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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

Transport public - Interface de service pour les informations en temps réel relatives aux opérations de transport public - Partie 3 : Modules d'interface d'application individuels

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

This European Standard was approved by CEN on 13 June 2022.

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EN 15531-3:2022 (E)**European foreword**

This document (EN 15531-3:2022) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2023, and conflicting national standards shall be withdrawn at the latest by January 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15531-3:2015.

SIRI (CEN/TS 15531-1:2006) has been a CEN Technical Specification since 2007 and a European normative standard since 2013 and has been widely used in Europe and elsewhere and proven its usefulness. This document proposes a revised version of SIRI as a European Standard, and is currently submitted to the Formal Vote. The proposed revisions are minor enhancements arising from experience of the deployment of SIRI in many live systems. This document also clarifies the relationship of SIRI to NeTEx, the CEN Technical Standard for the XML exchange of Public Transport Reference data based on the Transmodel CEN European Standard.

This document 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 PT, ET, ST, SM, VM, CT, CM, GM (Part 3).

Two additional parts define additional functional services as CEN Technical Specifications:

- additional data structures for additional application interface module FM (Part 4),
- additional data structures for additional application interface module SX (Part 5).

The XML schema can be downloaded from <https://github.com/SIRI-CEN/SIRI>, guidance on its use, example XML files, and case studies of national and local deployments is located at <http://siri-cen.eu/>.

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.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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[SIST EN 15531-3:2022](https://standards.iteh.ai/catalog/standards/sist/7b2c64df-d22a-4e70-a39e-74537be64ac0/sist-en-15531-3-2022)

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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 document 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.

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 document will improve a number of features of public transport information and service management:

- Interoperability – the document 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; (iii) 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 document 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 document will assist the economic provision of improved data by; (i) enabling the gathering and exchange of real-time data between AVMS systems; (ii) providing standardised, well defined interfaces that can be used to deliver data to a wide variety of distribution channels. Version 2.0 of SIRI includes a new Simple Web Service designed to support the widespread, massively scalable use of mobile devices and web browsers and other applications to display public transport data directly to users.

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.

History

Version 1.0 of SIRI was developed in 2004-2005 and submitted to vote, eventually passing through the CEN process to become an approved CEN Technical Specification in 2007. As well as the normative Version 1.0 XSD schema, successive informal working versions of the schema (v 1.1 – 1.4) were released to allow for fixes and to implement some very minor enhancements agreed by the working group. A WSDL version was also developed.

Version 2.0 of SIRI was developed in 2012 to coincide with making the SIRI standard a full CEN norm.

SIRI includes a Simple Web Services “SIRI-LITE” as an additional transport method and a WSDL document literal version and a WSDL2 version;

Version 2.1 of SIRI was developed in 2020/21 to address lessons from the now widespread implementation of SIRI.

The changes in SIRI version 2.1 include:

- remove the direct relationship with TPEG and other standards to enable support as the other standards change;
- support for new modes in line with TRANSMODEL and NeTEx;
- support for the Reason / Effect / Advice structure for disruptions in SIRI SX;
- increased granularity for occupancy data and Vehicle structures;
- improved subscription renewal options and filtering options;
- additional options and flexibility for STOP POINTS and relationships between journeys;
- migration of XSD to Github to improve access and change control processes.

Compatibility with previous versions

All changes in version 2.1 are intended to be fully backwards compatible, that is to say, existing documents that validate against earlier versions of the schema will also validate against the 2.1 schema without alteration (other than to schema version numbers), and version 2.1 documents that do not use new features will validate against earlier versions. Version 2.1 documents that use new features will not be backwards compatible.

[SIST EN 15531-3:2022](https://standards.iteh.ai/catalog/standards/sist/7b2c64df-d22a-4e70-a39e-74537be64ac0/sist-en-15531-3-2022)

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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 document 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 are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15531-1:2, *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 EN 15531-1:2022 apply.

4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations given in EN 15531-1:2022 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 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

<i>ProductionTimetableCapabilities</i>			<i>+Structure</i>	Capabilities describing implementation of Production Timetable service
<i>inherit</i>	<i>:::</i>	1:1	<i>See xxx-Capability-Response</i>	See SIRI Part 2 for Common Capability attributes.
<i>Topic</i>	TopicFiltering	0:1	<i>+Structure</i>	Which optional filtering features are supported?
	FilterByValidityPeriod	1:1	<i>xsd:boolean</i>	Whether results can be filtered by Validity Period. Required Capability: Fixed is <i>'true'</i> .
	FilterByOperatorRef	1:1	<i>xsd:boolean</i>	Whether results can be filtered by OPERATOR. Default is <i>'true'</i> .
	FilterByLineRef	1:1	<i>xsd:boolean</i>	Whether results can be filtered by LINE. Default is <i>'true'</i> .
	FilterByVehicleMode	0:1	<i>xsd:boolean</i>	Whether results can be filtered by VEHICLE MODE. Default is <i>'true'</i> . +SIRI v2.1
	FilterByProduct-CategoryRef	0:1	<i>xsd:boolean</i>	Whether results can be filtered by Product Category. Default is <i>'true'</i> . +SIRI v2.1
	FilterByStopPointRef	0:1	<i>xsd:boolean</i>	Whether results can be filtered by SCHEDULED STOP POINT. Default is <i>'true'</i> . +SIRI v2.1
<i>Request Policy</i>	RequestPolicy	0:1	<i>+Structure</i>	Which features of Request Policy are supported by the service?
	Language	1:*	<i>xsd:language</i>	National languages used by service.
	Translations	0:1	<i>xsd:boolean</i>	Whether the producer supports translations. SIRI 2.0 Default is <i>'false'</i> .
			<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.
<i>Sub- scription Policy</i>	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 <i>'true'</i> .
<i>Access Control</i>	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 <i>'false'</i> .
	CheckOperatorRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by OPERATOR is supported. Default is <i>'true'</i> .
	CheckLineRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by LINE is supported. Default is <i>'true'</i> .
	CheckConnection-LinkRef	0:1	<i>xsd:boolean</i>	If access control is supported, whether access control by CONNECTION link is supported. Default is <i>'true'</i> .
<i>any</i>	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			<i>+Structure</i>	Request for daily production timetables
Attributes	version	1:1	<i>VersionString</i>	Version identifier of <i>Production Timetable</i> Service, e.g. 1.0c
Endpoint Properties	Request-Timestamp	1:1	<i>xsd:dateTime</i>	See SIRI Part 2 for common properties of SIRI Functional Service Requests.
	Message-Identifier	0:1	<i>Message-Qualifier</i>	
Line Topic	ValidityPeriod	0:1	<i>ClosedTimeRangeStructure</i>	Start and end of timetable validity (time window) of journeys for which schedules are to be returned by the data producer. The ValidityPeriod of the delivered timetable must not exceed the ValidityPeriod requested by the subscriber. If omitted, then the full – as requested by the subscriber – ValidityPeriod or configured data horizon applies. See also 6.8.8 for details.
	Start	1:1	<i>xsd:dateTime</i>	The (inclusive) start and end time of the ValidityPeriod . See chapter Error! Reference source not found. for the specification of what data must be returned by the producer (i.e. when does data fall within the ValidityPeriod).
		1:1	<i>xsd:dateTime</i>	
	Timetable-VersionRef	0:1	<i>xsd:string</i>	Communicate only differences to the timetable specified by this version of the timetable.
	OperatorRef	0:*	<i>→Operator-Code</i>	Filter the results to include only results for the specified operator or operators. Optional SIRI capability: <i>TopicFiltering / ByOperator</i> .
	Lines			
	Line-Direction			
LineRef	0:1	<i>→LineCode</i>	Filter the results to include only results for the given LINE or LINES.	