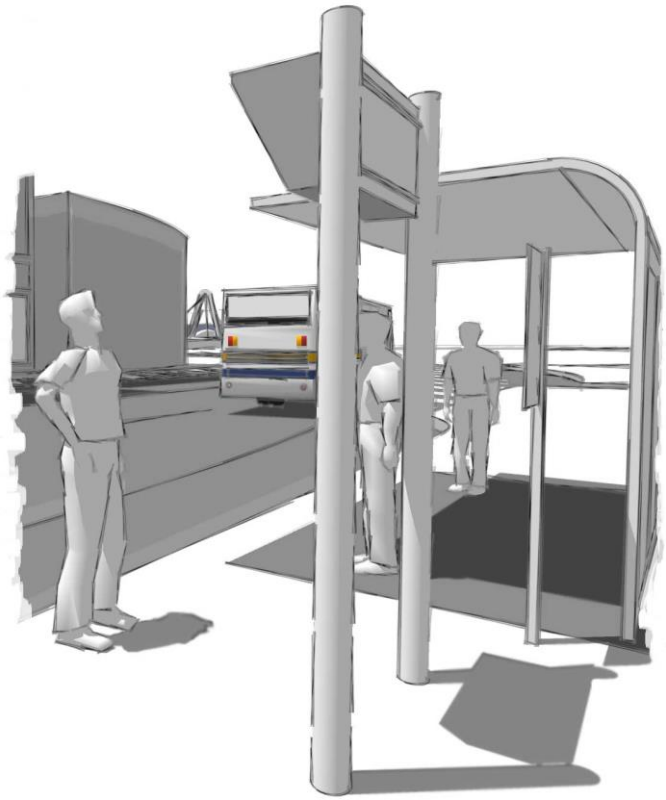
CONSAT
Telematics

ITS4mobility SIRI

Service Interface for Real Time Information Basics



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Terms, Acronyms and Abbreviations

Abbreviation	Description
SIRI	Service Interface for Real Time Information, CEN/TS 15531.
Transmodel	An abstract general purpose model for public transport information (CEN TC278, Reference Data Model For Public Transport, ENV12896 revised, june 2001).
I4M	ITS4Mobility
Call	A visit by a vehicle to a stop point id. A journey is a series of calls.
Client	A program that connects to an ITS4mobility SIRI server.
Server	A program running within the ITS4mobility system that can provide clients with information in near real-time using documents as defined in the SIRI specification.

1. Introduction

This document contains a description of the ITS4mobility SIRI implementation that is common for all the SIRI modules.

The SIRI interface is an open API that provides access to data from the ITS4mobility system.

The primary intended use of the ITS4mobility SIRI interface is for integration with external systems (machine-to-machine). It is not suitable for integration with end-user applications.

2. Scope and Purpose

SIRI as a standard has a large number of features and several optional capabilities. This document is intended to give developers the information needed to use any SIRI functional service supplied with ITS4mobility.

The capabilities and features of the different ITS4mobility SIRI modules are specified in separate documents.

3. SIRI and the ITS4mobility System

The SIRI protocols deliver information from the ITS4mobility system in near real time. The ITS4mobility system is a low latency asynchronous message based system. This means that the time it takes for information generated within the system to pass all the way to a SIRI client is as small as possible. For example, when an operator enters a new information message, the message is published on all external interfaces including SIRI/SX within a second or so. When a vehicle changes its position, the change is published on the SIRI/ET, SIRI/SM and SIRI/VM interfaces immediately.

3.1. SIRI Version

The ITS4mobility implementation of the SIRI functional interfaces adheres to the SIRI 1.4 specification published 2011-04-09.

4. SIRI Communication and Protocols

4.1. HTTP

HTTP using the POST method is used to transfer data between the ITS4mobility SIRI services and subscribers. The HTTP response code is used by both the services and the clients to acknowledge message transfer as well as raise errors. The payload is the XML documents as specified in the SIRI standard, and the HTTP content-type is “text/xml”. A successful transfer is acknowledged using the HTTP 200 response code.

The HTTP communication takes place over TCP/IP connections and the default port is usually TCP 80.

ITS4mobility does not support packaging the SIRI XML documents in SOAP.

4.2. Service URIs

The different SIRI modules are located on different endpoints. The following are the default values.

Module	**Default URI**
Estimated Timetable	http://<hostname>/siri/1.4/et
Situation Exchange (server)	http://<hostname>/siri/1.4/sx
Situation Exchange (client)	http://<hostname>/siri/1.4/sx/receiver
Stop Monitoring	http://<hostname>/siri/1.4/sm
Vehicle Monitoring	http://<hostname>/siri/1.4/vm

4.3. The Publish/Subscribe Communication Pattern

The ITS4mobility SIRI implementation supports the Publish/Subscribe communication pattern. It allows for an efficient event driven exchange of data. This means that the client implementation is elaborate as a session state has to be maintained and communication failures have to be handled in a robust and predictable way.

The service has a communication queue for every subscriber. As data becomes available or is updated, messages are placed in this queue and sent to the client in sequence. If the client does not receive the messages in an appropriate manner, the server queue might grow in size. The server has a configurable limit to how many messages can be stored in the queue. If the queue limit is reached the client subscription will be discarded and an error will be logged.

The service will regularly send *HeartbeatNotification* (HB) messages. These are also placed in the queue. The client must be prepared to handle the situation where the HB messages do not arrive within time limits due to other messages being transmitted.

4.4. Error Handling and Recovery Considerations

The Publish/Subscribe interaction pattern is stateful and consideration must be given to failure of the service, the client or the communications connection between them.

Once a subscription has been started it is kept active by the service. SIRI does not require the service to recover these subscriptions in case of failure. Instead it is the responsibility of the client to recreate subscriptions to replace the ones lost in the failure. It is the responsibility of the client to monitor whether the subscription and the connection to the service are still active. This is usually implemented by the client through monitoring received messages and especially *HeartbeatNotification* messages. The client can detect a failure by the failure of a HB to arrive within a prescribed interval.

Recovery action by the subscriber involves the following:

- Immediately clear all previously received data. Since the communication with the service has failed, the subscriber has no way of knowing if the current data is valid or not.
- Attempt to restart the subscription by sending one or more *SubscriptionRequests* to the service.

4.5. Multipart Dispatch and Document Size

When a client requests a subscription, the service will respond with the current data. Depending on the SIRI service and system, this might be hundreds of thousands of elements. The service can be configured with an approximate max message (document) size. If the initial response is larger than this max size, the response will be split into multiple messages that will be posted in sequence to the client. There can be several reasons for wanting to limit the maximum document size (such as available bandwidth, available memory, available processing power etc.). The service has a 1 minute timeout on every document that is sent to the subscriber, so the client must be able to receive and acknowledge the document within this time.

5. Subscriptions

5.1. Subscription Requests

All the SIRI subscription requests (*SubscriptionRequest*) have the following elements in common.

Element	Description
RequestTimestamp	The date and time that the client submits the subscription request. This value is ignored by the server.
RequestorRef	A reference used to identify the client.
ConsumerAddress	The URL to the subscriber. The SIRI XML documents will be posted to this URL.
SubscriptionContext	See below.

The *SubscriptionContext* element contains the following element.

Element	Description
HeartbeatInterval	How often the server should send a *HeartbeatNotification*. The recommended setting is 1 minute (PT1M).

A valid SIRI subscription request will be acknowledged with a HTTP 200 OK as well as a *SubscriptionResponse* or an error message and appropriate HTTP response code.

The *SubscriptionResponse* is delivered as the content part (result) of the client HTTP POST containing the *SubscriptionRequest*. It is also posted to the *ConsumerAddress* which in some cases simplifies the implementation of the client.

Note that ITS4mobility does not currently support filtering (topics and/or policies). All the available information is sent to the client.

6. References

CEN/TS 15531-1:2007 Service interface for real-time information relating to public transport operations: Context and framework.

CEN/TS 15531-2:2007 Service interface for real-time information relating to public transport operations: Communications infrastructure.

CEN/TS 15531-3:2007 Service interface for real-time information relating to public transport operations: Functional service interfaces.

7. Document history

Revision	Date	Comment
1	2014-02-15	Version 1.
1.1	2014-02-19	Added service URI information.