



FORM 4: NEW WORK ITEM PROPOSAL (NP)

Circulation date Click here to enter a date.	Reference number: Enter Number (to be given by ISO Central Secretariat)
Closing date for voting Click here to enter a date.	ISO/TC 204 /SC Enter Number
Proposer <input checked="" type="checkbox"/> ISO member body: SN (Norway) <input type="checkbox"/> Committee, liaison or other*: Click here to enter text.	<input type="checkbox"/> Proposal for a new PC N Click here to enter text.
Secretariat ANSI	

A proposal for a new work item within the scope of an existing committee shall be submitted to the secretariat of that committee.

The proposer of a new work item may be a member body of ISO, the secretariat itself, another technical committee or subcommittee, an organization in liaison, the Technical Management Board or one of the advisory groups, or the Secretary-General*. See ISO/IEC Directives Part 1, [Clause 2.3.2](#).

The proposer(s) of the new work item proposal shall:

- make every effort to provide a first working draft for discussion, or at least an outline of a working draft;
- nominate a project leader;
- discuss the proposal with the committee leadership prior to submitting the appropriate form, to decide on an appropriate development track (based on market needs) and draft a project plan including key milestones and the proposed date of the first meeting.

The proposal will be circulated to the P-members of the technical committee or subcommittee for voting, and to the O-members for information.

IMPORTANT NOTE

Proposals without adequate justification risk rejection or referral to originator.

Guidelines for proposing and justifying a new work item are contained [in Annex C of the ISO/IEC Directives, Part 1](#).

- The proposer has considered the guidance given in the Annex C during the preparation of the NP.

Resource availability:

- There are resources available to allow the development of the project to start immediately after project approval** (i.e. project leader, related WG or committee work programme).

** if not, it is recommended that the project is first registered as a preliminary work item (a Form 4 is not required for this) and when the development can start, Form 4 should be completed to initiate the NP ballot.

Proposal (to be completed by the proposer, following discussion with the committee leadership)

Title of the proposed deliverable

English title

Intelligent Transport Systems- Guided transportation service planning data exchange

French title (if available)

Systèmes de transport intelligents - Échange de données pour la planification d'un service de transport guidé

(In the case of an amendment, revision or a new part of an existing document, include the reference number and current title)

Scope of the proposed deliverable

The standard is applicable for the track-bound* transportation sector and the data exchange between organizations and their IT-systems. The data exchange facilitates for planning of vehicle operations.

To achieve this, the infrastructure and rolling stock must be described with a clearly defined meaning from an operational perspective. This will facilitate run time calculations to be made (not part of the standard), which will result in operational timetables which again result in public timetables (not part of the standard).

The standard focuses on exchange of this information about operational functionality of the infrastructure, rolling stock and timetable.

This data needs to be able to be exchanged efficient and unambiguous between organisations in the transportation sector.

The work item will include a mapping between elements existing in both the new standard (Intelligent Transport Systems-Guided transportation service planning data exchange) and the following specific existing standards:

- RINF (EU decision 2014/880)
- TAF/TAP (EU directive 2001/16)
- NeTEX (CEN/TS 16614-1/2)

* A track-bound (also known as a guided-way) transportation system consists of the systems: railway, metro (steel or rubber wheels), tram, cable cars, funiculars, maglev, hyperloop, guided busway or other track bound (guided) vehicle. In the standard the railway system will be the primary focus, but all other mentioned systems can be applied.

Purpose and justification of the proposal

Data exchange of operational functionality of infrastructure, rolling stock and timetable for planning purposes are today done according to national standards, and is often paper based. These standards are limited available and are followed to a varying degree. This makes data exchange in the field very difficult, work intensive and error prone. An international machine readable, clearly defined, data exchange format will increase efficiency, safety, interoperability, availability, foster innovation, promote competition, avoid vendor lock in, punctuality and capacity. Furthermore, it will foster innovation, promote competition and avoid vendor lock in.

The exchange format will be an Extensible Markup Language (XML) description, where the structure is defined in existing XSD schema files, and the data set definitions in an existing wiki. It might be used as pattern for an JSON syntax too.

The following benefits/impact are expected to be created for the track-bound transportation sector by the document:

- Improvement of interoperability
With standardized data modelling, interfaces, components and data exchange the interoperability will be enhanced on a global level.
- Increase of availability
Standardized data modelling and data exchange improves the efficiency of systems and cross-vendor compatibility, which increases availability of the transportation system.
- Increase of accuracy and efficiency
Standardized information exchange with machine-readable data will greatly improve efficiency and reduce errors from today's paper or digital paper-based planning.
- Fostering of innovation
Data modelling and data exchange standards in this transportation sector will open the market for private enterprises and thus support the development of innovative data-driven solutions for IT applications. Moreover, the time-to-market for systems and technologies based on these standards can be reduced significantly, which leads to an acceleration of development.
- Promotion of competition
Open standards and interfaces allow new parties to enter and participate in the market. E.g. new public order initiatives like the European union railway packages demands transparent and correct data to be available in a standardized data format.
- Cost reduction
Standardisation reduces life-cycle costs and increases competition. Furthermore, it will reduce unnecessary opposite or parallel developments and overcome cross-border obstacles to further developments. All lead to more cost-effective operations.
- Improvement of punctuality and capacity
Deriving from improved processes in the whole sector also passengers and freight forwarders will see the improvements by means of better punctuality, improved passenger and customer information or energy savings by enhanced collaboration. This will lead to improved customer experience

- [Support of international research collaboration](#)

Applying the document for data modelling and exchange in the transportation field is the required starting point for coordinated information seeking, identification and data collection. It builds the basis for effective sharing and purposeful dissemination of scientific results throughout the whole sector worldwide and helps to overcome language barriers.

Consider the following:

Is there a verified market need for the proposal?

What problem does this document solve?

What value will the document bring to end-users?

See [Annex C](#) of the ISO/IEC Directives part 1 for more information.

See the following guidance on justification statements in the brochure 'Guidance on New work': <https://www.iso.org/publication/PUB100438.html>

Please select any UN Sustainable Development Goals (SDGs) that this document will support. For more information on SDGs, please visit our website at www.iso.org/SDGs."

- GOAL 1:** No Poverty
- GOAL 2:** Zero Hunger
- GOAL 3:** Good Health and Well-being
- GOAL 4:** Quality Education
- GOAL 5:** Gender Equality
- GOAL 6:** Clean Water and Sanitation
- GOAL 7:** Affordable and Clean Energy
- GOAL 8:** Decent Work and Economic Growth
- GOAL 9:** Industry, Innovation and Infrastructure
- GOAL 10:** Reduced Inequality
- GOAL 11:** Sustainable Cities and Communities
- GOAL 12:** Responsible Consumption and Production
- GOAL 13:** Climate Action
- GOAL 14:** Life Below Water
- GOAL 15:** Life on Land
- GOAL 16:** Peace and Justice Strong Institutions
- N/A **GOAL 17:** Partnerships to achieve the Goal

Preparatory work

(An outline should be included with the proposal)

- A draft is attached
- An outline is attached
- An existing document will serve as the initial basis

The proposer or the proposer's organization is prepared to undertake the preparatory work required: Yes No

If a draft is attached to this proposal

Please select from one of the following options (note that if no option is selected, the default will be the first option):

- Draft document can be registered at Working Draft stage (WD – stage 20.00)
- Draft document can be registered at Committee Draft stage (CD – stage 30.00)
- Draft document can be registered at Draft International Standard stage (DIS – stage 40.00)

- If the attached document is copyrighted or includes copyrighted content, the proposer confirms that copyright permission has been granted for ISO to use this content in compliance with [clause 2.13](#) of the ISO/IEC Directives, Part 1 (see also the [Declaration on copyright](#)).

Is this a Management Systems Standard (MSS)?

- Yes No

NOTE: if Yes, the NP along with the Justification study (see [Annex SL of the Consolidated ISO Supplement](#)) must be sent to the MSS Task Force secretariat (tmb@iso.org) for approval before the NP ballot can be launched.

Indication of the preferred type or types of deliverable to be developed

- International Standard
- Technical Specification
- Publicly Available Specification

Proposed Standard Development Track (SDT)

To be discussed between proposer and Secretary considering, for example, when does the market (the users) need the document to be available, the maturity of the subject etc.

- 18 months* 24 months 36 months 48 months

* Projects using SDT 18 are eligible for the 'Direct publication process' offered by ISO /CS which reduces publication processing time by approximately 1 month.

Draft project plan (as discussed with committee leadership)

Proposed date for first meeting: [30.03.2020](#)

Proposed dates for key milestones: [Click here to enter a date.](#)

1st Working Draft (if any) circulated to experts: [Click here to enter a date.](#)

Committee Draft ballot (if any): [Click here to enter a date.](#)

DIS submission*: [30.03.2021](#)

Publication*: [30.03.2022](#)

* Target Dates on DIS submission and Publication should preferably be set a few weeks ahead of the limit dates (automatically given by the selected SDT).

For guidance and support on project management; descriptions of the key milestones; and to help you define your project plan and select the appropriate development track, see: go.iso.org/projectmanagement

NOTE: The draft project plan is later used to create a detailed project plan, when the project is approved.

Known patented items (see ISO/IEC Directives, Part 1, [clause 2.14](#) for important guidance)

Yes No

If "Yes", provide full information as annex

Co-ordination of work

To the best of your knowledge, has this or a similar proposal been submitted to another standards development organization?

Yes No

If "Yes", please specify which one(s):

[Click here to enter text.](#)

A statement from the proposer as to how the proposed work may relate to or impact on existing work, especially existing ISO and IEC deliverables. The proposer should explain how the work differs from apparently similar work, or explain how duplication and conflict will be minimized

Projects within ISO/TC 204 (Intelligent transport systems) relate to the proposed project, but duplication or conflict has not been identified. Since the proposed project relates to railway operations, infrastructure and rolling stock. ISO/TC 269 also relates to the proposed project, but no duplication or conflict has been identified for this TC either. Seek to have liaison with TC 269 and CEN TC 278 WG 3

A listing of relevant existing documents at the international, regional and national levels

- wiki.railml.org: a wiki defining data sets according to RailML 2
- [EU decision 2014/880 COMMISSION IMPLEMENTING DECISION of 26 November 2014 on the common specifications of the register of railway infrastructure](#)
- [CEN EN 12896 Road transport and traffic telematics -Public transport - Reference data model.](#)
- [CEN TS 16614: Public transport - Network and Timetable Exchange \(NeTEx\) .](#)

Please fill out the relevant parts of the table below to identify relevant affected stakeholder categories and how they will each benefit from or be impacted by the proposed deliverable(s)		
	Benefits/impacts	Examples of organizations/companies to be contacted
Industry and commerce – large industry	Standardized data modelling and data exchange in combination with standardized interfaces and components will improve interoperability of the European railway sector and reduce life-cycle costs and planning resources needed significantly. The applied standard will have a positive impact on train operation and thus directly contribute to improving customer experiences.	Railway operators and infrastructure managers Examples: Bane NOR, SBB/CFF/FFS, Deutsche Bahn, SZDC, Saudi Railways, JR East, China Railways, ADIF, Metrolinx,
Industry and commerce – SMEs	Focus on development work is possible directly without creating interfaces, transferring data, etc. Standards for data modelling and data exchange in railways will open the market also for private enterprises to develop innovative data driven solutions for railway IT applications.	Consulting firms and (IT) system suppliers
Government	Increased information leads to better decisions for more efficient use of public resources.	Transport authorities
Consumers	Better punctuality, improved passenger and customer information or energy savings by enhanced train collaboration.	Passengers and freight forwarders
Labour	Eliminate tiring and error-prone process of transferring data manually or creating new interfaces over and over again. Makes room for important work, e.g. analysis of capacity in national network.	Railway operators and related organizations
Academic and research bodies	Effective sharing and purposeful dissemination of the scientific results possible, which fosters innovation. Various input data in same format available.	Universities and R&D institutions
Standards application businesses	Click here to enter text.	Click here to enter text.
Non-governmental organizations	Click here to enter text.	Click here to enter text.
Other (please specify)	Click here to enter text.	Click here to enter text.

<p>Liaisons</p> <p>A listing of relevant external international organizations or internal parties (other ISO and/or IEC committees) to be engaged as liaisons in the development of the deliverable(s).</p> <p>railML.org e.V. ISO/TC 269 ISO/TC 211</p>	<p>Joint/parallel work</p> <p>Possible joint/parallel work with</p> <p><input type="checkbox"/> IEC (please specify committee ID) Click here to enter text.</p> <p><input checked="" type="checkbox"/> CEN (please specify committee ID) CEN TC 278 WG 3</p> <p><input type="checkbox"/> Other (please specify) Click here to enter text.</p>
<p>A listing of relevant countries which are not already P-members of the committee</p> <p>Click here to enter text.</p> <p>NOTE: The committee manager shall distribute this NP to the ISO members of the countries listed above to ask if they wish to participate in this work</p>	
<p>Proposed Project Leader (name and e-mail address)</p> <p>Torben Brand torben.brand@jernbanedirektoratet.no</p>	<p>Name of the Proposer (include contact information)</p> <p>Standards Norway Bjørn Brunstad BBR@standard.no</p>
<p>This proposal will be developed by</p> <p><input checked="" type="checkbox"/> An existing Working Group (please specify which one: WG 8, or WG 7?)</p> <p><input type="checkbox"/> A new Working Group (title: Click here to enter text.) (Note: establishment of a new WG must be approved by committee resolution)</p> <p><input type="checkbox"/> The TC/SC directly</p> <p><input type="checkbox"/> To be determined</p>	
<p>Supplementary information relating to the proposal</p> <p><input checked="" type="checkbox"/> This proposal relates to a new ISO document;</p> <p><input type="checkbox"/> This proposal relates to the adoption as an active project of an item currently registered as a Preliminary Work Item;</p> <p><input type="checkbox"/> This proposal relates to the re-establishment of a cancelled project as an active project.</p> <p><input type="checkbox"/> Other: Click here to enter text.</p>	

Maintenance agencies (MA) and registration authorities (RA)

- This proposal requires the service of a **maintenance agency**.

If yes, please identify the potential candidate:

[Click here to enter text.](#)

- This proposal requires the service of a **registration authority**.

If yes, please identify the potential candidate:

[Click here to enter text.](#)

NOTE: Selection and appointment of the MA or RA is subject to the procedure outlined in the [ISO/IEC Directives](#), Annex G and Annex H, and the RA policy in the ISO Supplement, Annex SN.

- Annex(es) are included with this proposal (give details)

[Click here to enter text.](#)

Additional information/questions

[Click here to enter text.](#)

Annex – Document outline

1. Scope

The standard is and an open, XML-based, data file format which enables an efficient and unambiguous exchange of static description of a track-bound transportation system* operational functionality of its infrastructure, rolling stock and its timetable.

* A track-bound (also known as a guided-way) transportation system consists of the sub systems: railway, metro (steel or rubber wheels), tram, cable cars, funiculars, maglev, hyperloop, guided busway or other track bound (guided) vehicle. In the standard the railway system will be the primary focus, but all other mentioned systems can be applied.

The purpose of the standard is to facilitate for planning of railway operations between organisations in the transportation sector and not towards the public.

The following timeframes are covered by the standard:

- Conceptual plan: usually years in advance of construction of the new or improved infrastructure
- Strategic plan: usually for new timetable concepts, and/or new rolling stock and/or improved infrastructure.
- Tactical plan/schedule: usually for a new timetable
- Operational plan/schedule: usually for short term changes to the timetable up to only hours in advance to implementation.
- Historic data: used timetables, rolling stock and infrastructure.

The standards purpose is not to facilitate the time frame for real time operational data.

The standard does not define the IT communication, versioning or other properties of the file. The standard creates a static file with a fixed description. If some objects that are describe change, a new file with the changed objects together with the unchanged objects needs to be created and exchanged to be able to communicate the new state of the objects.

The standard provides input data and describes the results from the following railway or rail-based transportation system use cases:

- Operational timetable planning for tenders, long- and short-term planning
Also see definition of "internal schedules" in [Wikipedia](#) and also railML use case "[ATimetableForACompetition](#)" and "[LongTermStrategicTimetabling](#)"
- Runtime calculations and operational simulations (operational functionality) of rolling stock. See also railML use case "[OperationalSimulation](#)"
- Passenger assets of rolling stock for operational planning. Amount of operational services and places, but not the individual items. See example in railML2.4 [RS:places](#).
- Schematic track plans for infrastructure planning. See railML use case "[Schematic Track Plan](#)"
- Signal routes for operational timetable simulation. See railML use case "[IL:Simulation](#)".
- Network statement of an infrastructure manager annex asset descriptions as defined in directive [2001/14/EC article 3](#) and ANNEX I, in [RNE Network Statement Common Structure](#) chapter 3 and in [Directive 2012/34/EU Article 27](#) and Annex IV. See also railML use case "[NetworkStatement](#)"

Only data elements, attributes and values which are necessary to the listed use cases is included in the standard.

The scope excludes the following:

- Exchange of public published transportation schedules (on stations, in the train, in apps etc.) Also see "publicly available schedules" in [Wikipedia](#).
- Building information modelling (BIM). Also see "building information modelling" in [Wikipedia](#).
- Asset management including maintenance state Also see "asset management" in [Wikipedia](#)
- Interlocking logics and hardware design of signalling systems.). Also see "interlocking" in [Wikipedia](#).
- Geometric and spatial engineering design Also see "geometric design of roads" in [Wikipedia](#).
- Geographic information systems (GIS). Also see "geographic information system" in [Wikipedia](#).
- Special and additional TAF/TAP requirements according to EU directive [2001/16](#).
- Special and additional RINF requirements according to EU decision [2014/880](#).

The standard seeks to integrate to other standards across transportation modes for all public transport. The goal is to identify and connect the key objects in the proposed standard to the equivalent key objects in already existing transportation model standards. This will be achieved through liaison with selected existing transportation model standards and within the ISO WG "Public transportation".

In order to facilitate conversion of overlapping elements between ISO "Railway markup language" with other standards, the semantics of elements, the attributes and their values will be well documented. This requires support for the mapping from the overlapping standards.

The standard includes a mapping between elements existing in both the new standard (railway markup language) and the following specific existing standards:

- RINF
- TAF/TAP
- NeTEX (CEN/TS 16614-1/2)

This requires common work between the mutual working groups. This to facilitate the exchange between the existing standards and the new developed standard.

2. Normative references

T.B.D.

3. Terms and definitions

T.B.D.

4. Intelligent Transport Systems- Guided transportation service planning data exchange

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The Standard, is based on the current railML schema that has been developed by the organization railML.org. railML is well documented at <https://www.railml.org/>, including a wiki at <https://wiki.railml.org/>.

(The Standard will include the specification of the schema "railML.xsd" as documented at <https://www.railml.org/files/download/schemas/2018/railML-2.4/documentation/railML.html>.

The final International Standard will be published *either* as a brief textual document with hyperlinks to the railML schema at www.railML.org, *or* as a package of html documents similar to the publication format of International Standard ISO 16739-1:2018 *Industry Foundation Classes (IFC) for data sharing in the construction and facility management industries — Part 1: Data schema*. A decision regarding the publication format will be taken by the ISO Technical Committee.)

The railML schema consists of the following schema files, which will be documented in the standard:

 genericRailML.xsd	22 kB
 infrastructure.xsd	57 kB
 infrastructureTypes.xsd	118 kB
 physicalUnits.xsd	16 kB
 railML.xsd	22 kB
 railwayBaseTypes.xsd	32 kB
 railwayUnits.xsd	6 kB
 rollingstock.xsd	45 kB
 rollingstockTypes.xsd	102 kB
 timetable.xsd	39 kB
 timetableTypes.xsd	61 kB

Below is included (in rather compact form to save space) the complete top-level schema file, railML.xsd:

```
<?xml version="1.0" encoding="UTF-8"?>
<!-- $Id: railML.xsd 850 2018-09-24 08:30:11Z christian.rahmig $ -->
<xs:schema version="2.4" elementFormDefault="qualified"
targetNamespace="https://www.railml.org/schemas/2018" xmlns:dc="http://purl.org/dc/elements/1.1/"
xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:rail="https://www.railml.org/schemas/2018">
<xs:annotation>
<xs:documentation>Copyright (c) railML.org e.V. Dresden/Germany; All Rights Reserved.</xs:documentation>
<xs:documentation>This work is licensed under the restricted Creative Commons Attribution-NonCommercial-
NoDerivs 3.0 Unported License with additional license conditions of railML.org.</xs:documentation>
<xs:documentation>For further information see: https://www.railml.org/licence</xs:documentation>
<xs:documentation>Content of this file: XML Schema for railML(R) 2.4 Definition of root element "railml", refers to
elements of all sub schemas from "xs:include" paths</xs:documentation>
</xs:annotation>

<xs:include schemaLocation="infrastructure.xsd"/>
<xs:include schemaLocation="rollingstock.xsd"/>
<xs:include schemaLocation="timetable.xsd"/>

<xs:element name="railml"> <xs:complexType> <xs:annotation> <xs:documentation
source="http://wiki.railml.org/index.php?title=CO:railml"/> </xs:annotation> <xs:sequence> <xs:element
name="metadata" minOccurs="0" type="rail:tMetadata"> <xs:annotation> <xs:documentation
source="http://wiki.railml.org/index.php?title=CO:metadata"/> </xs:annotation> </xs:element> <xs:element
minOccurs="0" ref="rail:infrastructure"> <xs:annotation> <xs:documentation>"subschema Infrastructure (IS)" can
be outsourced in extra file and imported with xi:include mechanism</xs:documentation> </xs:annotation>
```

```

</xs:element> <xs:element minOccurs="0" ref="rail:infrastructureVisualizations"> <xs:annotation>
<xs:documentation>use this branch to model explicit visualizations of infrastructure data</xs:documentation>
</xs:annotation> </xs:element> <xs:element minOccurs="0" ref="rail:rollingstock"> <xs:annotation>
<xs:documentation>"subschema Rollingstock (RS)" can be outsourced in extra file and imported with xi:include
mechanism</xs:documentation> </xs:annotation> </xs:element> <xs:element minOccurs="0" ref="rail:timetable">
<xs:annotation> <xs:documentation>"subschema Timetable (TT)" can be outsourced in extra file and imported with
xi:include mechanism</xs:documentation> </xs:annotation> </xs:element> </xs:sequence> <xs:attribute
name="version" type="rail:tRailMLVersion"> <xs:annotation> <xs:documentation>supported railML version should
be declared for software compatibility reasons, valid for all subschemas, don't mix railML versions between
subschemas in one XML file</xs:documentation> </xs:annotation> </xs:attribute> </xs:complexType> <!--
infrastructureManager identity in metadata --> <xs:key name="infrastructureManagerKey"><xs:selector
xpath="//rail:organizationalUnits/rail:infrastructureManager"/> <xs:field xpath="@id"/> </xs:key> <!--
infrastructureManager reference in infrastructure subschema --> <xs:keyref name="infrastructureManager-
ownerKeyref" refer="rail:infrastructureManagerKey"><xs:selector xpath="//rail:infraAttributes/rail:owner"/>
<xs:field xpath="@infrastructureManagerRef"/> </xs:keyref> <xs:keyref name="infrastructureManager-
ownerChangeKeyref" refer="rail:infrastructureManagerKey"><xs:selector xpath="//rail:ownerChange"/>
<xs:field xpath="@infrastructureManagerRef"/> </xs:keyref> <xs:keyref name="infrastructureManager-lineKeyref"
refer="rail:infrastructureManagerKey"><xs:selector xpath="//rail:line"/> <xs:field
xpath="@infrastructureManagerRef"/> </xs:keyref> <!-- vehicleManufacturer identity in metadata --> <xs:key
name="vehicleManufacturerKey"><xs:selector xpath="//rail:organizationalUnits/rail:vehicleManufacturer"/>
<xs:field xpath="@id"/> </xs:key> <!-- vehicleManufacturer reference in rollingstock subschema --> <xs:keyref
name="vehicleManufacturer-manufacturerKeyref" refer="rail:vehicleManufacturerKey"><xs:selector
xpath="//rail:classification/rail:manufacturer"/> <xs:field xpath="@vehicleManufacturerRef"/> </xs:keyref> <!--
vehicleOperator identity in metadata --> <xs:key name="vehicleOperatorKey"><xs:selector
xpath="//rail:organizationalUnits/rail:vehicleOperator"/> <xs:field xpath="@id"/> </xs:key> <!-- vehicleOperator
reference in rollingstock subschema --> <xs:keyref name="vehicleOperator-operatorKeyref"
refer="rail:vehicleOperatorKey"><xs:selector xpath="//rail:classification/rail:operator"/> <xs:field
xpath="@vehicleOperatorRef"/> </xs:keyref> <!-- customer identity in metadata --> <xs:key
name="customerKey"><xs:selector xpath="//rail:organizationalUnits/rail:customer"/> <xs:field xpath="@id"/>
</xs:key> <!-- customer reference in timetable subschema --> <xs:keyref name="customer-customerKeyref"
refer="rail:customerKey"><xs:selector xpath="//rail:organizationalUnitBinding/rail:customer"/> <xs:field
xpath="@ref"/> </xs:keyref> <!-- railwayUndertaking identity in metadata --> <xs:key
name="railwayUndertakingKey"><xs:selector xpath="//rail:organizationalUnits/rail:railwayUndertaking"/>
<xs:field xpath="@id"/> </xs:key> <!-- railwayUndertaking reference in timetable subschema --> <xs:keyref
name="railwayUndertaking-railwayUndertakingKeyref" refer="rail:railwayUndertakingKey"><xs:selector
xpath="//rail:organizationalUnitBinding/rail:railwayUndertaking"/> <xs:field xpath="@ref"/> </xs:keyref> <!--
operationalUndertaking identity in metadata --> <xs:key name="operationalUndertakingKey"><xs:selector
xpath="//rail:organizationalUnits/rail:operationalUndertaking"/> <xs:field xpath="@id"/> </xs:key> <!--
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operationalUndertakingKeyref" refer="rail:operationalUndertakingKey"><xs:selector
xpath="//rail:organizationalUnitBinding/rail:operationalUndertaking"/> <xs:field xpath="@ref"/> </xs:keyref> <!--
concessionaire identity in metadata --> <xs:key name="concessionaireKey"><xs:selector
xpath="//rail:organizationalUnits/rail:concessionaire"/> <xs:field xpath="@id"/> </xs:key> <!-- concessionaire
reference in timetable subschema --> <xs:keyref name="concessionaire-concessionaireKeyref"
refer="rail:concessionaireKey"><xs:selector xpath="//rail:organizationalUnitBinding/rail:concessionaire"/>
<xs:field xpath="@ref"/> </xs:keyref> <!-- contractor identity in metadata --> <xs:key
name="contractorKey"><xs:selector xpath="//rail:organizationalUnits/rail:contractor"/> <xs:field xpath="@id"/>
</xs:key> <!-- contractor reference in timetable subschema --> <xs:keyref name="contractor-contractorKeyref"
refer="rail:contractorKey"><xs:selector xpath="//rail:organizationalUnitBinding/rail:contractor"/> <xs:field
xpath="@ref"/> </xs:keyref> <!-- ocp identity in infrastructure subschema --> <xs:key name="ocpKey"><xs:selector
xpath="//rail:operationControlPoints/rail:ocp"/> <xs:field xpath="@id"/> </xs:key> <!-- ocp reference in
infrastructure subschema --> <xs:keyref name="ocp-macroscopicNodeKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:macroscopicNode"/> <xs:field xpath="@ocpRef"/> </xs:keyref> <xs:keyref name="ocp-switchKeyref"
refer="rail:ocpKey"><xs:selector xpath="//rail:switch"/> <xs:field xpath="@ocpStationRef"/>
</xs:keyref> <xs:keyref name="ocp-crossSectionKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:crossSections/rail:crossSection"/> <xs:field xpath="@ocpRef"/> </xs:keyref> <xs:keyref name="ocp-
levelCrossingsKeyref" refer="rail:ocpKey"><xs:selector xpath="//rail:levelCrossings/rail:levelCrossing"/>
<xs:field xpath="@ocpStationRef"/> </xs:keyref> <xs:keyref name="ocp-signalKeyref"
refer="rail:ocpKey"><xs:selector xpath="//rail:signals/rail:signal"/> <xs:field xpath="@ocpStationRef"/>
</xs:keyref> <xs:keyref name="ocp-trainDetectorKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:trainDetectionElements/rail:trainDetector"/> <xs:field xpath="@ocpStationRef"/>
</xs:keyref> <xs:keyref name="ocp-trackCircuitBorderKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:trainDetectionElements/rail:trackCircuitBorder"/> <xs:field xpath="@ocpStationRef"/>
</xs:keyref> <xs:keyref name="ocp-platformEdgeKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:platformEdges/rail:platformEdge"/> <xs:field xpath="@ocpRef"/> </xs:keyref> <xs:keyref

```

```

name="ocp-serviceSectionKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:serviceSections/rail:serviceSection"/> <xs:field xpath="@ocpRef"/> </xs:keyref><xs:keyref
name="ocp-stopPostKeyref" refer="rail:ocpKey"><xs:selector xpath="//rail:stopPosts/rail:stopPost"/> <xs:field
xpath="@ocpRef"/> </xs:keyref><xs:keyref name="ocp-locallyControlledAreaKeyref"
refer="rail:ocpKey"><xs:selector xpath="//rail:trackGroups/rail:locallyControlledArea"/> <xs:field
xpath="@ocpStationRef"/> </xs:keyref><xs:keyref name="ocp-stateKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:states/rail:state/rail:*"/> <xs:field xpath="@ocpRef"/> </xs:keyref><xs:keyref name="ocp-signal-
signalBoxKeyref" refer="rail:ocpKey"><xs:selector xpath="//rail:signals/rail:signal"/> <xs:field
xpath="@signalBoxOcpRef"/> <!-- Deprecated --> </xs:keyref><xs:keyref name="ocp-signal-stationKeyref"
refer="rail:ocpKey"><xs:selector xpath="//rail:signals/rail:signal"/> <xs:field xpath="@stationOcpRef"/> <!--
Deprecated --> </xs:keyref><xs:keyref name="ocp-locallyControlledArea-shortKeyref"
refer="rail:ocpKey"><xs:selector xpath="//rail:trackGroups/rail:locallyControlledArea"/> <xs:field
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name="ocp-ocpTTKeyref" refer="rail:ocpKey"><xs:selector xpath="//rail:ocpsTT/rail:ocpTT"/> <xs:field
xpath="@ocpRef"/> </xs:keyref><xs:keyref name="ocp-connectionKeyref" refer="rail:ocpKey"><xs:selector
xpath="//rail:ocpTT/rail:connections/rail:connection"/> <xs:field xpath="@ocpRef"/> </xs:keyref><xs:keyref
name="ocp-blockPartStartKeyref" refer="rail:ocpKey"><xs:selector xpath="//rail:blockParts/rail:blockPart"/>
<xs:field xpath="@startOcpRef"/> </xs:keyref><xs:keyref name="ocp-blockPartEndKeyref"
refer="rail:ocpKey"><xs:selector xpath="//rail:blockParts/rail:blockPart"/> <xs:field xpath="@endOcpRef"/>
</xs:keyref> <!-- track identity in infrastructure subschema --> <xs:key name="trackKey"> <xs:selector
xpath="//rail:tracks/rail:track"/> <xs:field xpath="@id"/> </xs:key> <!-- track reference in infrastructure subschema -
--> <xs:keyref name="track-lineKeyref" refer="rail:trackKey"> <xs:selector
xpath="//rail:trackGroups/rail:line/rail:trackRef"/> <xs:field xpath="@ref"/> </xs:keyref><xs:keyref name="track-
locallyControlledAreaKeyref" refer="rail:trackKey"> <xs:selector
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</xs:keyref><xs:keyref name="track-ocpKeyref" refer="rail:trackKey"> <xs:selector
xpath="//rail:operationControlPoints/rail:ocp/rail:propEquipment/rail:trackRef"/> <xs:field xpath="@ref"/>
</xs:keyref> <!-- track reference in timetable subschema --> <xs:keyref name="track-ocpTTKeyref"
refer="rail:trackKey"> <xs:selector xpath="//rail:ocpsTT/rail:ocpTT"/> <xs:field xpath="@trackRef"/>
</xs:keyref><xs:keyref name="track-sectionTTKeyref" refer="rail:trackKey"> <xs:selector
xpath="//rail:ocpTT/rail:sectionTT/rail:trackRef"/> <xs:field xpath="@ref"/> </xs:keyref> <!-- line identity in
infrastructure subschema --> <xs:key name="lineKey"> <xs:selector xpath="//rail:trackGroups/rail:line"/> <xs:field
xpath="@id"/> </xs:key> <!-- line reference in infrastructure subschema --> <xs:keyref name="line-
signalLineKeyref" refer="rail:lineKey"> <xs:selector xpath="//rail:signal/rail:line"/> <xs:field xpath="@ref"/>
</xs:keyref><xs:keyref name="line-signalMilepostKeyref" refer="rail:lineKey"> <xs:selector
xpath="//rail:signal/rail:milepost"/> <xs:field xpath="@lineRef"/> </xs:keyref> <!-- line reference in timetable
subschema --> <xs:keyref name="line-sectionTTKeyref" refer="rail:lineKey"> <xs:selector
xpath="//rail:ocpTT/rail:sectionTT"/> <xs:field xpath="@lineRef"/> </xs:keyref> <!-- vehicle identity in rollingstock
subschema --> <xs:key name="vehicleKey"> <xs:selector xpath="//rail:vehicles/rail:vehicle"/> <xs:field
xpath="@id"/> </xs:key> <!-- vehicle reference in rollingstock subschema --> <xs:keyref name="vehicle-
vehicleFamilyKeyref" refer="rail:vehicleKey"> <xs:selector xpath="//rail:vehicles/rail:vehicle"/> <xs:field
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refer="rail:vehicleKey"> <xs:selector xpath="//rail:trainOrder/rail:vehicleRef"/> <xs:field xpath="@vehicleRef"/>
</xs:keyref> <!-- vehicle reference in timetable subschema --> <xs:keyref name="vehicle-bookingKeyref"
refer="rail:vehicleKey"> <xs:selector xpath="//rail:reservationInfo/rail:booking"/> <xs:field xpath="@vehicleRef"/>
</xs:keyref><xs:keyref name="vehicle-rosteringKeyref" refer="rail:vehicleKey"> <xs:selector
xpath="//rail:rosterings/rail:rostering"/> <xs:field xpath="@vehicleRef"/> </xs:keyref><xs:keyref name="vehicle-
blockPartKeyref" refer="rail:vehicleKey"> <xs:selector xpath="//rail:blockParts/rail:blockPart"/> <xs:field
xpath="@vehicleRef"/> </xs:keyref> <!-- formation identity in rollingstock subschema --> <xs:key
name="formationKey"> <xs:selector xpath="//rail:formations/rail:formation"/> <xs:field xpath="@id"/> </xs:key>
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refer="rail:formationKey"> <xs:selector xpath="//rail:trainParts/rail:trainPart/rail:formationTT"/> <xs:field
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refer="rail:formationKey"> <xs:selector xpath="//rail:rosterings/rail:rostering"/> <xs:field
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refer="rail:formationKey"> <xs:selector xpath="//rail:blockParts/rail:blockPart"/> <xs:field
xpath="@formationRef"/> </xs:keyref> <!-- category identity in timetable subschema --> <xs:key
name="categoryKey"> <xs:selector xpath="//rail:categories/rail:category"/> <xs:field xpath="@id"/> </xs:key> <!--
category reference in timetable subschema --> <xs:keyref name="category-trainPartKeyref"
refer="rail:categoryKey"> <xs:selector xpath="//rail:trainParts/rail:trainPart"/> <xs:field xpath="@categoryRef"/>
</xs:keyref><xs:keyref name="category-trainPartSequenceKeyref" refer="rail:categoryKey"> <xs:selector
xpath="//rail:trains/rail:train/rail:trainPartSequence"/> <xs:field xpath="@categoryRef"/> </xs:keyref> <!--
category reference in rollingstock subschema --> <xs:keyref name="category-formationKeyref"
refer="rail:categoryKey"> <xs:selector xpath="//rail:formations/rail:formation/rail:categoryRef"/> <xs:field
xpath="@ref"/> </xs:keyref> <!-- speed profile identity in infrastructure subschema --> <xs:key

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Form 4: New work item proposal (NP)

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name="speedProfileKey"><xs:selector xpath="//rail:speedProfiles/rail:speedProfile"/> <xs:field xpath="@id"/>
</xs:key> <!-- speed profile reference in timetable subschema --> <xs:keyref name="speedProfile-
trainPartSequenceKeyref" refer="rail:speedProfileKey"><xs:selector
xpath="//rail:trainPartSequence/rail:speedProfileRef"/> <xs:field xpath="@ref"/> </xs:keyref> <!-- stop post
identity in infrastructure subschema --> <xs:key name="stopPostKey"><xs:selector
xpath="//rail:stopPosts/rail:stopPost"/> <xs:field xpath="@id"/> </xs:key> <!-- stop post reference in timetable
subschema --> <xs:keyref name="stopPost-stopDescriptionKeyref" refer="rail:stopPostKey"><xs:selector
xpath="//rail:ocpsTT/rail:ocpTT/rail:stopDescription"/> <xs:field xpath="@stopPostRef"/> </xs:keyref> <!--
platform edge identity in infrastructure subschema --> <xs:key name="platformEdgeKey"><xs:selector
xpath="//rail:platformEdges/rail:platformEdge"/> <xs:field xpath="@id"/> </xs:key> <!-- platform edge reference in
infrastructure subschema --> <xs:keyref name="platformEdge-platformEdgeKeyref"
refer="rail:platformEdgeKey"><xs:selector xpath="//rail:platformEdges/rail:platformEdge"/> <xs:field
xpath="@parentPlatformEdgeRef"/> </xs:keyref> <xs:keyref name="platformEdge-stopPostKeyref"
refer="rail:platformEdgeKey"><xs:selector xpath="//rail:stopPosts/rail:stopPost"/> <xs:field
xpath="@platformEdgeRef"/> </xs:keyref> <!-- platform edge reference in timetable subschema --> <xs:keyref
name="platformEdge-stopDescriptionKeyref" refer="rail:platformEdgeKey"><xs:selector
xpath="//rail:stopDescription/rail:platformEdgeRef"/> <xs:field xpath="@ref"/> </xs:keyref> <!-- service section
identity in infrastructure subschema --> <xs:key name="serviceSectionKey"><xs:selector
xpath="//rail:serviceSections/rail:serviceSection"/> <xs:field xpath="@id"/> </xs:key> <!-- service section
reference in infrastructure subschema --> <xs:keyref name="serviceSection-serviceSectionKeyref"
refer="rail:serviceSectionKey"><xs:selector xpath="//rail:serviceSections/rail:serviceSection"/> <xs:field
xpath="@parentServiceSectionRef"/> </xs:keyref> <!-- service section reference in timetable subschema -->
<xs:keyref name="serviceSection-stopDescriptionKeyref" refer="rail:serviceSectionKey"><xs:selector
xpath="//rail:stopDescription/rail:serviceSectionRef"/> <xs:field xpath="@ref"/> </xs:keyref> <!-- operating period
identity in timetable subschema --> <xs:key name="operatingPeriodKey"><xs:selector
xpath="//rail:operatingPeriods/rail:operatingPeriod"/> <xs:field xpath="@id"/> </xs:key> <!-- operating period
reference in timetable subschema --> <xs:keyref name="operatingPeriod-trainPartKeyref"
refer="rail:operatingPeriodKey"> <xs:selector xpath="//rail:trainParts/rail:trainPart/rail:operatingPeriodRef"/>
<xs:field xpath="@ref"/> </xs:keyref> <xs:keyref name="operatingPeriod-stopDescriptionKeyref"
refer="rail:operatingPeriodKey"><xs:selector xpath="//rail:ocpsTT/rail:ocpTT/rail:stopDescription"/> <xs:field
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refer="rail:operatingPeriodKey"><xs:selector xpath="//rail:blockParts/rail:blockPart"/> <xs:field
xpath="@operatingPeriodRef"/> </xs:keyref> <xs:keyref name="operatingPeriod-circulationKeyref"
refer="rail:operatingPeriodKey"><xs:selector xpath="//rail:circulations/rail:circulation"/> <xs:field
xpath="@operatingPeriodRef"/> </xs:keyref> <xs:keyref name="operatingPeriod-circulationNextKeyref"
refer="rail:operatingPeriodKey"><xs:selector xpath="//rail:circulations/rail:circulation"/> <xs:field
xpath="@nextOperatingPeriodRef"/> </xs:keyref> <xs:keyref name="operatingPeriod-annotationKeyref"
refer="rail:operatingPeriodKey"> <xs:selector xpath="//rail:annotationRef"/> <xs:field
xpath="@operatingPeriodRef"/> </xs:keyref> <!-- operating period reference in infrastructure subschema -->
<xs:keyref name="operatingPeriod-stateKeyref" refer="rail:operatingPeriodKey"> <xs:selector
xpath="//rail:states/rail:state"/> <xs:field xpath="@operatingPeriodRef"/> </xs:keyref> <xs:keyref
name="operatingPeriod-speedProfileKeyref" refer="rail:operatingPeriodKey"> <xs:selector
xpath="//rail:speedProfiles/rail:speedProfile"/> <xs:field xpath="@operatingPeriodRef"/> </xs:keyref>
</xs:element> </xs:schema>
```