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Traveline API – Guidance for Developers

Prepared by:

Traveline & mxData

Version control

Ver.	Date	Author	Description
2.0	06/10/11	ML	New supplier + add appendix 2 &3
2.1	22/10/11	ML	Example SIRI request amended
2.2	30/10/12	SP	Removed NextBuses display rules appendix
2.3	19/02/13	SP	Amended SIRI section
2.4	22/07/14	AG	Introduction of beta channel
2.5	13/08/14	SP	Removed unused stops appendix & simplified

Contents

Purpose of the API

Information on the departure times of buses, coaches, trams and light rail systems in Great Britain is spread across a large number of local feeds, with a variety of data formats and licensing arrangements. The purpose of the NextBuses API is to make all of this information available as a single standard data source.

Departure times feeds fall into two basic categories:

- **Scheduled information:** collected and organized into ten regional feeds by Traveline
- **Real-time information**: typically commissioned on a local basis by local authorities

Traveline currently operates two mobile services for departures information – the SMS shortcode service **84268** and the mobile website **nextbuses.mobi**. These services connect to a wide and growing range of scheduled and real-time data sources, blending the data and enabling consistent national coverage to be provided (though there are still some areas without real-time feeds).

The NextBuses API takes this integrated set of data sources and makes it available as an open API for the purpose of encouraging innovation. The API is hosted and operated by mxData under contract from Traveline.

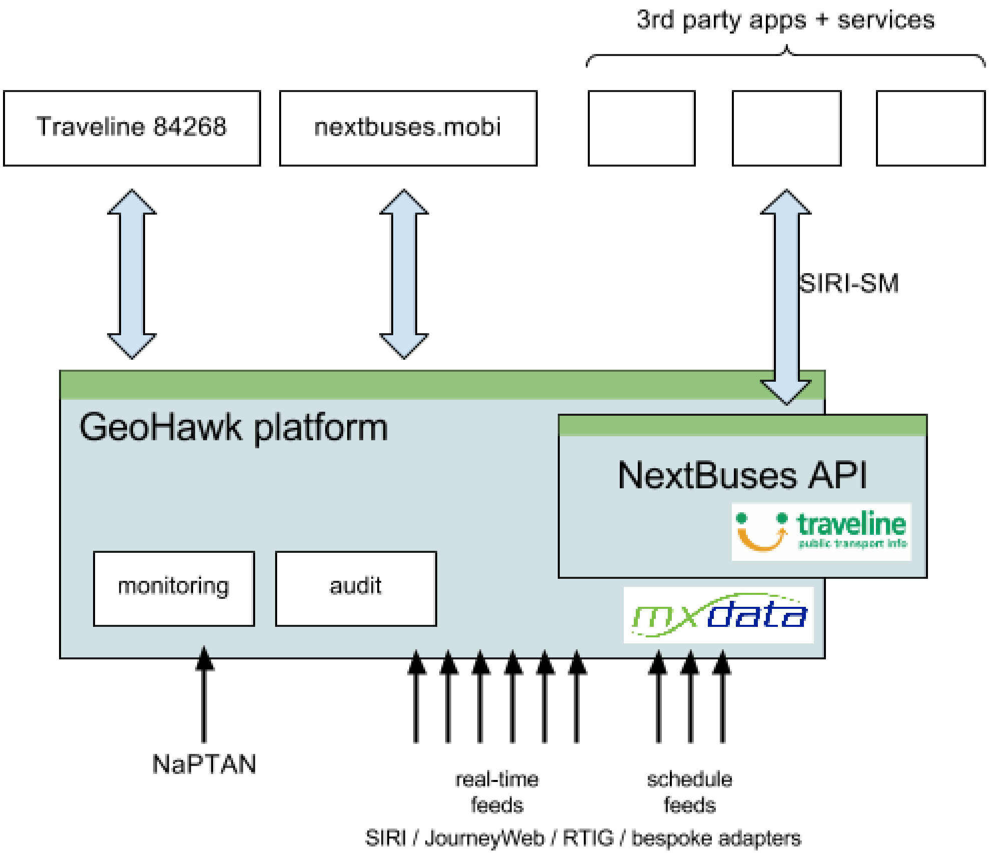
Architecture

The diagram below shows the NextBuses API in the context of the overall set of Traveline departure time services.

The API uses the **SIRI-SM** standard to provide the request / response access to the **mxData** GeoHawk platform that acts as an integration layer connecting to many different local and regional feeds using a variety of formats, using **NaPTAN** for stop identification. NaPTAN is described in more detail in Appendix Two.

Business rules are set in this integration layer, inclusion and exclusion of particular feeds depending on location, naming rules, and determining how information in the feeds is blended when they overlap (typically when there is scheduled and real-time information for the same bus route).

Rules are set by agreement ~Traveline, and apply to all services feeding from the integration layer. The data provided by the API will be consistent with that provided to the Traveline SMS and mobile web services.



Introducing SIRI

Overview

The **Service Interface for Real-time Information** (SIRI) is a European standard for use in the exchange of information relating to real-time public transport vehicle or journey time data. It based on the **Transmodel** abstract model for public transport information.

Key elements of the SIRI standard are its communication mechanisms and the message structures for specific functional services. SIRI has an evolving modular structure, allowing users to adopt whichever functions are relevant to their specific needs, and allowing new functional services that use the common protocols to be added in the future.

For the purposes of the NextBuses API, the relevant communication method is **request / response** and the relevant functional service is **Stop Monitoring** (SIRI-SM). The Stop Monitoring service provides real-time information on services due to call at a specific stop. This can be used to provide live departure boards, for example through a web/mobile provider.

NextBuses employs the simplest version of SIRI – 1.0 – because of the variety of different feeds that are accessible through the API.

Full technical documentation is available at www.siri.org.uk and provides the full scope of SIRI, including all functional services and communication mechanisms that aren't available in the NextBuses API.

Worked example

The NextBuses API makes it easy to retrieve information about departures from a specified stop. A request is made by posting a suitable SIRI-SM request to the API which returns a SIRI-SM response. Both request and response are encoded using XML.

Connections to the NextBuses API are authenticated by username and password (HTTP basic authentication) on a server to server basis using credentials supplied by Traveline. The username will be used to track usage so it is important that separate logins are set up and used for each service using the API. The username format is TravelineAPIxxx (‘x’ representing a number).

Requests should be posted to the URL:

http://<username>:<password>@nextbus.mxdata.co.uk/nextbuses/1.0/1

Each request must be for a single stop point, using the appropriate NaPTAN (see Appendix Two for more information on NaPTAN).

An example SIRI-SM request is shown below:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Siri version="1.0" xmlns="http://www.siri.org.uk/">
  <ServiceRequest>
    <RequestTimestamp>2014-07-01T15:09:12Z</RequestTimestamp>
    <RequestorRef>TravelineAPI101</RequestorRef>
     <StopMonitoringRequest version="1.0">
       <RequestTimestamp>2014-07-01T15:09:12Z</RequestTimestamp>
       <MessageIdentifier>12345</MessageIdentifier>
       <MonitoringRef>020035811</MonitoringRef>
     </StopMonitoringRequest>
  </ServiceRequest>
</Siri>
```

The request is a generic SIRI **ServiceRequest** meaning the response will contain a ServiceDelivery element. The client is identified using their username as the value for the **RequestorRef** element (TravelineAPIxxx) in this example. This must be the same as that used to authenticate the request.

The generic service request wraps a single **StopMonitoringRequest**. This identifies the stop of interest using the **MonitoringRef** element (020035811 in this example). This may be either an AtcoCode or a NaptanCode – the latter may be familiar from their use to identify stops using SMS services. The stop monitoring request also include a **MessageIdentifier** that must be populated. This will be returned in the RequestMessageRef element of the response.

An example SIRI-SM response is shown in Appendix One.

The NextBuses API can be tested with any tool capable of sending HTTP POST data. Examples include HTTP Resource Test (Mozilla Firefox extension) and cURL (Linux command line tool).

Beta channel

Upcoming changes to the NextBuses API are previewed on the beta channel, which is available through the alternative URL:

http://<username>:<password>@nextbus.mxdata.co.uk/nextbuses/beta

Your existing credentials will work on this URL.

The following two features are currently available in the beta channel:

- **National Operator Codes**: the **OperatorRef** element will contain a national operator code. Currently the OperatorRef contains codes which differ depending on whether they have come from a real-time or scheduled feed. In addition the same operator may be represented by different codes in different locations

- **Line-name matching**: line name (**PublishedLineName**) and destination name (**DestinationName**) elements will be matched between real-time and scheduled feeds. Currently the names associated with real-time feed may not match those used by a scheduled feed resulting a duplication of information.

  For example, a regular API response may indicate that there is a number 3 service with destination ‘C.Hinton’ due in 3 mins (from a real-time feed) and there is also a Citi 3 service to ‘Fulbourn, Superstore’ at 1330 (from a scheduled feed). These would be the same service but are duplicated because of the different line name and destination name.

  The line-name matching beta now uses a combination of scheduled times and stop codes to make the match. When matches are found, the names from the scheduled feed are used in preference to those from the real-time feed.

Administration

Requests for access to the NextBuses API should be addressed to Traveline at nextbuses@traveline.info

mxData provides the service based on an agreed overall monthly usage limit which will apply across all connections using the service. Please ensure that Traveline is informed of usage expectations so that appropriate infrastructure planning can be undertaken.

Any unexpected high usage that either endangers the service or takes usage materially above the agreed total usage limit for the service will be identified immediately through mxData's automated monitoring systems. mxData will discuss these situations with Traveline but, if urgent action is required, a particular connection may be throttled or blocked without notice.

All support issues should be referred to Traveline.

Appendix One: SIRI-SM example

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<Siri version="1.0" xmlns="http://www.siri.org.uk/">
  <ServiceDelivery>
    <ResponseTimestamp>2014-07-01T15:09:20.889+01:00</ResponseTimestamp>
    <StopMonitoringDelivery version="1.0">
      <ResponseTimestamp>2014-07-01-24T15:09:20.889+01:00</ResponseTimestamp>
      <RequestMessageRef>12345</RequestMessageRef>

      <MonitoredStopVisit>
        <RecordedAtTime>2014-07-01T15:09:20.889+01:00</RecordedAtTime>
        <MonitoringRef>020035811</MonitoringRef>
        <MonitoredVehicleJourney>
          <FramedVehicleJourneyRef>
            <DataFrameRef>-</DataFrameRef>
            <DatedVehicleJourneyRef>-</DatedVehicleJourneyRef>
          </FramedVehicleJourneyRef>
          <VehicleMode>bus</VehicleMode>
          <PublishedLineName>42</PublishedLineName>
          <DirectionName>Toddington, The Green</DirectionName>
          <OperatorRef>153</OperatorRef>
          <MonitoredCall>
            <AimedDepartureTime>2014-07-01T15:09:00.000+01:00</AimedDepartureTime>
          </MonitoredCall>
        </MonitoredVehicleJourney>
      </MonitoredStopVisit>

      <MonitoredStopVisit>
        <RecordedAtTime>2014-07-01T15:09:20.889+01:00</RecordedAtTime>
        <MonitoringRef>020035811</MonitoringRef>
        <MonitoredVehicleJourney>
          <FramedVehicleJourneyRef>
            <DataFrameRef>-</DataFrameRef>
            <DatedVehicleJourneyRef>-</DatedVehicleJourneyRef>
          </FramedVehicleJourneyRef>
          <VehicleMode>bus</VehicleMode>
          <PublishedLineName>2</PublishedLineName>
          <DirectionName>Elstow, Elstow Park and Ride</DirectionName>
          <OperatorRef>5100</OperatorRef>
          <MonitoredCall>
            <AimedDepartureTime>2014-07-01T15:10:00.000+01:00</AimedDepartureTime>
          </MonitoredCall>
        </MonitoredVehicleJourney>
      </MonitoredStopVisit>

      <MonitoredStopVisit>
        <RecordedAtTime>2014-07-01T15:09:20.889+01:00</RecordedAtTime>
        <MonitoringRef>020035811</MonitoringRef>
        <MonitoredVehicleJourney>
          <FramedVehicleJourneyRef>
            <DataFrameRef>-</DataFrameRef>
            <DatedVehicleJourneyRef>-</DatedVehicleJourneyRef>
          </FramedVehicleJourneyRef>
          <VehicleMode>bus</VehicleMode>
          <PublishedLineName>1</PublishedLineName>
          <DirectionName>Kempston</DirectionName>
          <MonitoredCall>
            <AimedDepartureTime>2014-07-01T15:17:00.000+01:00</AimedDepartureTime>
            <ExpectedDepartureTime>2014-07-01T15:18:02.000+01:00</ExpectedDepartureTime>
          </MonitoredCall>
        </MonitoredVehicleJourney>
      </MonitoredStopVisit>

    </StopMonitoringDelivery>
  </ServiceDelivery>
</Siri>
```

The response is a single generic **ServiceDelivery** element which contains a single **StopMonitoringDelivery** element, which is a response to the StopMonitoringRequest in the original request. The **RequestMessageRef** in the response should match the MessageIdentifier from the request.

In the above example the response describes three stop visits (**MonitoredStopVisit**). Each of these identifies the stop being monitored, namely that with NaPTAN identifier 020035811 (**MonitoringRef**). The first of these stop visits is the number ’42’ (**PublishedLineName**) to ‘Toddington, The Green’ (**DirectionName**). Note that the PublishedLineName may be a string rather than a number, for example ‘Citi 3’.

The first two stop visits include a code to identify the operator of the service (**OperatorRef**) although this element is not always present.

The first two stop visits provide only the scheduled departure time (**AimedDepartureTime**) whereas the third stop visit provides both the scheduled departure time and the predicted departure base on real-time information (**ExpectedDepartureTime**).

Appendix Two: Introducing NaPTAN

Overview

The **National Public Transport Access Node** (NaPTAN) database is a UK-wide system for uniquely identifying points of access to public transport.

Every UK railway station, coach terminus, airport, ferry terminal, bus stop, taxi rank, or other place where public transport can be joined or left, is allocated a unique NaPTAN identifier. There are approximately 420,000 entries in the database.

The relationship of such points to a city, town, village, or locality, can be indicated through an association with elements of the **National Public Transport Gazetteer**. The CEN IFOPT initiative is underway to develop NaPTAN concepts into a Europe-wide system, as an extension of Transmodel.

For the purposes of the NextBuses API, NaPTAN identifiers must be used to specify the stop for which data is being requested using the SIRI-SM request / response communication described above.

Full technical documentation including schemas, versioning, and accessing the database, is available at https://www.gov.uk/government/publications/national-public-transport-access-node-schema.

NaPTAN stop points

NaPTAN identifiers provide a systematic identification of all UK points of access to public transport (or stop points, using the Transmodel term). NaPTAN stop points are submitted by transport authorities to a central service which consolidates the data and distributes it back to users. Certain sets of stop point data such as airports and ferry ports are provided nationally.

- Every UK rail station, bus and coach terminus, airport, ferry terminal, bus stop, tram stop, and taxi rank is allocated a unique NaPTAN identifier.

- For large interchanges and termini, NaPTAN points identify the entrances from the public thoroughfare with one identifier distinguished as the main entrance. Platforms may also be individually identified.

- For each stop there are two associated NaPTAN identifiers, each unique within the UK: a 12 character system identifier (**AtcoCode**), and a short 7 or 8 digit version, suitable for placing on stops and other public facing systems (**NaptanCode**). This latter number has been designed to be suitable for use in SMS and other delivery channels requiring a direct reference to a stop identifier by the general public. Either code can be used in the NextBuses API.

- Every local authority has been allocated a unique prefix for their stop numbering to ensure that stop numbers cannot be duplicated. In England stop details are provided by 87 local authorities and are prefixed with numbers ranging between 010 and 490. In Wales they're provided by 22 local authorities and are prefixed with numbers ranging between 511 and 582. In Scotland stop details are provided by 32 local authorities and are prefixed with numbers ranging between 601 and 690.

- In addition there are other number prefixes – 900 for coach stops, 910 for rail stations, 920 for airports, 930 for ferry terminal, and 940 for metro and tram stops – that are created centrally by the DfT , rather than by local authorities.