



Institut luxembourgeois de la normalisation
de l'accréditation, de la sécurité et qualité
des produits et services

ILNAS-EN 15531-2:2022

Public transport - Service interface for real-time information relating to public transport operations - Part 2: Communications infrastructure

Transport public - Interface de service
pour les informations en temps réel
relatives aux opérations de transport
public - Partie 2 : Infrastructure des

Öffentlicher Verkehr - Dienstschnittstelle
für Echtzeitinformationen bezogen auf
Operationen im öffentlichen Verkehr -
Teil 2: Kommunikationsinfrastruktur



National Foreword

This European Standard EN 15531-2:2022 was adopted as Luxembourgish Standard ILNAS-EN 15531-2:2022.

Every interested party, which is member of an organization based in Luxembourg, can participate for FREE in the development of Luxembourgish (ILNAS), European (CEN, CENELEC) and International (ISO, IEC) standards:

- Participate in the design of standards
- Foresee future developments
- Participate in technical committee meetings

<https://portail-qualite.public.lu/fr/normes-normalisation/participer-normalisation.html>

THIS PUBLICATION IS COPYRIGHT PROTECTED

Nothing from this publication may be reproduced or utilized in any form or by any mean - electronic, mechanical, photocopying or any other data carries without prior permission!

ILNAS-EN 15531-2:2022

EUROPEAN STANDARD **EN 15531-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM

November 2022

ICS 35.240.60

Supersedes EN 15531-2:2015

English Version

**Public transport - Service interface for real-time
information relating to public transport operations - Part
2: Communications infrastructure**

Transport public - Interface de service pour les
informations en temps réel relatives aux opérations de
transport public - Partie 2 : Communications

Öffentlicher Verkehr - Dienstschnittstelle für
Echtzeitinformationen bezogen auf Operationen im
öffentlichen Verkehr - Teil 2:
Kommunikationsinfrastruktur

This European Standard was approved by CEN on 16 October 2022.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Türkiye and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European Foreword.....	6
Introduction.....	8
1 Scope.....	10
2 Normative references.....	11
3 Terms and definitions	11
4 Symbols and abbreviations	11
5 Common communication aspects	11
5.1 Data Exchange Patterns of Interaction	11
5.1.1 Introduction.....	11
5.1.2 Request/Response Pattern	11
5.1.3 Publish/Subscribe Pattern	12
5.1.4 Publish/Subscribe with Broker Pattern.....	13
5.1.5 Request/Response – Compound Requests	14
5.1.6 Publish/Subscribe – Compound Subscriptions.....	15
5.2 Delivery Patterns	15
5.2.1 Introduction.....	15
5.2.2 Direct Delivery	15
5.2.3 Fetched Delivery	16
5.2.4 Data Horizon for Fetched Delivery.....	17
5.2.5 Get Current Message	18
5.2.6 Multipart Despatch of a Delivery	18
5.2.7 Multipart Despatch of a Fetched Delivery – MoreData	19
5.3 Mediation Behaviour	20
5.3.1 Introduction.....	20
5.3.2 Mediation Behaviour – Maintaining Subscription Last Updated State	20
5.3.3 Mediation Behaviour – Subscription Filters	23
5.4 Recovery Considerations for Publish Subscribe	25
5.4.1 Introduction.....	25
5.4.2 Check Status – Polling.....	25
5.4.3 Heartbeat – Pinging.....	25
5.4.4 Degrees of Failure.....	26
5.4.5 Detecting a Failure of the Producer	26
5.4.6 Detecting a Failure of the Consumer.....	28
5.5 Recovery Considerations for Direct Delivery.....	29
5.6 Request Parameters and Interactions	29
5.7 Error Conditions for Requests	32
5.8 Versioning.....	34
5.8.1 Introduction.....	34
5.8.2 The Overall SIRS Framework Version Level.....	34
5.8.3 The SIRS Functional Service Type Version Level.....	34
5.9 Access Controls: Security and Authentication.....	34
5.9.1 Introduction.....	34
5.9.2 System Mechanisms External to SIRS Messages.....	35
5.10 Service Discovery	36
5.10.1 Introduction.....	36
5.10.2 Discovery of Servers that Support SIRS Services	36
5.10.3 Discovery of the Capabilities of a SIRS Server.....	36
5.10.4 Discovery of the Coverage of a Given SIRS Functional Service	36

5.11	Capability Matrix	37
5.11.1	Introduction	37
5.11.2	SIRI General Capabilities	38
6	Request/Response	39
6.1	Making a Direct Request	39
6.1.1	Introduction	39
6.1.2	ServiceRequest Message — Element	39
6.1.3	The ServiceRequestContext — Element	41
6.1.4	Common Properties of ServiceRequest Messages — Element	43
6.1.5	ServiceRequest — Example	44
6.1.6	Access Controls on a Request	44
6.2	Receiving a Data Delivery	45
6.2.1	Introduction	45
6.2.2	ServiceDelivery	46
7	Subscriptions	50
7.1	Setting up Subscriptions	50
7.1.1	Introduction	50
7.1.2	SubscriptionRequest	51
7.1.3	SubscriptionResponse	54
7.2	Subscription Validity	57
7.3	Terminating Subscriptions	57
7.3.1	Introduction	57
7.3.2	The TerminateSubscriptionRequest	57
7.3.3	The TerminateSubscriptionResponse	58
7.3.4	The SubscriptionTerminatedNotification (+SIRI 2.0)	60
8	Delivering data	62
8.1	Direct Delivery	62
8.1.1	Introduction	62
8.1.2	Acknowledging Receipt of Data (DataReceivedAcknowledgement)	62
8.2	Fetches Delivery	63
8.2.1	Introduction	63
8.2.2	Signalling Data Availability (DataReadyNotification / DataReadyResponse)	63
8.2.3	Polling Data (DataSupplyRequest/ServiceDelivery)	65
8.3	Delegated Delivery +SIRI 2.0	67
9	Recovery from system failure	67
9.1	Introduction	67
9.2	Recovery after Client Failure	67
9.3	Recovery after Server Failure	68
9.4	Reset after Interruption of Communication	68
9.5	Alive Handling	69
9.5.1	Introduction	69
9.5.2	CheckStatusRequest	69
9.5.3	CheckStatusResponse	70
9.5.4	HeartbeatNotification	71
9.6	Additional Failure modes for delegated delivery (+SIRI v2.0)	72
10	Transport of SIRI messages	73
10.1	Separation of Addressing from Transport Protocol	73
10.2	Logical Endpoint Addresses	73
10.2.1	Endpoint Addresses	73
10.2.2	Endpoint Address — Examples	74
10.3	Parallelism and Endpoint Addresses	75
10.4	Encoding of XML messages	76
10.4.1	Principles	76
10.4.2	Encoding of Errors in XML	76
10.4.3	Character Set	76
10.4.4	Schema Packages	76

10.4.5	Siri.XSD – Use of XML Choice	77
10.4.6	SiriSG.XSD – Use of XML Substitution groups	78
10.5	Use of SIRI with SOAP / WSDL	79
10.5.1	Introduction	79
10.5.2	Web Services	80
10.5.3	Use of SOAP	82
10.5.4	SIRI WSDL	82
10.5.5	SIRI WSDL structure	83
10.5.6	SIRI RPC WSDL	86
10.5.7	SIRI Document WSDL (+SIRI v2.0)	90
10.5.8	SIRI WSDL 2.0 (+SIRI v2.0)	91
10.5.9	SIRI WSDL Status	91
11	Capability Discovery Requests	91
11.1	General	91
11.2	Capability Request	91
11.3	Service Capability Discovery	92
11.3.1	Service Capability Discovery Request — Element	92
11.3.2	Service Capability Discovery Response — Element	93
11.3.3	Functional Service Capability Discovery Response — Element	94
11.3.4	Service Capability Response — Example	96
11.4	Functional Service Capability Permission Matrix	98
11.4.1	Introduction	98
11.4.2	OperatorPermissions — Element	99
11.4.3	LinePermissions — Element	99
11.4.4	ConnectionLinkPermissions — Element	99
11.4.5	StopMonitorPermissions — Element	100
11.4.6	VehicleMonitorPermissions — Element	100
11.4.7	InfoChannelPermissions — Element	101
12	SIRI for Simple Web Services – SIRI Lite (+SIRI v2.0)	101
12.1	Introduction	101
12.1.1	Existing Implementations	102
12.1.2	Using SIRI-LITE services in combination	102
12.1.3	Alternative Response Encoding	103
12.1.4	Lossless transforms	104
12.1.5	Simple transforms	104
12.2	Encoding of URL Requests	104
12.2.1	Complete Request Encoding in HTTP URL's	104
12.2.2	General format of SIRI Lite request URL	104
12.2.3	Endpoints and Service Identification	105
12.2.4	Encoding of Service Parameters on http request	105
12.2.5	Naming of Request Parameters with Hierarchy	106
12.2.6	Naming of Parameters with Plural Cardinality	106
12.2.7	Handling of invalid request combinations	106
12.2.8	Specifying the encoding of the Response	106
12.3	Examples	106
12.3.1	General	106
12.3.2	SIRI-SM Simple Stop Monitoring request to fetch stop departures – SIRI LITE Examples	106
12.3.3	SIRI-VM Simple Vehicle Monitoring request to fetch vehicle positions – SIRI Lite examples	110
12.3.4	SIRI-VM Complex Vehicle Monitoring to obtain journeys – SIRI Lite examples	113
12.3.5	SIRI-SM Stop Monitoring failed request with Exception – SIRI LITE examples	120
12.4	Mapping of SIRI XML to Alternative encodings	121
12.4.1	Use of syntactic features of alternative rendering formats	121
12.4.2	Mapping of SIRI data types to alternative encodings	122
12.5	Recommendations for the use of SIRI Simple Web Services	122
12.5.1	General	122
12.5.2	Services useful for device Passenger Information Services	122
12.5.3	Response filtering	122

12.5.4	Incorporation of reference data in responses.....	123
12.5.5	Multiple functional service deliveries in the same response	123
12.5.6	Support a choice of response encodings	123
12.5.7	Provide reporting identifiers	123
13	Common SIRI elements & Data Types	124
13.1	General.....	124
13.2	Introduction	125
13.3	Base Data Types.....	125
13.3.1	W3C Simple Types	125
13.3.2	SIRI Simple Types.....	126
13.3.3	NationalLanguageStringStructure — Element.....	127
13.4	Shared Elements & Structures.....	127
13.4.1	FramedVehicleJourneyRef — Element.....	127
13.4.2	Location — Element	128
13.4.3	Error — Element.....	128
13.4.4	JourneyRelation — Element (+SIRI 2.1)	129
13.4.5	Branding — Element (+SIRI 2.1)	133
13.4.6	Extension — Element.....	133
13.4.7	KeyList — Element (+SIRI 2.1)	134
13.4.8	TypesOfValue — Element (+SIRI 2.1)	134
13.4.9	Train Formation/Composition Model — Element (+SIRI 2.1)	135
13.5	Shared groups of elements	139
13.5.1	ServiceInfoGroup — Group	139
13.5.2	JourneyInfoGroup — Group	140
13.5.3	VehicleJourneyInfoGroup — Group	140
13.5.4	JourneyPatternInfoGroup — Group	142
13.5.5	DisruptionGroup — Group	143
13.5.6	JourneyProgressGroup — Group	146
13.6	OperationalBlockGroup — Group.....	150
13.7	OperationalInfoGroup — Group.....	150
13.8	TypeOfValueGroup — Group (+SIRI 2.1).....	150
13.9	JourneyRelationInfoGroup — Group (+SIRI 2.1).....	151
13.10	JourneyPartViewGroup — Group (+SIRI 2.1)	151
13.11	VehicleTypeGroup — Group (+SIRI 2.1).....	152
13.12	TrainFormationReferenceGroup — Group (+SIRI 2.1).....	153
13.13	QuayAssignmentGroup — Group (+SIRI 2.1).....	153
13.13.1	General.....	153
13.13.2	TypeOfNestedQuayEnumeration — Allowed Values	154
13.14	BoardingPositionAssignmentGroup — Group (+SIRI 2.1).....	155
13.15	FlexibleStopLocationGroup — Group (+SIRI 2.1)	156

European foreword

This document (EN 15531-2:2022) 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 May 2023, and conflicting national standards shall be withdrawn at the latest by May 2023.

This document supersedes EN 15531-2:2015.

SIRI (CEN/TS 15531-2:2006) 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 2 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:

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.

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.

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, Türkiye and the United Kingdom.