	**ERA Ontology – Version 4** **Ontology of the rail system**		
		1.4	Domain: telematics
[2]	**ERA/TD/CCT – Version 2** **Codification of combined transport**		
	Identifiers of ILUs	3.3.3(3)(a)	2.3.1
	Type of ILUs	3.3.3(3)(b)	
	Compatibility of freight wagons with ILUs and routes		3
	Certification and registration of ILUs	3.3.3(5)(a)	2.3.2

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[100]	**ERA-TD-100 – Version 4** **Figures and sequence diagrams of telematics messages**		
	Capacity allocation	2.3	2
	Train preparation	2.5	3
	Train traffic data	2.6	4, 5
	Consignment note	3.1.1	6
	Movement of freight wagons	3.2.1	7
	Availability and reservation	4.5	8
	Availability and reservation for PRM assistance	4.5.4	9
[103]	**ERA-TD-103 – Version 4** **Reference data**		
	Common reference data		
	Organisations reference data	1.2.1	3, 5, 8
	Locations reference data	1.2.2	3, 4, 8
	Freight specific reference data		
	Rolling stock reference data	3.3.2	3, 6, 8
	Intermodal loading unit reference data	3.3.3	3, 7, 8

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[105]	**ERA-TD-105 – Version 4** **XSD Data and message model**		
	Data presentation	1.4(2)(a)	Telematics_catalogue
	Common reference data for rail ticketing		
	Reference data for European reservation systems	4.8	Passenger_codelist
	Reference data of codes for passenger timetable data		
	Reference data of codes for tariff data		
	Message-dataset catalogue		
	Passenger code list		
[106]	**ERA-TD-106 – Version 4** **Public key infrastructure (PKI)**		
	Asymmetric or symmetric encryption, public key infrastructure (‘PKI’)	1.3	6, 7, 8, 9

C.2 LIST OF REFERENCED TECHNICAL DOCUMENTS SPECIFIC TO DATA SHARING IN RELATION TO CAPACITY MANAGEMENT, TRAFFIC MANAGEMENT, AND TRAIN PREPARATION

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[104]	**ERA-TD-104 – Version 4** **Common interface**		
	Application programming interface (‘API’)	1.7	all

C.3 LIST OF REFERENCED TECHNICAL DOCUMENTS TO DATA SHARING SPECIFIC FOR THE MANAGEMENT OF FREIGHT WAGONS AND THEIR LOAD

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[102]	**ERA-TD-102 – Version 4** **Common wagon and intermodal loading unit operational ('WIMO') database**		
	Common wagon and intermodal loading unit operational ('WIMO') database	3.3.4.1	all

C.4 LIST OF REFERENCED SPECIFICATIONS SPECIFIC TO RAIL TICKETING IN RELATION TO PASSENGER RAIL TRANSPORT SERVICES AND RAIL PASSENGER TRAVEL INFORMATION

C.4.A List of referenced standards

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[P.1]	**CEN/TS 16614-1:2025** **Public transport – Network and Timetable Exchange (NeTEx) – Part 1: Public transport network topology exchange format**		
	Sharing of reference location data with other modes of transport	4.9	all
[P.2]	**CEN/TS 16614-2:2025** **Public transport – Network and Timetable Exchange (NeTEx) – Part 2: Public transport scheduled timetables exchange format**		
	Passenger timetable data for passenger rail transport services	4.2.1	all
	Passenger timetable data of connection times	4.2.2	
	Sharing of passenger timetable data with other modes of transport	4.9	
	Passenger travel information within the station	4.7.1	

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[P.3]	**CEN/TS 16614-3:2025** **Public transport – Network and Timetable Exchange (NeTEx) – Part 3: Public transport fares exchange format**		
	Tariffs data for passenger rail transport services	4.3.1	all
	Tariffs data sharing with other modes of transport	4.9	
[P.4]	**CEN/TS 16614-4:2025** **Public transport - Network and Timetable Exchange (NeTEx) – Part 4: Passenger Information European Profile**		
	Passenger timetable data for passenger rail transport services	4.2.1	all
	Passenger timetable data of connection times	4.2.2	
	Passenger timetable data sharing with other modes of transport	4.9	
	Passenger travel information within the station	4.7.1	
[P.5]	**EN 15531-2:2022** **Public transport – Service interface for real-time information relating to public transport operations – Part 2: Communications infrastructure**		
	Sharing of data with other modes of transport in relation to passenger travel information during train journeys	4.9	all
[P.6]	**EN 301549:2021** **Accessibility requirements for ICT products and services**		
	Accessibility of information intended for passenger		
	Accessibility of websites and mobile applications used to present the conditions of carriage to passengers	4.4	all

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[P.7]	**EN 12896-1:2016** **Public transport – Reference data model – Part 1: Common concepts**		
	Data presentation	1.4(2)(b)	all
	Tariff data formats fully compatible and interoperable	4.3.1(2)	

C.4.B List of referenced technical documents

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[B.5]	**ERA/TD/B.5 – Version 4** **Electronic reservation of seats/berths and electronic production of travel documents – Exchange of messages**		
	Availability and reservation	4.5.2, 4.5.3	2, 3, 4, 5
	Dossier reference	4.6.2	
[B.10]	**ERA/TD/B.10 – Version 4** **Electronic reservation of assistance for persons with reduced mobility – Exchange of messages**		
	Availability of and reservation for PRM assistance	4.5.4	4, 5, 6, 7, 8
[B.11]	**ERA/TD/B.11 – Version 4** **Layout for electronically issued rail passenger tickets**		
	Tickets type and format	4.6.3	2, 3, 4, 5, 6, 7, 8
[B.12]	**ERA/TD/B.12 – Version 4** **Digital security elements for rail ticketing**		
	Security elements for electronic delivery	4.6.1	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
[B.14]	**ERA/TD/B.14 – Version 4** **e-Ticket Exchange for Control**		
	Ticket annotation	4.6.4.1	2, 3, 4, 5, 6

Index	Characteristics to be assessed	Telematics TSI point	Mandatory standard point
[B.15]	**ERA/TD/B.15 – Version 4** **European Passenger Information Railway Station Accessibility Profile**		
	Conditions of access to the station	4.4.3.2	2
[B.16]	**ERA/TD/B.16 – Version 4** **European Rail Fares Information Profile**		
	Tariffs data for passenger rail transport services	4.3.1	All
[B.17]	**ERA/TD/B.17 – Version 4** **Testing procedure for timetable data**		
	Compliance assessment testing procedure for passenger timetable data	Appendix D.3.A	2, 3, 4, 5, 6, 7, 8

APPENDIX D
TESTING PROCEDURES FOR COMPLIANCE ASSESSMENT

D.1 SELF-ASSESSMENT AND EVIDENCE-BASED DECLARATION FOR INDIVIDUAL IT MESSAGES

(1) The telematics applications used by telematics stakeholders for the implementation of this Regulation shall be subject to a self-assessment of the compliance of the data shared against the requirements laid down in the Regulation. Self-assessment performed by telematics stakeholders and notified to the Agency in accordance with Article 18 shall be accompanied by the following information automatically compiled by the web application provided by the Agency:

(a) functions covered and reference to corresponding points of this Regulation, including general and structured description of the telematics applications used in relation to those functions;

(b) online documentation of messages (including their sequence) tested against the specifications referenced in the Regulation, and corresponding automated evidence-based declaration of compliance as referred to in point (6);

(c) the version of the specifications referenced in Appendix C, as implemented and subject to compliance assessment;

(d) files of the serialised messages and associated structured data elements shared as well as the SHACL or XSD files used to validate those messages.

(2) For requests submitted to the Agency for correctness checks of the automated evidence-based declaration of compliance resulting from self-assessment in accordance with Article 18(8), the information referred to in subpoint (1) of this point shall also include background information and a timeline of the project to be assessed.

(3) Where an existing self-assessment is to be renewed in accordance with Article 18(5), the self-assessment referred to in point (1) shall be limited to the elements affected by the changes self-assessed. The information compiled pursuant to point (1) shall also include a reference to the previous self-assessment or to the evaluation report delivered by the Agency in accordance with Article 18(7).

(4) To facilitate the testing of messages referred to in point (1)(b) and their sequence, telematics stakeholders shall self-assess the compliance of individual messages deployed and used for the purposes of implementing this Regulation.

(5) The Agency shall make available a web application for self-assessing message compliance where telematics stakeholders are to self-asses relevant files in accordance with point (1)(d) for automated testing against the specifications referenced in Appendix C, index [1].

(6) After self-assessment, that web application shall issue an automated acknowledgment of receipt and a self-compliance assessment result to be used by the self-assessed telematics stakeholder as an evidence-based declaration of presumption of compliance for the messages or sequence of messages tested.

D.2 EVALUATION OF THE CORRECTNESS OF SELF-ASSESSMENT

(7) Where the Agency checks, pursuant to Article 18, paragraphs 6, 7, and 8, the correctness of the automated evidence-based declaration of presumption of compliance resulting from self-assessment, it shall report its evaluation on whether the telematics application used complies with this TSI. Its evaluation report shall cover at least the following aspects:

(a) compliance of all mandatory elements contained in the messages;

(b) compliance of the messages themselves;

(c) compliance of the sequence of messages.

D.3 SPECIFIC TESTING PROCEDURES FOR RAIL TICKETING

D.3.A Passenger timetable

Testing procedures for assessment of compliance against the requirements laid down in point 4.2 of this Annex shall be in accordance with the specifications referenced in Appendix C, index [B.17].

D.3.B Tariffs

(1) Testing procedures for assessment of compliance against the requirements laid down in point 4.3 of this Annex are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

(2) Pending the development of relevant testing procedures pursuant to Article 23, points (c) and (e), automatic converters and validators based on an open architecture may be used by telematics stakeholders to self-assess the compatibility and interoperability of the data shared and the processes implemented against the specifications set out in point 4.3.

D.3.C Availability check and reservation

(1) Testing procedures for assessment of compliance against the requirements laid down in point 4.5 of this Annex are identified as an 'open point' in accordance with Article 4(6) of Directive (EU) 2016/797 and are listed in Appendix B to this Annex.

(2) Pending the development of relevant testing procedures pursuant to Article 23, points (c) and (e), automatic validators based on an open architecture may be used by telematics stakeholders to self-assess the compatibility and interoperability of the data shared and the processes implemented against the specifications set out in point 4.5.

APPENDIX E
ACCURACY OF FORECAST INFORMATION FOR TRAIN AND FREIGHT WAGON MOVEMENTS

(1) Since the train forecast information referred to in point 2.6.4 and the wagon forecast information referred to in point 3.2.3 refer to the predicted time of arrival of a train and of a freight wagon and its load, respectively, at an agreed reporting point, it will be used by stakeholders and customers involved in the rail transport service to plan subsequent operations or onward connections.

(2) Since both the train forecast information referred to in point 2.6.4 and the freight wagon forecast information referred to in point 3.2.3 are an estimate that derive from the time originally planned in the working timetable +/- the deviation from the working timetable that occurred during the train operation, the originator of such a forecast shall:

(a) carry out an ex-post measurement of the accuracy of its forecast in accordance with Article 10 in order to create confidence in the data to be reused by the recipient for the planning of subsequent operation;

(b) ensure that the recipient of the forecast referred to in point (a) is informed of the expected accuracy of the forecast based on earlier train runs.

(3) As an alternative to linear time-shifting methods commonly applied by some telematics stakeholders for the purposes of point (2) (a), others may apply different methods or use internal algorithm-based machine learning methods that may be integrated into an artificial intelligence to achieve more accurate and intelligent insights.

(4) For the purpose of point (2), recurrent quality assurance checks on the accuracy of forecast information are laid down as follows:

(a) absolute error:

The ‘absolute error’ is calculated as the absolute value of the difference between the actual date and time of arrival at a specified reporting point and the forecast date and time of arrival at that reporting point;

(b) relative error:

To put the ‘absolute error’ at a specified reporting point in perspective with the duration of the remaining train journey, a ‘relative error’ is calculated as the ratio or percentage obtained by dividing the ‘absolute error’ by the ‘duration of the remaining train journey’;

The ‘duration of the remaining train journey’ is calculated as the difference between the actual date and time of the arrival of a train at the reporting point and the time when the corresponding forecast information has been provided;

(c) accuracy:

The ‘accuracy’ are calculated as the complement of the ‘relative error’ to 100%.

(5) Where a data holder, that is to say the originator of the data, performs recurrent quality assurance checks as referred to in point (3), it shall assess the accuracy of the data as a stochastic probability of the statistical values of the forecast information at a specified reporting point for a group composed of previous rail transport services.

(6) A data holder shall perform quality assurance checks on the accuracy of train forecast information only once that train has arrived, or after that freight wagon and its load have been handed over or delivered at, the reporting point that is subject to the forecast. Quality assurance checks shall be based only on historical data.

(7) Indicators resulting from the measurements referred to in point (3) shall be available through the common Union web UI referred to in Article 5.

APPENDIX F
ESSENTIAL REQUIREMENTS

Telematics TSI point	Element of the telematics subsystem	Essential requirements as referred to in Annex III to Directive (EU) 2016/797					
		Safety	**Reliability and availability**	**Health**	**Environmental protection**	**Technical compatibility**	**Accessibility**
1.2	Common reference data		X			X	
1.3	Security		X			X	
1.4	Data presentation					X	
1.5	Data quality		X			X	
1.7	APIs		X			X	
	Web UIs		X	X		X	X
2.1	Object identifiers					X	
2.2	Strategic management of infrastructure capacity		X		X	X	
2.3	Capacity allocation		X		X	X	
2.4	Capacity restrictions	(X)	X		X	X	
2.5.1	Train composition	(X)	X		X	X	
2.5.2	Train ready	(X)	X			X	
2.5.3	Train readiness forecast	(X)	X			X	
2.6	Train traffic data	(X)	X			X	
3.1.1	Consignment note	(X)				X	
3.2	Movements of freight wagons and their load	(X)	X			X	
3.3	Freight-specific reference data		X		X	X	
4.2	Passenger timetable data					X	X
4.3	Tariff data					X	
4.4	Conditions of carriage					X	X
4.5	Availability and reservation					X	X
4.6	Security elements for product		X			X	

Telematics TSI point	Element of the telematics subsystem	Essential requirements as referred to in Annex III to Directive (EU) 2016/797					
		Safety	Reliability and availability	Health	Environmental protection	Technical compatibility	Accessibility
	distribution						
4.7	Passenger travel information during the train journey			X		X	X
4.8	Common reference data for rail ticketing		X			X	
(X) Where data stored or shared pursuant to this Regulation is intended to be used for the safety of operations, it shall be in accordance with point 1.1 and point 2.7.4 of Annex III to Directive (EU) 2016/797.							

APPENDIX G
IMPLEMENTATION MILESTONES

(1) The subsystem shall be considered to have been deployed by a telematics stakeholder in accordance with this Regulation when the data sharing requirements and messages have been fully implemented in accordance with the specifications set out in this Annex and when corresponding telematics applications used for data sharing have been declared as compliant with this Regulation pursuant to Article 18 and point 1.6 of this Annex and are fully operational (first day of operation).

(2) To fulfil the deadlines laid down in Article 16, paragraphs (2), (3) and (4), each telematics stakeholder shall deploy the telematics subsystem in accordance with the milestones set out in the following table:

Functions	***Basic parameters***	***Milestone***
Capacity management	2.1 – Object identifiers	4.3.2029
	2.3 – Capacity allocation	4.3.2029
Train preparation	2.5.1 – Train composition • Freight rail transport services • Passenger rail transport services	9.12.2029
	2.5.2 – Train ready	9.12.2029
	2.5.3 – Train readiness forecast	9.12.2029
Traffic management	2.6 – Train traffic data • Freight services • Passenger services	 9.12.2029 10.12.2028
Management of freight wagons and their load	3.1.1 – Consignment note	9.12.2029
	3.2.1 – Wagon running information	9.12.2029
	3.2.3 – Wagon forecast information	9.12.2029
Reference data	1.2 – Common reference data • organisations • locations	13.12.2026
	3.3.2 – Rolling stock reference data	10.12.2028
	3.3.3 – Intermodal loading unit reference data	10.12.2028
	3.3.4 – Wagon and intermodal loading unit operational data	-/-
	4.8 – Common reference data for rail ticketing	10.12.2028

Functions	*Basic parameters*	*Milestone*
Rail ticketing of passenger rail transport services	4.2.1 – Passenger timetable data	14.12.2025
	4.2.2 – Passenger timetable data of connection times	12.12.2027
	4.3 – Tariff data	10.12.2028
	4.4 – Conditions of carriage	13.12.2026
	4.5 – Availability and reservations	10.6.2029
	4.6 – Security elements for product distribution	13.12.2026
Passenger travel information	4.7 – Passenger travel information during the train journey	12.12.2027