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Entwurf

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**Öffentlicher Verkehr –
Serviceschnittstelle für Echtzeitinformationen, bezogen auf Operationen
im öffentlichen Verkehr –
Teil 3: Funktionelle Serviceschnittstelle;
Englische Fassung prEN 15531-3:2013**

Public transport –
Service interface for real-time information relating to public transport operations –
Part 3: Functional service interfaces;
English version prEN 15531-3:2013

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DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE

Nationales Vorwort

Dieses Dokument (prEN 15531-3:2013) wurde vom Technischen Komitee CEN/TC278 „Straßentransport und Verkehrstelematik“ ausgearbeitet, dessen Sekretariat vom NEN (Niederlande) gehalten wird.

Das zuständige deutsche Normungsgremium ist der Gemeinschaftsarbeitsausschuss NA 052-02-71 GA „Straßenverkehrstelematik“ des Normenausschusses Automobiltechnik.

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Dienste für den öffentlichen Verkehr verlassen sich zunehmend auf Informationssysteme, welche zuverlässige, einfach handhabbare und überall zugängliche korrekte Information für Reisende liefern. Diese Art von Systemen decken folgende spezifischen Nutzungsprofile ab: Laden von Kalendern und Fahrplänen; Kontrolle von Fahrzeugbeständen; Ticket- und Rechnungsausstellung; Aktuelle Informationen zu laufenden Diensten usw.

Diese Norm spezifiziert eine Serviceschnittstelle für Echtzeitinformationen (SIRI) zum öffentlichen Verkehr. Sie definiert Austauschinformationen zwischen Servern, welche Echtzeitinformationen zum öffentlichen Verkehr oder Reisedaten bereitstellen. Dies beinhaltet Kontrollzentren von Verkehrsanbietern und Informationssystemen welche Echtzeit Fahrzeuginformationen nutzen, wie zum Beispiel Dienste für Reiseinformation.

Änderungen

Gegenüber DIN CEN/TS 15531-3 (DIN SPEC 70656):2011-07 wurden folgende Änderungen vorgenommen:

- a) Überführung in eine Norm;
- b) das Dokument wurde an verschiedenen Stellen inhaltlich ergänzt;
- c) Dokument wurde in den Abschnitten neu strukturiert.

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Will supersede CEN/TS 15531-3:2007

English Version

Public transport - Service interface for real-time information
relating to public transport operations - Part 3: Functional
service interfaces

Öffentlicher Verkehr - Serviceschnittstelle für
Echtzeitinformationen, bezogen auf Operationen im
öffentlichen Verkehr - Teil 3: Funktionelle
Serviceschnittstelle

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 278.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Foreword

This document (prEN 15531-3:2013) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 15531-3:2007.

This presents Part 3 of the European Standard known as “SIRI”. SIRI provides a framework for specifying communications and data exchange protocols for organisations wishing to exchange Real-time Information (RTI) relating to public transport operations.

The SIRI European Standard is presented in three parts:

- Context and framework, including background, scope and role, normative references, terms and definitions, symbols and abbreviations, business context and use cases (Part 1).
- The mechanisms to be adopted for data exchange communications links (Part 2).
- Data structures for a series of individual application interface modules (Part 3).
- Two additional parts define additional functional services as CEN Technical Standards:
 - Additional data structures for additional application interface module FM (Facility Monitoring: Part 4).
 - Additional data structures for additional application interface module SX (Situation eXchange: Part 5).

The XML schema can be downloaded from <http://www.siri.org.uk/>, along with available guidance on its use, example XML files, and case studies of national and local deployments.

It is recognised that SIRI is not complete as it stands, and from time to time will need to continue to be enhanced to add additional capabilities. It is therefore intended that a SIRI Management Group should continue to exist, at European level, based on the composition of SG7.

Introduction

Public transport services rely increasingly on information systems to ensure reliable, efficient operation and widely accessible, accurate passenger information. These systems are used for a range of specific purposes: setting schedules and timetables; managing vehicle fleets; issuing tickets and receipts; providing real-time information on service running, and so on.

This European Standard specifies a Service Interface for Real-time Information (SIRI) about Public Transport. It is intended to be used to exchange information between servers containing real-time public transport vehicle or journey time data. These include the control centres of transport operators and information systems that utilise real-time vehicle information, for example, to deliver services such as travel information. SIRI 2 has also added, with SITI Lite, a possible exchange between server and end-user devices like smartphones or web browsers

Well-defined, open interfaces have a crucial role in improving the economic and technical viability of Public Transport Information Systems of all kinds. Using standardised interfaces, systems can be implemented as discrete pluggable modules that can be chosen from a wide variety of suppliers in a competitive market, rather than as monolithic proprietary systems from a single supplier. Interfaces also allow the systematic automated testing of each functional module, vital for managing the complexity of increasing large and dynamic systems. Furthermore, individual functional modules can be replaced or evolved, without unexpected breakages of obscurely dependent function.

This European Standard will improve a number of features of public transport information and service management:

- Interoperability – the European Standard will facilitate interoperability between information processing systems of the transport operators by: (i) introducing common architectures for message exchange; (ii) introducing a modular set of compatible information services for real-time vehicle information; (ii) using common data models and schemas for the messages exchanged for each service; and (iv) introducing a consistent approach to data management.
- Improved operations management – the European Standard will assist in better vehicle management by (i) allowing the precise tracking of both local and roaming vehicles; (ii) providing data that can be used to improve performance, such as the measurement of schedule adherence; and (iii) allowing the distribution of schedule updates and other messages in real-time.
- Delivery of real-time information to end-users – the European Standard will assist the economic provision of improved data by: (i) enabling the gathering and exchange of real-time data between VAMS systems; (ii) providing standardised, well defined interfaces that can be used to deliver data to a wide variety of distribution channels.

Technical advantages include the following:

- Reusing a common communication layer for all the various technical services enables cost-effective implementations, and makes the European Standard readily extensible in future.

1 Scope

There are many potential ways for passenger transport operations centres to interact. The approach taken by SIRI is for an open-ended set of standard data structures, carried over a communications channel constructed using one of a small number of specific options.

Part 2 of this European Standard specifies the communications channel. This Part 3 section specifies a number of functional modules, based on the 'use cases' identified in Annex B to Part 1:

- Production Timetable (PT): this service enables the provision of information on the planned progress of vehicles operating a specific service, identified by the vehicle time of arrival and departure at specific stops on a planned route for a particular Operational Day.
- Estimated Timetable (ET): this service enables the provision of information on the actual progress of Vehicle Journeys operating specific service lines, detailing expected arrival and departure times at specific stops on a planned route. There will be recorded data for stops which have been passed, and predicted data for stops not yet passed. In addition the Estimated Timetable service allows Vehicle Journeys to be cancelled, added or changed.
- Stop Timetable (ST): this service provides a stop-centric view of timetabled vehicle arrivals and departures at a designated stop. It can be used to reduce the amount of information that needs to be transmitted in real-time to stops and displays, as reference data for a Stop Monitoring Service; and provides a data feed of the static timetables.
- Stop Monitoring (SM): this service provides a stop-centric view of vehicle arrivals and departures at a designated stop. It can be used by displays and other presentation services to provide departure board and other presentations of timetable and real-time journey information both at stops and at a distance.
- Vehicle Monitoring (VM): this service enables the provision of information on the current location and status of a set of vehicles. It provides all the current relevant information from one AVMS relating to all vehicles fulfilling a set of selection criteria.
- Connection Timetable (CT): this service may be used to provide information about the scheduled arrivals of a feeder vehicle to the operator of a connecting distributor service. The distributor operator can then plan how to guarantee the connection, either with the expected vehicle or a different vehicle.
- Connection Monitoring (CM): this service is used to provide information about the expected arrival of a feeder vehicle to the operator of a connecting distributor service. The distributor operator can then manage the service to guarantee the connection, based on actual vehicle running.
- General Message (GM): the SIRI "General Message" service is used to exchange informative messages between identified individuals in free or an arbitrary structured format. It enables messages to be sent and to be revoked. Messages are assigned validity periods in addition to the actual content.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15531-1, Public transport - Service interface for real-time information relating to public transport operations
- Part 1: Context and framework

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 15531-1:2013 apply.

4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations given in prEN 15531-1:2013 apply.

5 Production Timetable Service [PT]

5.1 Purpose

The SIRI Production Timetable Service transmits daily timetables that include any planned updates that are known about at the time of transmission. The service is used typically to communicate between Scheduling systems and AVMS systems, and also between AVMS systems and intelligent clients of the AVMS system. The timetables exchanged should cover all LINES covered by the AVMS system.

The SIRI Production Timetable Service is also used to transmit the planned interchanges between journeys, including information about the linking of vehicle journey parts through the interchange, such as whether passengers are able to remain seated in the VEHICLE.

The provision of known updates gives a more accurate data set of journeys for the SIRI Estimated Timetable Service to reference, allowing a more efficient real-time exchange of content. However, the provision of a Production Timetable Service is not absolutely essential for the functioning of the Estimated Timetable service.

Because of the enhanced quality of data given by an increased integration with operational and back-office scheduling systems, SIRI implementations that are able to obtain production timetables should always provide and make use of a SIRI Production Timetable Service.

NOTE Note that an AVMS system may be aware of additional operational journeys and calls such as dead runs, and layovers. As the schedule information system usually only knows about VEHICLE JOURNEYS that are relevant to the passenger, the AVMS should only transmit passenger carrying VEHICLE JOURNEYS to the schedule information system.

5.2 Capability and Permission Matrices

5.2.1 Capability Matrix

Table 1 shows the set of required and optional capabilities defined for the Production Timetable service.

If the service supports Capability Discovery the **ProductionTimetableCapabilitiesRequest** / **ProductionTimetableCapabilitiesResponse** message pair can be used to determine the implementation's capabilities.

Table 1 — ProductionTimetableCapabilities Matrix

ProductionTimetableCapabilities			+Structure	Capabilities describing implementation of Production Timetable service
<i>inherit</i>	...	1:1	See xxx- Capability- Response	See SIRI Part 2 for Common Capability attributes.
<i>Topic</i>	TopicFiltering	0:1	+Structure	Which optional filtering features are supported?
	FilterByValidityPeriod	1:1	xsd:boolean	Whether results can be filtered by Validity Period. Required Capability: Fixed is <i>true</i> .
	FilterByOperatorRef	1:1	xsd:boolean	Whether results can be filtered by OPERATOR. Default is <i>true</i> .
	FilterByLineRef	1:1	xsd:boolean	Whether results can be filtered by LINE. Default is <i>true</i> .
	FilterByVersionRef	1:1	xsd:boolean	Whether results can be filtered by TIMETABLE Version. Default is <i>true</i> .
<i>Request Policy</i>	RequestPolicy	0:1	+Structure	Which features of Request Policy are supported by the service?
	Language	1:*	xsd:language	National languages used by service.

		Translations	0:1	<i>xsd:boolean</i>	Whether the producer supports translations. SIRI 2.0 Default is false.
				<i>choice</i>	Location reference system for coordinates.
	a	GmlCoordinateFormat	0:1	<i>SrsNameType</i>	Default coordinate format is given by a GML value.
	b	WgsDecimalDegrees		<i>EmptyType</i>	Default coordinate data system is WGS 84 latitude and longitude.
Sub- scription Policy		SubscriptionPolicy	0:1	<i>+Structure</i>	Which features of Subscription Policy are supported by the service?
		HasIncremental- Updates	0:1	<i>xsd:boolean</i>	Whether incremental updates can be specified for updates. Default is 'true'.
Access Control		AccessControl	0:1	<i>+Structure</i>	Which optional Access Control features are supported by service?
		RequestChecking	1:1	<i>xsd:boolean</i>	Whether access control of requests is supported. Default is 'false'.
		CheckOperatorRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by OPERATOR is supported. Default is 'true'.
		CheckLineRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by LINE is supported. Default is 'true'.
		CheckConnection- LinkRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by CONNECTION link is supported. Default is 'true'.
any		Extensions	0:1	<i>xsd:any*</i>	Placeholder for user extensions.

5.2.2 Permission Matrix

If the implementation supports both Capability Discovery and Access Controls, then the **ProductionTimetableCapabilitiesResponse** response can include the access permissions for the requestor participant to access data. Table 2 shows this.

Table 2 — Production Timetable Service — Permissions

ProductionTimetablePermission			<i>+Structure</i>	Permissions to use implementation of Production Timetable service.
In- herit	...	1:1	<i>xxxService- Permissions</i>	See SIRI Part 2 for Common Permission elements.
Topic	OperatorPermissions	0:1	<i>+Structure</i>	OPERATOR permissions for participant. See Part 2.
	LinePermissions	0:1	<i>+Structure</i>	LINE permissions for participant. See Part 2.
	ConnectionLinkPermissions	0:1	<i>+Structure</i>	CONNECTION link permissions for participant. See Part 2.

5.3 ProductionTimetableRequest

5.3.1 ProductionTimetableRequest — Element

The **ProductionTimetableRequest** states which timetables should be returned – see Table 3 below.

Table 3 — ProductionTimetableRequest — Attributes

ProductionTimetableRequest			+Structure	Request for daily production timetables
Attributes	version	1:1	VersionString	Version identifier of <i>Production Timetable</i> Service, e.g. 1.0c
Endpoint Properties	Request-Timestamp	1:1	xsd:dateTime	See SIRI Part 2 for common properties of SIRI Functional Service Requests.
	Message-Identifier	0:1	Message-Qualifier	
Line Topic	ValidityPeriod	0:1	ClosedTimeSpanRange-Structure	Start and end of timetable validity (time window) of journeys for which schedules are to be returned. Refers to the departure time at the first stop of each VEHICLE JOURNEY. If blank the configured data horizon will be used.
	Start	1:1	xsd:dateTime	The (inclusive) start time.
	End	1:1	xsd:dateTime	The (inclusive) end time.
	Timetable-VersionRef	0:1	xsd:string	Communicate only differences to the timetable specified by this version of the timetable.
	OperatorRef	0:*	→Operator-Code	Filter the results to include only results for the specified operator or operators. Optional SIRI capability: <i>TopicFiltering / ByOperator</i> .
	Lines			
	LineDirection			
	LineRef	0:1	→LineCode	Filter the results to include only results for the given LINE or LINES.
	DirectionRef	0:1	→Direction-Code	Filter the results to include only journeys for VEHICLES running in a specific relative DIRECTION. Optional SIRI capability: <i>TopicFiltering / ByDirection</i> .
Policy	Language	0:1	xml:lang	Preferred language in which to return text values. Optional SIRI capability: <i>NationalLanguage</i> .
	Include-Translations	0:1	xsd:boolean	Whether the producer should include any available translations of NLString text elements into multiple languages. If false elements only one value per text element will be provided. +SIRI.2.0 Default is false.
	Incremental-Updates	0:1	xsd:boolean	Whether the producer should return the complete set of current data, or only provide updates to the last timetable returned, i.e. additions, modifications and deletions, as indicated by the TimetableVersionRef . If <i>false</i> each subscription response will contain the full information as specified in this request.
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

The **ProductionTimetableRequest** can be used in both a direct request, and for a subscription. If used for a subscription, additional **ProductionTimetableSubscriptionPolicy** parameters can be specified.

The primary *Topic* term on the request is the time window for which timetables are to be returned. Additional topic filtering on LINE and timetable version is also allowed. If filtering is not specified, all LINES known to the AVMS are transmitted.

If the timetable version is not available an error code is returned **NoInfoForTopic**. In this situation a subscription is not set up.

5.3.2 ProductionTimetableRequest — Example

The following is an example of a **ProductionTimetableRequest**.

```
<ServiceRequest>
  <RequestTimestamp>2004-12-17T09:30:47-05:00</RequestTimestamp>
  <RequestorRef>NADER</RequestorRef>
  <ProductionTimetableRequest version="1.0">
    <RequestTimestamp>2001-12-17T09:30:47-05:00</RequestTimestamp>
    <ValidityPeriod>
      <StartTime>14:20:00</StartTime>
      <EndTime>14:20:00</EndTime>
    </ValidityPeriod>
    <TimetableVersionRef>002</TimetableVersionRef>
    <OperatorRef>Smooth</OperatorRef>
    <Lines>
      <LineDirection>
        <LineRef>123</LineRef>      <DirectionRef>Outbound</DirectionRef>
        <LineDirection>
          <LineDirection>
            <LineRef>124</LineRef>
          </LineDirection>
        </LineDirection>
      </Lines>
    </ProductionTimetableRequest>
  </ServiceRequest>
```

5.4 ProductionTimetableSubscriptionRequest

5.4.1 ProductionTimetableSubscriptionRequest — Element

The **ProductionTimetableSubscriptionRequest** (Table 4) requests the asynchronous delivery of the information described by a **ProductionTimetableRequest**. The **ProductionTimetableSubscriptionRequest** Policy parameters control the processing of the subscription.

Table 4 — ProductionTimetableSubscriptionRequest Parameters

ProductionTimetableSubscriptionRequest			+Structure	Request for a subscription to the SIRI Production Timetable Service.
Identity	SubscriberRef	0:1	→ParticipantCode	See SIRI Part 2 for common SubscriptionRequest parameters.
	SubscriptionIdentifier	1:1	SubscriptionQualifier	
Lease	InitialTerminationTime	1:1	xsd:dateTime	
Request	ProductionTimetable-Request	1:1	+Structure	See ProductionTimetableRequest .
	Extensions	0:1	xsd:any*	Placeholder for user extensions.

5.4.2 ProductionTimetableSubscriptionRequest — Example

The following is an example of a **ProductionTimetableSubscriptionRequest**.

```
<SubscriptionRequest>
  <RequestTimestamp>2004-12-17T09:30:47-05:00</RequestTimestamp>
  <RequestorRef>NADER</RequestorRef>
  <ProductionTimetableSubscriptionRequest>
    <SubscriberRef>NADER</SubscriberRef>
    <SubscriptionIdentifier>0000456</SubscriptionIdentifier>
    <InitialTerminationTime>2001-12-17T09:30:47-05:00</InitialTerminationTime>
    <ProductionTimetableRequest version="1.0">
      <RequestTimestamp>2001-12-17T09:30:47-05:00</RequestTimestamp>
      <ValidityPeriod>
        <StartTime>14:20:00</StartTime>
        <EndTime>14:20:00</EndTime>
      </ValidityPeriod>
      <TimetableVersionRef>002</TimetableVersionRef>
      <OperatorRef>Smooth</OperatorRef>
      <Lines>
        <LineDirection>
          <LineRef>123</LineRef>
          <DirectionRef>Outbound</DirectionRef>
        </LineDirection>
        <LineDirection>
          <LineRef>124</LineRef>
        </LineDirection>
      </Lines>
    </ProductionTimetableRequest>
  </ProductionTimetableSubscriptionRequest>
</SubscriptionRequest>
```

5.5 ProductionTimetableDelivery

5.5.1 Introduction

The **ProductionTimetableDelivery** returns the position of a VEHICLE or group of VEHICLES.

5.5.2 ServiceDelivery with a ProductionTimetableDelivery

One or more **ProductionTimetableDelivery** elements may be returned as part of a SIRI Functional ServiceDelivery. Table 5 shows this element.

Table 5 — ServiceDelivery / ProductionTimetableDelivery — Attributes

ServiceDelivery			+Structure	See SIRI Part 2 ServiceDelivery
HEADER	:::	1:1	See ServiceDelivery	
Payload	ProductionTimetableDelivery	0:*	+Structure	See ProductionTimetableDelivery element.

5.5.3 ProductionTimetableDelivery — Element

Each **ProductionTimetableDelivery** is made up of **DatedTimetableVersionFrame** elements. There will be status messages for any request that could not be returned. Table 6 shows this element.

Table 6 — ProductionTimetableDelivery — Attributes

ProductionTimetableDelivery			+Structure	Describes one or more Dated Timetables.
Attributes	version	1:1	VersionString	Version identifier of Production Timetable Service. Fixed, e.g. 1.0.
LEADER	:::	1:1	xxxServiceDelivery	See SIRI Part 2.xxxServiceDelivery.
Payload	DatedTimetableVersionFrame	0:*	+Structure	A version of the timetable to run on a specified date. See DatedTimetableVersionFrame element.
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

5.5.4 DatedTimetableVersionFrame — Element

5.5.4.1 Introduction

Each production timetable is returned as a **DatedTimetableVersionFrame** element. Each **DatedTimetableVersionFrame** contains a version of the timetable for a LINE and DIRECTION, and comprises one or more **DatedVehicleJourney** elements. Table 7 shows this element.

Table 7 — DatedTimetableVersionFrame — Attributes

DatedTimetableVersionFrame			+Structure	Provides a schedule of DATED VEHICLE JOURNEY for a LINE and DIRECTION.
Log	RecordedAtTime	1:1	xsd:dateTime	Time at which data was recorded.
Identity	VersionRef	0:1	→VersionCode	Reference to a TIMETABLE VERSION FRAME.
Line	LineRef	1:1	→LineCode	Identifier for the LINE.
	DirectionRef	1:1	→DirectionCode	Reference to the DIRECTION the VEHICLE is running along the LINE, for example, "in" or "out", "clockwise". Distinct from a destination.
Journey Pattern Info	:::	0:1	JourneyPattern-InfoGroup	See SIRI Part 2 JourneyPatternInfo-Group .
Service Info	:::	0:1	ServiceInfoGroup	See SIRI Part 2 ServiceInfoGroup .
Notes	DestinationDisplay	0:*	NLString	Name of DESTINATION of journey. One per language (Unbounded 0:* since +SIRI v2.0).
	LineNote	0:*	NLString	Text associated with LINE. One per language (Unbounded 0:* since +SIRI v2.0).
	FirstOrLastJourney	0:1	unspecified	Whether journey is first or last journey of day. +SIRI v2.0
Real time defaults	HeadwayService	0:1	xsd:boolean	Whether this is a Headway Service, that is one shown as operating at a prescribed interval rather than to a fixed timetable.

	Monitored	0:1	xsd:boolean	Whether there is real-time information available for journey, if not present, not known.
Journeys	DatedVehicleJourney	0:*	+Structure	Provides schedule information about the VEHICLE JOURNEY along which a VEHICLE is running.
Inter-changes	ServiceJourney-Interchange	0:*	+Structure	Provides schedule information about the planned SERVICE JOURNEY INTERCHANGES that connect services.
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

5.5.4.2 DatedVehicleJourney — Element

Each **DatedVehicleJourney** contains an ordered list of **DatedCall** elements representing the sequence of stop calls, as well as other properties that apply to the journey as a whole. Table 8 shows this element.

Table 8 — DatedVehicleJourney — Attributes

DatedVehicleJourney				+Structure	Provides schedule information about the VEHICLE JOURNEY along which a VEHICLE is running.
Vehicle Journey Identity	Choice	Framed-Vehicle-JourneyRef	1:1	+Structure	Identifies the DATED VEHICLE JOURNEY. Note that the preferred construction is using FramedVehicleJourneyRef from SIRI 2.0. For backward compatibility it is still possible to use the deprecated DatedVehicle-JourneyCode
		Dated-Vehicle-Journey-Code	1:1	VehicleJourney-Code	
	VehicleJourneyRef		0:1	→Vehicle-JourneyCode	VEHICLE JOURNEY from which this journey is different.
	ExtraJourney		0:1	xsd:boolean	Whether this journey is an addition to the plan. Can only be used when both participants recognise the same schedule version. If omitted, defaults to <i>false</i> : the journey is not an addition.
	Cancellation		0:1	xsd:boolean	Whether this journey is a Cancellation of a journey in the plan. Can only be used when both participants recognise the same schedule version. If omitted, defaults to <i>false</i> : Journey is not a Cancellation.
Journey Pattern Info	:::		0:1	JourneyPattern-InfoGroup	See SIRI Part 2 JourneyPatternInfoGroup .
Service Info	:::		0:1	ServiceInfo-Group	See SIRI Part 2 ServiceInfoGroup .
Journey-Info Group	:::		0:1	JourneyInfo-Group See above	See SIRI Part 2 JourneyInfoGroup .
Notes	DestinationDisplay		0:*	NLString	The appropriate text to be used as Destination for this VEHICLE JOURNEY. Can be overridden at individual calling points. One per language (Unbounded 0:* since +SIRI v2.0).
	LineNote		0:*	NLString	Additional text associated with LINE. Inherited property. One per language (Unbounded 0:* since +SIRI v2.0).
Timetable-info	HeadwayService		0:1	xsd:boolean	Whether this is a HEADWAY JOURNEY, that is one shown as operating at a prescribed interval rather than to a fixed timetable.
Real-time Info	Monitored		0:1	xsd:boolean	Whether there is real-time information available for journey, if not present, not known.

Operational Block	:::		0:1	OperationalBlockGroup	See SIRI Part 2 OperationalBlockGroup .
Children	a	DatedCalls	1:1	+Structure	Complete sequence of stops along the route path, in calling order. Calls are in order within a JOURNEY PATTERN.
		DatedCall	2:*	+Structure	Individual DatedCall . See below.
any	Extensions		0:1	xsd:any*	Placeholder for user extensions.

5.5.4.3 DatedCall — Element

Each **DatedCall** describes the PASSING TIMES of a VEHICLE JOURNEY at a stop, together with other data elements relating to the CALL. A journey must contain at least two CALLS. Table 9 shows this element.

Table 9 — DatedCall — Attributes

DatedCall			+Structure	Provides information about a CALL in a DATED VEHICLE JOURNEY.
Stop Identity	StopPointRef	1:1	→StopPointCode	Reference to a SCHEDULED STOP POINT. Defaults to that of context i.e. that specified on StopPoint .
	VisitNumber	0:1	VisitNumberType	For JOURNEY PATTERNS that involve repeated visits by a VEHICLE to a stop, the VisitNumber count is used to distinguish each separate visit. Default is '1'.
	Order	0:1	xsd:positive-Integer	For implementations for which the overall Order within JOURNEY PATTERN is not used for VisitNumber , (i.e. if VisitNumbersOrder is <i>false</i>) then can be used to associate the overall Order as well if useful.
	StopPointName	0:*	NLString	Name of Stop. One per language (Unbounded 0:* since +SIRI v2.0).
Info	TimingPoint	0:1	xsd:boolean	Whether the stop is a TIMING POINT. Times for stops that are not timing points are sometimes interpolated crudely from the timing points, and may represent a lower level of accuracy. Default is 'true'.
	BoardingStretch	0:1	xsd:boolean	Whether this is a Hail and Ride stop. A hail and ride stop may represent a linear stretch in the stop model. Default is 'false'.
	RequestStop	0:1	xsd:boolean	Whether VEHICLE stops only if requested explicitly by passenger. Default is 'false'.
Service Info	DestinationDisplay	0:*	NLString	The publicised DESTINATION at this point in the journey; used to help identify the VEHICLE to the public. Since VEHICLES can change their published DESTINATION during a journey, the destination included here should be what the VEHICLE will display when it reaches this stop. The DESTINATION DISPLAY is specified by exception: if none is specified, the value from any previous DatedCall instances for the same journey will be used. If there are none then any values from the underlying DatedVehicleJourney will be used, or failing that, from the DatedTimetableVersionFrame . One per language (Unbounded 0:* since +SIRI v2.0).
Call	CallNote	0:*	NLString	Text annotation that applies to this CALL. One per language (Unbounded 0:* since +SIRI v2.0).
Disruption-Group	...	0:1	DisruptionGroup	See SIRI Part 2 DisruptionGroup . <i>DetailLevel</i> : normal.
Arrival	AimedArrivalTime	0:1	xsd:dateTime	Aimed Arrival Time in either the original or Production Timetable. Can be omitted at the end stop.

	Arrival-PlatformName	0:1	NLString	Bay or platform name. Inherited property. Can be omitted if the same as the DeparturePlatformName .
	Arrival-BoardingActivity	0:1	ArrivalBoarding-ActivityEnum	Type of alighting allowed at stop. Default is 'alighting'. <i>alighting noAlighting passthru</i>
	ArrivalStop-Assignment	0:1	+Structure	Assignment of arrival of Scheduled STOP POINT to a physical QUAY (platform). If not given, assume same as for departure +SIRI v2.0.
	AimedQuayRef	0:1	→QuayCodeType	Physical QUAY to use according to the planned timetable. +SIRI v2.0
	Aimed-QuayName	0:1	NLString	Scheduled Platform name. Can be used to indicate a platform change. +SIRI v2.0.
Departure	Aimed-DepartureTime	0:1	xsd:dateTime	Aimed Departure Time in either the original or Production Timetable.
	Departure-PlatformName	0:1	NLString	Bay or platform (QUAY) name from which VEHICLE will depart.
	Departure-BoardingActivity	0:1	Departure-BoardingActivityEnum	Type of boarding allowed at stop. Default is 'boarding'. <i>boarding noBoarding passthru</i>
	DepartureStop-Assignment	0:1	+Structure	Assignments of departure platform for SCHEDULED STOP POINT to a physical QUAY. +SIRI v2.0. +SIRI v2.0. <i>DetailLevel: normal.</i>
	AimedQuayRef	0:1	→QuayCodeType	Physical QUAY (Platform) to use according to the planned timetable. +SIRI v2.0
	Aimed-QuayName	0:*	NLString	Scheduled QUAY (Platform) name. Can be used to indicate a platform change. +SIRI v2.0 One per language
	AimedLatestPassengerAccessTime	0:1	xsd:dateTime	Latest target time at which a PASSENGER should aim to arrive at the STOP PLACE containing the stop. This time may be earlier than the VEHICLE departure times and may include time for processes such as checkin, security, etc.(As specified by CHECK CONSTRAINT DELAYS in the underlying data) If absent assume to be the same as Earliest expected departure time, +SIRI 2.0
Headway	AimedHeadway-Interval	0:1	Positive-DurationType	Target headway interval between services for frequency based services.
Interchange	Targeted-Interchange	0:*	+Structure	Information on any planned connections. If omitted: No connections, i.e. TargetedInterchange . <i>Deprecated from SIRI v2.0</i>
Interchange	FromServiceJourneyInterchange	0:*	+Structure	Information on any feeder of a planned connections. +SIRI v2.0
Interchange	ToServiceJourneyInterchange	0:*	+Structure	Information on any distributor of a planned connections. +SIRI v2.0
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

5.5.4.4 TargetedInterchange — Element

Each **TargetedInterchange** describes the SERVICE JOURNEY INTERCHANGES (i.e. connections) that may be made at a stop to another onwards distributor journey. Each **TargetedInterchange** is described in the context of a specific **DatedCall** for a specific journey. Table 10 shows this element.

Table 10 — TargetedInterchange — Attributes

TargetedInterchange			+Structure	Information on any planned connections. If omitted: No connections.
Identity	InterchangeCode	0:1	→Interchange-Code	Identifier of SERVICE JOURNEY INTERCHANGE.
	DistributorVehicle-JourneyRef	1:1	→DatedVehicle-JourneyCode	Reference to a distributor DATED VEHICLE JOURNEY.
Connection	Distributor-ConnectionLink	1:1	+Structure	CONNECTION link over which SERVICE JOURNEY INTERCHANGE takes place.
	ConnectionCode	1:1	ConnectionCode	Identifier of CONNECTION link.
	StopPointRef	0:1	→StopPoint-Code	SCHEDULED STOP POINT from which the distributor VEHICLE JOURNEY departs. If omitted: the distributor journey stop is the same as the feeder journey stop, i.e. that of the containing dated call.
	Interchange-Duration	0:1	PositiveDuration-Type	Time (Duration) needed by passenger to change from feeder to distributor.
	Frequent-TravellerDuration	0:1	PositiveDuration-Type	Time (Duration) needed by passenger who is familiar with CONNECTION link to change from feeder to distributor. If absent, use InterchangeDuration and a standard weighting.
	Occasional-TravellerDuration	0:1	PositiveDuration-Type	Time (Duration) needed by passenger who is not familiar with CONNECTION link to change from feeder to distributor. If absent, use InterchangeDuration and a standard weighting.
	ImpairedAccess-Duration	0:1	PositiveDuration-Type	Time (Duration) needed by impaired mobility passenger to change from feeder to distributor. If absent, use InterchangeDuration and a standard weighting.
Identity	Distributor-VisitNumber	0:1	VisitNumber-Type	Sequence of visit to stop within distributor VEHICLE JOURNEY. Increases monotonically, but not necessarily sequentially.
	DistributorOrder	0:1	xsd:positive-Integer	For implementations for which the overall Order within JOURNEY PATTERN is not used for VisitNumber , (i.e. if VisitNumbersOrder is <i>false</i>) then can be used to associate the overall Order as well if useful.
Interchange Properties	StaySeated	0:1	xsd:boolean	Whether Vehicle stops only if requested explicitly by passenger. Default is <i>false</i> .
	Guaranteed	0:1	xsd:boolean	Whether the SERVICE JOURNEY INTERCHANGE is guaranteed. Default is <i>false</i> ; interchange is not guaranteed.
	Advertised	0:1	xsd:boolean	Whether the SERVICE JOURNEY INTERCHANGE is advertised as a guaranteed connection. Default is <i>false</i> .
Interchange Times	StandardWaitTime	0:1	xsd:duration	Standard wait time for INTERCHANGE. SIRI v2.0
	MaximumWaitTime	0:1	xsd:duration	Maximum time that Distributor will wait for Feeder for INTERCHANGE. SIRI v1.0.
	MaximumAutomatic-WaitTime	0:1	xsd:duration	Maximum automatic wait time that Distributor will wait for Feeder for INTERCHANGE. SIRI v2.0.
	StandardTransfer-Time	0:1	xsd:duration	Standard transfer duration for INTERCHANGE. SIRI
	MinimumTransfer-Time	0:1	xsd:duration	Minimum transfer duration for INTERCHANGE. SIRI
	MaximumTransfer-Time	0:1	xsd:duration	Maximum transfer duration for INTERCHANGE. SIRI

any	Extensions	0:1	xsd:any*	Placeholder for user extensions.
-----	-------------------	-----	----------	----------------------------------

5.5.4.5 ServiceJourneyInterchange — Element (SIRI v2.0)

Each **ServiceInterchange** describes the SERVICE JOURNEY INTERCHANGES, i.e. connections that may be made over a CONNECTION link between a feeder and a distributor journey. The element is similar in purpose to **TargetedInterchange** but also allows feeder connections to be described, as well as the exchange of SERVICE JOURNEY INTERCHANGES independent of the exchange of a specific journey. Table 11 shows this element. Note that redundant Feeder and Distributor information can be excluded when given by context.

Table 11 — ServiceJourneyInterchange — Attributes

ServiceJourneyInterchange			+Structure	Information on any planned connections, i.e. SERVICE JOURNEY INTERCHANGES. If omitted: No connections.
<i>Identity</i>	InterchangeCode	0:1	→Interchange-Code	Identifier of SERVICE JOURNEY INTERCHANGE.
<i>Connection Link Identity</i>	ConnectionLinkRef	0:1		Reference to a physical CONNECTION LINK over which the SERVICE JOURNEY INTERCHANGE takes place. +SIRI v2.0
<i>Feeder Vehicle Journey Identity</i>	FeederRef	0:1*	+Structure	Reference to a connecting feeder VEHICLE JOURNEY. +SIRI v2.0. *)This structure is mandatory except when the ServiceJourneyInterchange is in context of the feeders dated Call.
	FramedVehicle-JourneyRef	0:1	+Structure	Frame qualified Reference to a connecting feeder VEHICLE JOURNEY. +SIRI v2.0
	DataFrameRef	0:1	→Vehicle-JourneyCode	Reference to a data frame within participant service. Used to ensure that the DatedVehicleJourneyRef is unique with the data horizon of the service. Often the OperationalDayType is used for this purpose. +SIRI v2.0
	DatedVehicle-JourneyRef	0:1	→DatedVehicle-JourneyCode	A reference to the DATED VEHICLE JOURNEY that the VEHICLE is making. +SIRI v2.0
	LineRef	0:1	→LineCode	A reference to the LINE of the referenced feeder VEHICLE JOURNEY. +SIRI v2.0
	ParticipantRef	0:1	→Participant-Code	A reference to the system from which the feeder reference comes
<i>Feeder StopPoint Identity</i>	FeederArrivalStopRef	0:1*	→StopPointRef	SCHEDULED STOP POINT at which feeder journey arrives. +SIRI v2.0. *)This element is mandatory except when the ServiceJourneyInterchange is in context of the distributors dated Call.
	FeederVisitNumber	0:1	VisitNumber-Type	Sequence of visit to stop within feeder VEHICLE JOURNEY. Increases monotonically, but not necessarily sequentially.
<i>Distributor Vehicle Journey Identity</i>	DistributorRef	0:1*	+Structure	Reference to a connecting distributor VEHICLE JOURNEY. +SIRI v2.0. *)This structure is mandatory except when the ServiceJourneyInterchange is in context of the distributors dated Call.
	FramedVehicle-JourneyRef	0:1	+Structure	Frame qualified Reference to a connecting distributor VEHICLE JOURNEY. +SIRI v2.0
	DataFrameRef	0:1	→Vehicle-JourneyCode	Reference to a data frame within participant service. Used to ensure that the DatedVehicleJourneyRef is unique with the data horizon of the service. Often the OperationalDayType is used for this purpose. +SIRI v2.0
	DatedVehicle-JourneyRef	0:1	→DatedVehicle-JourneyCode	A reference to the distributor DATED VEHICLE JOURNEY that the VEHICLE is making. +SIRI v2.0

	LineRef	0:1	→LineCode	A reference to the LINE of the referenced distributor VEHICLE JOURNEY. +SIRI v2.0
	ParticipantRef	0:1	→Participant-Code	A reference to the system from which the distributor reference comes
<i>Distributor Stop Point Identity</i>	DistributorDepartureStopRef	0:1*	→StopPointRef	SCHEDULED STOP POINT at which distributor journey departs. +SIRI v2.0. *)This element is mandatory except when the ServiceJourneyInterchange is in context of the distributors dated Call.
	DistributorVisitNumber	0:1	VisitNumber-Type	Sequence of visit to stop within distributor VEHICLE JOURNEY. Increases monotonically, but not necessarily sequentially.
<i>Interchange Properties</i>	StaySeated	0:1	xsd:boolean	Whether Vehicle stops only if requested explicitly by passenger. Default is 'false'.
	Guaranteed	0:1	xsd:boolean	Whether the interchange is guaranteed. Default is 'false'; interchange is not guaranteed.
	Advertised	0:1	xsd:boolean	Whether the interchange is advertised as a connection. Default is 'false'.
<i>Interchange Times</i>	StandardWaitTime	0:1	xsd:duration	Standard wait time for INTERCHANGE. SIRI v2.0
	MaximumWaitTime	0:1	xsd:duration	Maximum time that Distributor will wait for Feeder for INTERCHANGE. SIRI v1.0.
	MaximumAutomatic-WaitTime	0:1	xsd:duration	Maximum automatic wait time that Distributor will wait for Feeder for INTERCHANGE. SIRI v2.0.
	StandardTransferTime	0:1	xsd:duration	Standard transfer duration for INTERCHANGE. SIRI
	MinimumTransferTime	0:1	xsd:duration	Minimum transfer duration for INTERCHANGE. SIRI
	MaximumTransferTime	0:1	xsd:duration	Maximum transfer duration for INTERCHANGE. SIRI
Any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

5.5.5 ProductionTimetableDelivery — Example

The following is an example of a **ProductionTimetableDelivery**.

```
<ServiceDelivery>
  <!--=====HEADER===== -->
  <ResponseTimestamp>2004-12-17T09:30:46-05:00</ResponseTimestamp>
  <ProducerRef>KUBRICK</ProducerRef>
  <Status>true</Status>
  <MoreData>>false</MoreData>
  <!--=====PAYLOAD===== -->
  <ProductionTimetableDelivery version="1.0">
    <ResponseTimestamp>2001-12-17T09:30:47-05:00</ResponseTimestamp>
    <SubscriberRef>NADER</SubscriberRef>
    <SubscriptionRef>00123456</SubscriptionRef>
    <Status>true</Status>
    <ValidUntil>2001-12-17T10:30:47-05:00</ValidUntil>
    <DatedTimetableVersionFrame>
      <LineRef>123</LineRef>
      <DirectionRef>Out</DirectionRef>
      <PublishedLineName>String</PublishedLineName>
      <DirectionName xml:lang="EN">Outbound</DirectionName>
      <!-- Service Info Group -->
      <OperatorRef>Smooth</OperatorRef>
      <ProductCategoryRef>Fun Special</ProductCategoryRef>
      <ServiceFeatureRef>normalStopping</ServiceFeatureRef>
      <VehicleFeatureRef>lowStep</VehicleFeatureRef>
    </DatedTimetableVersionFrame>
  </ProductionTimetableDelivery>
</ServiceDelivery>
```

```
<ServiceFeatureRef>cyclesPermitted</ServiceFeatureRef>
<LineNote>Special services at Easter</LineNote>
<!-- Timetable real-time info Group -->
<Monitored>true</Monitored>
<DatedVehicleJourney>
  <!-- Identity Group -->
  <DatedVehicleJourneyCode>DVC0008767</DatedVehicleJourneyCode>
  <VehicleJourneyRef>VJ123</VehicleJourneyRef>
  <ExtraJourney>false</ExtraJourney>
  <PublishedLineName>123 Out</PublishedLineName>
  <!-- Service Info Group -->
  <OperatorRef>Sharp</OperatorRef>
  <ProductCategoryRef>plusbus</ProductCategoryRef>
  <ServiceFeatureRef>hailAndRider</ServiceFeatureRef>
  <VehicleFeatureRef>lowDoor</VehicleFeatureRef>
  <!-- Journey Info Group -->
  <VehicleJourneyName>Shoppers Special</VehicleJourneyName>
  <JourneyNote>Not suitable for claustrophobes.</JourneyNote>
  <Monitored>true</Monitored>
  <HeadwayService>false</HeadwayService>
  <!-- == CALL 1 == -->
  <DatedCall>
    <StopPointRef>HLTS00101</StopPointRef>
    <BoardingStretch>false</BoardingStretch>
    <RequestStop>false</RequestStop>
    <DestinationDisplay>Limbo</DestinationDisplay>
    <AimedArrivalTime>2001-12-17T09:30:47-05:00</AimedArrivalTime>
    <ArrivalBoardingActivity>alighting</ArrivalBoardingActivity>
    <AimedArrivalTime>2001-12-17T09:30:47-05:00</AimedArrivalTime>
    <DeparturePlatformName>1</DeparturePlatformName>
    <DepartureBoardingActivity>boarding</DepartureBoardingActivity>
  </DatedCall>
  <!-- == CALL 2 == -->
  <DatedCall>
    <StopPointRef>HLTS00102</StopPointRef>
    <BoardingStretch>true</BoardingStretch>
    <DestinationDisplay>Hell First Circle</DestinationDisplay>
    <AimedArrivalTime>2001-12-17T09:30:47-05:00</AimedArrivalTime>
    <AimedDepartureTime>2001-12-17T09:30:47-05:00</AimedDepartureTime>
    <TargetedInterchange>
      <DistributorVehicleJourneyRef>V45681</DistributorVehicleJourneyRef>
      <DistributorConnectionLink>
        <ConnectionLinkCode>01340</ConnectionLinkCode>
        <DefaultDuration>P3M</DefaultDuration>
      </DistributorConnectionLink>
      <DistributorVisitNumber>1</DistributorVisitNumber>
      <Guaranteed>true</Guaranteed>
    </TargetedInterchange>
  </DatedCall>
  <!-- == CALL 3 == -->
  <DatedCall>
    <StopPointRef>HLTS00103</StopPointRef>
    <DestinationDisplay>Hell</DestinationDisplay>
    <CallNote>Can change here to </CallNote>
    <TimetabledArrivalTime>2001-12-17T09:30:47-05:00</TimetabledArrivalTime>
```

```
<ArrivalPlatformName>4</ArrivalPlatformName>
<TimetabledDepartureTime>2001-12-17T09:30:47-05:00</TimetabledDepartureTime>
<DepartureBoardingActivity>NoBoarding</DepartureBoardingActivity>
<TargetedInterchange>
  <InterchangeCode>I765</InterchangeCode>
  <DistributorVehicleJourneyRef>V45678</DistributorVehicleJourneyRef>
  <DistributorConnectionLink>
    <ConnectionLinkCode>01345</ConnectionLinkCode>
    <StopPointRef>HLTS00103</StopPointRef>
    <StopPointName>Gare de Nord</StopPointName>
    <DefaultDuration>P5M</DefaultDuration>
    <FrequentTravellerDuration>P3M</FrequentTravellerDuration>
    <OccasionalTravellerDuration>P7M</OccasionalTravellerDuration>
    <ImpairedAccessDuration>P15M</ImpairedAccessDuration>
  </DistributorConnectionLink>
  <DistributorVisitNumber>2</DistributorVisitNumber>
  <StaySeated>false</StaySeated>
  <Guaranteed>true</Guaranteed>
  <Advertised>true</Advertised>
  <MaximumWaitTime>P15M</MaximumWaitTime>
</TargetedInterchange>
</DatedCall>
</DatedVehicleJourney>
</DatedTimetableVersionFrame>
</ProductionTimetableDelivery>
</ServiceDelivery>
```

5.5.6 Efficient Delivery of Large Timetables

Production Timetable Service responses may be very large. The XML messages may be broken down into smaller packets for transmission using the **MoreData** attribute in the **DataSupplyAnswer** message. See Multipart Despatch earlier.

In order to reduce the data volume it is possible to exchange only the changes instead of the entire schedule. However, for this to work the daily updated schedule of the AVMS must originate from the same database as the seasonal schedule of the schedule information system. Note also that the daily updated planned schedules usually exist as a progression of the seasonal schedule, which means that over time, the deviations from the originally created seasonal schedule become greater. To obtain just changes, the active schedule version against which changes are desired must be specified in the **TimetableVersionRef** of the subscription request. If the same or an earlier version is active in the data sender, then it need only transmit the changes to the planned schedule in the Production Timetable service.

6 Estimated Timetable Service [ET]

6.1 Purpose

The Estimated Timetable service is used by the AVMS to inform interested schedule information systems of the current status of all known VEHICLE JOURNEYS. This enables the schedule information system to provide up-to-the-minute information for short-term journey planning. It can also be used to support intelligent displays that calculate the deviation from timetable themselves using a timetable and a real time difference delay by the SIRI Stop Monitoring Service.

Message content can include:

— Schedule deviations with predictions for future route sections.

- Failure of a VEHICLE JOURNEY.
- Additional journeys.
- Change to the VEHICLE capacity (passenger load).
- Change to VEHICLE TYPE/VEHICLE Equipment.
- Platform changes.
- Stop obstruction.
- Path (i.e. JOURNEY PATTERN) changes.

As with the production timetable service, the AVMS must only transmit the boardable VEHICLE JOURNEYS, i.e. the VEHICLE JOURNEYS that carry passengers.

6.2 Capability and Permission Matrices

6.2.1 Capability Matrix

The following set of required and optional capabilities is defined for the Estimated Timetable service. If the service supports Capability Discovery, the **EstimatedTimetableCapabilitiesRequest** / **EstimatedTimetableCapabilitiesResponse** message pair can be used to determine the implementation's capabilities.

Table 12 — EstimatedTimetable Service Capabilities Matrix

EstimatedTimetableCapabilities			+Structure	Capabilities describing implementation of Estimated Timetable service.
<i>inherit</i>	...	1:1	See xxx-Capability-Response	See SIRI Part 2 for Common Capability attributes.
<i>Topic</i>	TopicFiltering	0:1	+Structure	Which optional filtering features are supported?
	DefaultPreview-Interval	0:1	Positive-DurationType	Default Preview Interval.
	FilterByOperator-Ref	0:1	xsd:boolean	Whether results can be filtered by OPERATOR. Required Capability: Default is 'true'.
	FilterByLineRef	0:1	xsd:boolean	Whether results can be filtered by LINE. Required Capability: Default is 'true'.
	FilterByVersionRef	0:1	xsd:boolean	Whether results can be filtered by TIMETABLE Version. Default is 'true'.
<i>Request Policy</i>	RequestPolicy	0:1	+Structure	Which optional features of the Request Policy are supported by the service?
	Language	1:*	xsd:language	National languages used by service.
			choice	Location reference coordinate system.
	Translations	0:1	xsd:boolean	Whether the producer supports translations. SIRI 2.0 Default is false.
	a GmlCoordinate-Format	0:1	SrsNameType	Default coordinate format is given by a GML format name value.
	b WgsDecimal-Degrees		EmptyType	Default coordinate data system is WGS 84 latitude and longitude in decimal degrees of arc.
<i>Sub- scription</i>	SubscriptionPolicy	0:1	+Structure	Which features of the SubscriptionPolicy are supported by service?

<i>Policy</i>	HasIncremental-Updates	0:1	<i>xsd:boolean</i>	Whether incremental updates can be specified for updates. Default is 'true'.
	HasChange-Sensitivity	0:1	<i>xsd:boolean</i>	Whether change threshold can be specified for updates. Default is 'true'.
<i>Access Control</i>	AccessControl	0:1	<i>+Structure</i>	Which optional Access Control features are supported by service?
	RequestChecking	0:1	<i>xsd:boolean</i>	Whether access control of requests is supported. Default is 'false'.
	CheckOperatorRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by OPERATOR is supported. Default is 'true'.
	CheckLineRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by LINE is supported. Default is 'true'.
	CheckConnection-LinkRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by CONNECTION link is supported. Default is 'true'.
any	Extensions	0:1	<i>xsd:any*</i>	Placeholder for user extensions.

6.2.2 Permission Matrix

If the implementation supports both Capability Discovery and Access Controls, then the **EstimatedTimetable-CapabilitiesResponse** response can include the access permissions for the requestor participant to access data.

Table 13 — EstimatedTimetable Service — Permissions

EstimatedTimetablePermission			<i>+Structure</i>	Permissions to use implementation of Estimated Timetable service.
Inherit	...	1:1	<i>xxxService-Permissions</i>	See SIRI Part 2 for Common Permission elements.
<i>Topic</i>	OperatorPermissions	0:1	<i>+Structure</i>	OPERATOR permissions for participant. See Part 2.
	LinePermissions	0:1	<i>+Structure</i>	LINE permissions for participant. See Part 2.
	ConnectionLinkPermissions	0:1	<i>+Structure</i>	CONNECTION link permissions for participant. See Part 2.

6.3 EstimatedTimetableRequest

6.3.1 EstimatedTimetableRequest — Element

The **EstimatedTimetableRequest** states which timetables should be returned.

The **EstimatedTimetableRequest** can be used in both a direct request, and for a subscription. If used for a subscription, additional **EstimatedTimetableSubscriptionPolicy** parameters can be specified.

The primary *Topic* term on the request is the time window for which timetables are to be returned. Additional topic filtering on LINE is also allowed. If filtering is not specified, all LINES known to the AVMS are transmitted.

If the timetable version is not available, an error code is returned NoInfoForTopic. In this situation a subscription is not set up.

Table 14 — EstimatedTimetableRequest — Attributes

EstimatedTimetableRequest			+Structure	Request for Estimated timetables.
Attributes	Version	1:1	VersionString	Version identifier of Estimated Timetable Service, e.g. '1.0c.'
Endpoint Properties	Request- Timestamp	1:1	xsd:dateTime	See SIRI Part 2 Common properties of SIRI Functional Service Requests.
	Message- Identifier	0:1	Message- Qualifier	
Topic	Preview- Interval	0:1	Positive- DurationType	Maximum Preview time in minutes requested by the schedule information system. Preview horizon only limits real time prediction data, information on additional journeys, cancellations etc., that are beyond the interval may still be included.
	Timetable- VersionRef	0:1	xsd:string	Communicate only differences to the timetable specified by this version of the timetable.
	OperatorRef	0:1	→OperatorCode	Filter the results to include only results for the specified operator. Optional SIRI capability: <i>TopicFiltering / ByOperator</i> .
	Lines	0:*	LineDirection	Filter the results to include only VEHICLES along the given LINES. SIRI v1.3
	LineRef	0:1	→LineCode	Filter the results to include only results for the given LINE. If no LineRef is specified as a subscription filter, this implicitly implies transmission of data for all LINES in the AVMS.
	Direction- Ref	0:1	→DirectionCode	Filter the results to include only Stop Visits for VEHICLES running in a specific relative DIRECTION, for example, "inbound" or "outbound". (Direction does not specify a destination.) Optional SIRI capability: <i>TopicFiltering / ByDirection</i> .
Policy	Language	0:1	xml:lang	Preferred language in which to return text values. Optional SIRI capability: <i>NationalLanguage</i> .
	Include- Translations	0:1	xsd:boolean	Whether the producer should include any available translations of NLString text elements into multiple languages. If false elements only one value per text element will be provided. +SIRI.2.0 Default is false.
	EstimatedTi- metableDetail Level	0:1	EstimatedTimeta- bleDetailLevelEn- um	Level of detail to include in response. <i>minimum basic normal calls full</i> Default is 'normal'. Optional SIRI capability: <i>DetailLevel</i> (if absent, must support <i>normal</i>). +SIRI.2.0
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

6.3.2 EstimatedTimetableRequest — Example

The following is an example of an **EstimatedTimetableRequest**.

```
<ServiceRequest>
  <EstimatedTimetableRequest version="1.0">
    <RequestTimestamp>2001-12-17T09:30:47-05:00</RequestTimestamp>
    <PreviewInterval>P1Y2M3DT10H30M</PreviewInterval>
    <TimetableVersionRef>0008</TimetableVersionRef>
    <OperatorRef>SMOOTH</OperatorRef>
    <Lines
      <LineDirection>
```

```

        <LineRef>123</LineRef>
        <DirectionRef>INBOUND</DirectionRef>
    </LineDirection>
</Lines>
</EstimatedTimetableRequest>
</ServiceRequest>

```

6.4 EstimatedTimetableSubscriptionRequest

6.4.1 EstimatedTimetableSubscriptionRequest — Element

The **EstimatedTimetableSubscriptionRequest** requests the asynchronous delivery of the information described by an **EstimatedTimetableRequest**. The **EstimatedTimetableSubscriptionRequest** Policy parameters control the processing of the subscription.

At the start of the subscription, the AVMS is responsible for transmitting the current full status to the schedule information system, i.e. it transmits all real-time data that deviates from the planned schedule at the start of the subscription.

Table 15 — EstimatedTimetableSubscriptionRequest — Attributes

EstimatedTimetable-SubscriptionRequest			+Structure	Request for a subscription to the SIRI Estimated Timetable Service.
Identity	SubscriberRef	0:1	→ParticipantCode	See SIRI Part 2, Common SubscriptionRequest parameters.
	SubscriptionIdentifier	1:1	Subscription-Qualifier	
Lease	InitialTerminationTime	1:1	xsd:dateTime	
Request	EstimatedTimetable-Request	1:1	+Structure	See EstimatedTimetableRequest .
Policy	ChangeBeforeUpdate	1:1	PositiveDuration-Type	Threshold value in seconds after which the deviations from planned schedule or the last message are to be transmitted.
	Extensions	0:1	xsd:any*	Placeholder for user extensions.

6.4.2 EstimatedTimetableSubscriptionRequest — Example

The following is an example of an **EstimatedTimetableSubscriptionRequest**.

```

<SubscriptionRequest>
  <!--=====ENDPOINT REFERENCES=====-->
  <RequestTimestamp>2004-12-17T09:30:47-05:00</RequestTimestamp>
  <RequestorRef>NADER</RequestorRef>
  <!-- Subscription 1 for VIS123 to Place 975 -->
  <EstimatedTimetableSubscriptionRequest>
    <SubscriberRef>NADER</SubscriberRef>
    <SubscriptionIdentifier>000765</SubscriptionIdentifier>
    <InitialTerminationTime>2001-12-17T09:30:47-05:00</InitialTerminationTime>
    <EstimatedTimetableRequest version="1.0">
      <RequestTimestamp>2001-12-17T09:30:47-05:00</RequestTimestamp>
      <PreviewInterval>P1Y2M3DT10H30M</PreviewInterval>
      <TimetableVersionRef>0008</TimetableVersionRef>
      <OperatorRef>SMOOTH</OperatorRef>
      <LineRef>123</LineRef>
      <DirectionRef>INBOUND</DirectionRef>
    </EstimatedTimetableRequest>
  </EstimatedTimetableSubscriptionRequest>
</SubscriptionRequest>

```

```
</EstimatedTimetableRequest>
<ChangeBeforeUpdates>P1Y2M3DT10H30M</ChangeBeforeUpdates>
</EstimatedTimetableSubscriptionRequest>
</SubscriptionRequest>
```

6.5 The EstimatedTimetableDelivery

6.5.1 Introduction

The **EstimatedTimetableDelivery** returns the predicted arrival times of a VEHICLE or group of VEHICLES .

6.5.2 ServiceDelivery with a EstimatedTimetableDelivery — Element

One or more **EstimatedTimetableSubscriptionRequest** elements may be returned as part of a SIRI **ServiceDelivery**.

Table 16 — ServiceDelivery / EstimatedTimetableDelivery — Attributes

ServiceDelivery			+Structure	See SIRI Part 2 ServiceDelivery
HEADER	...	1:1	See ServiceDelivery	
Payload	EstimatedTimetableDelivery	0:*	+Structure	See EstimatedTimetableDelivery element.

6.5.3 EstimatedTimetableDelivery — Element

Each **EstimatedTimetableDelivery** is made up of **EstimatedVehicleJourney** elements. There will be status messages for any requests that could not be fulfilled.

Table 17 — EstimatedTimetableDelivery — Attributes

EstimatedTimetableDelivery			+Structure	Describes one or more Dated Timetables.
Attributes	version	1:1	VersionString	Version identifier of Production timetable Service. Fixed.
LEADER	...	1:1	xxxServiceDelivery	Inherits from xxx ServiceDelivery : See SIRI Part 2.
Payload	EstimatedTimetable-VersionFrame	0:*	+Structure	See EstimatedTimetableVersionFrame element.
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

6.5.4 EstimatedTimetableVersionFrame — Element

Each production timetable is returned as an **EstimatedTimetableVersionFrame** element. Each **Estimated-TimetableVersionFrame** comprises one or more **EstimatedVehicleJourney** elements grouped for a version of the timetable.

Table 18 — EstimatedTimetableVersionFrame — Attributes

EstimatedTimetableVersionFrame			+Structure	Provides a schedule of DATED VEHICLE JOURNEY for a LINE and DIRECTION
Log	RecordedAtTime	1:1	xsd:dateTime	Time at which data was recorded.
Identity	VersionRef	0:1	→VersionCode	Reference to a TIMETABLE VERSION FRAME.
Journ-	EstimatedVehicle-	1:*	+Structure	Provides real-time information about a VEHICLE JOURNEY along which a VEHICLE is running.

ays	Journey			See EstimatedVehicleJourney element.
Connections	EstimatedServiceJourneyInterchange	0:*	+Structure	Connection parameters for a monitored SERVICE JOURNEY INTERCHANGE between a feeder and distributor journey. SIRI 2.0
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

6.5.5 EstimatedVehicleJourney — Element

6.5.5.1 Overview

Each **EstimatedVehicleJourney** contains an ordered list of **EstimatedCall** elements, as well as other properties.

There are three different ways to match the journeys described in the real-time data to the planned schedule:

- A full DatedVehicleJourneyRef, if known.
- A signature of the journey comprising its origin and destination points and arrival and departure times at those points.
- A real-time VEHICLE JOURNEY code (**EstimatedVehicleJourneyCode**).

Method (ii) allows installations that do not have a Production Timetable service still to make use of data.

Table 19 — EstimatedVehicleJourney — Attributes

EstimatedVehicleJourney			+Structure	Provides real-time information about the VEHICLE JOURNEY along which a VEHICLE is running.
Vehicle Journey Identity	LineRef	1:1	→LineCode	Reference to the LINE of the VEHICLE JOURNEY.
	DirectionRef	1:1	→DirectionCode	Reference to the relative DIRECTION the VEHICLE is running along the LINE, for example, "in" or "out", "clockwise". Distinct from a destination.
			choice	One of the following three ways of identifying a journey.
	a FramedVehicleJourneyRef	1:1	+Structure	Reference to the VEHICLE JOURNEY.
	b DatedVehicleJourney-IndirectRef		+Structure	If no VEHICLE JOURNEY reference is available, identify it by origin and destination and the scheduled times at these stops.
	OriginRef		→StopPointCode	The origin is used to help identify the VEHICLE JOURNEY.
	Aimed-Departure-Time		xsd:dateTime	Departure time at origin stop.
	Destination-Ref		→StopPointCode	The origin is used to help identify the VEHICLE JOURNEY.
	AimedArrival-Time		xsd:dateTime	Arrival time at origin stop.
	c EstimatedVehicleJourneyCode	1:1	Estimated-VehicleJourney-Code	If this is the first message about an extra unplanned VEHICLE JOURNEY, a new and unique code must be given for it. ExtraJourney should be set to 'true'.
Change	ExtraJourney	0:1	xsd:boolean	Whether this journey is an addition to the plan. Can only be used when both participants recognise the same schedule version. If omitted, defaults to <i>false</i> : the journey is not an addition.

	Cancellation	0:1	<i>xsd:boolean</i>	Whether this journey is a cancellation of a journey in the plan. Can only be used when both participants recognise the same schedule version. If omitted, defaults to <i>false</i> : Journey is not a cancellation.
<i>Journey Pattern Info</i>	...	0:1	<i>JourneyPattern-InfoGroup</i>	See SIRI Part 2 JourneyPatternInfoGroup .
<i>Service Info</i>	...	0:1	<i>ServiceInfoGroup</i>	See SIRI Part 2 ServiceInfoGroup .
<i>Journey Info Group</i>	...	0:1	<i>JourneyInfoGroup</i> See above	See SIRI Part 2 JourneyInfoGroup .
<i>Estimated Info</i>	HeadwayService	0:1	<i>xsd:boolean</i>	Whether this is a Headway Service, that is one shown as operating at a prescribed interval rather than to a fixed timetable.
	FirstOrLastJourney	0:1	FirstOrLastJourneyEnum	Whether journey is first or last journey of day. +SIRI v2.0
<i>Disruption-Group</i>	...	0:1	<i>DisruptionGroup</i>	See SIRI Part 2 DisruptionGroup . <i>DetailLevel</i> : normal.
<i>Real-time Info</i>	Monitored	0:1	<i>xsd:boolean</i>	Whether there is real-time information available for journey, if not present, not known. Inheritable.
	PredictionInaccurate	0:1	<i>xsd:boolean</i>	Whether the VEHICLE is in congestion. If not, present, not known. Inheritable.
	Occupancy	0:1	<i>OccupancyEnum</i>	How full the VEHICLE is. If omitted: passenger load is unknown. See Part2 Common definitions <i>full</i> <i>seatsAvailable</i> <i>standingAvailable</i>
<i>Operational Info</i>	...	0:1	<i>OperationalInfo-Group</i>	See SIRI Part 2 OperationalInfoGroup .
<i>Calls</i>	EstimatedCalls	0:1	+Structure	Complete sequence of stops along the route path, in calling order.
	EstimatedCall	2:*	+Structure	Individual EstimatedCall . See below.
	IsComplete-StopSequence	0:1	<i>xsd:boolean</i>	Whether the above call sequence is complete, i.e. represents every call of the route and so can be used to replace a previous call sequence Default is <i>false</i> .
<i>any</i>	Extensions	0:1	<i>xsd:any*</i>	Placeholder for user extensions.

6.5.5.2 EstimatedCall — Element

Each **EstimatedCall** describes the times at a stop. A journey must contain at least two calls.

NOTE Note that if the **Occupancy** field in the **EstimatedCall** structure is filled, this represents a predicted passenger load. If the corresponding field is filled in a **MonitoredVehicleJourney**, this overwrites the last current passenger occupancy value.

Table 20 — EstimatedCall — Attributes

EstimatedCall			+Structure	Provides real-time information about a call at a stop.
<i>Stop Identity</i>	StopPointRef	1:1	→StopPoint-Code	Reference to a SCHEDULED STOP POINT.
	VisitNumber	0:1	<i>VisitNumber-Type</i>	For JOURNEY PATTERNS that involve repeated visits by a VEHICLE to a stop, the VisitNumber count is used to distinguish each separate visit. If not specified, Default is '1'.

	Order	0:1	<i>xsd:positive-Integer</i>	For implementations for which the overall order within JOURNEY PATTERN is not used for VisitNumber , (i.e. if VisitNumbersOrder is <i>false</i>) then can be used to associate the overall Order as well if useful.
	StopPointName	0:*	<i>NLString</i>	Name of stop. One per language (Unbounded 0:* since +SIRI v2.0).
Change	ExtraCall	0:1	<i>xsd:boolean</i>	Whether this call is an addition to the plan. Can only be used when both participants recognise the same schedule version. If omitted, defaults to <i>false</i> : the call is not an addition.
	Cancellation	0:1	<i>xsd:boolean</i>	Whether this call is a cancellation of a call in the plan. Can only be used when both participants recognise the same schedule version. If omitted, defaults to <i>false</i> : Call is not a Cancellation.
Real time Info	Prediction-Inaccurate	0:1	<i>xsd:boolean</i>	Whether the VEHICLE is in congestion. If not, present, not known. Inheritable.
	Occupancy	0:1	<i>OccupancyEnum</i>	How full the VEHICLE is at the stop. Enumeration. If omitted: Occupancy is as for journey. Enumeration. See Part2 Common definitions. <i>full seatsAvailable standingAvailable</i>
Call Property	TimingPoint	0:1	<i>xsd:boolean</i>	Whether the stop is a timing point. Times for stops that are not timing points are sometimes interpolated crudely from the timing points, and may represent a lower level of accuracy. Default is <i>true</i> .
	BoardingStretch	0:1	<i>xsd:boolean</i>	Whether this is a Hail and Ride stop. Default is <i>false</i> .
	RequestStop	0:1	<i>xsd:boolean</i>	Whether Vehicle stops only if requested explicitly by passenger. Default is <i>false</i> .
	Destination-Display	0:*	<i>NLString</i>	The name of the destination of the journey; used to help identify the VEHICLE to the public: Since VEHICLES can change their destination during a journey, the destination included here should be what the VEHICLE will display when it reaches this stop. One per language (Unbounded 0:* since +SIRI v2.0).
Note	CallNote	0:*	<i>NLString</i>	Text annotation that applies to this call.
Disruption Group	...	0:1	<i>DisruptionGroup</i>	See SIRI Part 2 DisruptionGroup . <i>DetailLevel</i> : normal.
Arrival	AimedArrival-Time	0:1	<i>xsd:dateTime</i>	Planned arrival time in either the original or Production Timetable. Can be omitted if equal to the departure time, or if the time is for the VEHICLE at the origin stop.
	ExpectedArrival-Time	0:1	<i>xsd:dateTime</i>	Estimated time of arrival of VEHICLE.
	...	0:1	<i>MonitoredStop-Arrival StatusGroup</i>	Set of states description elements for arrival Monitored-StopArrivalStatusGroup . See later below.
Departure	...	0:1	<i>Onwards Departure TimesGroup</i>	See later below OnwardsVehicleDepartureTimes-Group . (part of MonitoredVehicleJourney).
	...	0:1	<i>PassengerDepartureTimesGroup</i>	See later below
	...	0:1	<i>MonitoredStop DepartureStatus-Group</i>	Set of states description elements for arrival. See MonitoredStopDepartureStatusGroup later below . (part of MonitoredVehicleJourney).
Headway Interval Group	AimedHeadway-Interval	0:1	<i>PositiveDuration</i>	Target interval for frequency based service.
	Estimated-HeadwayInterval	0:1	<i>PositiveDuration</i>	Estimated interval for frequency based service.

Stop Proximity Group	DistanceFrom-Stop	0:1	<i>DistanceType</i>	Distance of VEHICLE from stop of CALL as measured along ROUTE track. Only shown if detail level is 'calls' or higher. Positive value denotes distance before stop. +SIRI v2.0.
	NumberOf-StopsAway	0:1	<i>nonNegative-Integer</i>	Count of stops along SERVICE PATTERN between current position of VEHICLE and stop of CALL as measured along ROUTE track. Only shown if detail level is 'calls' or higher. +SIRI v2.0.
any	Extensions	0:1	xsd:any*	Placeholder for user extensions.

6.5.6 EstimatedServiceJourneyInterchange — Element (SIRI v2.0)

6.5.6.1 Overview

Each **EstimatedServiceJourneyInterchange** represents a real-time SERVICE JOURNEY INTERCHANGE that may be made at a specified point. It includes the current real time predicted wait values.

Table 21 — EstimatedServiceJourneyInterchange — Attributes

EstimatedServiceJourneyInterchange			+Structure	Provides real-time information about a SERVICE JOURNEY INTERCHANGE that is being monitored. +SIRI v2.0
Connecting Vehicle Journey Identity	InterchangeRef	0:1	→Interchange-Code	Reference to an interchange at which connection takes place. +SIRI v2.0
	FeederJourneyRef	1:1	+Structure	Reference to a connecting feeder VEHICLE JOURNEY. +SIRI v2.0
	FramedVehicle-JourneyRef	1:1	+Structure	Frame qualified Reference to a connecting feeder VEHICLE JOURNEY. +SIRI v2.0
	DataFrame-Ref	0:1	→Vehicle-JourneyCode	Reference to a data frame within participant service. Used to ensure that the DatedVehicleJourneyRef is unique with the data horizon of the service. Often the OperationalDayType is used for this purpose. +SIRI v2.0
	DatedVehicle-JourneyRef	0:1	→DatedVehicle-JourneyCode	A reference to the DATED VEHICLE JOURNEY that the VEHICLE is making. +SIRI v2.0
	LineRef	0:1	→LineCode	A reference to the LINE of the referenced feeder VEHICLE JOURNEY. +SIRI v2.0
	ParticipantRef	0:1	→ParticipantCode	A reference to the system from which the feeder reference comes
	Distributor-JourneyRef	1:1	+Structure	Reference to a connecting distributor VEHICLE JOURNEY. +SIRI v2.0
	FramedVehicle-JourneyRef	1:1	+Structure	Frame qualified Reference to a connecting distributor VEHICLE JOURNEY. +SIRI v2.0
	DataFrame-Ref	0:1	→Vehicle-JourneyCode	Reference to a data frame within participant service. Used to ensure that the distributor DatedVehicleJourneyRef is Unique with the data horizon of the service. Often the OperationalDayType is used for this purpose. +SIRI v2.0
	DatedVehicle-JourneyRef	0:1	→DatedVehicle-JourneyCode	A reference to the distributor DATED VEHICLE JOURNEY that the VEHICLE is making. +SIRI v2.0
	LineRef	0:1	→LineCode	A reference to the LINE of the referenced distributor VEHICLE JOURNEY. +SIRI v2.0
	ParticipantRef	0:1	→ParticipantCode	A reference to the system from which the distributor reference comes
Inter-change			choice	One of the following three ways of identifying a journey.

parameters	a	WillNotWait		EmptyType	Distributor will not wait (i.e. connection broken) +SIRI v2.0
	b	WillWait	1:1	+Structure	If no VEHICLE JOURNEY reference is available, identify it by origin and destination and the scheduled times at these stops. +SIRI v2.0
		WaitUntilTime	1:1	xsd:dateTime	Time up until which the distributor will wait. SIRI v2.0
		DriverHas-Acknowledged WillWait	0:1	xsd:boolean	Whether an acknowledgement has been received that the driver will wait. SIRI v2.0
		ExpectedDeparture-TimeOfDistributor	0:1	xsd:dateTime	Time at which distributor VEHICLE is expected to depart. SIRI v2.0
		Connection-Monitoring	0:1	xsd:boolean	Whether connection monitoring is active or not for this connection SIRI v2.0.

6.5.7 EstimatedTimetableDelivery — Example

The following is an example of an **EstimatedTimetableDelivery**.

```
<ServiceDelivery>
<!--=====HEADER===== -->
<ResponseTimestamp>2004-12-17T09:30:46-05:00</ResponseTimestamp>
<ProducerRef>KUBRICK</ProducerRef>
<Status>true</Status>
<MoreData>>false</MoreData>
<!--=====PAYLOAD===== -->
<EstimatedTimetableDelivery version="1.0">
  <ResponseTimestamp>2001-12-17T09:30:47-05:00</ResponseTimestamp>
  <SubscriberRef>NADER</SubscriberRef>
  <SubscriptionRef>0004</SubscriptionRef>
  <Status>true</Status>
  <ValidUntil>2001-12-17T19:30:47-05:00</ValidUntil>
  <EstimatedVehicleJourney>
    <LineRef>LZ123</LineRef>
    <DirectionRef>INBOUND</DirectionRef>
    <DatedVehicleJourneyRef>00008</DatedVehicleJourneyRef>
    <Cancellation>>false</Cancellation>
    <PublishedLineName>124</PublishedLineName>
    <OperatorRef>SMOOTH</OperatorRef>
    <ProductCategoryRef>NMTOKEN</ProductCategoryRef>
    <ServiceFeatureRef>NMTOKEN</ServiceFeatureRef>
    <VehicleFeatureRef>DisabledAccess</VehicleFeatureRef>
    <ServiceFeatureRef>CyclesPermitted</ServiceFeatureRef>
    <DestinationName>Howard's End</DestinationName>
    <VehicleJourneyName>Shoppers Special</VehicleJourneyName>
    <JourneyNote>Not o bank holidays</JourneyNote>
    <Monitored>true</Monitored>
    <PredictionInaccurate>>false</PredictionInaccurate>
    <PassengerLoad>full</PassengerLoad>
    <!-- Call 1-->
    <EstimatedCall>
      <StopPointRef>00001</StopPointRef>
      <ExtraStop>>false</ExtraStop>
      <PredictionInaccurate>>false</PredictionInaccurate>
      <Occupancy>SeatsAvailable</Occupancy>
    </EstimatedCall>
  </EstimatedVehicleJourney>
</EstimatedTimetableDelivery>
</ServiceDelivery>
```

```

<BoardingStretch>false</BoardingStretch>
<RequestStop>false</RequestStop>
<CallNote>Starts here</CallNote>
<AimedArrivalTime>2001-12-17T09:30:47-05:00</AimedArrivalTime>
<ArrivalBoardingActivity>NoAlighting</ArrivalBoardingActivity>
<AimedDepartureTime>2001-12-17T09:30:47-05:00</AimedDepartureTime>
<DeparturePlatformName>1</DeparturePlatformName>
</EstimatedCall>
<!-- Call 2-->
<EstimatedCall>
  <StopPointRef>00002</StopPointRef>
  <ExtraStop>false</ExtraStop>
  <PredictionInaccurate>false</PredictionInaccurate>
  <Occupancy>SeatsAvailable</Occupancy>
  <AimedArrivalTime>2001-12-17T09:30:47-05:00</AimedArrivalTime>
  <AimedDepartureTime>2001-12-17T09:30:47-05:00</AimedDepartureTime>
  <ExpectedArrivalTime>2001-12-17T09:30:47-05:00</ExpectedArrivalTime>
  <ExpectedDepartureTime>2001-12-17T09:30:47-05:00</ExpectedDepartureTime>
  <BoardingActivity>BoardingAndAlighting</BoardingActivity>
  <RequestStop>true</RequestStop>
  <DeparturePlatformName>3</DeparturePlatformName>
  <ArrivalPlatformName>4</ArrivalPlatformName>
</EstimatedCall>
<!-- Call 3 -->
<EstimatedCall>
  <StopPointRef>00003</StopPointRef>
  <ExtraStop>false</ExtraStop>
  <PredictionInaccurate>true</PredictionInaccurate>
  <Occupancy>full</Occupancy>
  <AimedArrivalTime>2001-12-17T09:30:47-05:00</AimedArrivalTime>
  <ExpectedArrivalTime>2001-12-17T09:30:47-05:00</ExpectedArrivalTime>
  <ArrivalPlatformName>5</ArrivalPlatformName>
  <AimedDepartureTime>2001-12-17T09:30:47-05:00</AimedDepartureTime>
  <ExpectedDepartureTime>2001-12-17T09:30:47-05:00</ExpectedDepartureTime>
  <DepartureBoardingActivity>NoBoarding</DepartureBoardingActivity>
</EstimatedCall>
<IsCompleteStopSequence>false</IsCompleteStopSequence>
</EstimatedVehicleJourney>
</EstimatedTimetableDelivery>
</ServiceDelivery>

```

6.6 Handling of Predictions in the Estimated Timetable Service

6.6.1 Supplementary Rule for the Delay Profile

Various mechanisms are supported in SIRI to prevent unnecessary data traffic. Some of these can involve a limited amount of independent recomputation by the schedule information system to process the transmitted data, in particular delays; this recomputation should be done in a consistent manner.

In particular, to reduce the transmitted data volume, the producer *only need complete the stops at which the delay has changed* (the 'interpolation rule'). The schedule information system assigns the last reported delay (or rather schedule deviation, as a VEHICLE may also be early) to all stops along the route until the next reported delay is received.

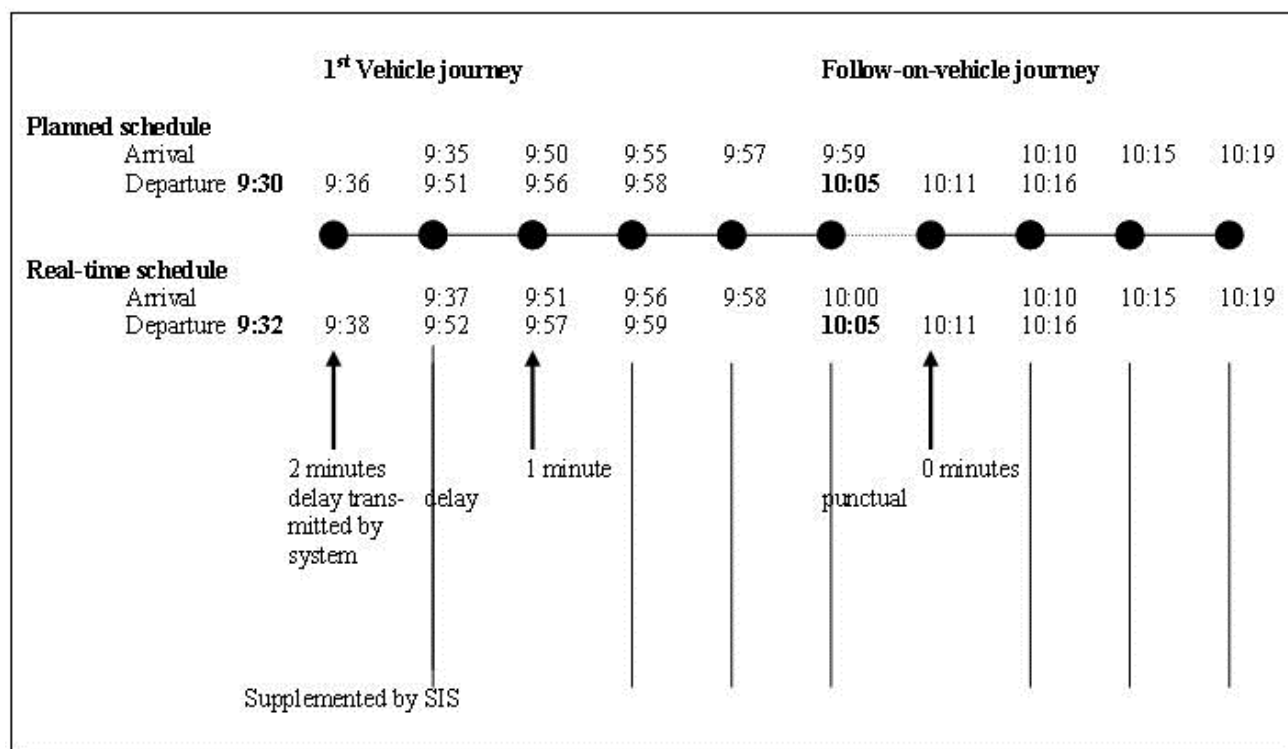


Figure 1 — Supplementary Rule for Delay Extrapolation

The Producer can use its authority to adjust predictions if it establishes that there are waiting times at upcoming stops that could compensate for the delay. The schedule information system receives a message for these stops by means of multiple **EstimatedCall** structures (in a single delivery). For the stops in between, the schedule information system must interpolate the current real-time status. In this case the overall sovereignty for making delay prognoses still rests with the Producer and the principle that it is the authoritative source is not violated. Using interpolation, the schedule information system can then complete the remaining fields from a single transmission, without needing additional information from subsequent or previous messages.

6.6.2 Other Supplementary Rules

Interpolation rules must be agreed for each implementation. The use of the interpolation rule is only recommended for the transmission of delays or early times.

On the basis of early practical experiences with inter-system AVMS interfaces, further rules should be exactly specified for the independent supplementation of transmitted data in order to avoid any confusion in interpretation. The producer control computer must know the stops for which the schedule information system carries out extrapolation and the stops for which the predictions need to be sent. In SIRI an indication can be given as to whether a stop is a timing point or not which may be relevant to the interpolation process.

6.6.3 Quality of Prognoses and Prediction Windows

Customers expect VEHICLE JOURNEY information from real-time enabled systems to be more accurate, informative and timely than the planned schedules. For example, with the help of the SIRI Estimated Timetable service the schedule information system can mark VEHICLE JOURNEYS as “delayed x min”, “punctual” or “cancelled”.

Systems should therefore be able to distinguish between there being no messages from the Producer because there is no significant delay, from the case when the Producer is unable to generate any messages for the VEHICLE at all, for example, because the VEHICLE has no radio equipment. In the first case the VEHICLE JOURNEY should be explicitly marked as punctual in the schedule information system; and in the

latter case, as having an unknown accuracy. SIRI includes a number of elements (**Monitored**, **PredictionInaccurate**, **InCongestion**, **InPanic**) that can be used to represent this.

In order to be able to make reliable predictions, the schedule information system should base its VEHICLE JOURNEY information on information from explicit messages, and not on conclusions drawn from the assumed successful passing of events.

The further ahead in time a prediction is being attempted, the less certain factors will influence it, and so the greater likelihood of inaccuracy. This increasing indeterminism also applies to the prediction of traffic flows. In practice, predictions are only reliable for VEHICLE JOURNEYS in the near future. To avoid misrepresenting the apparent accuracy of prognoses, every producer system has a restricted **PreviewInterval**, which defines a rolling forward window within which predictions will be attempted. The Preview Interval is specific to each implementation and lies in the region of 20-60 min. This prevents it attempting to make predictions about the punctuality of VEHICLE JOURNEYS that lie too far in the future.

Passengers do not in any case expect an exact long-term prognosis of punctuality. It would make little sense then for a schedule information system, when responding to an enquiry made in the morning about a journey that evening, to mark the evening VEHICLE JOURNEYS as 'punctual'.

When setting up a SIRI Estimated Timetable subscription, the schedule information system requests a desired Preview Interval from the Producer.

6.6.4 Reporting Rules and Monitored Journeys

The Producer must report every VEHICLE JOURNEY for which there are predictions at least once.

The Producer only transmits the predictions for the VEHICLE JOURNEYS that start within the Preview Interval. A future VEHICLE JOURNEY lies within the Preview Interval if the departure time of the VEHICLE JOURNEY at the origin SCHEDULED STOP POINT lies in the time window from the current time until the end time given by the Preview Interval.

The prediction message shall be generated as early as possible within the Preview Interval, that is, as soon as the Producer can give a prediction for the start of the VEHICLE JOURNEY. If this is not possible, a message shall be generated for the VEHICLE JOURNEY after the comparison between the planned and real-time data (after logon, after first radio contact, before/at/after the start stop).

As soon as a follow-on VEHICLE JOURNEY falls into the Preview time, it too shall be reported with its entire delay profile as soon as possible (i.e. with the prediction for the start stop and all subsequent stops).

For every transmitted VEHICLE JOURNEY, the predicted delay profile is reported up to the end of the VEHICLE JOURNEY, even if the VEHICLE JOURNEY finishes after the prediction horizon.

A VEHICLE JOURNEY that has been reported once shall continue to be reported until it is completed, or until predictions become impossible.

The schedule information system can therefore assume a VEHICLE JOURNEY to be punctual if it has received an initial message for the journey from the Producer, and if the **Monitored** property has not been set to false. Without the active transmission of this information, the journey is regarded as unmonitored, and the schedule information system switches back to using only planning data for the journey.

This procedure ensures that the schedule information system only marks VEHICLE JOURNEYS as punctual when they are actually monitored by the Producer, and are being transmitted without error. It is possible to further improve the reliability if, in the case of punctual vehicles too, the Producer continues to send messages from time to time after the first real-time message.

The disadvantage is the slightly greater volume of data that needs to be transmitted. The re-initialisation of a real-time data subscription (e.g. after a restart) in particular would generate a new message to the schedule information system from every VEHICLE affected by the subscription currently in operation.

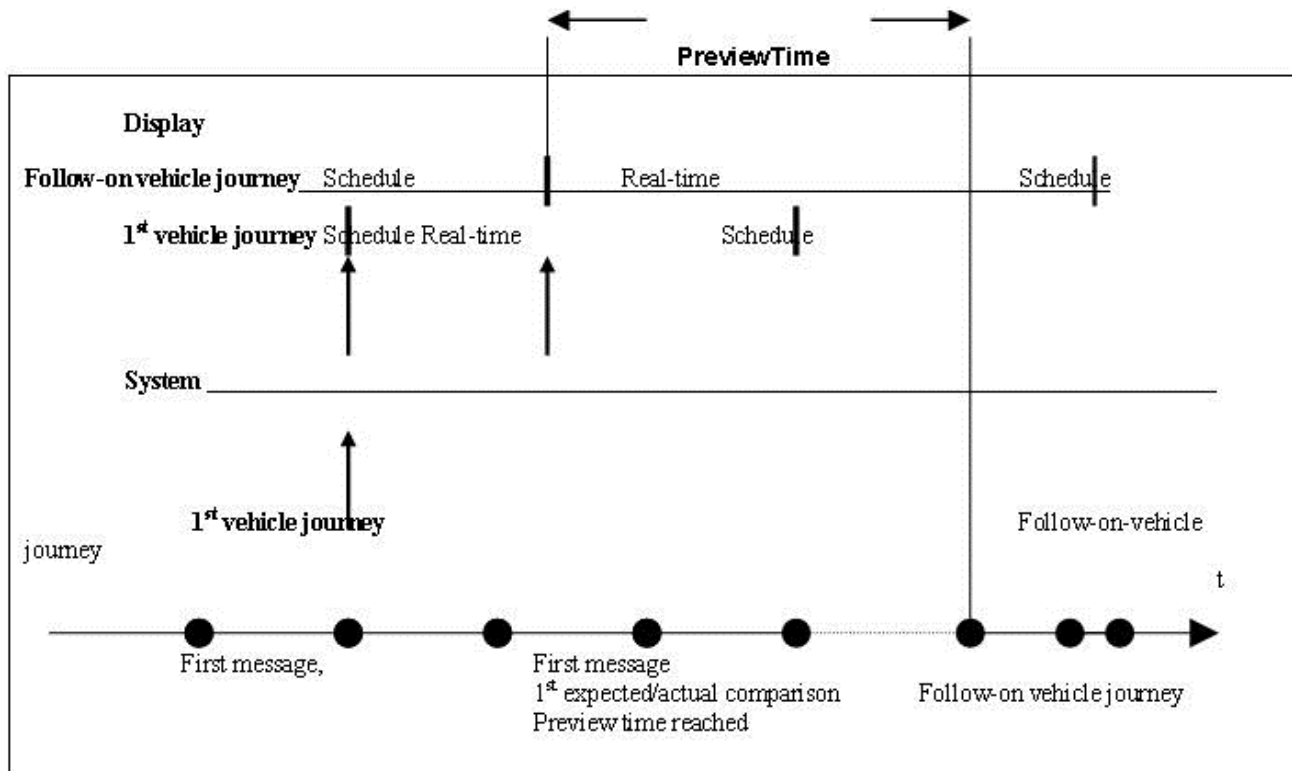


Figure 2 — Preview Time and Active First Message

6.6.5 Temporal Reporting Behaviour – Sensitivity Threshold

The SIRI Estimated Timetable service reports the current absolute arrival and departure times for a VEHICLE JOURNEY. The content of a delay message therefore does not represent information as a difference to a value in the preceding message, e.g. “+5 min”, or to the static planned schedule. Every individual SIRI Estimated Timetable message can be interpreted on its own. It can be made available in the schedule information system if there is a corresponding reference to the planned data.

NOTE Note that Stop Visits and monitored journeys may also be assigned a descriptive categorisation of their relative progress; for example ‘onTime’, ‘late’, ‘early’: this progress status is a presentation hint to display systems that may reflect an informational policy of the operator, for example that trains less than two minutes behind the planned times should be regarded as on-time regardless.

The triggering of the communication of VEHICLE JOURNEY delays however is relative to differences in the data since the last message, and takes the form of a hysteresis function: As soon as a delay prediction for a stop exceeds the last transmitted value by a specific threshold (either negatively or positively), the Producer triggers a real-time message to the schedule information system which overwrites the old value.

It is recommended that a single sensitivity threshold be globally defined for the entire real-time data subscription, with a value in the range of one to two minutes. The alternative approach of defining the threshold values for each LINE, or even each VEHICLE JOURNEY or interval is not recommended because of the resulting complexity. Instead, the presence of a global sensitivity value should be interpreted as signifying that the schedule information system does not wish to receive any messages whose difference in content lies below the threshold value. For transmissions in the opposite direction however, the Producer may suppress messages that lie above the threshold as it is in a better position to determine whether it would be useful to transmit the data or not. For example, the messages could be suppressed when the headways are short, i.e. the VEHICLES run in rapid succession. This allows the Producer to dynamically vary threshold values as appropriate.

A preview interval can be used to limit the data horizon for predictions. Other changes, for example additional journeys or journey cancellations, will still be included even if beyond the prediction horizon.

6.6.6 Prediction Inaccurate – In Congestion

If the AVMS establishes that a VEHICLE is travelling extremely slowly or is at a complete standstill, it can activate the **InCongestion** and **PredictionInaccurate** elements in the **JourneyProgressGroup** structure for the relevant VEHICLE JOURNEY. At the same time, the operation of hysteresis mentioned above is suspended, i.e. the Producer suppresses further messages as long as **PredictionInaccurate** is active. This avoids the continuing exchange of redundant messages that would arise as the delay increased. The system avoids sending delay messages when it must be assumed they will only increase further after another 2 minutes.

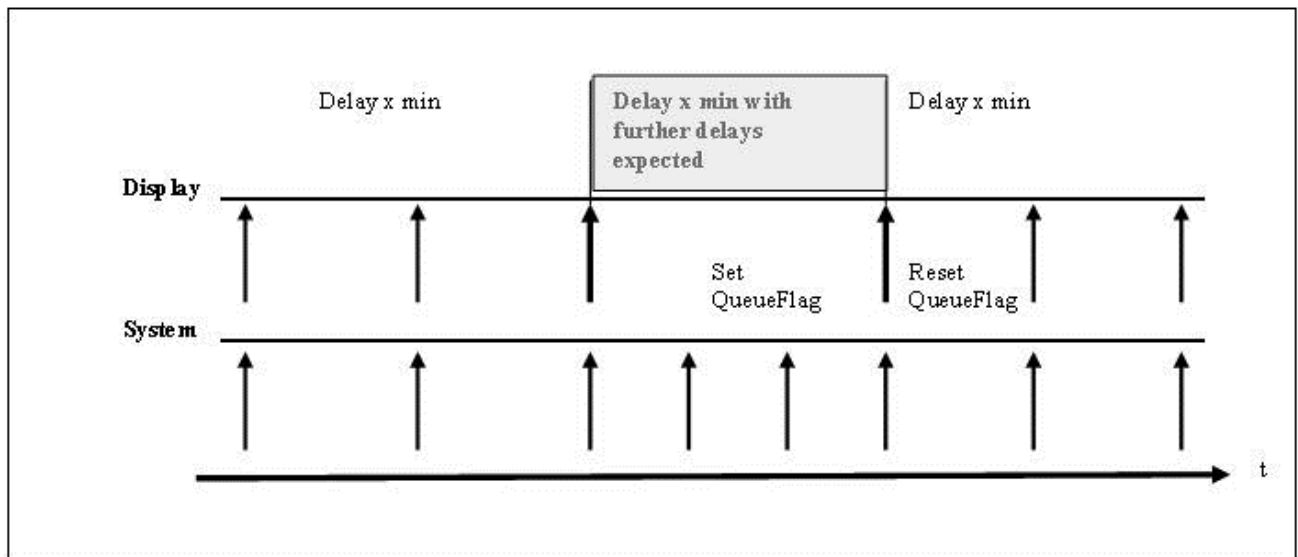


Figure 3 — Reporting Behaviour in the case of PredictionInaccurate

With the transmission of a new current prediction, the Producer deactivates the **PredictionInaccurate** status and signals that the change sensitivity function has been resumed.

The schedule information system can provide special behaviour to process **PredictionInaccurate** content. In contrast to how it handles a breakdown in communication, the schedule information system does not revert to the backup level of planned data, but is able to trigger messages such as “20 min delay, more delays expected”.

The **PredictionInaccurate** is an overall status: it may be further explained by additional elements such as **InCongestion** and **InPanic**.

6.6.7 Unexpected Termination of Monitoring

If a VEHICLE logs off from its block, or becomes unattainable via radio (‘loss of contact’), the Producer must be able to revoke a previously reported prediction. In this case, for every VEHICLE JOURNEY already reported, the Producer sends the Consumer system an **EstimatedVehicleJourney** message with the **Monitored** attribute set to false (i.e. unmonitored). This action makes the schedule information system aware of the inaccuracy pertaining to predictions for these VEHICLE JOURNEYS, so that it can inform passengers. After a message reporting a VEHICLE JOURNEY as unmonitored, the journey has the same status as if it had not been reported at all. A more specific diagnosis of the error condition (e.g. GPRS, radio etc.) can be included in the form of a **MonitoringError** code, allowing Producer systems to handle different failure modes differently.