ROAD INFRASTRUCTURE MANAGEMENT

Functional and Technical Specification
Version 1.1

For Application Service Providers

Document Details

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Version	Date	Description
1.0	November 2018	First version.
1.1	July 2019	Converted to structure and content for a functional and technical specification, along with full revision of requirements for a Level 1 Assurance application.

ABOUT US

Transport Certification Australia (TCA) is the Australian entity responsible for providing assurance in the use of telematics and related intelligent technologies.

We manage the National Telematics Framework, which brings producers, providers and consumers together on a common digital business platform.

The National Telematics Framework:

- Provides a national platform for the use of telematics and related intelligent technologies
- Supports different applications across regulatory, contractual and commercial needs
- Supports different levels of assurance
- Is outcome-focussed and encourages innovation.

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1 INTRODUCTION

1.1 Purpose of this Document

1.1.1 This document describes the functional and technical requirements of the Road Infrastructure Management (RIM) application operating within the National Telematics Framework (NTF). The NTF is a digital business platform for the use of telematics and related intelligent technologies, to underpin reforms, policies and industry-sought outcomes.

1.1.2 The RIM application enables the collection of telematics data from monitored vehicles, including identity, location and time.

1.1.3 This document describes obligations of parties associated with the RIM application, particularly where these obligations relate to interacting with the Application Service Provider (ASP).

1.1.4 The use of this document is linked to *Telematics Business-to-Business Data Exchange Functional and Technical Specification.*

1.2 Scope

1.2.1 This document describes the following RIM requirements:

- requirements that shall be met by applicants intending to provide telematics devices for usage within the RIM application; and

- requirements that shall be met by ASPs intending to provide RIM application services.

1.3 Document Overview

1.3.1 The philosophy guiding the formation and application of this specification has been to focus on required outcomes without being overly prescriptive or solution-oriented.

1.3.2 The specification commences with this Introduction (Section 1), followed by Background (Section 2).

1.3.3 Documents referenced in this specification are listed at Section 3.

1.3.4 Sections 4 and 5 describe the requirements for:

- telematics devices; and

- ASPs.

1.3.5 Section 4 contains the requirements for telematics device usage within the RIM application. Requirements in this section are referred to as Part A and are prefixed by an 'A' (e.g. A.1.5).

1.3.6 Section 5 contains the requirements for an ASP to provide RIM application services. Requirements in this section are referred to as Part B and are prefixed by a 'B' (e.g. B.12.5).

1.3.7 In fulfilling the functional and technical requirements of an ASP intending to provide the RIM application, the ASP must meet requirements of Parts A and B.

1.3.8 The specification includes the following appendices:

- Appendix A: Acronyms and Definitions; and

- Appendix B: Record Formats.

1.4 Purpose of the RIM Application

1.4.1 The RIM application provides road managers with access to road asset utilisation data for asset planning and network management.

1.4.2 Used in conjunction with the Telematics Analytics Platform (TAP), RIM provides mechanisms to generate reports containing data collected from vehicles fitted with a telematics device. The provision of such reports offers insights into the use of specific road infrastructure assets, which may not be currently available through other means.

1.4.3 RIM leverages capabilities provided by the NTF, tailored to meet the needs of road infrastructure managers. Specifically, this application:

- meets the needs of road infrastructure managers (and regulators) to manage road infrastructure assets (i.e. the intended purpose);

- ensures that specific data is only collected which is directly related to the intended purpose;

- provides a commensurate level of assurance (i.e. it does not require the high integrity, certificate-based data or evidence offered by other regulatory applications); and

- provides a way for vehicle operators to opt in to the application with:

  o a transparent understanding of the intended purpose of the application;

  o full disclosure from road infrastructure managers about the type and use of data collected through the application; and

  o a mechanism for vehicle operators to provide informed consent for the use of data by road infrastructure managers, in accordance with the intended purpose.

1.4.4 RIM is a Level 1 Assurance application. For more information on levels of assurance, see 2.2.2.

1.5 Nomenclature

1.5.1 In this document:

- all references to software include software in any form or medium, including firmware, unless otherwise qualified; and

- where the context requires it, references to the 'ASP' shall be a reference to that party intending to provide RIM services.

1.5.2 Requirements clauses within this document that are denoted by:

- 'shall' are requirements that must be met;

- 'should' are requirements that should desirably be met; and

- 'will' are obligations that will be met by other parties.

1.5.3 Notes are included by way of clarification and apply to the immediately preceding clause.

1.5.4 Acronyms and terms defined for the purposes of this specification may be found within Appendix A, Acronyms and Definitions.

1.5.5 In this document, the term 'telematics device' is used for the primary in-vehicle telematics device which monitors parameters, such as the telematics in-vehicle unit (IVU).

2 BACKGROUND

2.1 The National Telematics Framework

2.1.1 The NTF is a digital business platform with infrastructure and rules that aims to ensure an open marketplace of telematics and related intelligent technology providers.

2.1.2 The NTF:

- provides a national platform for the use of telematics and related intelligent technologies;

- supports a number of applications across regulatory, contractual and commercial needs;

- supports different levels of assurance; and

- is outcome-focussed and encourages innovation.

2.2 National Telematics Framework – High-Level Architecture

2.2.1 Telematics applications function within the context of the NTF. The high-level architecture of the NTF is illustrated in Figure 1.

Figure 1: NTF High-Level Architecture
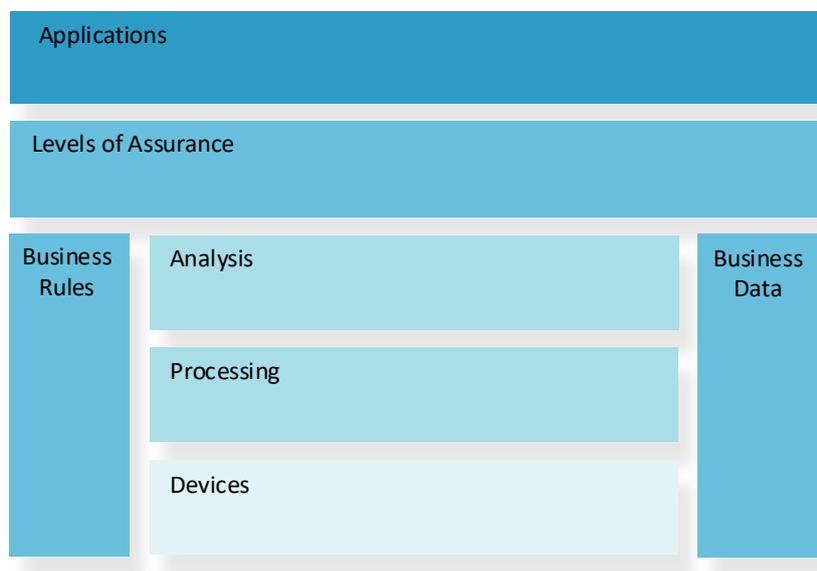
2.2.2 The architectural components of the NTF are as follows:

- Applications – An application is a capability of the NTF that provides business value to stakeholders, delivered as an assembly of policy, business components and technical components, within the context of an intended level of assurance.

- Levels of Assurance – Each level of assurance is determined by the intended use of a telematics application, the risks being managed, the availability and reliability of supporting contextual information, and the needs and expectations of consumers and other stakeholders. Three broad levels of assurance have been defined:
  - Level 1: Self-assessment of data and no independent oversight of a telematics application.
  - Level 2: Independent assessment of specific elements of a telematics application. Telematics data is combined with other data sources.
  - Level 3: Certificate-based data and evidence. Independent assessment and oversight of all aspects of a telematics application and service provision.

  For more information, refer to *National Telematics Framework – Levels of Assurance*.

  Note: RIM is a Level 1 Assurance application.

- Business Rules – A common set of business rules that ensure an open, robust, secure and interoperable marketplace of providers, and meet the requirements for defined levels of assurance (including evidentiary requirements associated with regulatory requirements).

  For more information, refer to *National Telematics Framework – Business Rules*.

- Business Data – Data elements that are common to data analysis, processing and telematics devices, which include the Telematics Data Dictionary and the National Telematics Map (NTM).

  Note: The NTM is sourced by TCA from a third party for NTF purposes. It is independent of any telematics application or scheme. The NTM is not used by the RIM application.

- Analysis – Advanced analysis of data and information related to telematics devices and applications.

- Processing – Processing components concerned with (generally) automated service provider functionality, comprising a framework of business domain documents.

- Devices – Individual telematics capabilities that are typically able to exist independently, or within the context of broader telematics-based solutions. Each device or technology collects a defined set of data which is packaged in the form of data records.

2.2.3   Business-to-business (B2B) data is exchanged within the NTF using the following data exchange mechanisms, which are fully explained in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*:

- **Tier 1 Data Exchange**:
  A web services solution where structured information is exchanged that complies with requirements such as authentication, security, privacy and certainty of delivery. It includes exchanges of information related to a vehicle's enrolment in telematics applications, conditions and adherence to those conditions.

- **Tier 2 Data Exchange**:
  The human-initiated (rather than automated) exchange of business-related information and advice. Typical exchanges via this tier include reporting of issues and resolutions, correspondence regarding certification and re-certification, advice regarding information and communications technology (ICT), data assurance and other reporting.

- **Tier 3 Data Exchange**:
  The packaging and delivery of data packages, comprising data records and enrolment-related artefacts. Data packages have several uses which include data analysis by the recipient, data assurance, and for research purposes.

2.3   Application Participants

2.3.1   Refer to Table 1 for a description of key participants in the RIM application:

Table 1: Application Participants

Name	Description
Producer	A Producer develops and publishes schemes which utilise a telematics application. A scheme is a specific use of the application linked to delivering a policy objective of the Producer. Each enrolment of a vehicle in the application must specify a scheme. A Producer may appoint an administrator to perform its functions. If delegation occurs, it applies across all schemes published by the Producer for a given application. *Note: Wherever a requirement states an operational responsibility for a Producer, it includes responsibility for any administrator that may have been appointed by the Producer to perform its functions.* Each scheme requires that vehicles enrol in a specific telematics application to ensure telematics monitoring and/or assessment of vehicle operation associated with the application.
User	A User operates one or more vehicles eligible to enter a scheme requiring a telematics application. A User may apply to enrol vehicles within a scheme by meeting the necessary conditions or agreements. The enrolment conditions or agreements require a User to utilise the services of an ASP in order to participate in a scheme offered by a Producer. *Note: In NTF documents, User is referred to as 'consumer'.*
Application Service Provider (ASP)	An ASP is a private-sector entity that provides telematics services (e.g. hardware, software and associated processes) and is certified or approved by TCA for participation in one or more telematics applications (each subject to separate certification or approval assessments for service provision). An ASP is responsible for installation of telematics devices and any other technologies required by applications, monitors vehicles in accordance with the application, and provides the level of assurance sought by Producers. For RIM, the ASP monitors vehicles via data sent by the telematics device to the ASP back office. For more detail on the operation of RIM, refer to 2.4. *Note: In NTF documents, ASP is referred to as 'provider'.*
TCA	TCA has oversight of all NTF applications, including their publishing, maintenance, data assurance and auditing (if required), and ensures they continue to operate in accordance with the NTF. Oversight includes certification or approval of ASPs and the type-approval of telematics devices. Reporting and program coordination activities are undertaken in line with the Producer's needs.

2.3.2   Key RIM participants and high-level interactions are shown in Figure 2.

Figure 2: RIM Participants and Interactions
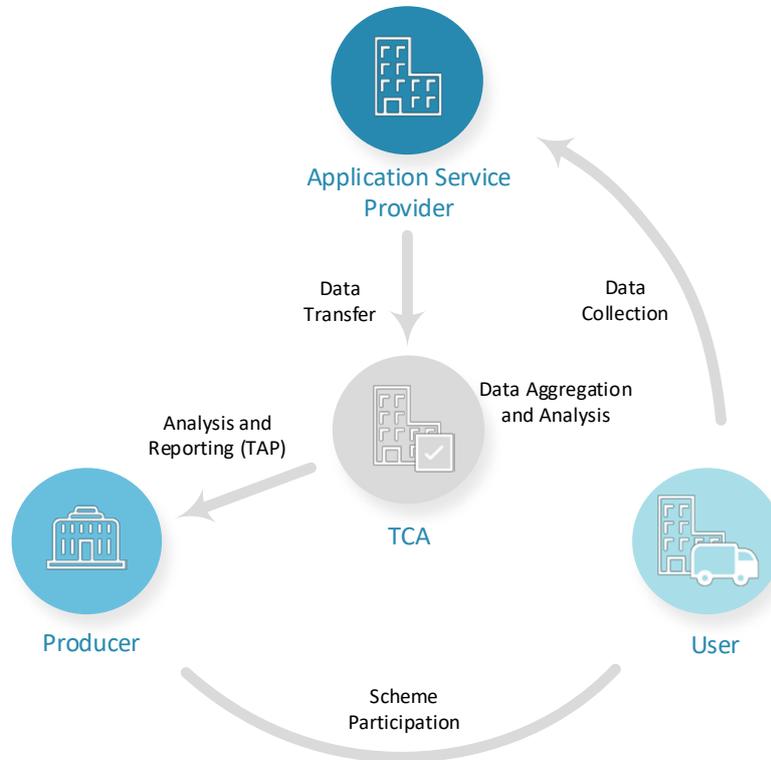
Note: Subject to the specifics of an application and level of assurance, the ASP may also be the User.

2.4 Operation of Road Infrastructure Management Application

2.4.1 The operation of the RIM application is shown in Figure 3. It involves interaction of telematics application participants, and includes processes such as enrolment of vehicles in schemes and data reporting.

Figure 3: Operation of the RIM Application
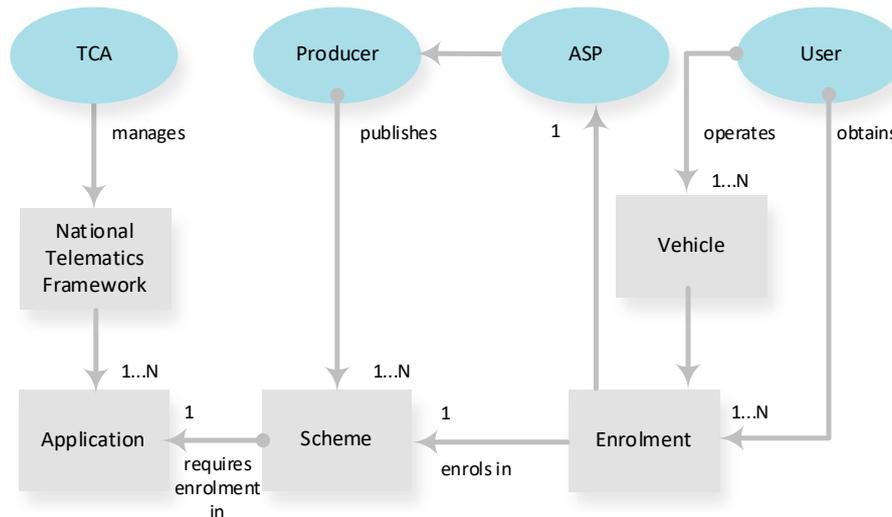
2.4.2 Each Producer publishes and operates one or more schemes.

2.4.3 The User identifies and undertakes to join a scheme offered by a Producer (or its appointed administrator for operational functions).

Note: Enrolment within a scheme simultaneously confirms enrolment in the application that underpins that scheme.

2.4.4 The User engages an ASP to:

- install a telematics device, to enable monitoring of vehicle parameters;
- provide RIM services; and
- manage vehicle enrolment.

2.4.5 Details of the User's enrolment in a RIM scheme are contained in an enrolment form. The enrolment form specifies details about the Producer, User, vehicle, ASP and the installed in-vehicle equipment.

Note: A vehicle may operate under one or more schemes. A vehicle may have more than one enrolment.

2.4.6 After a User has enrolled a vehicle in a scheme, the Producer is notified and may consider that enrolment in the context of its own business rules and procedures.

2.4.7 The ASP commences provision of services for RIM. Services include monitoring the vehicle through collection of data and generation of data records.

2.4.8 The ASP provides a monthly enrolment report to each Producer.

2.5 Physical Reference Architecture

2.5.1 Figure 4 depicts the main components in the physical reference architecture of a telematics application.

Figure 4: Physical Reference Architecture
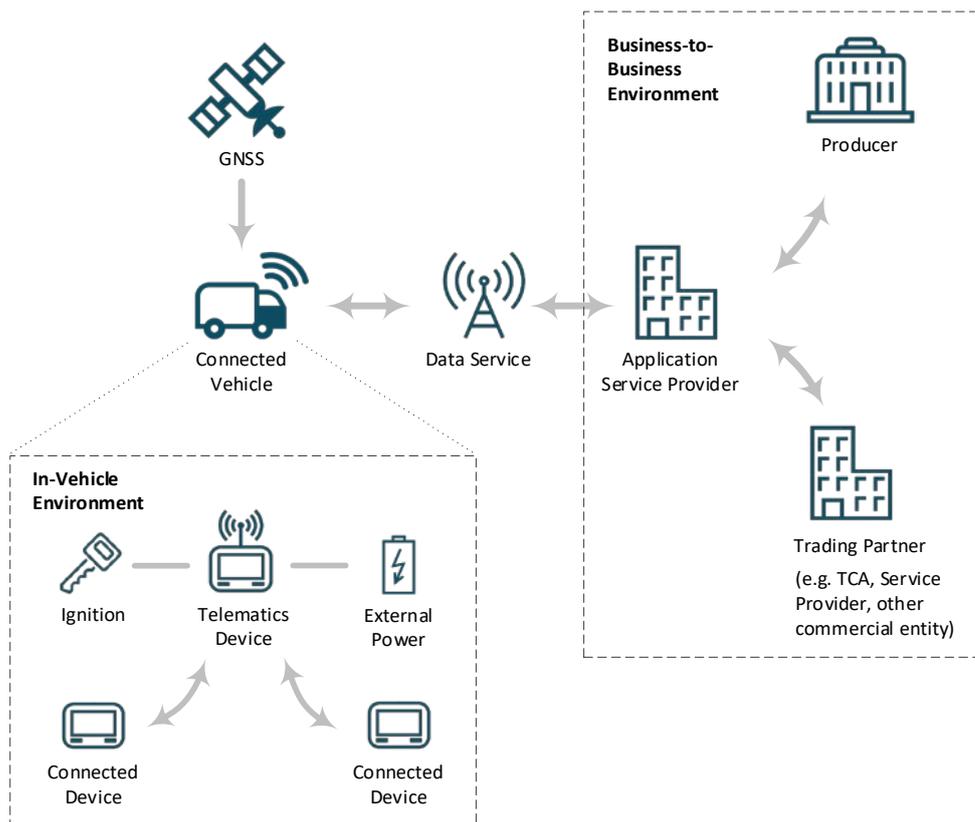
2.5.2 The telematics device is the primary in-vehicle telematics device which monitors parameters as required by the application.

2.5.3 The telematics device will collect data from a number of sources and sensors, generate telematics device data records and transmit those records to the ASP System for further processing. This activity is performed independently of the User.

2.5.4 Telematics device data records are transferred to the ASP back office.

2.5.5 For RIM, data processed by the ASP will allow the ASP to monitor the vehicle.

2.5.6 The ASP is also required, on a periodic basis, to generate and transfer an enrolment report to TCA for each Producer.

2.5.7   Data moves within the physical reference architecture of a telematics application in various ways as shown in Figure 4 and described in the following phases:

- Data collection: The application describes the data to be collected and the records to be generated and stored by the telematics device prior to data transfer.

- Data transfer: The application describes the telematics device data records that are to be transmitted from the telematics device to the ASP System, dealing with issues such as frequency, storage, security and access to communication links.

2.5.8   While the data to be collected by the telematics device is specified, the ASP determines how that data is collected.

2.5.9   The performance of a telematics device is monitored to ensure it is performing in accordance with requirements specified by the application and device functional and technical specification.

3 REFERENCES

3.1.1 Documents referenced in the specification are listed below:

- Transport Certification Australia (TCA). (2019). *Telematics Business-to-Business Functional and Technical Specification*. Transport Certification Australia. Melbourne, Australia.

- Transport Certification Australia (TCA). (2018). *National Telematics Framework – Levels of Assurance*. Transport Certification Australia. Melbourne, Australia.

- Transport Certification Australia (TCA). (2018). *National Telematics Framework – Business Rules*. Transport Certification Australia. Melbourne, Australia.

- Transport Certification Australia (TCA). (2018). *Telematics Data Dictionary*. Transport Certification Australia. Melbourne, Australia.

- Australian Communications and Media Authority (ACMA). (2017). Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017.

4 REQUIREMENTS FOR TELEMATICS DEVICES

4.1 Overview

4.1.1 This section contains the requirements for the use of telematics devices within the RIM application.

4.1.2 RIM is an application that operates at Level 1 Assurance. Consequently, the device requirements for RIM are set at this level. A device that exceeds these requirements is still eligible for use.

4.2 Requirements

TELEMATICS DEVICE

A.1 Physical Characteristics

A.1.1 Each telematics device shall have a unique identifier that will be used to identify:

    a.   the particular telematics device; and

    b.   data from that telematics device.

A.1.2 A telematics device shall be capable of being connected to the vehicle such that the vehicle identity is associated with data collected by the vehicle.

A.1.3 The telematics device shall be suitable for use in vehicles, with considerations for where components are installed, and for vibration, temperature, humidity, impact and ingress protection.

A.1.4 The telematics device shall conform with the Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017 (ACMA 2017) or equivalent.

A.2 Position Data

A.2.1 Vehicle position shall be determined using latitude and longitude from a Global Navigation Satellite System (GNSS) receiver or a TCA-approved alternative mechanism with a similar level of accuracy.

A.3 Date and Time Data

A.3.1 The telematics device shall obtain date and time data from a trusted time source.

Note:

i)   *The trusted time source may be GNSS or Network Time Protocol (NTP), for example.*

ii)   *The telematics device should check its synchronisation regularly, particularly after reacquiring a connection to the time source and after being turned on.*

A.4 Position Records

A.4.1 The telematics device shall generate position records that detail at least:

    a.   vehicle latitude;

    b.   vehicle longitude; and

    c.   date/time.

Note:

i)   *Date/time data must be represented in the UTC time zone when transferred in a B2B environment.*

ii)   *The format used to transfer position records in an B2B environment as well as additional fields that are available in position records are shown in Appendix B.*

A.4.2   The following fields may be included in a position record:

    a.   Record Number;

    b.   Direction of Travel;

    c.   Satellite Count;

    d.   Horizontal Dilution of Precision;

    e.   Ignition Switch Status; and/or

    f.   Movement Sensor Status.

A.4.3   The range of values of the attributes in A.4.1 and A.4.2 shall conform with those specified for a position record in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E.

A.4.4   If a record number is included in a position record, it shall be assigned using a sequence of consecutive and increasing integers.

A.4.5   If a measurement of position cannot be established, a latitude and longitude value shall not be reported within position records.

A.4.6   Position records shall be continuously generated and stored at regular time intervals that meet the following conditions when the vehicle is in operation:

    a.   position records shall be generated no more frequently than once every 1 second; and

    b.   position records shall be generated no less frequently than once every 60 seconds.

Note: A frequency of once every 30 seconds is recommended.

5 ASP REQUIREMENTS

5.1 Overview

5.1.1 This section contains the requirements for an ASP to provide RIM application services. The section is divided into the following:

- ASP System;
- Data Handling;
- Enrolment;
- Data Reporting;
- Enrolment Report; and
- Data Exchange.

5.2 Requirements

ASP SYSTEM

B.1 ASP System Maintenance and Continuity

B.1.1 The ASP shall report to TCA any data security breach within 1 working day of such a breach becoming apparent.

DATA HANDLING

B.2 Data Processing

B.2.1 The ASP shall convert any position data within telematics device data records to GDA94 for storage and any further processing if collected according to a different datum.

Note: Position data refers to any representation of latitude and longitude.

ENROLMENT

B.3 Enrolment

B.3.1 The ASP shall manage the enrolment of the vehicle:

   a. in a scheme managed by the Producer; and

   b. as a prerequisite to enrolment in the scheme, in the application.

   Note:

   i) *Management of an enrolment includes collation and oversight of enrolment information, formal enrolment approval, and (as required) enrolment cancellation.*

   ii) *A scheme is a formal use of the application by the Producer.*

   iii) *A vehicle may have multiple active enrolments. A vehicle may be enrolled in applications of different Producers. For a single Producer, a vehicle may also be enrolled multiple times in different applications and different schemes.*

B.3.2 An ASP shall only proceed with enrolment of a vehicle into the RIM application if it meets the application requirements.

   Note: Eligibility for enrolment rests upon the nature of the scheme, set by the Producer.

B.4 Enrolment Form

B.4.1 The ASP shall document enrolment of a vehicle in an enrolment form as described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Section 4.6 and Appendix B, Enrolment Form Schema, that comprises:

   a. enrolment identifying information;

   b. Part 1 – identifies scheme,

   c. Part 2 – User details;

   d. Part 3 – ASP and telematics device installation details; and

   e. Part 4 – enrolment approval and cancellation information.

B.4.2   The ASP shall ensure the following:

    a.   all necessary equipment for the referenced scheme is installed in the vehicle and is functioning correctly before completing an enrolment;

    b.   if the same vehicle has another active enrolment in any other application or scheme, the vehicle details match;

    c.   the VIN of the prime mover/rigid truck is entered as part of the vehicle details;

    Note: If the VIN is not available, the chassis number shall be provided as the non-VIN identifier. If the chassis is also unavailable, the engine number shall be provided as the non-VIN identifier. If required, the VIN shall also be entered for all relevant trailers.

    d.   the enrolment is assigned an identifier by the ASP that is unique across all the enrolments it issues or receives for every NTF application;

    e.   the application referenced is named 'Road Infrastructure Management';

    f.   the ASP only approves the enrolment after it is satisfied that all of the above details are correct.

B.4.3   The ASP shall provide a copy of the enrolment form whenever its state changes (i.e. approved or cancelled) such that it is:

    a.   provided in the format described in B.4.1; and

    b.   transmitted to TCA using Tier 3 Data Exchange as described in Section B.6; or

    c.   transmitted to TCA using Tier 2 Data Exchange in place of inclusion in the data package, where agreed to by TCA.

B.4.4   The ASP should document its process for enrolling vehicles and Users and for managing enrolments across their lifecycle.

B.4.5   The ASP shall be able to commence monitoring the vehicle no later than 1 working day after its formal approval date and time of the enrolment.

B.4.6   The ASP shall deactivate the enrolment within 1 working day of:

    a.   the stated cessation date in accordance with the approved enrolment; or

    b.   the enrolment being cancelled.

B.5   Enrolment Cancellation

B.5.1   As required, the ASP shall manage the cancellation of an enrolment.

Note: The transmission of requests for cancellation between a User, Producer and ASP are out of scope of this specification and are dependent on the rules of the applicable scheme(s). Communications between an ASP and Producer should occur via Tier 2 Data Exchange.

B.5.2   The ASP shall manage updates to enrolment details by cancelling the enrolment and replacing it with a new enrolment with a unique identifier and a reference to the previous enrolment identifier.

Note: Typical reasons for updating an enrolment are changes to User or device details. A User exiting a scheme and entering a different scheme should not be treated as an update. Any proposed changes to the ASP's business details require notification to TCA.

DATA REPORTING

B.6   Data Reporting

B.6.1   The ASP shall support transmission of data packages to TCA as required by *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Part C.

Note: The transmission of data packages to TCA is to facilitate auditing of the application, and data analysis and reporting. Progressive transfer of data packages is recommended.

B.6.2   The ASP shall include application data in the data package as required by *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Part C, for each enrolment that was active at any time during the data collection period.

Note:

i)   *Application data included within the data package comprises telematics device data records, enrolment forms and enrolment reports.*

ii)   *A data collection period is a whole number of days in the UTC time zone for which all application data is provided. Successive data collection periods are contiguous.*

B.6.3   The data collection period for data packages shall be a calendar month.

B.6.4   Data packages shall be provided within 7 days of the end of the data collection period.

ENROLMENT REPORT

B.7   Enrolment Report

B.7.1   The ASP shall issue Producer-specific enrolment reports and in a format as specified in *Telematics Business-to-Business Data Exchange Specification*, Appendix B, Enrolment Report Schema.

Note: A separate enrolment report is required for each application.

B.7.2   The ASP shall generate an enrolment report for every Producer that is referenced in at least one active enrolment during the reporting period.

B.7.3   The enrolment report shall include all vehicles which were monitored for a Producer at some time during the reporting period, which shall start and end based upon the Producer's local date and time (which may differ from that of the ASP).

B.7.4   Each enrolment report shall be assigned a unique identifier.

Note: TCA will provide each ASP with a unique, three-character identifier which the ASP shall use as a prefix in the enrolment report identifier.

B.7.5   An enrolment report shall contain a unique entry for each combination of:

a.   vehicle identifier (by VIN or non-VIN identifier);

b.   telematics device identifier; and

c.   enrolment identifier.

B.7.6   Within an enrolment report, each unique entry identified in accordance with B.7.5 shall comprise details of application entry and exit date and time.

Note:

i)   *The application entry and exit date and time is reported for each enrolment.*

ii)   *If the ASP provides more than one application for a Producer, separate enrolment reports are produced for each application.*

B.7.7   The enrolment report shall contain the time and date of generation of the report, which shall be based upon the ASP's local time.

B.7.8   The reporting period for the enrolment report is a calendar month. Reports shall be provided within 7 business days of the end of the month.

B.7.9   The ASP shall provide a copy of the enrolment report such that it is:

a.   provided in the format described in B.7.1;

b.   transmitted to TCA using Tier 3 Data Exchange as described in Section B.6; or

c.   transmitted to TCA using Tier 2 Data Exchange in place of inclusion in the data package, where agreed to by TCA.

DATA EXCHANGE

B.8   Tier 2 Data Exchange

B.8.1   The ASP shall meet Tier 2 Data Exchange requirements as described in Part B of *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, and as follows:

a.   Tier 2 Data Exchange shall be supported using secure email, FTPS, registered mail and/or secure web portal according to requirements B.1–B.4 of *Telematics Business-to-Business Data Exchange Functional and Technical Specification*; and

b.   the ASP shall communicate with TCA on matters of conformance via Tier 2 Data Exchange.

B.9   Tier 3 Data Exchange

B.9.1   The ASP shall meet Tier 3 Data Exchange requirements as described in Part C of *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, with included data records formatted in accordance with Appendix B of this specification.

Note: Tier 3 Data Exchange is used to support the transmission of data packages (see B.6).

Acronyms

Acronym	Definition
ACMA	Australian Communications and Media Authority
ASP	Application Service Provider
B2B	business-to-business
FTPS	Fire Transfer Protocol Secure
GDA94	Geocentric Datum of Australia 1994
GNSS	Global Navigation Satellite System
HDOP	horizontal dilution of precision
ICT	information and communications technology
NTF	National Telematics Framework
NTM	National Telematics Map
NTP	Network Time Protocol
UTC	Coordinated Universal Time
VIN	vehicle identification number

Definitions

Term	Definition
applicant	A party which has applied for approval to provide telematics application services.
application	A capability of the NTF that provides business value to stakeholders, delivered as an assembly of policy, business components and technical components, within in the context of an identified level of assurance.
Application Service Provider (ASP)	A service provider that has been certified or approved by TCA as meeting the requirements of one of more telematics applications.
data collection period	A whole number of days in the UTC time zone for which all application data is provided. Successive data collection periods are contiguous.
data package	A package of information sent via Tier 3 Data Exchange for a data collection period.
data record	A discrete and defined set of data elements, including a (unique) record number, and record date time (of data record generation), produced for a device for a data collection period.
enrolment	Both the process and outcome by which a User enters a Producer's scheme. Each vehicle must be enrolled for each scheme it participates in. Enrolment also confirms the application and conditions (if applicable) that the vehicle is monitored under.
enrolment form	An electronic document that formally and simultaneously records the enrolment of a vehicle within a scheme, and within the application required by that scheme.
enrolment report	A summary of enrolments relevant to a given Producer for a specified reporting period, including any aggregated data required by specific applications.
Jurisdiction	A geographical area containing a road network (i.e. typically an Australian state or territory).
level of assurance	An assurance level that supports telematics applications, structured around the intended use of a telematics application, the risks being managed, the availability and reliability of supporting contextual information, and the needs and expectations of consumers and other stakeholders.
National Telematics Map (NTM)	The map used for the purposes of determining location.
operation (in)	A vehicle status when the telematics device's supporting external power supply is connected to the telematics device and the ignition status is ON.
prime mover/ rigid truck	That part of a vehicle which contains the power unit to which the telematics device is affixed.
Producer	An entity, associated with a Jurisdiction, responsible for the administration of one or more NTF applications. A Producer may appoint an administrator to perform its functions. *See also: Jurisdiction.*

Term	Definition
scheme	A specific use of the application linked to delivering a policy objective of the Producer. Each enrolment of a vehicle in the application must specify a scheme.
telematics device	The primary in-vehicle telematics device which monitors parameters.
telematics device data record	A record that originates from and is generated by a telematics device.
Tier 1 Data Exchange	A web services solution where structured information is exchanged that complies with requirements such as security parameters and certainty of delivery and receipt. It includes exchanges of information related to a vehicle's enrolment in telematics applications, conditions and adherence to those conditions.
Tier 2 Data Exchange	The human-initiated (rather than automated) exchange of business-related information and advice. Typical exchanges via this tier include reporting of issues and resolutions, correspondence regarding certification and re-certification, advice regarding information and communications technology (ICT), data assurance and other reporting.
Tier 3 Data Exchange	The packaging and delivery of data packages, comprising data records and enrolment-related artefacts. Data packages have several uses which include data analysis by the recipient, data assurance, and for research purposes.
User	An entity that operates one or more vehicles eligible to enter a scheme.

Appendix B Data Records

Introduction

This appendix specifies the core data requirements that shall be supported by the ASP to facilitate Tier 3 data delivery.

Data reporting via Tier 3 Data Exchange shall be delivered in accordance with *Telematics Business-to-Business Data Exchange Functional and Technical Specification.*

Data Formats

Data formats for all data records defined across NTF applications are described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix F.

The data record tables in this appendix provide a complementary set of data record tables that list:

- the data elements that are relevant to the application (with those not listed being considered not relevant); and

- whether elements that are relevant to the application are mandatory or optional.

Note: In the Use column of each data record table, 'Mandatory' denotes that the field must always be populated. 'Optional' denotes that the field must be populated if a valid measurement is available, but is otherwise left blank – for example, when position cannot be established.

The data record tables in this appendix and in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix F, must be used in combination during the software development process to ensure valid data records are generated.

Note: The telematics device ID is always associated with its telematics device data records via the structure of the data package.

JSON Schemas

The JSON schema that specifies JSON encoding for all data records defined across NTF applications is provided in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix C.

The JSON schema at the end of this appendix provides a complementary schema that reflects the information in the data record tables.

The JSON schemas in this appendix and in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix C, must be used in combination during the software development process to ensure valid data records are generated.

Position Record

Each position record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory and optional fields as described in Table B-2.

Table B-2: Position Record Fields

Name	Use
Record Date Time	Mandatory
Record Number	Optional
Latitude	Mandatory*
Longitude	Mandatory*
Direction of Travel	Optional
Satellite Count	Optional
Horizontal Dilution of Precision	Optional
Ignition Switch Status	Optional
Movement Sensor Status	Optional
Receipt Date Time	Mandatory

* Latitude and Longitude are optional only when there is no valid measurement of position, such as signal interruption in a tunnel. In this case, a record is created without a latitude or longitude measurement. If a measurement is available, it must be included in the record.

RIM Data Record JSON Schema

The RIM Data Record JSON schema presented below complements the Telematics Data Exchange JSON schema provided within *Telematics Business-to-Business Data Exchange Functional and Technical Specification,* Appendix C.

This schema formally specifies which data elements defined within *Telematics Business-to-Business Data Exchange Functional and Technical Specification,* Appendix C, are relevant to RIM, and of those, which are mandatory.

```
{

    "$id": "http://www.tca.gov.au/schemas/tde/rim/data-record/2018-07",
    "$schema": "http://json-schema.org/draft-07/schema#",
    "title": "Telematics Data Exchange (TDE) - data record definitions for IAP",

    "type" : "object",

    "oneOf": [
        {"$ref": "#/definitions/struct.data-record.set"},
        {"$ref": "#/definitions/struct.data-record.batch"}
    ],

    "definitions": {

        "struct.data-record" : {
            "if" : {
                "properties" : { "type" : { "const" : "POSITION" } }
            },
            "then" : {
                "patternProperties" : {
                    "^(type|dateTime|number|receiptDateTime|position|direction|
                        satelliteCount|hdop|ignition|movementSensor)$" : {}
                },
                "required" : ["type", "dateTime", "receiptDateTime"],
                "additionalProperties" : false
            },
            "else" : {
                "description" : "",
                "properties" : {},
                "minProperties" : 1,
                "additionalProperties" : false
            }
        },

        "struct.data-record.set" : {
            "type" : "object",
            "properties" : {
                "device" : {},
                "records" : {
                    "type" : "array",
                    "items" : {"$ref" : "#/definitions/struct.data-record"}
                }
            },
```

```
            "required" : ["device"]
        },

        "struct.data-record.batch" : {
            "type" : "object",
            "properties" : {
                "batchId" : {},
                "deviceRecords" : {
                    "type" : "array",
                    "items": {"$ref" : "#/definitions/struct.data-record.set"}
                }
            },
            "required" : ["batchId" ]
        }

    }

}
```

RIM Data Record Sample

The following extract provides a sample of a position record within a data record batch, according to the JSON schema on the previous page.

```
{
    "tdeVersion" : "2.0",
    "batchId" : "ABC20190803",
    "deviceRecords" : [{
        "device": {
            "id" : "1234"
        },
        "records" : [
            {
                "type" : "POSITION",
                "number" : 1234,
                "dateTime" : "2019-01-23T03:04:05Z",
                "position": {
                    "latitude": -36.00001,
                    "longitude":140
                },
                "receiptDateTime" : "2019-01-23T03:04:05Z"
            }
        ]
    }]
}
```

RIM Data Record Batch Sample

The following is a sample data record batch that contains two position records: the first contains the minimum set of data elements required by RIM, and the second the complete set of data elements allowed by RIM.

```json
{
    "tdeVersion": "2.0",
    "deviceRecords": [{
        "records": [
            {
                "type": "POSITION",
                "dateTime": "2018-09-27T00:00:15Z",
                "receiptDateTime": "2018-09-27T00:00:18Z"
            },
            {
                "type": "POSITION",
                "dateTime": "2018-09-27T00:56:05Z",
                "number": 1234,
                "position": {
                    "latitude": -33.95354,
                    "longitude": 151.22111
                },
                "direction": 299,
                "satelliteCount": 4,
                "hdop": 10.5,
                "ignition": "ON",
                "movementSensor": "MOVEMENT",
                "receiptDateTime": "2018-09-27T00:56:09Z"
            },
        ],
        "device": {"id": "ABC0000000000"}
    }],
    "batchId": "BATCHID"
}
```