

# **Rail Delivery Group**

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**Darwin  
‘Publish and Subscribe’  
via the Rail Data Marketplace**

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## Documentation Management

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## Review Information

Version	Comments
P-01-01	Changes to mention the XML topic (including adding section 2.4 to state that XSD files are available)

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## Terms and Definitions

Term	Definition
Certificate Authority (CA)	A company or entity that is responsible for attesting to the identity of users, computers, and organisations.
Darwin	Real time train running and related information.
GitHub	A platform for hosting code that has version control and allows for collaboration.
JSON	JavaScript Object Notation; a lightweight data-interchange format.
Kafka	Event streaming platform.
NRDP	National Rail Data Portal.
Offset Explorer	GUI application for managing and using Apache Kafka ® clusters.
PubSub	Publish and Subscribe.
RDM	Rail Data Marketplace.
SASL	Simple Authentication and Security Layer.
SSL	Secure Sockets Layer (provides secure internet communication).
XML	eXtensible Markup Language.
XSD	XML Schema file.

## 1. Introduction

### 1.1 Overview

- 1.1.1 This documentation describes how to interact with the Darwin ‘Publish and Subscribe’ (PubSub) mechanism via the ‘Rail Data Marketplace’ (RDM).
- 1.1.2 The Darwin PubSub mechanism differs from the offering via the National Rail Data Portal (NRDP).

### 1.2 Purpose

- 1.2.1 The documentation aims to provide information that enables users to consume messages from the Darwin PubSub data product in RDM.

### 1.3 Scope

- 1.3.1 This document:

- Provides a description of the contents of the data.
- Highlights differences between the PubSub product in RDM and the Darwin Push Port itself.
- Details how to get credentials to consume the data in RDM.
- Specifies how to consume data from the PubSub data product in RDM using a Kafka client.

## 2. Introduction to the Rail Data Marketplace

- 2.1 Rail Data Marketplace (RDM) is the central platform for finding and sharing rail data. RDM brings together rail data sources and related services in one place. It offers a simple and open way to share data from across the rail sector and beyond.
- 2.2 The RDM platform makes it easy to search for, access and share rail data, brings together both freely available and chargeable data, provides supporting information to help consumers make informed decisions, supports collaboration across a community of data consumers and publishers. It also creates and manages data sharing agreements, reducing legal costs, and lets publishers charge for their data and takes the effort out of billing.
- 2.3 To access the Rail Data Marketplace, please visit: <https://raildata.org.uk/>

## 3. Information on the Darwin PubSub data product

- 3.1 The push port data contains real time data on the creation of, and changes to, train schedule records, together with train movements and running predictions made by RDG's Darwin service. There are some differences between accessing the Darwin Push Port directly and via the RDM. For example, in order to get the timetable and reference data, as well as snapshots, these are provided as a separate file data product in the catalogue.
- 3.2 The Darwin Timetable Files that can be used in conjunction with the PubSub data product can be found in the RDM, under the name 'Darwin Timetable Files'.
- 3.3 There are XSD files available for the messages in the XML topic of the data product, to access these please visit: <https://www.rspaccreditation.org/publicDocumentation.php#RSPS5051>

## 4. Consuming data from the Darwin PubSub data product

### 4.1 Getting credentials in RDM

- 4.1.1 To view the 'access credentials' needed to consume the data, you must subscribe to the Darwin PubSub data product in RDM.
- 4.1.2 After subscribing to the data product, you will be able to see a set of access credentials consisting of a consumer key and consumer secret. The consumer key and consumer secret are synonymous with a username and password.
- 4.1.3 These access credentials are shown under the 'Pub/Sub' tab of the data product in RDM and are the same for all 'topics'.

## 4.2 Using a Kafka client to consume the data

4.2.1 The PubSub data product is using Kafka, an event streaming platform which in this instance is being used as a 'Publish and Subscribe' based messaging system.

4.2.2 There are currently four topics available, these are:

- The base topic.
- A JSON topic.
- An Avro topic.
- An XML topic.

From these topics, messages may be viewed as string, JSON, Avro serialized messages or XML.

4.2.3 A Kafka client will be needed to consume data in the topics, there are clients available in many languages. For more information on this, please visit: <https://docs.confluent.io/kafka-client/overview.html>

4.2.4 Along with the credentials from the RDM, when a Kafka consumer is created, the configuration details shown in the data product, such as the 'bootstrap server', the 'SASL mechanism', and 'security protocol' will be needed.

4.2.5 If a Java Kafka client is being used, then there is also a need to configure the SASL config in the consumer's configuration.

4.2.6 It is important to use the 'bootstrap server', the 'SASL mechanism', and 'security protocol' exactly as they are shown in the data product in RDM. Whilst other settings may work, they are not supported and use of them may not succeed in the future.

4.2.7 As the security protocol of the Kafka broker uses SSL, a CA certificate is required. In many operating systems there will be a default CA bundle in the operating system's certificate store. This location is dependent on your operating system but many resources regarding this are available online.

4.2.8 There may be a need to specify the location of the CA bundle in your file system for the 'ssl.ca.location'.

4.2.9 A code snippet is provided showing how to consume the data in the Darwin PubSub data product using the confluent-kafka client in Python. This will be updated as required so check the data product at the time of reading and regularly thereafter.

4.2.10 The code snippet can be found in the GitHub repository for the Rail Data Marketplace organisation here: <https://github.com/raildatamarketplace/rdm-darwin-kafka-client>.

4.2.11 There are also JSON schemas for the output of the data that can be found within the 'Reference Material' section of the data product.

End.