



PBC-PRIORITY-RULES specification v1.1.0

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1 Versioning

This document is using a versioning scheme that indicates the version of the PBC Priority Rules specification and tracks the revisions of this document. This version scheme is <specification version major>.<specification version minor>.<document revision>. The first two version numbers (major and minor) indicate the version of the interface and only change when there is technical change in the described specification. Major version is only bumped when there is compatibility breaking change. Minor version is bumped on trivial, non breaking changes of the specification. The last version number indicates the revision of this document.

Version	Date	Author	Changes
1.0.0	02 Nov 2020	Leander Rijnveld	Initial specification
1.1.0	06 Nov 2020	Leander Rijnveld	Added criterion type PUBLIC_TRANSPORT_LINE_NR

2 Referenced documents

ID	Reference	Version	Date
[1]	MAP Data, Dutch Profile¹	2.1.a	21 Jun 2019
[2]	SRM Data, Dutch Profile²	2.2.0	26 Jun 2020

¹ https://www.crow.nl/downloads/pdf/verkeer-en-vervoer/verkeersmanagement/landelijke-ivri-standaarden/d3046-1_map-profile.aspx

² https://www.crow.nl/downloads/pdf/verkeer-en-vervoer/verkeersmanagement/landelijke-ivri-standaarden/d3046-3_srm-profile.aspx

3 Introduction

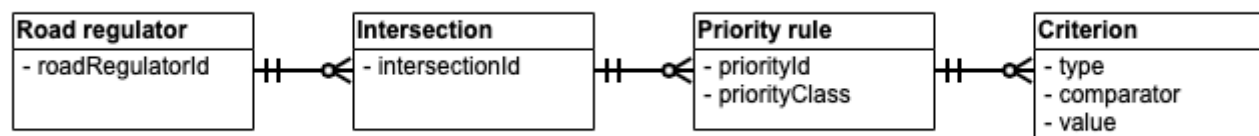
This document describes the specification of PBC Priority Rules.

The primary goal of this document is to track/version the specification so that the impact of future PBC Priority Rule specification changes can be properly assessed.

4 Priority rules data model

The simplified functional relational model for priority rules contains 4 entities:

1. The road regulator that is responsible / the owner of one or more intersections;
2. The intersection itself;
3. The rules that are configured for that intersection;
4. The criteria (a collection of criterions) for the rule that should be used to test if the rule applies.



4.1 Rule priority id

Rules should be evaluated in the order of the “priorityId”. Since multiple rules could be matching in certain use cases / configurations; taking the rule with the lowest priorityId gives a deterministic matching behavior and enables sophisticated configurations with default rules.

4.2 Rule priority class

Number indicating the level of priority / importance (0 to 15) as defined in SRM RequestorType.request (RequestImportanceLevel, see [2]).

4.3 Rule criterions (criteria)

A rule should be applied when its criteria are met. The criteria of a rule are defined by a collection of single criterion that all need to be satisfied when evaluating the rule (logical “AND” operation). How a criterion value is evaluated depends on its type and comparator. Example of a priority rule criteria existing out of 4 criterions which define a rule for an ambulance with patient, lights and sirens activated and requesting priority on signal group 12:

```

AMBULANCE_WITH_PATIENT EQUAL "1"
VEHICLE_EMERGENCY_SIRENS EQUAL "1"
VEHICLE_EMERGENCY_LIGHTS EQUAL "1"
INTERSECTION_SIGNAL_GROUP EQUAL "12"
  
```

See further details about the supported criterion types in the “Criterion Types” section below.

5 Criterion Types

The following table gives an overview of the currently supported “criterion types”. Further explanation regarding the each type can be found in a type specific sub paragraph.

ENUM	Type (stored as String)	Supported Operators	Validation
AMBULANCE_WITH_PATIENT	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
CALENDAR_DATE_TIME	Datetime ISO 8601	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	ISO 8601
CALENDAR_WEEK_DAYS	Comma separated String (ENUM): • MONDAY • TUESDAY • WEDNESDAY • THURSDAY • FRIDAY • SATURDAY • SUNDAY	EQUAL NOT_EQUAL	1 or more valid ENUM values separated by comma No duplicates
CALENDAR_DAY_OF_MONTH	Integer	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (8 bit integer) Min: 1 Max: 31

ENUM	Type (stored as String)	Supported Operators	Validation
CALENDAR_DAY_OF_MONTH_EVEN	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
FREIGHT_DANGEROUS_GOODS	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
FREIGHT_DANGEROUS_GOODS_IDENTIFIER	String	EQUAL NOT_EQUAL	Min length: 1 Max length: 255
FREIGHT_DELIVERY	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
FREIGHT_HEAVY	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
FREIGHT_SPECIAL_TRANSPORT	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
INTERSECTION_SIGNAL_GROUP	Integer	EQUAL NOT_EQUAL	Number (8 bit integer) Min: 1 Max: 254
PUBLIC_TRANSPORT_IDENTIFIER	String	EQUAL NOT_EQUAL	Min length: 1 Max length: 255

ENUM	Type (stored as String)	Supported Operators	Validation
PUBLIC_TRANSPORT_LINE_NR	Integer	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (16 bit integer) Min: 0 Max: 65535
PUBLIC_TRANSPORT_SCHEDULE_DELTA	Integer  Minutes	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (8 bit integer) Min: -128 Max: 127
VEHICLE_EMERGENCY_LIGHTS	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
VEHICLE_EMERGENCY_SIRENS	Boolean	EQUAL NOT_EQUAL	Number (1 bit) Min: 0 Max: 1
VEHICLE_ETSI_EMISSION_TYPE	Integer	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (8 bit integer) Min: 1 Max: 6

ENUM	Type (stored as String)	Supported Operators	Validation
VEHICLE_ETSI_ROLE	String (ENUM): • DEFAULT_0 • PUBLIC_TRANSPORT_1 • SPECIAL_TRANSPORT_2 • DANGEROUS_GOODS_3 • ROAD_WORK_4 • RESCUE_5 • EMERGENCY_6 • SAFETY_CAR_7 • AGRICULTURE_8 • COMMERCIAL_9 • MILITARY_10 • ROAD_OPERATOR_11 • TAXI_12 • RESERVED_1_13 • RESERVED_2_14 • RESERVED_3_15	EQUAL NOT_EQUAL	ENUM match

ENUM	Type (stored as String)	Supported Operators	Validation
VEHICLE_ETSISUB_ROLE	String (ENUM): - SUB_ROLE_UNKNOWN_0 - SUB_ROLE_1 - SUB_ROLE_2 - SUB_ROLE_3 - SUB_ROLE_4 - SUB_ROLE_5 - SUB_ROLE_6 - SUB_ROLE_7 - SUB_ROLE_8 - SUB_ROLE_9 - SUB_ROLE_10 - SUB_ROLE_11 - SUB_ROLE_12 - SUB_ROLE_13 - SUB_ROLE_14 - SUB_ROLE_RESERVED_15	EQUAL NOT_EQUAL	ENUM match
VEHICLE_HEIGHT	Integer  Centimeters	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (16 bit integer) Min: 100 Max: 500

ENUM	Type (stored as String)	Supported Operators	Validation
VEHICLE_LENGTH	Integer Centimeters	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (16 bit integer) Min: 100 Max: 5000
VEHICLE_MASS	Integer Kilogram	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (16 bit integer) Min: 1 Max: 65535
VEHICLE_PASSENGERS	Integer	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (8 bit integer) Min: 0 Max: 255
VEHICLE_SPEED	Integer Kilometer per hour	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (8 bit integer) Min: 0 Max: 255

ENUM	Type (stored as String)	Supported Operators	Validation
VEHICLE_STATE_OF_CHARGE	Integer Percentage	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (8 bit integer) Min: 0 Max: 100
VEHICLE_UTILIZATION	Integer Percentage	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (8 bit inter) Min: 0 Max: 100
VEHICLE_WIDTH	Integer Centimeters	EQUAL NOT_EQUAL GREATER_THAN GREATER_THAN_OR_EQUAL LESS_THAN LESS_THAN_OR_EQUAL	Number (16 bit integer) Min: 100 Max: 500

5.1 AMBULANCE_WITH_PATIENT

Indicates whether an ambulance is transporting a patient.

5.2 CALENDAR_DATE_TIME

Indicates whether the rule should be applied before or after a certain date/time.

5.3 CALENDAR_WEEK_DAYS

Indicates whether the rule should be applied for certain days in the week.

5.4 CALENDAR_DAY_OF_MONTH

Indicates whether the rule should be applied for certain day in the month.

5.5 CALENDAR_DAY_OF_MONTH_EVEN

Indicates whether the rule should be applied for even or odd month days only.

5.6 FREIGHT_DANGEROUS_GOODS

Indicates whether a vehicle is transporting dangerous goods.

5.7 FREIGHT_DANGEROUS_GOODS_IDENTIFIER

Indicates whether a vehicle is transporting dangerous goods with a certain identifier.

 The format/syntax of the identifier should be further specified.

5.8 FREIGHT_DELIVERY

Indicates whether a vehicle is transporting freight to be delivered to its final destination.

5.9 FREIGHT_HEAVY

Indicates whether a vehicle is transporting heavy freight.

 The definition of “heavy freight” should be further specified?

5.10 FREIGHT_SPECIAL_TRANSPORT

Indicates whether a vehicle is marked as “special”.

5.11 INTERSECTION_SIGNAL_GROUP

The signal group for which the priority rule’s priority class should apply to.

 This is not mandatory. This makes it possible to define intersection wide default behavior if desired.

5.12 PUBLIC_TRANSPORT_IDENTIFIER

The identifier for the public transport.

 The usage of the identifier should be further specified.

5.13 PUBLIC_TRANSPORT_LINE_NR

The number of the public transport line.

5.14 PUBLIC_TRANSPORT_SCHEDULE_DELTA

The amount of minutes public transport is behind or ahead of schedule. A positive number means behind on schedule. A negative number means ahead of schedule.

5.15 VEHICLE_EMERGENCY_LIGHTS

Indicates whether an emergency vehicle has emergency lights switched on.

5.16 VEHICLE_EMERGENCY_SIRENS

Indicates whether an emergency vehicle has sirens switched on.

5.17 VEHICLE_ETSI_EMISSION_TYPE

Indicates the emission type of the vehicle as referred to in the MAP specification element “RestrictionUserType-addGrpC” (see [1]). A number is used so that it becomes possible to define minimum or maximum level.

Value	ETSI extension reference (RestrictionUserType-addGrpC)
1	euro1
2	euro2
3	euro3
4	euro4
5	euro5
6	euro6

5.18 VEHICLE_ETSI_ROLE

Indicates the vehicle role in relation to the priority request as defined in SRM RequestorType.role (BasicVehicle-Role, see [2]).

5.19 VEHICLE_ETSI_SUB_ROLE

Indicates the vehicle sub role in relation to the priority request as defined in SRM RequestorType.subrole (RequestSubRole, see [2]).

5.20 VEHICLE_HEIGHT

Indicates the height of the vehicle in centimeters.

5.21 VEHICLE_LENGTH

Indicates the length of the vehicle in centimeters.

5.22 VEHICLE_MASS

Indicates the mass of the vehicle in kilograms.

5.23 VEHICLE_PASSENGERS

Indicates the amount of passengers in the vehicle.

5.24 VEHICLE_SPEED

Indicates the speed of the vehicle in kilometers per hour.

5.25 VEHICLE_STATE_OF_CHARGE

Indicates the State of Charge (SoC) of an electrical vehicle in percentage of the battery capacity.

5.26 VEHICLE_UTILIZATION

Indicates the utilization of the vehicle capacity (can be freight and/or passenger related) in percentage of its full capacity.

5.27 VEHICLE_WIDTH

Indicates the width of the vehicle in centimeters.