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Public transport - Service interface for real-time information relating to public transport operations - Part 5: Functional service interfaces situation exchange: Situation exchange

Öffentlicher Verkehr - Diensteschnittstelle für Echtzeitinformationen bezogen auf Betriebsabläufe im öffentlichen Verkehr - Teil 5: Funktionelle Serviceschnittstelle - Situativer Austausch

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Transport public - Interface de service pour les informations en temps réel relatives aux opérations de transport public - Partie 5 : Service d'interface fonctionnelle - Échange de l'état de l'exploitation et de son contexte

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Public transport - Service interface for real-time information relating to public transport operations - Part 5: Functional service interfaces situation exchange: Situation exchange

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This Technical Specification (CEN/TS) was approved by CEN on 20 June 2022 for provisional application.

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European foreword

This document (CEN/TS 15531-5:2022) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

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 CEN/TS 15531-5:2016.

SIRI (CEN/EN 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 5 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.

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According to the CEN/CENELEC Internal Regulations, the national standards organisations of the following countries are bound to announce this Technical Specification: 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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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.

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; (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 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 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.
- This SIRI Situation and Incident Exchange service is used to exchange information messages between identified participants in a standardised structured format suitable for travel information services. It enables messages to be sent and to be revoked (Part 5: CEN/TS 15531-5, this document).

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

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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.

Earlier version of the SIRI-SX service included data enumerations from TPEG that have since been superseded. These superseded enumerations will not be integrated into future version of SIRI-SX and are deprecated. They have been listed in a separate Annex E along with the replacement enumerations.

1 Scope

The SIRI Situation Exchange service (SIRI-SX) allows the efficient exchange of data about Situations caused by planned and unplanned incidents and events and is intended to support the use cases identified in Annex C. Situations are actual or potential perturbations to normal operation of a transport network. The SIRI-SX service uses the common SIRI communication framework and services which are described in EN 15531-1 and not repeated in this document.

The Situation Exchange service has a rich Situation model, allowing a structured description of all aspects of multimodal travel Situations, including cause, scope, effect and rules for distribution to an audience. The structured values enabling computer based distribution through a wide variety of channels, and the presentation of data in different formats for different device and different audiences. The Situation Exchange Service allows the exchange of incident and event information between, amongst others:

- Control centres;
- Operations Staff;
- Public Information systems;
- Alert systems and personalised alert systems;
- UTMC systems;
- Journey planners;
- AVMS (Automatic Vehicle Management Systems).

SIRI-SX uses a network model based on the CEN Transmodel conceptual model for Public Transport networks, schedules and operations, along with the CEN Identification of Fixed Objects in Public Transport (IFOPT) model for describing physical transport interchanges that is an integrated part of CEN Transmodel conceptual model for Public Transport networks.

The Situation Exchange service is envisaged as a 'back office' capture and exchange service that will feed other public facing travel information dissemination systems in particular those using the TPEG format. Transport Protocol Expert Group (TPEG) is a European Broadcasting Union fostered standard for broadcasting travel data over Digital Assisted Broadcasting (DAB) radio and other channels. TPEG is maintained by the Traveller Information Services Association (TISA). To this end, the SIRI-SX situation classification model has been harmonized as far as possible with that of TPEG and DATEX2 so that full interoperability can be achieved. Uses of structured elements from TPEG, for which translations already exist in most European languages, also facilitates human readability in different national languages. Maintaining and improving a harmonization with TPEG will be a continuing objective. In addition to the TPEG exchangeable content, SIRI-SX messages contain additional structured information which allows them to be processed in additional ways.

Situation and computer systems and applications are typically *distributed*, that is information will be captured on one system and exchanged with others for dissemination and further processing. This means that a message design is needed that allows the management of the identity of distributed messages over time and across different systems, so that subsequent updates to a Situation can be reconciled by different systems over a network, and obsolete messages can be retired automatically. The SIRI-SX SITUATION model is designed to support the distributed management of Situations.

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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 15531-1:2015, *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 15531-1:2015 apply.

4 Symbols and abbreviations

The common symbols and abbreviations used in the SIRI document set are presented in EN 15531-1. In addition, the following terms are used:

EBU	European Broadcasting Union
ICS	Incident Capture System
NeTEx	Network Timetable Exchange TS 16614
QoS	Quality of Service
PTS	Public Transport Information Services (TISA TPEG specification)
TISA	Traveller Information Services Association
SIRI-SX	SIRISituation Exchange
SIRI-FM	SIRIFacilities Management

5 Situations as Software Entities

5.1 General

In a travel information system, 'Situations' are data objects describing an incident, typically an unplanned event such as a disruption, but also planned events that affect public transport or its use, such as engineering works, or major public events that will affect use of transport. They will be captured and recorded on one system and then be transmitted to other systems to convey information about the current status to travellers and to transport operator staff. Those other systems will need to transform the data to suit different delivery channel requirements. At any time, further developments may occur that need to be represented by updates to the original SITUATION (or as further related SITUATIONS), and a distributed SITUATION model shall allow for the propagation and reconciliation of these changes across systems.

To support distributed processing of SITUATION a number of basic principles need to be followed:

- use of a rich **structured Situation** representation that can be emitted in standards compliant renderings such as the TISA Transport Protocol Experts Group (TPEG) specification;
- assignment of a persistent **Identity** to SITUATIONS within a global namespace; so they may pass into and out of different systems and still be matched with previous instantiations;
- use of **write-only updates** suitable for store and forward processing in a distributed environment;
- use of a **lifecycle model** with well-defined edit-version-release states;

- use of well-defined data reference systems. SIRI-SX uses a conceptual model for the scope of the application domain – Public Transport SITUATIONS – based on open standards (CEN Transmodel), allowing the sharing of references with other Transmodel based systems and services.

We elaborate on these below.

5.2 Structured Situations

A Situation object needs to be both machine readable and human readable (see Figure 1). To be machine readable requires a set of structured elements with precise meaning as to the nature and scope of the Situation, in particular as to its temporal and network scope (indicated by a location model) and its categorization that can be interpreted by agents such as station displays, journey planners and alert engines. To be human readable, the Situation shall be renderable on different devices in different formats as a textual and graphic representation that a human can understand. The text may be generated automatically from the structured elements, be explicitly encoded, or both.

The Situation shall also include identity and cross- referencing information that can be used to track its progress across different systems.

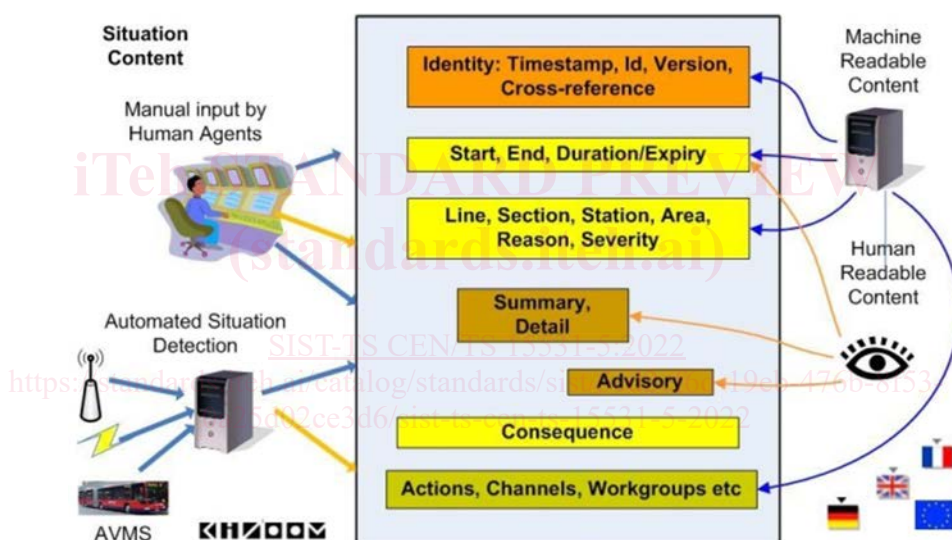


Figure 1 — Situation Structure elements

The actual structured Situation model needs to have components to describe its import, including:

- **Identity:** elements to identify and manage the SITUATION and its components;
- **Cross-reference:** elements to relate the SITUATION to other SITUATIONS to which it is related;
- **Audit:** elements to identify the source of the SITUATION;
- **Situation body:** elements – a set of structured details characterizing the nature and processing of the SITUATION, including its current status, **scope** of effect, **classification**, human readable **description**, consequence and suggested **distribution**.