

VDV implementation rules 454 – Swiss public transport system

Based on VDV Guideline 454 version 2.2

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Change history from V 1.1 to 1.2

Section	Change	Editor	Date
Sect. 1.4	Change of VDV version	KIDS working group	20/12/2016
Sect. 3.2.6	Subscription behaviour for REF-AUS in Swiss public transport CR0024 from WG meeting dated 15/09/2016	KIDS working group	04/10/2016
Sect. 5.1.1, 5.2.1	Implementation of operator filter for data platforms and ITCS with two or more operators is mandatory. The use of operator filter by clients is recommended. CR0036 from WG meeting dated 15/09/2016	KIDS working group	04/10/2016
Sect. 5.1.1, 5.2.1	Use of placeholders in Swiss public transport system CR0039 from WG meeting dated 08/06/2016	KIDS working group	17/08/2016
Sect. 5.2.2	In the Swiss public transport system, the first message in the AUS service must always be a complete journey, in order to ensure an initial status in each case for the journey, which is independent of the service. CR0030 from WG meeting dated 08/06/2016	KIDS working group	17/08/2016
Sect. 5.1.3.1, 5.2.2.1	Order of stops as per inspection. CR0032 from WG meeting dated 08/06/2016	KIDS working group	17/08/2016

Change history from V 1.2 to 1.3

Section	Change	Editor	Date
1.4	Reference [6] added	C. Heimlicher	18/12/2017
3.3	Sections ProduktID, VerkehrsmittelText revised in accordance with harmonisation of transport. In particular, the transport category was replaced and the table inserted.	C. Heimlicher	18/12/2017

KIDS working group

(Kundeninformationsdaten-Schnittstellen (customer information data interface) in the Swiss public transport system)

Section	Change	Editor	Date
5.1.3.1	Section now matches the VDV standard in version 2.5. Processing has not changed.	KIDS working group	17/07/2017
5.2.2.1	Section now matches the VDV standard in version 2.5. Processing has not changed.	KIDS working group	17/07/2017
5.2.2.8	New section from VDV Guideline 454 inserted.	KIDS working group	17/07/2017
6.1.10	Withdrawal of <code>PrognoseMoeglich</code> (prediction possible) from <code>true</code> to <code>false</code> was given new processing in VDV Guideline 454. This is not compatible with previous versions.	KIDS working group	17/07/2017
6.1.15	New section from VDV Guideline 454 inserted.	KIDS working group	17/07/2017
6.1.6	The description of partial failures (route changes) was moved from section 6.1.12 to section 6.1.6. Implementation remains the same.	KIDS working group	04/10/2017
6.1.12	For total failures, it was clarified that only the last valid stops (from the last complete journey) need to be transmitted again for a failure message. The fact that the <code>FahrtStartEnde</code> (journey start end) element is not permitted to be changed is already set out in the VDV guideline.	KIDS working group	04/10/2017
5.1.3 5.1.3.1	<code>VerkehrsmittelText</code> (transport mode text) and <code>ProduktID</code> (product ID) must be provided either in the line timetable or in the target journey.	KIDS working group	06/12/2017
5.2.2.1	<code>VerkehrsmittelText</code> (transport mode text) and <code>ProduktID</code> (product ID) must be provided in the actual journey.	KIDS working group	06/12/2017
3.3	Text added for <code>BetreiberID</code> (operator ID): "An operator can deliver either rail or local transport data with a <code>BetreiberID</code> (operator ID). If an operator needs to deliver both rail and local transport data,	KIDS working group	20/09/2018

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Section	Change	Editor	Date
	this must be delivered with a different <code>BetreiberID</code> (operator ID) even if both use the same line.”		
3.3	Text added for <code>LinienID</code> (line ID): “If an operator has multiple same lines (same line numbers), each of these lines must be delivered with a separate <code>BetreiberID</code> (operator ID).”	KIDS working group	20/09/2018
5.2.1	In the Swiss public transport system, delivery of real time to the FOT and therefore in the CUS is mandatory for all transport companies.	KIDS working group	20/09/2018
10.9	New values for the <code>VerkehrsmittelText</code> (transport text) and the conversion procedure added.	KIDS working group	20/09/2018
10.10	New values for the <code>ProduktID</code> (product ID) and the conversion procedure added.	KIDS working group	20/09/2018
10.11	New values for the <code>ServiceAttribut</code> (service attribute) and the conversion procedure added.	KIDS working group	20/09/2018

Approval status:

Version	Date	Status
1.0	07/11/2014	Approved by IT committee KIT (VöV)
1.1	21/10/2015	Approved by IT committee KIT (VöV)
1.2	28/04/2017	Reviewed by IT committee KIT and recommended for approval
1.2	02/11/2017	Approved by SKI Mgmt Board
1.3	01/10/2018	Reviewed by IT committee KIT and recommended for approval
1.3	24/10/2018	Approved and declared binding by SKI Mgmt Board
1.3.1	16/01/2018	Translation from German

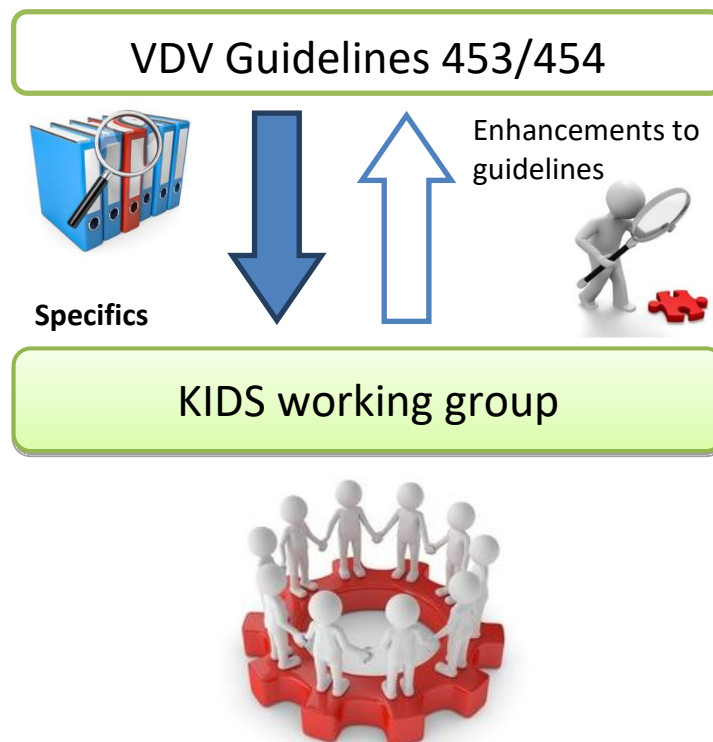
KIDS working group

(Kundeninformationsdaten-Schnittstellen (customer information data interface) in the Swiss public transport system)

1. Preliminary remarks

Based on the official VDV Guideline 454 [3] (published by the German Association of Transport Companies (VDV)), this document describes the implementation rules for public transport in Switzerland, hereinafter designated as “VDV-RV 454”.

It makes clear the specifics and deviations from the official guideline, with the aim of uniform application across the entire Swiss public transport system.



Implementation rules (VDV-RV 454) as shared basis across the Swiss public transport system

Figure 1: Interrelations between KIDS and VDV

The implementation rules in this document have been agreed upon by the KIDS working group (“Kundeninformationsdaten-Schnittstellen” (customer information data interface) in the Swiss public transport system) and are the result of a standardisation process that concerns the uniform application of VDV Guidelines across the Swiss public transport system.

The implementation rules are officially approved by the IT committee (KIT) of the Association of Public Transport (VöV).

The implementation rules essentially comprise:

- Specifics on points that are knowingly left abstract and vague in the VDV Guideline.
- Specifics on points that were previously not handled uniformly across the Swiss public transport system.
- Conscious deviations from the official VDV Guideline within the Swiss public transport system.

KIDS working group

(Kundeninformationsdaten-Schnittstellen (customer information data interface) in the Swiss public transport system)

1.1. Supported versions

The implementation rules are based on VDV Guideline 454 “Actual data interface – Timetable information” **Version 2.0**.

The XSD used to validate the XML messages is XSD **version** 2017.c (without Siri). This XSD (see [2]) contains the schemata for both VDV453 [1] and VDV454 [3].

1.2. Document structure and scope

1.2.1. Scope

These implementation rules for the Swiss public transport system (VDV-RV 454) are a supplement to the official VDV Guideline 454 [3] and describe only the deviations, changes and specifics to this guideline. This document therefore does **not** replace the official VDV Guideline 454 [3] and therefore does not contain the complete information needed to implement or understand the VDV454 interface.

In addition to these implementation rules, the respective partners require an agreement that is even more specific than described here and is tailored to the individual circumstances and needs of the individual partners. This VDV interface specification does not specify described points and may also contain explicit deviations and enhancements to VDV-RV 454. These bilateral or multilateral specifications (hereinafter referred to as Partner2Partner specifications) should always refer to this VDV-RV 454 and be based as closely as possible on this.

The document is not to be interpreted as a contract. The contractual situation between two partners or their suppliers is not part of this document.

1.2.2. Uniform chapter structure

In order to simplify a direct comparison between the implementation rules and the official VDV Guideline, the chapter structure of VDV Guideline 454 [3] shall be adopted consistently in this document, **starting with Section 2**.

In detail, this means that:

- The official VDV Guideline 454 [3] generally applies. The statements and definitions set out there are not repeated in this document¹.
- A **blank section** in this document means that the original VDV Guideline applies without exception or additional stipulations.
- If specifics or deviation from the standard is necessary due to special circumstances within Swiss public transport, these will be described in detail in the section in question.

¹ An exception to this rule will be made if a brief description of the normal case defined in VDV Guideline 454 is required or practical in order to understand a following text or the general context.

- The official VDV Guideline 454 [3] purposefully does not make any stipulations on metadata for data exchange between VDV partners. Stipulations on individual metadata and its structure, which apply to the entire Swiss public transport system as a rule², are described in the relevant sections.

The consistency of the chapter structure is guaranteed, with the following caveat:

If an explanation or addition is necessary and does not match the specified chapter structure, a separate section will be added at the end of the section level in question, which always has the extra text “(**addition for VDV-RV 454**)” in the title. This section (including any subsections) does not correspond to the official VDV Guideline 454 [3] and therefore by placing it at the end of the section level it does not affect other section numbers that follow it.

1.2.3. Mandatory, optional and non-supported fields

In the tables describing the XML structure of a data element, the last column specifies whether the element in question is mandatory or optional. If use deviates from the original VDV Guideline 454 [3], the value in this document is shown in **red**.

Table 1: Mandatory and optional fields

Mandatory	Element must be specified in the XML structure and contain a semantically meaningful value. Specifying a mandatory field without a value is not allowed.
Optional	Element can be specified or can be omitted. If the element is specified, it should contain a semantically meaningful value. A previously delivered value can be reset by explicitly not specifying the value when the element is transferred again (if this is permitted by the XSD definition). If the optional element is omitted in the case of a change notification, the value from the last transfer applies. If the optional element is omitted in the case of a complete journey, the value is reset to the default (if defined) or otherwise left blank (null).
n/a	Element is not supported. If it is specified, the content will be ignored. All data elements that are not supported or are not known to the system-specific XSD are to be ignored by the system. A processing or validation error must not result from this.

1.3. Binding nature

This document describes how VDV Guideline 454 [3] is applied and interpreted specifically within Switzerland. It forms the basis of agreements for VDV connection between the individual public transport partners for exchanging current data.

In addition to the stipulations in this document, the respective partners will not need to agree upon metadata defined either here or in the official VDV specification.

² The rules are defined by the KIDS working group and apply as the standard for the Swiss public transport system.

1.4. Referenced documents

- [1] German Association of Transport Companies (VDV)
VDV Guideline 453, Actual data interface – Timetable information, version 2.6,
Cologne (Germany), 2018
- [2] German Association of Transport Companies (VDV)
XML schema VDV453_incl_454_V2017.c.xsd (version: “2017.c”), Cologne
(Germany), 2018
- [3] German Association of Transport Companies (VDV)
VDV Guideline 454, Actual data interface – Timetable information, version 2.2,
Cologne (Germany), 2018
- [4] Public Transport Association (VöV)
**VDV453 implementation rules for the Swiss public transport system, version
1.3**, Bern (Switzerland), 2018
- [5] Swiss Federal Office of Transport (FOT)
Stops (Didok list), Bern (Switzerland)
- [6] Direkter Verkehr Schweiz (Swiss Direct Transport – ch-direct)
Basic document for the harmonisation of transport, Bern (Switzerland), 2017

2. Introduction

2.1. General objective

The VDV454 interface aims to transfer timetable data to one or more VDV partners. The data transferred via this interface is also required in order to provide real-time data in information systems.

This document, together with the official VDV Guideline 454 [3], defines the Swiss-wide standard for implementing the VDV interface, as well as individual data structures, based on the mutual exchange of real-time transport information between public transport companies using the ITCS (Intermodal Transport Control System) or “data platforms”.

Both documents when taken together describe in detail:

- What data can be exchanged between public transport partners
- What elements of the VDV Guideline are supported within the Swiss public transport system
- Explicit deviations from the corresponding VDV Guideline
- The format of individual data elements
- The content and time-related data flows
- What agreements concerning metadata are necessary
- What must be ensured for operation of the interface
- How data is to be interpreted if this is not clear from VDV Guideline 454 [3] or if its use deviates from VDV Guideline 454 [3]

(See also the corresponding section in the VDV guideline [3])

2.2. Requirements for data exchange

(see VDV Guideline 454 [3])

2.2.1. Transfer of updated planning and operating data

(see VDV Guideline 454 [3])

2.2.2. Referencing of actual data

(see VDV Guideline 454 [3])

2.2.3. Provision of target data

(see VDV Guideline 454 [3])

2.2.4. Definition of values to be used uniformly

(see VDV Guideline 454 [3])

3. Introduction and basic definitions

3.1. Structure of the interface

(see VDV Guideline 454 [3])

3.2. Timetable information data service AUS

(see VDV Guideline 454 [3])

3.2.1. Overview

(see VDV Guideline 454 [3])

3.2.2. Specialist services REF-AUS and AUS

(see VDV Guideline 454 [3])

3.2.3. Functional scope of REF-AUS

(see VDV Guideline 454 [3])

3.2.4. Functional scope of AUS

(see VDV Guideline 454 [3])

3.2.5. Scope of specialist service DFI

(see VDV Guideline 454 [3])

3.2.6. Data exchange with REF-AUS (addition for RDR-RV 454)

Before the operating day for the individual transport company starts, the recipient should obtain a complete day timetable via the REF-AUS service in accordance with VDV Guideline 454 (section 3.2.2 and 3.2.3). This creates the entire basis for the connecting subscription of AUS messages.

In processing the REF-AUS data in the recipient system, a time replacement from line timetables is used (same `BetreiberID` (operator ID), same `LinienID` (line ID), same `RichtungsID` (direction ID)) – this means that all journeys already received for these line timetables are replaced in the transmitted validity period (`GueltigVon` (valid from), `GueltigBis` (valid to) by the newly transmitted journeys from the day timetable (also for the period timetable).

This principle also applies to processing REF-AUS in an information system – even if the data from the period timetable is used there as a basis. In this case all journeys from REF-AUS are individually matched to the appropriate journeys in the period timetable:

- Matching journeys are displayed
- Additional journeys from REF-AUS are displayed without the “additional journey” attribute, without using the “additional journey” note
- Redundant journeys in the period timetable are removed, without the note “failed to use”.

This ensures that the number of operated journeys is always determined by the control system. The information system can, however, display additional attributes contained in the period timetable (e.g. subject to surcharge).

The maximum available validity periods and when the target day timetables are available from the respective data producer shall be agreed upon across the entire supply chain (producer, data platform, recipient) (see section 3.2.6.3).

3.2.6.1. Day timetable

A day timetable consists of a number of line timetables and a line timetable from a number of target journeys.

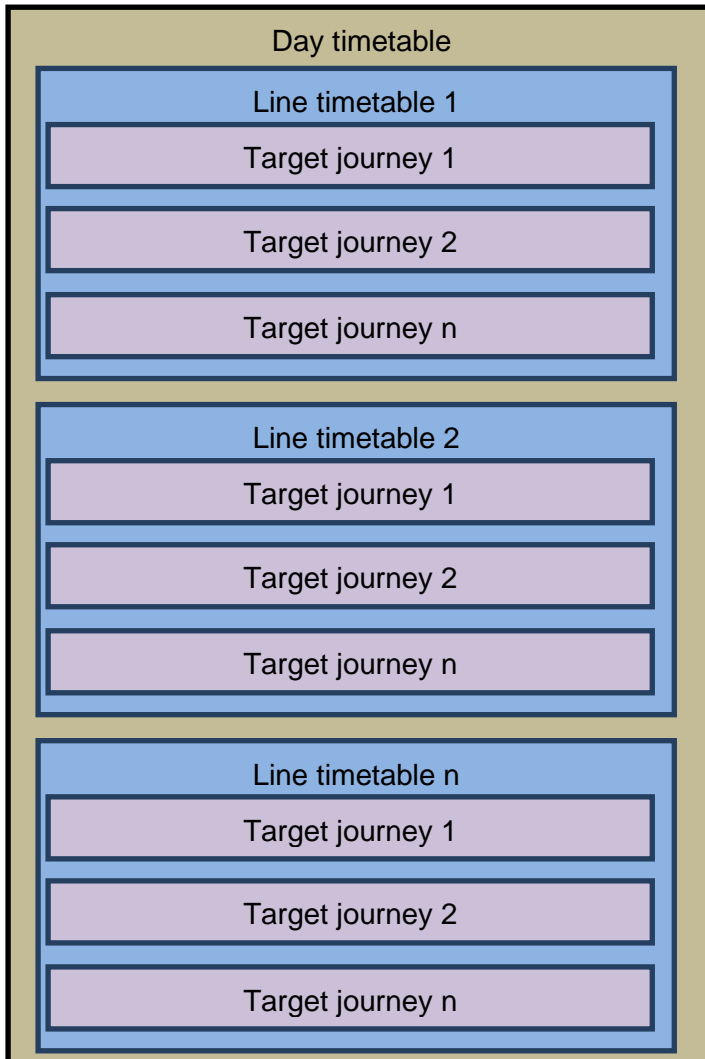


Figure 2: Overview day timetable

Complete line timetables across the defined validity period (*GuelzigVon* (valid from), *GuelzigBis* (valid to) are transferred via VDV454 REF-AUS. Each line timetable contains all target journeys that start within the validity period (*VDV Guideline 454, section 5.1.1: MitBereitsAktivenFahrten=false*).

The following rules must be observed in the process:

- A line timetable must always be transferred in full in one message. Dividing it up across multiple packets (e.g. *DatenAbrufenAntworten* via *WeitereDaten=true*) is not permitted. A line timetable always contains all journeys that are operated for the defined validity period. Target journeys that are not transferred in the line timetable are not operated; new target journeys are interpreted as additional journeys and the

“additional journey” flag is applied by the recipient as per the transferred target journey.

- Even a blank line timetable is a complete line timetable. A blank line timetable therefore deletes all journeys for the defined validity period.
- If the recipient cannot interpret target journeys, it is a good idea to discard the complete line timetable, or it at least needs to be considered whether it is better to discard the target journeys that cannot be interpreted (which are then no longer operated) or discard the entire line timetable.
- If a line timetable cannot be delivered in full for the agreed validity period as per the subscription, then it should not be transferred. Otherwise all journeys that are not transferred will be deleted.
- If a line timetable is not transferred, the recipient’s line timetable continues from its most recent transfer status (REF-AUS or period timetable).
- Target journeys in the line timetable can be marked as failed with the flag `FaelltAus=true`. If target journeys are simply omitted, it is a good idea for the recipient to delete the journey and not set the `FaelltAus` flag.

3.2.6.2. Transfer sequence for REF-AUS and AUS

According to VDV Guideline 454 (section 3.2.2 and 3.2.3), the day timetables should first be synchronised (the recipient has the same target data as the sender) and then changes to the day timetable are subscribed via the AUS service.

Reason:

- AUS messages will otherwise be transferred without the recipient’s and supplier’s data pools being synchronised.
- Obsolete or incorrect data pools may be displayed.
 - Additional journeys from REF-AUS are not displayed in the AUS service or are only displayed when the first journey is transferred.
 - Failed journeys continue to be displayed.
 - Route changes from REF-AUS are not displayed in the AUS service or are only displayed when the first journey is transferred.
 - Formations are not displayed in the AUS service or are only displayed when the first journey is transferred.
 - Actual journeys from the AUS service must be compared against the period timetable. If a journey cannot be compared, journeys may not be deleted or may be duplicated.
 - Etc.

3.2.6.3. Organisational agreement in CUS for the transfer of REF-AUS data

In order to issue subscriptions over the correct subscription period and with the right validity period, an organisational agreement is needed across the entire supply chain.

- Which subscription periods and validity periods for this day timetable can be defined is agreed upon organisationally across the entire supply chain (producer, data platforms, recipient).
- All CUS suppliers agree to deliver their line timetables in CUS by 04:00 at the latest on the day of operation, with a validity period running from 04:30 to 04:30 of the following day at a minimum.
- CUS as the data platform can only check whether the received line timetables comply with the recipient’s validity period once the line timetables are received from the suppliers, which is why CUS confirms the recipient’s subscription without checking

whether it can deliver this data in each case. It is ensured, however, that only data that matches the subscription is delivered. If this is not the case, no line timetables are delivered.

- The recipient always orders at least the minimum validity period from 04:30 to 04:30 of the following day.

The graphic shows how REF-AUS data can be transferred via a data platform (CUS in this case).

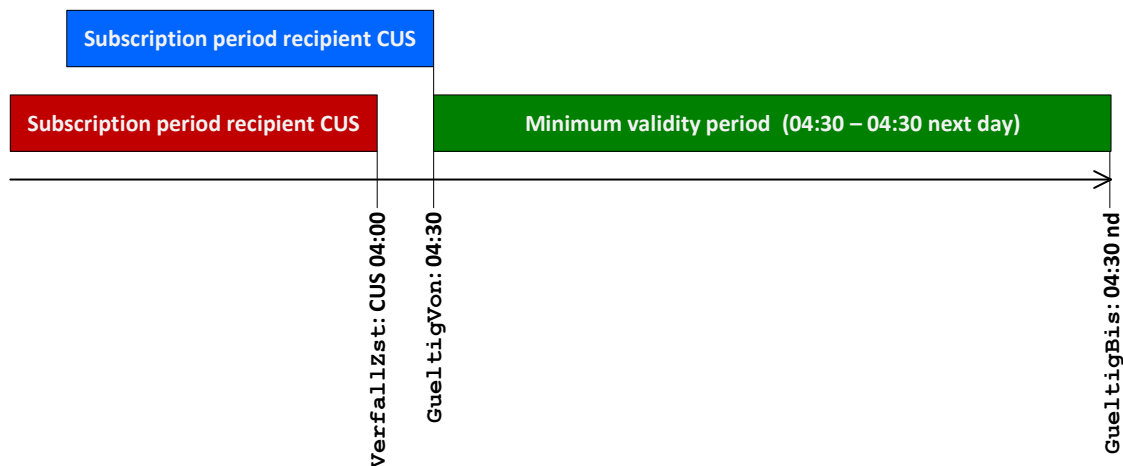


Figure 3: Overview subscription period

Table 2: Sample table for organisational agreement

Operator	Operator > CUS (inbound)				CUS > recipient (outbound)			
	Time range for sub query		Day timetable		Time range for sub query		Day timetable	
	Sub query	Sub expiry	Valid from	For duration of	Sub query	Sub expiry	Valid from	For duration of
Partner 1	03:30	04:00	04:30	24:45 h	04:00	04:30	04:30	24:45 h
Partner 2	03:30	04:00	04:30	30 h	04:00	04:30	04:30	30 h
Partner 3	23:00 (previous day)	01:00	04:30	48 h	01:30	02:30	04:30	30 h

3.3. Metadata, mapping of stops and lines

(see VDV Guideline 454 [3])

- **HaltID:**
(see VDV Guideline 454 [3])
The element `HaltID` (stop ID) describes the stop, and optionally the stopping point to which a vehicle runs.

Recommendation:

The KIDS committee aims to use unique Swiss-wide `HaltID` (stop ID) in the Swiss public transport system. The `HaltID` should be specified in as much detail as possible, if available, and should be treated the same in the application of Guidelines VDV453 [1] and VDV454 [3]. It should be structured as described in the following:

- Unique Swiss-wide two-digit UIC country code
- Five-digit UIC code (without check digit) for specifying the stop in question (global stop range)
- (Optional) two-digit code for identifying the stopping point within the stop

If there are multiple stopping points within a stop, the code can be used to identify and differentiate the precise position. If stops do not need to be broken down into more detail and the stopping position corresponds to the stop itself, the two-digit stopping point code does not have to be specified. The resulting code for the `HaltID` is therefore usually seven digits (`HaltID` corresponds to global stop), but can also be nine digits when more detail is provided (`HaltID` corresponds to a specific stopping point).

`HaltID` composition:

UIC country code + UIC code + (stopping point code)
--

Example for Zurich main station: 8503000, 850300002

The UIC country codes and UIC stop code for identifying the stop also apply to bus stops, tram stops, etc. They are based on the Swiss-wide operating point list (as per FOT DiDok list [5]).

- **LinienID (line):**
(see VDV Guideline 454 [3])

If an operator has multiple same lines (same line numbers) at different locations, each of these lines must be delivered with a separate `BetreiberID` (operator ID).

Note on REF-AUS:

If a line is operated by multiple transport companies and delivered to recipient systems via separated ITCS, these control systems and the data cancel each other out. These types of line must be divided into two separate lines (with separate line ID or separate operator ID) similar to the ITCS.

Formatting of `LinienID` (line ID) in local transport (target image):

[UIC country code]:[Business organisation number]:[Technical line key]

Example: 85:849:2

Formatting of `LinienID` (line ID) in rail transport:

In the VDV454 services, the journey number (usually the train number) for the respective journey is transferred in the `LinienID` (line ID) element.

Note:

See also section 4.5, observing VDV-RV 453 [4], section 6.1.6, Line and direction references [4].

- **RichtungsID (direction ID):**
(see VDV Guideline 454 [3])

Recommendation:

When journeys are transferred, the `RichtungsID` (direction ID) value, which is transferred via VDV454 services, should match the value from the “ID for direction” field for the corresponding journey from the period timetable.

In the REF-AUS service especially this is important in order to compare the line timetables with the line timetables in the period timetable.

- Formatting of `RichtungsID` (direction ID) in rail transport:
- The `RichtungsID` (direction ID) element contains the UIC code value [UIC country code + UIC stop code] for the final stop that is relevant to the customer.

- **ProduktID (product ID):**
(see VDV Guideline 454 [3])

The transport category is communicated as the `ProduktID` (product ID) in the Swiss public transport system (e.g. boat, bus, tram, train, etc.) The data-producing transport company must ensure in the process that the transmitted transport categories match the transport categories used in the timetable collection in the Swiss public transport system (INFO+).

The list of valid transport categories is in document [6] and is additionally provided in this document in section 0 for the sake of convenience.

The `ProduktID` (product ID) is specified partly for the assignment of pictograms in the information systems.

- **BetreiberID (operator ID):**
(see VDV Guideline 454 [3])

Indicates which business organisation of a transport company (business organisation number as per DiDok list [5]) is running a journey.

The `BetreiberID` (operator ID) is a mandatory field in the Swiss public transport system and must be specified in the following format:

[UIC country code]:[Business organisation number]

Identifier	Meaning	Example
UIC country code	Country code of the transport company (as per UIC) running the journey. Max. two-digit numerical value	85
Business organisation number	Number of the business organisation of a transport company running the journey, as per the FOT DiDok list [5] or reference for the country in question. (Synonym: transport company code) Number should not start with a leading zero. Max. six-digit alphanumerical value (permissible characters are { A-Z, a-z, 0-9, _ }).	37

	The business organisation number must be identical in the <code>FahrtBezeichner</code> (journey identifier), <code>BetreiberID</code> (operator ID) and <code>LinienID</code> (line ID) elements. If the numbers are different, the journey may not be able to be processed (inconsistencies).	
--	--	--

Table 3: Definition `BetreiberID`

An operator can deliver either rail or local transport data with a `BetreiberID` (operator ID). If an operator needs to deliver both rail and local transport data, this must be delivered with a different `BetreiberID` (operator ID) even if both use the same line (e.g. use of buses instead of rail in off-peak periods).

Note: The product “Bahn” (rail) must be able to be subscribed even without local transport data (including filtering). Until all systems are able to deliver the `ProduktID` (product ID) and have consistently implemented a `ProduktFilter` (product filter), this interim solution involving a separate `BetreiberID` (operator ID) for rail and local transport must remain in place.

- **`VerkehrsmittelText` (transport mode text) (addition for VDV-RV 454):**
The offer category is communicated as the `VerkehrsmittelText` (transport mode text) in the Swiss public transport system (e.g. ICE, RE, R, S, B, T, FUN, LB, etc.) The data-producing transport company must ensure in the process that the transmitted `VerkehrsmittelText` (transport mode text) matches the offer categories used in the timetable collection in the Swiss public transport system (INFO+).
The list of valid transport categories is in document [6] and is additionally provided in this document in section 10.10 for the sake of convenience.

- **`LinienText` (line text): (addition for VDV-RV 454)**

The `LinienText` (line text) element is publication-relevant and must therefore be forwarded to the information system and displayed there in the format of consistent customer information as prepared by the data supplier.

`LinienText` (line text) in rail transport:

The publication-relevant line designation (PLB) is transmitted in the `LinienText` (line text) element in the VDV454 services.

Table 4: In CUS PBL is composed of the following elements

Offer category	Line number	<code>LinienText</code>
S		S
S	1	S1
IC		IC
ICE		ICE
R		R
S	L1	SL1

Delivered in CUS, however, the PLB in rail transport is divided into the `VerkehrsmittelText` (offer category) and `LinienText` (line number):

- PLB = S1

- CUS (VDV454 delivery)
 - VerkehrsmittelText (transport mode text) = S
 - LinienText (line text) = 1
- INFO+ (delivery)
 - Category = S
 - Line = 1
- *Note:*
Delivery from CUS in LinienText (line text): S1 (as per table above).
- PLB = R
 - CUS (VDV454 delivery)
 - VerkehrsmittelText (transport mode text) = R
 - LinienText (line text) = "blank"
 - INFO+ (delivery)
 - Category = R
 - Line = blank
 - *Note:*
Delivery from CUS in LinienText (line text): R (as per table above).

3.4. Estimation of data quantities

(see VDV Guideline 454 [3])

3.5. Estimation of data currentness

(see VDV Guideline 454 [3])

3.6. Time formatting

(see VDV Guideline 454 [3])

The time format must match the UTC definition (cf. ISO 8601):

- Expressions such as 25:30 as a synonym for 01:30 (as some planning systems allow) are **not** permitted.
- Transitions between days must be identified by changing the date in UTC format, for example:
 - Before midnight: "2014-07-09T23:55:00"
 - After midnight: "2014-07-10T01:30:00"

3.7. Operating day (addition for VDV-RV 454)

(see also VDV453 RV [4] section 6.1.1)

4. “Basic infrastructure” interface description

4.1. Preliminary remarks

(see VDV Guideline 454 [3])

4.2. Subscription procedure

(see VDV Guideline 454 [3])

4.3. Protocols

(see VDV Guideline 454 [3])

4.4. Service ID / query URL

(see VDV Guideline 454 [3])

Since changes within a partner’s system environment, which also acts as a server, can also affect application addressing, it is a good idea to design the addressing of VDV queries to be configurable on the client side.

Changes to the URL of a service on the server side must be approved by the recipients.

4.4.1. Control system ID (addition for VDV-RV 454)

The control system ID is included in both the access URL and in the message itself in the form of the `Sender` XML attribute.

In addition to the **sender of the message** (IT system ID), it also identifies the respective **platform** from which a message is sent (platform ID). Both components are connected with a “_” (underscore sign) between them.

<IT System ID>_<Platform ID>

It is a good idea to specify the control system ID in lowercase letters.

The IT system ID can be freely selected. The underscore sign “_” must not be used within the IT system ID, however. It is a good idea to specify in the IT system ID the respective abbreviations for the partner and, if necessary, the abbreviation for the IT system designation (e.g. “sbb”, “sbbfpl”, “aags”, “riv”, “zvv”, “zvb”, “svb-lio”, “svb-dss”, etc.)

The platform from which data is exchanged is specified in the platform ID.

Table 5: The following IDs are defined as stand

Platform	Platform ID
Development	entw
Test	test
Integration	int
Production	prod

If the platform IDs defined here are not sufficient, more IDs can be added with the agreement of both sides. Partners that operate fewer than the platforms listed here are limited to the ones they have.

Valid control system IDs include, for example: “zvv_test”, “zvv_prod”, “riv_prod”, “sbb_int”, “sbb_prod”, “svb-dds_test”, “svb-dds_prod”.

4.5. Reused data types

(see VDV Guideline 454 [3])

In relation to the VDV454 services, please explicitly follow the specifics from VDV-RV 453 [4] regarding the following reused data types:

Table 6: Specifics of data types

Element	Note	Specifics in VDV-RV 453 [4]
DatenAbrufenAntwort	The separation of data for a subscription. Include as much detail as possible	Section 5.1.4.2
FahrtID	Specifics concerning mandatory field and formatting of <code>FahrtID</code> (journey ID) and use and consistency with <code>FahrtBezeichner</code> (journey identifier) (VDV453/454)	Section 6.1.5
LinienID	Specifics concerning formatting and use and consistency with <code>LinienID</code> (line ID) (VDV453/454)	Section 6.1.6

4.5.1. `StatusAnfrage` (status query) and `StatusAntwort` (status reply) (addition for VDV-RV 454)

Client side

If a client receives a `notok` back in the `StatusAntwort` (status reply) to a sent `StatusAnfrage` (status query), it must be assumed that the entire service is not available. From this point, the client is not allowed to send any more queries to the partner system except for the `StatusAnfragen` (status queries) that continue on a cyclical basis. As soon as the first `ok` is received in a `StatusAntwort` (status reply), the service in question is considered “available again” and regular data exchange can be resumed. The behaviour is no different from when absolutely no reply is received to a `StatusAnfrage` (status query) (see also VDV Guideline 453 [1], section 5.1.8 [1]).

4.6. Use of optional fields

VDV-RV 454 follows the stipulations of VDV Guideline 454 [3] in this case in principle. For data recipients this means that they always have to compare newly received data against data that was received prior, in order to have all information for a journey. Data in optional elements that were specified in a previous message retain their validity even if they are no longer explicitly specified in a subsequent change message (except when transmitting complete journeys).

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5. Specialist services

5.1. Target data service REF-AUS

(see VDV Guideline 454 [3])

5.1.1. Timetable data query (AboAUSRef)

(see VDV Guideline 454 [3])

Table 7: AboAUSRef

Element	Notes	Field
BetreiberFilter	<p>(Subelement, mandatory/option, multiple) – filter for the transport company for which day timetables are to be sent. The element contains the <code>BetreiberID</code> (operator ID), for which the subscriber is requesting data (see VDV Guideline 454 [3], section 5.1.1.3).</p> <p>No data: All of the target data known to the ITCS must be transmitted (subject to other filters or limitations).</p> <p>For all data platforms delivered in CUS and ITCS with two operators or more, the operator filter (outbound) must be implemented; for all others implementation is optional. Data suppliers that have not yet implemented the <code>BetreiberFilter</code> (operator filter) must respond to an <code>AboAnfrage</code> (subscription query) with a <code>BetreiberFilter</code> (operator filter) with <code>notok</code> and an error number 3xx.</p> <p>Using the operator filter is recommended for all data recipients, as otherwise all new operators will automatically be added to the server.</p>	Optional/mandatory (see notes)

Use of placeholders for filtering in the Swiss public transport system:

Two partners can agree to use placeholders in the filter criteria. The following characters are allowed:

- The asterisk * stands for any number of characters (letters or numbers), or for no character at all
- The question mark ? standards for exactly one character (letter or number)
- The hash # stands for exactly one single digit number

Note:

The use of placeholders in the Swiss public transport system is voluntary and must be explicitly agreed upon between two partners.

5.1.2. Transmitting data (AUSNachricht)

(see VDV Guideline 454 [3])

5.1.3. Line-oriented timetable data transmission (line timetable)

In contrast to VDV Guideline 454 [3] (cf. [1], section 5.1.3), the `BetreiberID` (operator ID) is mandatory:

Table 8: Line timetable: `BetreiberID`

Element	Notes	Field
<code>BetreiberID</code>	<p>See section 3.3, <code>BetreiberID</code> [.....] Indicates which business organisation of a transport company (business organisation number as per DiDok list [5]) is running the target journeys for the line timetable in question. A line timetable can only be run by one business organisation. If the journeys are being run by a third party on behalf of the operating business organisation, the <code>BetreiberID</code> (operator ID) for the business organisation operating the journey must be specified (not the third party running it). Also indicates the business organisation for which the period timetable is to be replaced by the day timetable.</p>	Mandatory

Specifics for VDV Guideline 454 (cf. [3], section 5.1.3) concerning `ProduktID` (product ID):

Table 9: Line timetable: `ProduktID`

Element	Notes	Field
<code>ProduktID</code>	<p>See VDV Guideline 454 [3] The <code>ProduktID</code> (product ID) must either be specified in the line timetable or in all target journeys.</p>	Mandatory/optional (see notes)

Specifics for VDV Guideline 454 (cf. [3], section 5.1.3) concerning `VerkehrsmittelText` (transport mode text):

Table 10: Line timetable: `VerkehrsmittelText`

Element	Notes	Field
<code>VerkehrsmittelText</code>	<p>(Mandatory/optional) [.....] Designation for the offer category of the target journeys in a line timetable. (See also section 3.3 <code>VerkehrsmittelText</code>) The <code>VerkehrsmittelText</code> (transport mode text) element can be overridden for each target journey. (cf. VDV Guideline 454 [3], section 5.1.3.1) No data: The offer category known from the year timetable (period timetable) is used. The <code>VerkehrsmittelText</code> (transport mode text) must either be specified in the line timetable or in all target journeys.</p>	Mandatory/optional (see notes)

5.1.3.1. Individual journey data (`SollFahrt`)
(see VDV Guideline 454 [3])

Table 11: SollFahrt

Element	Notes	Field
<code>ProduktID</code>	See VDV Guideline 454 [3] The <code>ProduktID</code> (product ID) must either be specified in the line timetable or in all target journeys.	Mandatory/optional (see notes)
<code>VerkehrsmittelText</code>	See VDV Guideline 454 [3] The <code>VerkehrsmittelText</code> (transport mode text) must either be specified in the line timetable or in all target journeys.	Mandatory/optional (see notes)
<code>Zugname</code>	The <code>Zugname</code> (train name) element contains the marketing name (see [6])	Optional
<code>ServiceAttribut</code>	The <code>ServiceAttribute</code> (service attributes) are predefined in the Swiss public transport system; see section 10.11.	Optional

5.1.3.2. Information on journey service (`ServiceAttribut` – service attribute)
(see VDV Guideline 454 [3])

5.1.3.3. Information on the stop (`SollHalt` – target stop)
(see VDV Guideline 454 [3])

5.1.3.4. Information on `SollFahrt` (target journey) formation (`SollFormation` – target formation)
(see VDV Guideline 454 [3])

5.1.3.5. Planned connections (`SollAnschluss` – target connection)
(see VDV Guideline 454 [3])

5.2. Actual data service AUS

5.2.1. Actual data query (`AboAUS`)
(see VDV Guideline 454 [3])

In contrast to VDV Guideline 454 (cf.[3], section 5.21), the `BetreiberFilter` (operator filter) may be mandatory:

Table 12: AboAus: BetreiberFilter

Element	Notes	Field
<code>BetreiberFilter</code>	(see VDV Guideline 454 [3]) For all data platforms delivered in CUS and ITCS with two	Optional/mandatory

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Element	Notes	Field
	operators or more, the operator filter (outbound) must be implemented; for all others implementation is optional. Data suppliers that have not yet implemented the <code>BetreiberFilter</code> (operator filter) must respond to an <code>AboAnfrage</code> (subscription query) with a <code>BetreiberFilter</code> (operator filter) with <code>notok</code> and an error number 3xx. Using the operator filter is recommended for all data recipients, as otherwise all new operators will automatically be added to the server.	(see notes)
MitRealZeiten	(see VDV Guideline 454 [3]) In the Swiss public transport system, delivery of real time to the FOT and therefore in the CUS is mandatory for all transport companies. For this reason, CUS only sets all subscriptions with the parameter <code>MitRealZeiten=true</code> (with <code>real times = true</code>).	Mandatory

Use of placeholders for filtering in the Swiss public transport system:

Two partners can agree to use placeholders in the filter criteria. The following characters are allowed:

- The asterisk * stands for any number of characters (letters or numbers), or for no character at all
- The question mark ? standards for exactly one character (letter or number)
- The hash # stands for exactly one single digit number

Note:

The use of placeholders in the Swiss public transport system is voluntary and must be explicitly agreed upon between two partners.

5.2.2. Transmitting actual data

(see VDV Guideline 454 [3])

For all suppliers that deliver in CUS, the first message in the AUS service must always be a complete journey, in order to ensure an initial status in each case for the journey, which is independent of the service.

If the `DatensatzAlle` (dataset all) element for a `DatenAbrufenAnfrage` (data query) is set to `true`, all of the journeys that are active and relevant at the time are transmitted as complete journeys. The respective partners must decide among themselves whether existing journeys are relevant.

5.2.2.1. Actual data for a journey (`IstFahrt` – actual journey)

(see VDV Guideline 454 [3])

In contrast to VDV Guideline 454 (cf.[3], section 5.1.3), the `BetreiberID` (operator ID) is mandatory:

Table 13: IstFahrt: BetreiberID

Element	Notes	Field
BetreiberID	[.....] See section 3.3, BetreiberID The transport company (business organisation number as per the DiDok list [5]) that is commissioned (by FOT, the canton, etc.) to run this journey and holds the concession for it is always specified in the BetreiberID (operator ID). It does not matter whether they actually run this journey themselves or commission another transport company (third party) to do it.	Mandatory
ProduktID	See VDV Guideline 454 [3]	Mandatory
Verkehrsmittel Text	See VDV Guideline 454 [3]	Mandatory
Zugname	The Zugname (train name) element contains the marketing name (see [6])	Optional
ServiceAttribu t	The ServiceAttribute (service attributes) are predefined in the Swiss public transport system; see section 10.11.	Optional

5.2.2.2. Referencing of journey data (FahrtRef – journey ref)

(see VDV Guideline 454 [3])

In contrast to VDV Guideline 454 (cf.[3], section 5.2.2.2), the FahrtID (journey ID) is mandatory:

Table 14: FahrtRef: FahrtID

Element	Notes	Field
FahrtID	[.....] The FahrtID (journey ID) must always be specified, as it is needed in the Swiss public transport system to reference the IstFahrten (actual journeys) (AUS) and for mapping to target journeys (REF-AUS). Concerning the format of FahrtBezeichner (journey identifier), see VDV-RV 453 [4], section 6.1.5	Mandatory

5.2.2.2.1. Alternative referencing information (FahrtStartEnde – journey start end)

(see VDV Guideline 454 [3])

5.2.2.3. Information on the stop (IstHalt – actual stop)

(see VDV Guideline 454 [3])

5.2.2.4. Formation of the IstFahrt (actual journey) (IstFormation – actual formation)

(see VDV Guideline 454 [3])

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5.2.2.5. Element structures used multiple times within the `IstFormation` (actual formation)

(see VDV Guideline 454 [3])

5.2.2.6. Additional information (`StoerungsInfo` – fault info)

(see VDV Guideline 454 [3])

5.2.2.7. Prediction quality (`IstAnkunftPrognoseQualitaet` (actual arrival prediction quality) and `IstAbfahrtprognoseQualitaet` (actual departure prediction quality)): (`ZeitQualitaet` – time quality)

(see VDV Guideline 454 [3])

5.2.2.8. Reference to the originally planned journey (`FahrtBeziehung` – journey reference)

(see VDV Guideline 454 [3])

5.2.3. Circuit-related actual data transmission (`IstUmlauf` – actual circuit)

(see VDV Guideline 454 [3])

5.3. Secured connection relationships

(see VDV Guideline 454 [3])

5.4. Transmission of formation information

(see VDV Guideline 454 [3])

5.5. Transmission of combined journeys (connection of transport journeys)

(see VDV Guideline 454 [3])

6. Handling of actual data service AUS

6.1. Implementation notes and rules

(see VDV Guideline 454 [3])

6.1.1. Prediction competency of the ITCS

(see VDV Guideline 454 [3])

6.1.2. Additional rule on delay profile

(see VDV Guideline 454 [3])

6.1.3. Aggregation of messages for one journey

(see VDV Guideline 454 [3])

6.1.4. Example “Travelling through a stop” (attribute change)

(see VDV Guideline 454 [3])

6.1.5. Example “Operating a required transport stop”

(see VDV Guideline 454 [3])

6.1.6. Example “Route change”

(see VDV Guideline 454 [3])

In the case of **partial failures** an `IstFahrt` (actual journey) is sent with the following properties:

- The `FaelltAus` (failing) element is not included or has value `false`.
- The `Komplettfahrt` (complete journey) element has value `true`.
- All elements of the type `IstHalt` (actual stop) that are still valid are specified.
- The failed elements of type `IstHalt` (actual stop) are omitted.

6.1.7. Initial message and preview time

(see VDV Guideline 454 [3])

6.1.8. Time-related message behaviour – delays

(see VDV Guideline 454 [3])

For application in the Swiss public transport system, a standard value of 30 seconds has been defined for the delay for all systems. If a subscription contains a different value, the server is nevertheless entitled to process the subscription with a delay of 30 seconds.

6.1.9. **PrognoseUngenau (prediction inaccurate) element**

(see VDV Guideline 454 [3])

6.1.10. **Withdrawal of predictions/resetting of journey**

(see VDV Guideline 454 [3])

Note:

The behaviour regarding withdrawing predictions by setting `PrognoseMoeglich=false` (prediction possible = false) was changed in VDV Guideline 454, version 2.1. Now only prediction times are reset to the target times; other changes such as route changes, track changes, formation changes, etc. remain. If the entire journey needs to be reset to target, the new `FahrtZuruecksetzen` (reset journey) flag must be set to value `true`. `PrognoseMoeglich=false` (prediction possible = false) in combination with `FahrtZuruecksetzen=true` (reset journey = true) produces the old behaviour.

6.1.11. Actual arrival and departure times

(see VDV Guideline 454 [3])

Note:

Specifying `AnkunftStatus` (arrival status) and `AbfahrtStatus=Real` (departure status = real) does not provide any information as to whether a vehicle has effectively stopped at a stop or just travelled through. The `Durchfahrt` (travel through) element is only for planning purposes and not used to retroactively report that a train has travelled through a stop.

6.1.12. Journey failures

(see VDV Guideline 454 [3])

In the case of **actual journeys that have completely failed** (AUS service), at least one `IstFahrt` (actual journey) must be sent with the following properties:

- The `FaelltAus` (failing) element has value `true`.
- The `Komplettfahrt` (complete journey) element has value `true`.

All stops for the last complete journey before the failure message must be specified (see table below).

Table 15: In the event of a failure, all stops from the “Failure message” column must be delivered

Initial message	Complete journey	Complete journey	Failure message (as complete journey)
Stop A	Stop A	Stop A	Stop A
Stop B	Stop B	Stop B	Stop B
Stop C	Stop C	Stop C	Stop C
Stop D	Stop D	Stop D	Stop D
Stop E	Stop E		
Stop F			

This should provide the data recipients with as much information on the failed journey as possible. This is especially practical for matching (if no REF-AUS data is available) and for data recipients that do not have a period timetable or other target data basis.

The same key that was specified to identify the journey must be used. In the Swiss public transport system, the `FahrtID` (journey ID) is what must be specified to identify the journey in this case. Optionally the passenger-relevant start and end stops can also be specified within the `FahrtStartEnde` (journey start end) element.

Note:

The failure of a journey that has already started never results in a total failure/journey failure; instead it only results in a partial failure or a route change.

Partial failures are route changes and are therefore described in section 6.1.6.

6.1.13. Additional journeys

In the case of additional actual journeys (AUS service) (e.g. special event trains), the `Zusatzfahrt` (additional journey) element from ITCS is set to `true`. Additional journeys are always communicated in the initial message as a complete run (`Komplettfahrt = true`) (complete journey = true).

The `FahrtID` (journey ID) for the additional journey must always be unique within the operating day.

6.1.14. Implementation for rail applications

(see VDV Guideline 454 [3])

6.1.15. Assurance of plausible predictions

(see VDV Guideline 454 [3])

6.2. Connection information

(see VDV Guideline 454 [3])

7. Glossary

(see VDV Guideline 454 [3])

8. English alias identifiers

(see VDV Guideline 454 [3])

9. Anhang: Transmission of prediction quality

(see VDV Guideline 454 [3])

10. Annex: Value lists (ENUM)

(see VDV Guideline 454 [3] with the exception of the following section).

10.1. FoFahrzeugTyp

(see VDV Guideline 454 [3])

10.2. FoFahrzeugAusstattungsCode

(see VDV Guideline 454 [3])

10.3. FoSprachCode

(see VDV Guideline 454 [3])

10.4. FoTechnischesAttributCode

(see VDV Guideline 454 [3])

10.5. FoAenderunsCode & FoAenderungsCodeAmHalt

(see VDV Guideline 454 [3])

10.6. FoZustandsCode

(see VDV Guideline 454 [3])

10.7. FoOrientierung

(see VDV Guideline 454 [3])

10.8. FoFahrtrichtung

(see VDV Guideline 454 [3])

10.9. ProduktID

The transport category (see [6]) is transmitted in the `ProduktID` (product ID) element. The following table shows the defined transport categories as of 31/12/2017:

Table 16: Transport category

Value	Meaning of value	Notes
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Value	Meaning of value	Notes
Train	Individual or connected rail vehicles	
Tram	Public local passenger transit run on electricity on rails in a city transport network	
Metro	Underground railway or city railway	New
Cog railway	Transport on rails, converting the driving force into motion using a toothed gearwheel and cog rail.	New
Bus	Short for omnibus or autobus	
Funicular	Transport on rails, moved by a cable	New
Closed cable car	Cable car with closed cabins Aerial tramway or gondola lift	New
Chair lift	Cable car with open seats	New
Lift	Vertical cable car	New
Boat	A larger watercraft	

Table 17: The following transport category (see [6]) is no longer transmitted in the ProduktID (product ID) element.

Value	Meaning of value	Notes
Rope conveyor	Cabins, seats or transport containers suspended on a conveyor cable and moved along a circuit	Deleted

Notes:

- The values for the transport category may change at short notice and sometimes even without notice. Recipient systems should therefore be able to respond to such changes and must not discard data with unknown offer categories.
- All new values must be added to the recipient system in a first phase before they are transmitted from supplier systems. After all supplier systems have been converted, the “deleted” values can be removed from the recipient systems.
- The transport category is being converted in accordance with the “Roadmap SKI”.
- Data from abroad is not subject to the implementation rules, so this data may contain different values. These must be passed on unchanged; they are not converted.
- Depending on the expansion of VDV Guideline 454 concerning these predefined product types, the table in the implementation rules may be removed again.

10.10.VerkehrsmittelText

The offer category (see [6]) is transmitted in the VerkehrsmittelText (transport mode text) element. The following table shows the defined offer categories as of 31/12/2017:

Table 18: Offer category

KIDS working group

(Kundeninformationsdaten-Schnittstellen (customer information data interface) in the Swiss public transport system)

Value	Meaning of value	Notes
ASC	Lift	New
ATZ	Auto tunnel train	New
BAT	Boat	
B	Bus	New
BN	Night bus	New
BP	PanoramaBus	New
CAX	International long-distance bus	New
CAR	Long-distance bus	New
CC	Cog railway	New
EC	EuroCity	
EN	EuroNight	
EXB	Express bus	New
EXT	Special event train	
FAE	Ferry	
FUN	Funicular	
GB	Gondola lift	New
G	Train with no guarantee of sticking to timetable	New
IC	InterCity	
IR	InterRegio	
M	Metro	
PB	Aerial tramway	New
PE	PanoramaExpress	New
R	Regio	
RE	RegioExpress	
RUB	Rufbus (dial-a-bus service)	New
S	S-Bahn	
SL	Chair lift	New
SN	Night S-Bahn	
T	Tram	
TN	Night tram	New

Table 19: The following offer categories (see [6]) are no longer transmitted in the VerkehrsmittelText (transport mode text) element

Value	Meaning of value	Notes
ART	Auto tunnel train	Deleted
BAV	Steamboat	Deleted
BEX	Bernina Express	Deleted
BUS	Bus (autobus)	Deleted
CNL	CitynightLine	Deleted
D	Fast train	Deleted
GEX	Glacier Express	Deleted
NB	Night bus	Deleted
NFB	Low-floor bus	Deleted
NFO	Low-floor trolley bus	Deleted

Value	Meaning of value	Notes
NFT	Low-floor tram	Deleted
VAE	Voralpen-Express	Deleted

Notes:

- The values for the offer categories may change at short notice and sometimes even without notice. Recipient systems should therefore be able to respond to such changes and must not discard data with unknown offer categories.
- All new values must be added to the recipient system in a first phase before they are transmitted from supplier systems. After all supplier systems have been converted, the “deleted” values can be removed from the recipient systems.
- The offer categories are being converted in accordance with the “Roadmap SKI”.
- Deviating values from the VDV Guideline are not used in the Swiss public transport system.
- Data from abroad is not subject to the implementation rules, so this data may contain different values. These must be passed on unchanged; they are not converted.
- Depending on the expansion of VDV Guideline 454 concerning these predefined product types, the table in the implementation rules may be removed again.

10.11.ServiceAttribute (service attributes) (addition for VDV-RV 454)

Attributes and notes (see [6], section 9) are transmitted via `ServiceAttribute` (service attributes). The following values are defined in the Swiss public transport system:

Table 20: Attributes and notes

Name of the <code>ServiceAttribute</code> (service attribute)	Meaning of value	Note
NF	Low floor	Phase 1, for date see list of implementation deadlines
PH	No low floor	Phase 1, for date see list of implementation deadlines
(... to be defined by INFO+)	Autonomous and spontaneous access for manual and electric wheelchairs	Phase 2, for date see list of implementation deadlines
(... to be defined by INFO+)	Access for manual and electric wheelchairs with advance notice	Phase 2, for date see list of implementation deadlines
(... to be defined by INFO+)	Limited access for manual and electric wheelchairs	Phase 2, for date see list of implementation deadlines
(... to be defined by INFO+)	No access for manual and electric wheelchairs	Phase 2, for date see list of implementation deadlines
Z	With surcharge	Phase 2, for date see list of implementation

Name of the ServiceAttributes (service attribute)	Meaning of value	Note
		deadlines
TX	Taxi	Phase 2, for date see list of implementation deadlines
TT	Tilting technology	Phase 2, for date see list of implementation deadlines

Clarification: ServiceAttribute (service attributes) NF and PH are to be considered independent, so that NF = no does not automatically mean a high floor.

Table 21: Low and high floor

ServiceAttribute value	Meaning	Note
NF = true	Low floor	
NF = false	No low floor	Does not mean high floor
NF missing	No information concerning low floor	Does not mean high floor
PH = true	High floor	
PH = false	No high floor	Does not mean low floor
PH missing	No information concerning high floor	Does not mean low floor

11. Annex: XML examples

(see VDV Guideline 454 [3])