TMR QLDTraffic Event Import Specification

Traffic and road condition information import

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Status Final	Final

History

Version	Date	Description
0.1	31/7/2012	Draft specification (unreleased)
0.12	14/11/2017	• Source property is mandatory • Source.source_id must be unique • Removed Duration.active_days property • Added N/A as event subtype for Special event • Added publication structure
0.13	04/12/2017	• Recurrence.startDay is now a string
0.14	07/12/2017	• Added Notes for implementers section • Large reformatting effort
1.0	15/12/2017	• Removed notes for implementers section • Added implementation requirements section
1.2	09/01/2018	Formatting changes

Contents

1 Introduction

1.1 Purpose

This document provides a specification of the integration and data distribution framework provided by the Department of Transport and Main Roads' QLDTraffic service. The specification is intended to provide sufficient detail to enable the implementation of client components that interact and communicate with the QLDTraffic service information.

1.2 Scope

The scope of this document is to specify a file format that allows information, such as crashes, hazards, road restrictions and other road-related events to be imported into the TMR system for use in the QLDTraffic service.

1.3 Audience

The intended audience is developers, architects, system designers and testers. It assumes prior knowledge and understanding of concepts and specifications including JSON and GeoJSON.

1.4 References

1	H. Butler, M. Daly, A. Doyle, S. Gillies, T. Schaub and C. Schmidt, "The GeoJSON Format Specification," August 2016. [Online]. Available: https://tools.ietf.org/html/rfc7946. [Accessed 28 July 2017].

1.5 Definitions

Term	Definition
JSON	JavaScript Object Notation, an open standard for transmitting data.
GEOJSON	An open, specialized JSON format for encoding a variety of geographic data structures and related metadata.
EPS	Event Publication System
TMR	Transport and Main Roads
URL	Uniform Resource Locator. Also known as a web address.

2 Implementation requirements

Authority to provide data for the EPS to consume will be granted on a case by case basis. To request authorisation, please email QLDTraffic@tmr.qld.gov.au and include the name of your data source, and reason(s) for wishing to integrate with QLDTraffic in the request.

TMR will review the event types that are intended to be provided by the implementer, to ensure information is relevant to Queensland motorists.

Implementers are required to provide separate sources for testing and production data. Testing of the integration will be conducted by TMR in a test environment prior to integrating with the production QLDTraffic environment.

The GeoJSON source must be accessible over the public internet, via an HTTP Get request. TLS/SSL is supported, authentication methods are not supported, redirects (HTTP 3xx responses) will not be followed. The EPS outgoing IP addresses can be provided if the implementer wishes to filter traffic.

3 Import Process Overview

The TMR Event Publication System (EPS) imports data from various internal and external sources and presents the data for use in the QLDTraffic website. The following is a high-level description of the import process:

The various data sources are polled by EPS at a set interval. There is currently no facility to push data back to the source system - it is a one-way feed via the endpoint provided.

A high-level overview of the steps for the import is as follows:

1. A GeoJSON file is fetched from a URL with an HTTP Get request; first level cache checks if the file has changed since the previous import, before proceeding to the rest of the steps
2. The systems performs a 'cache check', which checks to see if the event has been imported before, and therefore decides whether to create a new event or update an existing event in EPS:
    a. A new event record will be imported and published if no errors or conflicts were found.
    b. New events undergo a duplicate check, and a conflict check which validates if the source provider can publish events for a given road. A failure on either check will result in the Event still being imported, but as a DRAFT status instead of PUBLISHED. TMR staff will update or remove DRAFT events as appropriate.
    c. An existing (previously downloaded) record that has not changed will be ignored
    d. An existing (previously downloaded) record that has changed will trigger an update
    e. A missing record (i.e. was in the feed previously but is now absent) implies that the corresponding road event is now over. As a result, the event is archived, which removes it from the QLDTraffic site.
3. The Geometry object is normalised against Google and TMR data in order to form a road segment that can be used in Google Maps

4   Data Contract Specification

The import file will be a GeoJSON file that has a FeatureCollection that contains Features. Each Feature is a single Event that contains a Geometry object and a Properties object. The Geometry object provides the details for the geographic points or lines that correspond to roads that are affected by the event, and the Properties object provides the metadata for the event.

4.1   Feature Structure

The general format for feature is:

```
{
  "type": "Feature",
  "geometry": Object,
  "properties": Object
}
```

Properties of the above Feature are described as:

Property	Type	Description
Type	String	**Mandatory**. Always "Feature"
geometry	Object	**Mandatory**. This object contains geometry data structures supported by the GeoJSON specification
properties	Object	**Mandatory**. This object contains the metadata properties related to the road event and is described in further detail in the following section.

4.2   Geometry Object

This object contains the geographic points or lines for roads that are affected by the event. The object is described by the Internet Engineering Task Force (IETF) in RFC7946 >> https://tools.ietf.org/html/rfc7946

The "type" used will be "GeometryCollection".

The principal "type" attributes found within the "geometries" will be "LineString" and/or "Point". No other types are supported.

Points should be used for events that affect a simple contiguous piece of road.

LineString should be used for events that cover multiple roads or a single road with an event affecting non-contiguous sections.

4.3   Feature Properties

The general format for properties is:

```
"properties": {
  "source": {
    "source_name": String,
```

```
    "source_id": String,
    "account": String,
    "provided_by": String,
    "provided_by_url": String
  },
  "event_type": String,
  "event_subtype": String,
  "event_due_to": String,
  "impact": {
    "direction": String,
    "towards": String,
    "impact_type": String,
    "impact_subtype": String,
    "delay": String
  },
  "duration": {
    "start": ISO DateTime,
    "end": ISO DateTime,
    "recurrences": [
      {
        "startDay": String,
        "daysDuration": Number,
        "startTime": String,
        "duration": String,
        "allDay": Boolean,
        "impact": {
          "direction": String,
          "towards": String,
          "impact_type": String,
          "impact_subtype": String,
          "delay": String
        }
      },
      ...
    ]
  },
  "description": String,
  "advice": String,
  "information": String,
  "last_updated": ISO Datetime,
  "next_inspection": ISO Datetime,
  "web_link": String,
}
```

This object contains the metadata properties related to the road event.

Property	Type	Description
source	Object	**Mandatory.** A Source object, as described below.
event_type	String	**Mandatory.** The primary type for this event, always one of the following: • Hazard • Crash • Congestion • Roadworks • Special event

		• Flooding This is the 1st part of a 3-part hierarchy for event categorisation
event_subtype	String	**Mandatory.** The secondary type for this event. This is the 2nd part of a 3-part hierarchy for event categorisation See section 3.4 (below) for valid event_type – event_subtype combinations.
event_due_to	String	The cause of the event. This is the 3rd part of a 3-part hierarchy for event categorization See section 3.4 (below) for valid event_type – event_subtype – event_due_to combinations.
impact	Object	**Mandatory.** An Impact object, described below.
duration	Object	**Mandatory.** The duration and times that this event impact.
description	String	An event description
advice	String	**Mandatory.** Advice to motorists, always one of the following: • Changed traffic conditions • Allow extra travel time • Diversions are in place • Do not drive in flood waters • Emergency services are on scene/en-route • Motorists are urged to show patience • Observe signage • Seek alternative transport method • Traffic control on scene • Use alternative route • Proceed with caution • QPS on scene • Reduced speed limit (40km/h) • Reduced speed limit (60km/h) • Reduced speed limit (80km/h)
information	String	Extra information regarding this event.
last_updated	ISO Datetime	The date time this event was last updated in the system.
next_inspection	ISO Datetime	**Mandatory if event_subtype is one of ["Road damage", "Bridge or culvert damaged", "Flash flooding"].** The date time a review is next due for road inspection related to the roads of this event

web_link	String	A URL link to additional information for the event (external to qldtraffic)
publication	Object	**Manditory if event_type is "Special event" or event_subtype is "Planned roadworks".** The times when the event should be published, described below.

4.3.1   Source Structure

A source describes the source of the event data.

```
{
  "source_name": String,
  "source_id": String,
  "account": String,
  "provided_by": String,
  "provided_by_url": String
}
```

Property	Type	Description
source_name	String	**Mandatory.** The source system from which this event was sourced.
source_id	String	**Mandatory.** The additional unique event identifier from the external source.
account	String	The additional account information
provided_by	String	The additional regional data supporting events from the source
provided_by_url	String	The additional web link data supporting events from the source

4.3.2   Impact Stucture

An impact describes the affect an event has on the roads effected.

```
{
  "direction": String,
  "towards": String,
  "impact_type": String,
  "impact_subtype": String,
  "delay": String
}
```

Property	Type	Description
direction	String	**Mandatory.** Always one of the following: • Northbound • Southbound • Eastbound • Westbound • Northeast bound • Northwest bound • Southeast bound • Southwest bound

		• Inbound • Outbound • Both directions • All direction • Unknown
towards	String	**If Direction is one of ["Both directions", "All directions", "Unknown"] then not required, Mandatory for all other values of Direction.** Text, may be null or whitespace.
impact_type	String	**Mandatory.** Always one of the following: • N/A • Closures • Lanes affected • Lanes blocked • Road restricted • No blockage This is the 1st part of a 2-part hierarchy impact categorisation as follows.
impact_subtype	String	**Mandatory if impact_type is one of ["Closures", "Lanes affected", "Lanes blocked", "Road restricted"].** The secondary impact type for this event. This is the 2nd part of a 2-part hierarchy for event categorisation See section 3.5 (below) for valid impact_type – impact_subtype combinations
delay	String	Values vary depending on the Event_Type, see "4.3.2 Source Structure – Event_Type/Delay map" below.

4.3.3   Source Structure – Event_Type/Delay Mapping

Event_Type		Delay
Hazard Crash Congestion Flooding	>>	No delays expected Delays expected Long delays expected

Roadworks	>>	No delays expected
Special Events		Delays expected (during active hours)
		Long delays expected (during active hours)

4.3.4 Duration Structure

A duration describes when an event is taking place.

```json
{
  "start": ISO DateTime,
  "end": ISO DateTime,
  "recurrences": [
    {
        "startDay": String,
        "daysDuration": Number,
        "startTime": String,
        "duration": String,
        "allDay": Boolean
       "impact": Object
    }
  ]
}
```

Property	Type	Description
start	ISO Datetime	The date and time this event starts
end	ISO Datetime	**Mandatory if event_type is one of ["Roadworks", "Special event"].** The date and time this event stops
recurrences	Array	An array of days, times and impacts that this event is impacting the road, may be null or empty.
recurrences[n].startDay	String	**Mandatory if recurrence is used.** The day of week that the recurrence starts.
recurrences[n].daysDuration	Number	**Mandatory if recurrence is used.** 1..7 – number of days, 1 meaning a single day, 7 all week
recurrences[n].startTime	String	**Mandatory if recurrence is used and allDay <> True.** ISO 8601 time string, Queensland time
recurrences[n].duration	String	Mandatory if recurrence is used and allDay <> True. ISO 8601 duration string. Hours and minutes. Duration can't be more than 24 hours.
recurrences[n].allDay	Boolean	Optional – Set to true if impact is for the entire day. startTime and duration are invalid if this is true.
recurrences[n].impact	Object	An impact object, described above.

4.4 Event Type / Event SubType / Event Due To Mapping

event_type	event_subtype	event_due_to
Hazard	Poor visibility	Fog Heavy Rain Dust Sun glare Smoke
	Adverse driving conditions	High winds Slippery surface Animal or wildlife Water over road
	Signal fault	Lights blacked out Lights flashing yellow
	Road damage	Earlier flooding Earlier flash flooding Pot holes Rough surface Soft shoulders Saturated pavements Boggy conditions Deep wheel tracks
	Bridge or culvert damaged	
	Debris on road	Fallen vegetation Spill
	Stationary vehicle Police incident Fire	
Crash	Single Vehicle Multi-vehicle	
Congestion	Recurring Incident related General Earlier incident related	
Roadworks	Planned roadworks Emergency roadworks	
Special event	N/A	
Flooding	Long-term flooding	Heavy rain Flooding of river
	Flash flooding	Heavy rain Burst water main

4.5 Direction / Impact / Impact Details

Direction	Impact	Impact Details
Northbound Southbound Eastbound Westbound Northeast bound Northwest bound Southeast bound Southwest bound Inbound Outbound	N/A	
	No blockage	
	Closures	Road closed to all traffic Road closed to through traffic One lane closed Partial lane closures
	Lanes affected	All lanes affected Both lanes affected Lane or lanes reduced Single lane in operation
	Lanes blocked	All lanes blocked Both lanes blocked Lane or lanes blocked One lane blocked Two lanes blocked Left lane blocked Middle lane blocked Right lane blocked
	Road Restricted	Restricted to four wheel drive vehicles only Restricted to high clearance vehicles only Subject to a 5 tonne GVM limit Subject to a 10 tonne GVM limit Subject to a 15 tonne GVM limit Subject to a 25 tonne GVM limit Subject to a 42.5 tonne GVM limit Subject to a 46 tonne GVM limit Limited to 80% of legislative axle group limit
Both Directions	N/A	
All directions	No blockage	
	Closures	
	Lanes affected	All lanes affected Lane or lanes reduced
	Lanes blocked	All lanes blocked Lane or lanes blocked
	Road Restricted	Restricted to four wheel drive vehicles only Restricted to high clearance vehicles only Subject to a 5 tonne GVM limit Subject to a 10 tonne GVM limit Subject to a 15 tonne GVM limit Subject to a 25 tonne GVM limit Subject to a 42.5 tonne GVM limit Subject to a 46 tonne GVM limit Limited to 80% of legislative axle group limit
Unknown	N/A	

	No blockage	
	Closures	Partial lane closures
	Lanes affected	Lane or lanes reduced
	Lanes blocked	Lane or lanes blocked

4.6 Publication

Describes when an event should have details published.

```
{
  "start": ISO DateTime,
  "end": ISO DateTime
}
```

Property	Type	Description
start	ISO Datetime	The date and time publication should start.
end	ISO Datetime	The date and time publication should stop.

5 Appendix A – Sample JSON Structure

```json
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "geometry": {
        "type": "GeometryCollection",
        "geometries": [
          {
            "type": "LineString",
            "coordinates": [
              [
                153.0258962,
                -27.3399828
              ],
              [
                153.02596,
                -27.34007
              ],
              [
                153.02602,
                -27.34015
              ],
              [
                153.026028,
                -27.3401745
              ]
            ]
          },
          {
            "type": "LineString",
            "coordinates": [
              [
                153.026028,
                -27.3401745
              ],
              [
                153.025712,
                -27.3403917
              ]
            ]
          }
        ]
      },
      "properties": {
        "id": 155,
        "source": {
          "source_name": "Guardian",
          "source_id": "57dbf30f-7dd0-4680-af00-ef37378ae7ab",
          "account": "32260",
          "provided_by": "CASSOWARY COAST REGIONAL",
          "provided_by_url": "http://www.cassowarycoast.qld.gov.au"
```

```json
    },
    "event_type": "Special event",
    "event_subtype": "N/A",
    "event_due_to": null,
    "impact": {
      "direction": "Southbound",
      "towards": "Station",
      "impact_type": "Lanes blocked",
      "impact_subtype": "Right lane blocked",
      "delay": "No delays expected"
    },
    "duration": {
      "start": "2016-06-13T12:13:00+10:00",
      "end": "2016-06-27T12:18:00+10:00",
      "recurrences": [
        {
          "startDay": "monday",
          "daysDuration": 4,
          "startTime": "18:00",
          "duration": "P6H",
          "impact": {
            "direction": "Southbound",
            "towards": "Station",
            "impact_type": "Lanes blocked",
            "impact_subtype": "Right lane blocked",
            "delay": "No delays expected"
          }
        },
        {
          "startDay": "wednesday",
          "daysDuration": 3,
          "startTime": "00:00",
          "duration": "P18H",
          "impact": {
            "direction": "Southbound",
            "towards": "Station",
            "impact_type": "Lanes affected",
            "impact_subtype": "Lane or lanes reduced",
            "delay": "No delays expected"
          }
        },
        {
          "startDay": "friday",
          "daysDuration": 3,
          "allDay": true,
          "impact": {
            "direction": "Southbound",
            "towards": "Station",
            "impact_type": "Lanes affected",
            "impact_subtype": "Lane or lanes reduced",
            "delay": "No delays expected"
          }
        }
      ]
    }
```

```
        },
        "description": "Fitzgibbon - Road name abbreviations",
        "advice": "Use alternative route",
        "information": "Cleaning - Fitzgibbon",
        "last_updated": "2016-06-20T11:37:19.448257+10:00",
        "next_inspection": "2016-06-27T09:30:00.000000+10:00",
        "web_link": "http://www.metropolitan.qld.gov.au"
      }
    ]
  }
```