



Department for Transport

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1. Document Control

1.1 Version History

Version	Author	Summary of changes	Date
3.2.4	PA Consulting	Additional validation rules removed from and changed in notification of objects for Beta updates to data model	October 2024

1.2 Document Review

Version	Reviewer(s)	Date
3.2.4	Jon Harrod Booth (Harrod Booth Consulting, for the Department for Transport)	October 2024

1.3 Approved Versions

Version	Approver(s)	Date
3.2.4	John Cooper (Department for Transport, Product Owner)	October 2024

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2. Terms and Abbreviations

Term / Abbreviation	Definition
D-TRO	Digital Traffic Regulation Order
DfT	Department for Transport
TRA	Traffic Regulation Authority
ICD	Interface Control Document
SWA	Street Work Act (SWA) codes

3. Introduction

Britain is on the verge of a transport revolution and the Department has recently delivered the Future of Mobility, Urban Strategy as part of the Future of Mobility Grand Challenge. The Strategy prioritises providing a regulatory framework that evolves with transport technology and advocates data sharing to improve operation of the transport system.

Traffic Regulation Orders (TROs) are the legal orders made under the Road Traffic Regulation Act 1984 which define the rules of the road network. They currently provide Traffic Regulation Authorities with powers to place permanent, temporary, or experimental restrictions on traffic for the purposes of safety or traffic management. Orders therefore provide a vital mechanism for enforcement on the road network. Digitisation of these orders and providing them as standardised data would provide many benefits, including: (1) improving existing services (e.g., satnav routing); (2) providing new services; (3) reducing enforcement and processing costs to highway authorities; (4) reducing congestion; and (5) provision of the digital infrastructure for connected and automated vehicles.

The Automated Vehicles Act 2024 (section 93) provides the capability for the Secretary of State, through regulation, to require Traffic Regulation Authorities (TRAs) to provide information on a defined set of Traffic Regulation Measures, in a specified manner and form, to be provided in accordance with a specified model, standard or set of specifications. These will be the D-TRO Data Specifications including the D-TRO Data Model, and are expected to be specified under secondary legislation.

This document specifies the semantic validation rules that submitted D-TRO records will be executed against before acceptance into the central storage system.

4. Target Audience

The target audiences of this document include:

- Traffic Regulation Authorities (TRAs) and any Solution Providers that currently manage IT contracts within the authority.
- The D-TRO Service Owner who will be responsible for long-term support, maintenance, and continual improvement of the Service.

5. Validation approach

Schema validation

Schema validation ensures that submitted D-TROs align with the data model. Schema validation is executed at the time of submission. The current version of the schema can be requested through the schema endpoint defined in the ICD or can be found within the D-TRO Beta GitHub repository: <https://github.com/department-for-transport-public/D-TRO>

Semantic validation

Semantic validation ensures that submitted D-TROs contain quality and representational data beyond alignment with the schema. Semantic validation is executed at the time of submission. The current version of the semantic validation rules can be found in section 7. Semantic validation is defined through three approaches. The first is to use JSON native validation where possible to validate ranges or types. The second is to define more complex, dependent rules using Json Logic (<https://jsonlogic.com/>). These rules are defined using the JSON logic syntax and are created under a semantically versioned ruleset. Finally, any more complex rules are defined within the D-TRO service codebase.

Validation strategy for supporting multiple versions

When a D-TRO is submitted the request body must include a version of the data schema that the D-TRO is to be validated against. There is a relationship between the schema version number and a semantic rules version number document. As semantic validation rules are defined in section 7, they are assigned an 'introduced in version' number showing which version they are applied to, therefore any D-TRO submitted with the corresponding schema version will be validated against that versions ruleset and any lower versions ruleset. If a D-TRO is submitted against one version of the schema and semantic rules, future updates can be made against the version of the schema it was originally submitted against. Updates can also be submitted against a higher version of the schema and rules and will be accepted against the higher version if validation is successful.

6. Assumptions, Constraints, Risks and Dependencies

ID	Scenario	Impact
01	D-TRO maintains the D-TRO user code list, which is synchronised with the SWA code list, where the user exists in the SWA code list. The Street Works Act (SWA) code list used is maintained externally by GeoPlace (link here) so may change without notice.	A change to the SWA code list may render previously accepted records or D-TRO user codes invalid if an update is attempted if the code changes.
02	DfT may not be aware of the association between a Traffic Regulation Authority and a Solution Provider.	Records may be rejected if a system is not in place for traffic authorities to nominate solution providers to provide their data.

7. Semantic validation rules

Current Applicable rules

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version
1.	Source.actionType		Each instance shall be unique and one of these values: "new", "amendment", "noChange", "errorFix" Note: this is a subset of the ActionType list.	3.2.1
2.	Source.currentTraOwner		This must be an integer, and numeric value of the integer must match an entry in the D-TRO user code list.	3.2.2
3.	Source.reference		This must be a string.	3.2.0
4.	Source.section		This must be a string.	3.2.0
5.	Source.traAffected		This must be an array of integers, comma separated, and numeric value(s) must match an entry in the D-TRO user code list.	3.2.3

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version
6.	Source.traCreator		This must be an integer, and numeric value must match an entry in the D-TRO user code list.	3.2.2
7.	Source.troName		This must be a string with a descriptor name for the TRO.	3.2.0
8.	Provision.actionType		Each instance shall be unique and one of these values: "new", "amendment", "fullAmend", "partialAmend", "fullRevoke", "partialRevoke", "noChange", "errorFix"	3.2.1
9.	Provision.orderReportingPoint		Shall be one of: "experimentalAmendment", "experimentalMakingPermanent", "experimentalNoticeOfMaking", "experimentalRevocation", "permanentAmendment", "permanentNoticeOfMaking", "permanentNoticeOfProposal", "permanentRevocation", "specialEventOrderNoticeOfMaking", "ttroTtmoByNotice", "ttroTtmoExtension", "ttroTtmoNoticeAfterMaking", "ttroTtmoNoticeOfIntention", "ttroTtmoRevocation", "variationNotice" "troOnRoadActiveStatus"	3.2.0
10.	Provision.provisionDescription		This must be a string.	3.2.0
11.	Provision.reference		This must be a string.	3.2.0
12.	RegulatedPlace.description		This must be a string.	3.2.0
13.	Geometry.version		This must be an integer with the version number of the selected geometry.	3.2.0
14.	if Geometry is PointGeometry	Use of Point Geometry	Value and usage must be consistent with WKT standards with one pair of coordinates.	3.2.3
15.	if Geometry is LinearGeometry	Use of Linear Geometry	Value and usage must be consistent with WKT standards with at least two pairs of coordinates.	3.2.3

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version
16.	if Geometry is Polygon	Use of Polygon	Value and usage must be consistent with WKT standards with at least four pairs of coordinates.	3.2.3
17.	if Geometry is DirectedLinear	Use of Directed Linear	Value and usage must be consistent with WKT standards with at least two pairs of coordinates.	3.2.3
18.	Geometry	Use of any geometries	Coordinate pairs must fall within range of whole Great Britain bounding box coordinate reference.	3.2.3
19.	Geometry	Use of any geometries	Needs to include prefix of "SRID=27700;..." to indicate use of the OSGB36 referencing system.	3.2.3
20.	ExternalReference.lastUpdateDate		This must be a date in the past.	3.2.0
21.	UniqueStreetReferenceNumber.nsgStreetName		This must be a string. Should correspond to the official street name, if present, for the USRN identified.	3.2.0
22.	UniqueStreetReferenceNumber.nsgStreetNumber		This must be a string. Should correspond to the official street number, if present for the USRN identified.	3.2.0
23.	UniqueStreetReferenceNumber.usrn		This must be an int representing the ID of the Unique Street Reference Number that appears in the National Street Gazetteer.	3.2.0
24.	ElementaryStreetUnit.esu		This must be an int representing the ID of the Elementary Street Unit that appears in the National Street Gazetteer	3.2.0
25.	Regulation.timeZone		Must be IANA format (e.g. Europe/London)	3.1.2
26.	SpeedLimitValueBased.mphValue		Must be one of defined values (e.g. 10, 20, 30, 40, 50, 60, 70)	3.1.2
27.	SpeedLimitValueBased.SpeedLimitValueType		This must be a string and one of the followings: "maximumSpeedLimit", "minimumSpeedLimit", "nationalSpeedLimitWellLitStreetDefault"	3.2.3

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version
28.	one of SpeedLimitValueBased, SpeedLimitProfileBased, GeneralRegulation or OffListRegulation must be present.		Conditional to be checked (4-way condition)	3.1.2
29.	TimeValidity.start	TimeValidity.end	End must be later than start, if present	3.2.3
30.	TimePeriodOfDay.startTimeOfPeriod	TimePeriodOfDay.endTimeOfPeriod	End must be later than start	3.2.3
31.	RateLineCollection.sequence		Values must be sequential for all RateLineCollection instances in RateTable	3.1.2
32.	RateLine.sequence		Values must be sequential for all RateLine instances in RateLineCollection	3.1.2
33.	RateLineCollection.minValueCollection	RateLineCollection.maxValueCollection	max must be greater than or equal to min	3.1.2
34.	RateLineCollection.startValidUsagePeriod	RateLineCollection.endValidUsagePeriod	end must be later than start, if present	3.1.2
35.	RateLineCollection.minTime	RateLineCollection.maxTime	max must be greater than min	3.1.2
36.	MaximumWidthCharacteristic.vehicleWidth		Where provided, it must be >0 <= 6m	3.2.2
37.	MaximumHeightCharacteristic.vehicleHeight		Where provided, it must be >0 <= 6m	3.2.2
38.	MaximumLengthCharacteristic.vehicleLength		Where provided, it must be >0 <= 40m	3.2.2
39.	maximumGrossWeightCharacteristic.grossVehicleWeight		Where provided, it must be >0 <= 50t	3.2.2
40.	heaviestAxleWeightCharacteristic.heaviestAxleWeight		Where provided, it must be >0 <= 50t	3.2.2
41.	VehicleCharacteristics.yearOfFirstRegistration		shall be >1900 and less than or equal to current year value	3.1.2
42.	DayWeekMonth.applicableDay		Each instance within DayWeekMonth shall be unique	3.2.3
43.	DayWeekMonth.applicableMonth		DayWeekMonth shall be unique	3.2.3
44.	CalendarWeekInMonth.weekInMonth		each instance within CalendarWeekInMonth shall be unique	3.1.2
45.	WeekInMonth.applicableWeek		each instance within WeekInMonth shall be unique	3.1.2

Rule ID	Applicable Data Field	Secondary data field(s)	Rule Definition	Introduced in Version
46.	InstanceOfDayWithinMonth		each instance within InstanceOfDayWithinMonth shall be unique	3.1.2
47.	RateLineCollection.minTime		shall be equal to or greater than zero	3.1.2
48.	RateLineCollection.maxTime		shall be equal to or greater than zero	3.1.2
49.	RateLine.minValue		must be equal to or greater than zero	3.1.2
50.	RateLine.maxValue		must be equal to or greater than zero	3.1.2
51.	RateLine.minValue	RateLine.maxValue	max must be greater than min	3.1.2
52.	RateLine.value		must be equal to or greater than zero	3.1.2