Appendix DVM-Exchange v2.5 Services

Version 2.5.8

Contents

1 Introduction

This appendix documents the standard services that can be exchanged using DVM-Exchange 2.5.

For every service configuration messages, update messages and request messages can be exchanged. This appendix describes how to use the standard parameters and the optional parameters in these messages in DVM-Exchange 2.5.

2 History

Datum	DVM-Exchange version	Appendix revision	Author	Description
2013-06-21	2.5	0.1	Erwin Gribnau	Initial version
2013-07-17	2.5	0.2	Erwin Gribnau	Added details to services
2013-07-19	2.5	0.3	Erwin Gribnau	Enhanced TrafficService and changed layout.
2013-09-16	2.5	0.4	Erwin Gribnau	Aligned content with IDD version 2.5.3.
2013-10-09	2.5	0.5	Erwin Gribnau	Translated to English Added all DVM-Exchange 1.0 services based on proposal by Marcel Valé
2013-11-14	2.5	0.6	Marcel Valé	Processed review comments on chapter 6, 7 and 8
2013-11-29	2.5	0.7	Rob Olsthoorn	Overall fixes, consistency, definitions, English.
2015-02-08	2.5	2.5.8	Rob Olsthoorn	Updated version number to reflect relation with IDD 2.5.x and XSD 2.5. Changed version description. Checked and fixed all examples. Note: technically this document is the same as the released appendix 0.7. except for fix of TRAFFIC_SERVICE valueSet configuration parameter type and value parameter type in StartServiceRequest to match with protocol version 2.5.

2.1 Version numbering scheme

DVM-Exchange version

The DVM-Exchange version number refers to the DVM-Exchange protocol version number.

Appendix version

The DVM-Exchange protocol version and schema use a <major>.<minor> version (XSD) and the interface description (IDD) and appendices will use <major>.<minor>.<update> version. The version always increases. Thus when this appendix describes services for DVM-Exchange protocol version 2.5, its version will start at 2.5.0. Hence 2.5.1 will be the next minor revision of the appendix for protocol version 2.5.

3 Provided services through a DVM-Exchange

It is not required to provide all services. What is supported by a DVM-Exchange connection can be defined with the following table.

Service	ObjectType in XML	Supported?
SpecificService	SPECIFIC_SERVICE	☐
TrafficService - SPEED	TRAFFIC_SERVICE	☐
TrafficService - FLOW	TRAFFIC_SERVICE	☐
TrafficService - CAPACITY	TRAFFIC_SERVICE	☐
InformationService	INFORMATION_SERVICE	☐

ReroutingService	REROUTING_SERVICE	☐

4 General

Some parameters can be added to all types of services. These are detailed in this chapter.

4.1 ServiceConfiguration

None defined.

4.2 ServiceStartRequest

None defined.

4.3 ServiceUpdateRequest

None defined.

4.4 ServiceStatusUpdate

4.4.1 Parameters

Parameter	Type	Value	Usage
availabilityExplanation	StringType	Explanation for the current availabilityState[1]	Optional[2]
stateSourceDescription	StringType	A description of how the current serviceState was obtained[3]	Optional
stateExplanation	StringType	Explanation for the current serviceState[4]	Optional

4.4.2 Example

```
<parameter name="availabilityExplanation" xsi:type="StringType" value="..." />
<parameter name="stateSourceDescription" xsi:type="StringType" value="..." />
<parameter name="stateExplanation" xsi:type="StringType" value="..." />
```

---

[1]   IRS_DVM.410: Elk status/toestand bericht bevat altijd een verklaring van de actuele status

[2]   The IRS document states that every StatusUpdate should always contain an explanation. When using strings to transport these explanations, an empty string ("") is also a valid value. Therefore this design makes them optional. Making them required has no added value.

[3]   IRS_DVM.411: Elk status/toestand bericht bevat altijd een beschrijving van de wijze waarop de toestand van het object is verkregen

[4]   IRS_DVM.412: Elk status/toestand bericht bevat altijd een verklaring van de actuele toestand

5 SpecificService

A specific service is a predefined measure or scenario that is deployed by referencing their number or name. The resulting actions, and involved instruments (devices) are often known upfront.

A SpecificService uses "SPECIFIC_SERVICE" as its ObjectType.

5.1 ServiceConfiguration

5.1.1 Parameters

Parameter	Type	Value	Usage
name	StringType	Human readable name of the service. This parameter is intended to be shown to operators.[5]	Required
strengthValueSet	IntegerListType	Set of supported strength values (range [1,100]) for the service. 1 is minimal strength, 100 is maximal strength[6]	Optional
effectDescription	StringType	Textual description of the intended effect[7]	Optional
effectAreaDescription	StringType	Textual description of the geographical area this service affects[8]	Optional
conditionDescription	StringType	Textual description of the preconditions that are guarded by the providing system for this service[9]	Optional

5.1.2 Example

```xml
<body xsi:type="ConfigurationUpdate">
    <updated xsi:type="ServiceConfiguration">
        <objectRef objectId="omleiding-n213-n456" objectType="SPECIFIC_SERVICE" />
        <timestamp>2001-12-31T12:00:00+01:00</timestamp>
        <locationForDisplay>
            <latitude>52.02214</latitude>
            <longitude>5.14935</longitude>
            <direction>178</direction>
        </locationForDisplay>
        <involvedObject objectId="1" objectType="VMS" />
        <involvedObject objectId="2" objectType="VMS" />
        <involvedObject objectId="3" objectType="TRAFFIC_LIGHT_CONTROLLER" />
        <parameter name="name" xsi:type="StringType" value="Omleiding N123 via N456" />
        <parameter name="strengthValueSet" xsi:type="IntegerListType">
            <value>50</value>
            <value>75</value>
            <value>100</value>
        </parameter>
        <parameter name="effectDescription" xsi:type="StringType" value="Tekst drip 23 en 25" />
        <parameter name="effectAreaDescription" xsi:type="StringType" value="Nabij N456" />
        <parameter name="conditionDescription" xsi:type="StringType" value="N456 beschikbaar" />
    </updated>
</body>
```

---

[5] IRS_DVM.309: Elk configuratie bericht bevat altijd een naam of aanduiding van het object

In dit geval is er sprake van zowel een aanduiding (het objectId) als een naam.

[6] IRS_DVM.318: Een configuratie bericht bevat aanvullend voor elke service een opsomming van de mogelijke waarden voor de kracht waarmee een service kan worden ingezet

[7] IRS_DVM.316: Een configuratie bericht bevat aanvullend voor elke service een beschrijving van het verwachte effect van een service

[8] IRS_DVM.312: Elk configuratie bericht bevat altijd de omschrijving van het effectgebied van een service of locatie van een instrument

[9] IRS_DVM.317: Een configuratie bericht bevat aanvullend voor elke service een beschrijving van de randvoorwaarden die door de server worden bewaakt

5.2 ServiceStartRequest

5.2.1 Parameters

Parameter	Type	Value	Usage
strength[10]	IntegerType	Within the range [1..100]. It must be a member of the strengthValueSet in the Configuration message when that is used.	Required

5.2.2 Example

```
<body xsi:type="ServiceStartRequest">
    <requestId>requestId</requestId>
    <reason>reason</reason>
    <objectRef objectId="omleiding-n213-n456" objectType="SPECIFIC_SERVICE"/>
    <duration>600</duration>
    <parameter xsi:type="IntegerType" name="strength" value="100" />
</body>
```

5.3 ServiceUpdateRequest

5.3.1 Parameters

Parameter	Type	Value	Usage
strength[11]	IntegerType	Within the range [1..100], must be a member of the strengthValueSet in the Configuration message when that is used.	Optional

5.3.2 Example

```
<body xsi:type="ServiceUpdateRequest">
    <requestId>requestId</requestId>
    <reason>reason</reason>
    <objectRef objectId="omleiding-n213-n456" objectType="SPECIFIC_SERVICE" />
    <duration>600</duration>
    <parameter xsi:type="IntegerType" name="strength" value="75" />
</body>
```

5.4 ServiceStatusUpdate

5.4.1 Parameters
None.

5.4.2 Example

```
<body xsi:type="StatusUpdate">
    <update xsi:type="ServiceStatusUpdate">
        <objectRef objectId="omleiding-n213-n456" objectType="SPECIFIC_SERVICE" />
        <timestamp>2001-12-31T12:00:00+01:00</timestamp>
        <availability>UNAVAILABLE</availability>
        <serviceState>ACTIVE</serviceState>
        <deployedBy>
            <systemId>a system</systemId>
        </deployedBy>
    </update>
</body>
```

---

[10] IRS_DVM.503: Kracht waarmee een service moet worden ingezet (bij inzet of wijziging)
[11] IRS_DVM.503: Kracht waarmee een service moet worden ingezet (bij inzet of wijziging)

6   TrafficService

A traffic service requests for a desired effect like an increase or reduction of flow, capacity, or speed. The actual actions (measures or scenario) are determined by the destination system at the time of the request. Compared to a specific service, a traffic service is parameterized and more flexible as it allows room for the destination system to fulfill the request.

A TrafficService uses 'TRAFFIC_SERVICE' as its ObjectType.

6.1   ServiceConfiguration

The ServiceConfiguration message conveys a list with all possible locations (objectId) to send TrafficService requests to.

6.1.1   Parameters

Parameter	Type	Value	Usage
effect	StringType	The effect supported at this location, one of "SPEED", "CAPACITY", "FLOW"	Required
absolute	BooleanType	This Parameter indicates whether this service supports absolute changes (true) or relative changes (false).	Required
valueSet	IntegerListType[12]	If a service only accepts a fixed set of absolute values, this list conveys those values.	Optional

6.1.2   Example

```
<body xsi:type="ConfigurationUpdate">
    <updated xsi:type="ServiceConfiguration">
        <objectRef objectId="A10Re_S116In" objectType="TRAFFIC_SERVICE" />
        <timestamp>2001-12-31T12:00:00+01:00</timestamp>
        <locationForDisplay>
            <latitude>52.40991</latitude>
            <longitude>4.93451</longitude>
            <direction>130</direction>
        </locationForDisplay>
        <parameter name="effect" xsi:type="StringType" value="SPEED" />
        <parameter name="absolute" xsi:type="BooleanType" value="true" />
        <parameter name="valueSet" xsi:type="IntegerListType">
            <value>50</value>
            <value>70</value>
            <value>90</value>
        </parameter>
    </updated>
</body>
```

---

[12]   The parameter type has changed from DoubleListType (in the previous version 0.7 of this document).

6.2 ServiceStartRequest

6.2.1 Parameters

Parameter	Type	Value	Usage
effect	StringType	The requested effect, one of "SPEED", "CAPACITY", "FLOW"	Required
absolute	BooleanType	For an absolute effect 'true', else 'false'.	Required
value	IntegerType[13]	The value for the requested effect. For relative changes this is limited to the range [-100, 100].	Required
priority	IntegerType	The priority parameter can be used by the cooperating traffic management authorities to define their control strategy. Its value is in the range of 0 to 100, where 0 is the highest priority and 100 the lowest priority. The priority parameter can be used to decide what to do when different systems request the same service. Conflicts may be handled by serving the highest priority.	Optional
vehicleTypes	StringListType	A series of values from NDW DatexII 2.2, type `VehicleTypeEnum`	Optional
vehicleUsages	StringListType	A series of values from NDW DatexII 2.2, type `VehicleUsageEnum`	Optional
causes	StringListType	A series of values from NDW DatexII 2.2, type `CauseTypeEnum`	Optional

6.2.2 Example

```
    <body xsi:type="ServiceStartRequest">
        <requestId>requestId</requestId>
        <reason></reason>
        <objectRef objectId="A10Re_S116In" objectType="TRAFFIC_SERVICE" />
        <duration>600</duration>
        <parameter name="vehicleTypes" xsi:type="StringListType">
            <value>anyVehicle</value>
        </parameter>
        <parameter name="vehicleUsages" xsi:type="StringListType">
            <value>nonCommercial</value>
            <value>commercial</value>
        </parameter>
        <parameter name="causes" xsi:type="StringListType">
            <value>congestion</value>
        </parameter>
        <parameter name="effect" xsi:type="StringType" value="SPEED" />
        <parameter name="absolute" xsi:type="BooleanType" value="true" />
        <parameter name="value" xsi:type="IntegerType" value="50" />
        <parameter name="priority" xsi:type="IntegerType" value="10" />
    </body>
```

6.3 ServiceUpdateRequest

6.3.1 Parameters

Parameter	Type	Value	Usage
value	DoubleType	The value for the requested effect. For relative changes this is limited to the range [-100, 100].	Required
priority	IntegerType	The priority parameter can be used by the cooperating traffic management authorities to define their control strategy. Its value is in the range of 0 to 100, where 0 is the highest priority and 100 the lowest. The priority parameter can be used to decide what to do when different systems request the same service. Conflicts may be handled by serving the request with the highest priority.	Optional

6.3.2 Example

```
    <body xsi:type="ServiceUpdateRequest">
```

---

[13] The parameter type has changed from DoubleType (in the previous version 0.7 of this document).

```
        <requestId>requestId</requestId>
        <objectRef objectId="A10Re_S116In" objectType="TRAFFIC_SERVICE" />
        <duration>600</duration>
        <parameter name="value" xsi:type="IntegerType" value="70" />
        <parameter name="priority" xsi:type="IntegerType" value="10" />
    </body>
```

6.4 ServiceStatusUpdate

6.4.1 Parameters
None.

6.4.2 Example
```
    <body xsi:type="StatusUpdate">
        <update xsi:type="ServiceStatusUpdate">
            <objectRef objectId="A10Re_S116In" objectType="TRAFFIC_SERVICE" />
            <timestamp>2001-12-31T12:00:00+01:00</timestamp>
            <availability>UNAVAILABLE</availability>
            <serviceState>ACTIVE</serviceState>
        </update>
    </body>
```

7 InformationService

An information service request aims to inform travelers in and around the specified location (objectId).

InformationService uses 'INFORMATION_SERVICE' as its ObjectType.

7.1 ServiceConfiguration

The ServiceConfiguration message conveys a list with all possible locations (objectId) to send InformationService requests to.

7.1.1 Parameters

None.

7.1.2 Example

```
<body xsi:type="ConfigurationUpdate">
    <updated xsi:type="ServiceConfiguration">
        <objectRef objectId="info A10Re_S116In" objectType="INFORMATION_SERVICE" />
        <timestamp>2001-12-31T12:00:00+01:00</timestamp>
        <locationForDisplay>
            <latitude>52.40991</latitude>
            <longitude>4.93451</longitude>
            <direction>130</direction>
        </locationForDisplay>
    </updated>
</body>
```

7.2 ServiceStartRequest

7.2.1 Parameters

Parameter	Type	Value	Usage
priority	IntegerType	The priority parameter can be used by the cooperating traffic management authorities to define their control strategy. Its value is in the range of 0 to 100, where 0 is the highest priority and 100 the lowest. The priority parameter can be used to decide what to do when different systems request the same service. Conflicts may be handled by serving the request with the highest priority.	Optional
information	StringType	Information to display to the driver (traveler).	Required
vehicleTypes	StringListType	A series of values from NDW DatexII 2.2, type VehicleTypeEnum	Optional
vehicleUsages	StringListType	A series of values from NDW DatexII 2.2, type VehicleUsageEnum	Optional
causes	StringListType	A series of values from NDW DatexII 2.2, type CauseTypeEnum	Required

7.2.2 Example

```
<body xsi:type="ServiceStartRequest">
    <requestId>requestId</requestId>
    <reason></reason>
    <objectRef objectId="info A10Re_S116In" objectType="INFORMATION_SERVICE" />
    <duration>600</duration>
    <parameter name="information" xsi:type="StringType" value="visibility less than 20 m" />
    <parameter name="priority" xsi:type="IntegerType" value="15" />
    <parameter name="vehicleTypes" xsi:type="StringListType">
        <value>highSidedVehicle</value>
        <value>carWithCaravan</value>
    </parameter>
    <parameter name="vehicleUsages" xsi:type="StringListType">
        <value>nonCommercial</value>
        <value>commercial</value>
    </parameter>
    <parameter name="causes" xsi:type="StringListType">
```

```
            <value>poorWeather</value>
        </parameter>
    </body>
```

7.3   ServiceUpdateRequest

7.3.1   Parameters

Parameter	Type	Value	Usage
priority	IntegerType	The priority parameter can be used by the cooperating traffic management authorities to define their control strategy. Its value is in the range of 0 to 100, where 0 is the highest priority and 100 the lowest. The priority parameter can be used to decide what to do when different systems request the same service. Conflicts may be handled by serving the request with the highest priority.	Optional

7.3.2   Example

```
    <body xsi:type="ServiceUpdateRequest">
        <requestId>requestId</requestId>
        <objectRef objectId="info A10Re_S116In" objectType="INFORMATION_SERVICE" />
        <duration>600</duration>
        <parameter name="priority" xsi:type="IntegerType" value="10" />
    </body>
```

7.4   ServiceStatusUpdate

7.4.1   Parameters
None.

7.4.2   Example

```
    <body xsi:type="StatusUpdate">
        <update xsi:type="ServiceStatusUpdate">
            <objectRef objectId="info A10Re_S116In" objectType="INFORMATION_SERVICE" />
            <timestamp>2001-12-31T12:00:00+01:00</timestamp>
            <availability>UNAVAILABLE</availability>
            <serviceState>ACTIVE</serviceState>
        </update>
    </body>
```

8 ReroutingService

ReroutingService uses 'REROUTING_SERVICE' as its ObjectType.

8.1 ServiceConfiguration

The ServiceConfiguration for Rerouting Services determines the possible rerouting locations a system supports. It consists of *origin*, *destination*, and *via* locations.

8.1.1 Parameters

Parameter	Type	Value	Usage
origin	BooleanType	To determine the function of this location in the network location. If true the origin can be used to address a Rerouting request to.	Required
destination	BooleanType	To determine the function of this location in the network location. If true this location can be used as destination in a Rerouting request.	Required
via	BooleanType	To determine the function of this location in the network location. If true this location can be used as via location reference in a Rerouting request.	Required

8.1.2 Example

```xml
<body xsi:type="ConfigurationUpdate">
    <updated xsi:type="ServiceConfiguration">
        <objectRef objectId="reroute A10Re_S116In" objectType="REROUTING_SERVICE" />
        <timestamp>2001-12-31T12:00:00+01:00</timestamp>
        <locationForDisplay>
            <latitude>52.40991</latitude>
            <longitude>4.93451</longitude>
            <direction>130</direction>
        </locationForDisplay>
        <parameter name="origin" xsi:type="BooleanType" value="true" />
        <parameter name="destination" xsi:type="BooleanType" value="true" />
        <parameter name="via" xsi:type="BooleanType" value="false" />
    </updated>
</body>
```

8.2 ServiceStartRequest

The ServiceStartRequest will use an ObjectId received in the ServiceConfiguration. It is an ObjectId with parameter *origin* value true.

8.2.1 Parameters

Parameter	Type	Value	Usage
origin	ObjectReference		Required
destination	ObjectReference	ObjectId for the destination in this Rerouting request. The source for this ObjectId is received in the ServiceConfiguration. It is an ObjectId with parameter destination value true.	
via	ObjectReference	ObjectId for the via in this Rerouting request. The source for this ObjectId is received in the ServiceConfiguration. It is an ObjectId with parameter via value true.	Required
priority	IntegerType	The priority parameter can be used by the cooperating traffic management authorities to define their control strategy. Its value is in the range of 0 to 100, where 0 is the highest priority and 100 the lowest. The priority parameter can be used to decide what to do when different systems request the same service. Conflicts may be handled by serving the highest priority.	Optional
information vehicleTypes	StringType StringListType	Information to be shown to the road user. A series of values from NDW DatexII 2.2, type `VehicleTypeEnum`	Optional Optional

vehicleUsages	StringListType	A series of values from NDW DatexII 2.2, type `VehicleUsageEnum`	Optional
causes	StringListType	A series of values from NDW DatexII 2.2, type `CauseTypeEnum`	Optional

8.2.2 Example

```
<body xsi:type="ServiceStartRequest">
    <requestId>requestId</requestId>
    <reason></reason>
    <objectRef objectId="reroute A10Re_S116In" objectType="REROUTING_SERVICE" />
    <duration>600</duration>
    <parameter name="destination" xsi:type="ObjectReferenceType">
        <value objectId="Centrum" objectType="REROUTING_SERVICE" />
    </parameter>
    <parameter name="via" xsi:type="ObjectReferenceType">
        <value objectId="A10Re_S114In" objectType="REROUTING_SERVICE" />
    </parameter>
    <parameter name="information" xsi:type="StringType" value="accident ahead" />
    <parameter name="priority" xsi:type="IntegerType" value="5" />
    <parameter name="vehicleTypes" xsi:type="StringListType">
        <value>anyVehicle</value>
    </parameter>
    <parameter name="causes" xsi:type="StringListType">
        <value>accident</value>
    </parameter>
</body>
```

8.3 ServiceUpdateRequest

8.3.1 Parameters

Parameter	Type	Value	Usage
priority	IntegerType	The priority parameter can be used by the cooperating traffic management authorities to define their control strategy. Its value is in the range of 0 to 100, where 0 is the highest priority and 100 the lowest. The priority parameter can be used to decide what to do when different systems request the same service. Conflicts may be handled by serving the highest priority.	Optional

8.3.2 Example

```
<body xsi:type="ServiceUpdateRequest">
    <requestId>requestId</requestId>
    <objectRef objectId="A10Re_S116In" objectType="REROUTING_SERVICE" />
    <duration>600</duration>
</body>
```

8.4 ServiceStatusUpdate

8.4.1 Parameters
None.

8.4.2 Example

```
<body xsi:type="StatusUpdate">
    <update xsi:type="ServiceStatusUpdate">
        <objectRef objectId="A10Re_S116In" objectType="REROUTING_SERVICE" />
        <timestamp>2001-12-31T12:00:00+01:00</timestamp>
        <availability>UNAVAILABLE</availability>
        <serviceState>ACTIVE</serviceState>
    </update>
</body>
```