

CTS SIRI-VM 2.0

Service Interface for Real Time Information
Vehicle Monitoring (VM)

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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
HTTP	Hypertext Transfer Protocol.
Service	The program (process) that implements one or more of the SIRI functions.
Subscriber	A client that receives data from a Service using HTTP.
Client	A subscriber that receives data from a Service using HTTP.
Server	A computer that hosts one or more Services.
VM	Vehicle Monitoring, a SIRI functional service interface.
APC	Automatic Passenger Counting
CTS	Consat Telematics Solution

1. Introduction

This document contains a description of the CTS SIRI Vehicle Monitoring (VM) version 2.0 implementation. The SIRI/VM implementation is an open API that provides access to data from the CTS system.

The primary intended use of the CTS SIRI/VM implementation is for integration with external systems (machine-to-machine).

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 the SIRI/VM functional service supplied with CTS. The capabilities and features of the CTS implementation are specified in detail.

3. SIRI Vehicle Monitoring (VM)

3.1 VehicleMonitoringSubscriptionRequest

These are the elements of the VehicleMonitoringSubscriptionRequest that are used in the CTS implementation. Please refer to the appendix for an example document.

Element	Description
SubscriberRef	A client reference, which can be any string. Will be returned in the SituationExchangeDelivery.
SubscriptionIdentifier	An identifier that will be returned as SubscriptionRef in the SituationExchangeDelivery.
InitialTerminationTime	How long this subscription will last before it is terminated by the server. For continuous operation this value should be far away.
VehicleMonitoringRequest	See below.

The VehicleMonitoringRequest element contains the following elements.

Element	Description
RequestTimestamp	The date and time that the client posted this request. The value is not used by the server.

3.2 VehicleMonitoringDelivery

These are the elements of the VehicleMonitoringDelivery that are used in the CTS implementation. Please refer to the appendix for an example document.

Element	Description
ResponseTimestamp	The date and time that the server sent this document.
VehicleActivity	One or more VehicleActivity elements. See below.

The VehicleActivity element contains the following elements.

Element	Description
RecordedAtTime	The date and time the activity was created, which is the date and time that the vehicle reported the data.
ValidUntilTime	See 4.6
ProgressBetweenStops	See below.

MonitoredVehicleJourney	See below.
Extensions	See below.

The ProgressBetweenStops element contains the following elements.

Element	Description
LinkDistance	The total distance in meters of the link that the vehicle is currently at.
Percentage	The percentage of the link that the vehicle has moved so far.

4. Server Configurations

Some settings that are configurable on the server will affect the output from the server:

4.1 PublishIntervalInSeconds

The minimum number of seconds between posts of the ServiceDelivery documents. If set to 5, vehicle reports will be cached and sent every 5 seconds.

4.2 MaxSubscriptionQueueSize

The number of outgoing documents that can be queued for delivery. If the queue exceeds this size, the subscription will be terminated.

4.3 PublishVehicleRef

If set to "true", the MonitoredVehicleJourney.VehicleRef element will be published. If set to "false", the vehicle identity will not be published.

4.4 PublishOccupancy

If set to "true", the MonitoredVehicleJourney.Occupancy element will be published. If set to "false", the occupancy will not be published.

4.5 PublishOccupancyExtension

If set to "true", the VehicleActivity.Extensions.ITS4mobility.Vehicle element will be published. The Vehicle element contains detailed occupancy data. If set to "false", the extension data will not be published. Not used with the CTS profile (used in the TfNSW profile).

4.6 ValidUntil_sec

If value set to 0, <ValidUntilTime> will be set to '9999-12-31T23:59:59'. If value set to >0, <ValidUntilTime> will be set to current time plus the value as number of seconds.

4.7 Profile

What profile to use. This document describes the 'CTS' profile.

4.8 PublishNotAssignedVehicles

If set to "true", vehicles not assigned to a block but has a GPS position will be published. If set to "false" only vehicles assigned to a block will be published.

4.9 PublishExtensionBlockRef

If set to "true", the Extension.CTS.VehicleActivityExtension.BlockRef element will be published. If set to "false", the BlockRef will not be published.

4.10 PublishExtensionPassengerCounter

If set to "true", the Extension.CTS.VehicleActivityExtension.PassengerCount element will be published. If set to "false", the PassengerCount will not be published.

4.11 DataSource

What value to use for the MonitoredVehicleJourney.DataSource. Used in Entur (see [codespace](#)). If set to empty string the element MonitoredVehicleJourney.DataSource will not be published.

4.12 PublishInvalidData

If set to "true", vehicles providing invalid data will be published.

4.13 PublishVehicleRefAs

What value to use for MonitoredVehicleJourney.VehicleRef. Possible values are 'SystemAddress' and 'ExternalId'.

5. Filtering of data

URL parameters can be used to filter what VehicleActivity will be included in the ServiceDelivery. When starting a subscription or requesting a ServiceDelivery a filter can be added to filter what vehicles or operators will be included in the ServiceDelivery.

- **For filtering on vehicles use the following parameter:**

One vehicle

`http:// consatTest.se /siri/server/2.0/vm/?vehicleRefs=3350249994`

Two vehicles

`http:// consatTest.se /siri/server/2.0/vm/?vehicleRefs=3350249994,3350249995`

- **For filtering on operators use the following parameter:**

One operator

`http:// consatTest.se /siri/server/2.0/vm/?operatorRefs=33`

Two operators

`http:// consatTest.se /siri/server/2.0/vm/?operatorRefs=33,7`

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.

CEN/TS 15531-4:2011 Service interface for real-time information relating to public transport operations: Functional service interfaces - Facility Monitoring

CEN/TS 15531-5:2011 Service interface for real-time information relating to public transport operations: Functional service interfaces - Situation Exchange

7. Document history

Revision	Date
1	2020-02-19

8. Appendix

8.1 The CTS VM extension schema

8.1.1. cts-vm.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xsd:schema xmlns:ctsCommon="http://consat.se/cts/siri/Common"
  xmlns="http://consat.se/cts/siri/VehicleActivityExtension"
  xmlns:siri="http://www.siri.org.uk/siri"
  attributeFormDefault="unqualified"
  elementFormDefault="qualified"
  id="VehicleActivityExtension"
  targetNamespace="http://consat.se/cts/siri/VehicleActivityExtension"
  version="1.0"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema">
  <xsd:import schemaLocation="siri.xsd"
    namespace="http://www.siri.org.uk/siri" />
  <xsd:import schemaLocation="cts-common.xsd"
    namespace="http://consat.se/cts/siri/Common" />
  <xsd:element name="CTS">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="VehicleActivityExtension">
          <xsd:complexType>
            <xsd:sequence>
              <xsd:element name="BlockRef"
                type="siri:BlockRefStructure"
                minOccurs="0">
                <xsd:annotation>
                  <xsd:documentation>BLOCK which journey runs. +SIRI
2.0</xsd:documentation>
                </xsd:annotation>
              </xsd:element>
              <xsd:element ref="ctsCommon:PassengerCount" minOccurs="0" />
            </xsd:sequence>
          </xsd:complexType>
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>
```

8.1.2. cts-common.xsd

```
<?xml version="1.0" encoding="utf-8" ?>
<xsd:schema xmlns="http://consat.se/cts/siri/Common"
  xmlns:siri="http://www.siri.org.uk/siri"
  attributeFormDefault="unqualified"
```

```

    elementFormDefault="qualified"
    id="Common"
    targetNamespace="http://consat.se/cts/siri/Common"
    version="1.0"
    xmlns:xsd="http://www.w3.org/2001/XMLSchema">
<xsd:import schemaLocation="siri.xsd"
    namespace="http://www.siri.org.uk/siri" />
<xsd:element name="PassengerCount">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element name="FramedVehicleJourneyRef"
        type="siri:FramedVehicleJourneyRefStructure"
        minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>A reference to the DATED VEHICLE JOURNEY that
the VEHICLE is making, unique with the data horizon of the service.</xsd:documentation>
        </xsd:annotation>
      </xsd:element>
      <xsd:group ref="siri:ContextualisedStopPointInSequenceGroup" />
      <xsd:element name="Capacity"
        minOccurs="0">
        <xsd:complexType>
          <xsd:sequence>
            <xsd:element name="Seats"
              type="xsd:unsignedInt"
              minOccurs="0">
              <xsd:annotation>
                <xsd:documentation>Total number of available seats.
If AvailableStands exists, it is for seated passengers, otherwise it is the number of
passengers the vehicle has room for.</xsd:documentation>
              </xsd:annotation>
            </xsd:element>
            <xsd:element name="Stands"
              type="xsd:unsignedInt"
              minOccurs="0">
              <xsd:annotation>
                <xsd:documentation>Total number of available places
for standing passengers.</xsd:documentation>
              </xsd:annotation>
            </xsd:element>
          </xsd:sequence>
        </xsd:complexType>
      </xsd:element>
      <xsd:element name="OnBoardCount"
        type="xsd:int"
        minOccurs="0">
        <xsd:annotation>
          <xsd:documentation>Current number of passengers on the
vehicle.</xsd:documentation>

```

```

        </xsd:annotation>
    </xsd:element>
    <xsd:element name="OnBoardCountDetails"
        minOccurs="0">
        <xsd:annotation>
            <xsd:documentation>Current numbers of passengers on the vehicle
per category.</xsd:documentation>
        </xsd:annotation>
        <xsd:complexType>
            <xsd:sequence maxOccurs="unbounded">
                <xsd:element name="OnBoardCountDetail">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="CategoryRef"
                                type="xsd:string" />
                            <xsd:element name="PassengerCount"
                                type="xsd:int" />
                        </xsd:sequence>
                    </xsd:complexType>
                </xsd:element>
            </xsd:sequence>
        </xsd:complexType>
    </xsd:element>
    <xsd:element name="OccupancyPercent"
        type="xsd:unsignedInt"
        minOccurs="0">
        <xsd:annotation>
            <xsd:documentation>Percent occupancy on the vehicle. Values range
between 0 and 200. The range 0 to 100 is for seated and 100 to 200 for
standing.</xsd:documentation>
        </xsd:annotation>
    </xsd:element>
    <xsd:element xmlns:q1="http://consat.se/cts/siri/Common"
        name="OccupancyChange"
        type="OccupancyChangeType"
        minOccurs="0">
    </xsd:element>
    <xsd:element name="OccupancyChangeDetails"
        minOccurs="0">
        <xsd:complexType>
            <xsd:sequence maxOccurs="unbounded">
                <xsd:element name="OccupancyChangeDetail">
                    <xsd:complexType>
                        <xsd:sequence>
                            <xsd:element name="CategoryRef"
                                type="xsd:string"
                                minOccurs="0" />
                            <xsd:element name="DoorRef"

```

```

type="xsd:string"
minOccurs="0" />
        <xsd:element
xmlns:q2="http://consat.se/cts/siri/Common"
        name="OccupancyChange"
        type="OccupancyChangeType" />
    </xsd:sequence>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
</xsd:complexType>
</xsd:element>
<xsd:complexType name="OccupancyChangeType">
    <xsd:sequence>
        <xsd:element name="AlightingCount"
            type="xsd:unsignedInt">
            <xsd:annotation>
                <xsd:documentation>Number of passengers that left the
vehicle.</xsd:documentation>
            </xsd:annotation>
        </xsd:element>
        <xsd:element name="BoardingCount"
            type="xsd:unsignedInt">
            <xsd:annotation>
                <xsd:documentation>Number of passengers that boarded the
vehicle.</xsd:documentation>
            </xsd:annotation>
        </xsd:element>
    </xsd:sequence>
</xsd:complexType>
</xsd:schema>

```

8.2 Example VehicleMonitoringSubscriptionRequest

```

<?xml version="1.0"?><AA:Siri xmlns:AA="http://www.siri.org.uk/siri" version="1.4">
  <AA:SubscriptionRequest>
    <AA:RequestTimestamp>2014-02-17T22:05:32</AA:RequestTimestamp>
    <AA:RequestorRef>ITS4mobilityTestClient</AA:RequestorRef>
    <AA:MessageIdentifier>MessageIdentifier</AA:MessageIdentifier>
    <AA:ConsumerAddress>http://192.168.4.15:80/siri/client/</AA:ConsumerAddress>
    <AA:SubscriptionContext>
      <AA:HeartbeatInterval>PT1M</AA:HeartbeatInterval>
    </AA:SubscriptionContext>
  </AA:VehicleMonitoringSubscriptionRequest>

```



```
<AA:SubscriberRef>ITS4mobilityTestClient</AA:SubscriberRef>  
<AA:SubscriptionIdentifier>ITS4mobilityTestClient</AA:SubscriptionIdentifier>  
<AA:InitialTerminationTime>9999-12-31T23:59:59.999</AA:InitialTerminationTime>  
<AA:VehicleMonitoringRequest version="1.4">  
  <AA:RequestTimestamp>2014-02-17T22:05:32</AA:RequestTimestamp>  
</AA:VehicleMonitoringRequest>  
</AA:VehicleMonitoringSubscriptionRequest>  
</AA:SubscriptionRequest>  
</AA:Siri>
```