

---

# SBB interface specification 05/2019

## VDV 454 – Version 2.7 (CUS 5.11)

---

### Actual-data interface – timetable information

REF-AUS Timetable information reference data

AUS Timetable information

---

#### Overall processing:

 SBB CFF FFS

Swiss Federal Railways SBB

Informatics – Infrastructure Solution Centre – Customer Information

“VDV Customer Information and Further Development Projects” team

Status: **Released**

Last changed: 03.04.2019

Copyright: This document is protected by copyright.  
Express, prior authorisation is required for any form of commercial use

## Contents

<b>1. Preliminary remarks .....</b>	<b>10</b>
1.1. Supported versions .....	10
1.2. Document structure and the limits to its scope .....	10
1.2.1. Limits .....	10
1.2.2. Uniform section structure .....	10
1.2.3. Mandatory, optional and non-supported fields.....	11
1.2.4. Distinction of server and client ( <i>expanded SBB text</i> ).....	11
1.2.5. CUS as a data hub ( <i>expanded SBB text</i> ) .....	11
1.2.6. CUS as a railway data producer – RDP ( <i>expanded SBB text</i> ).....	12
1.3. Compulsoriness .....	12
1.4. Documents referenced.....	13
<b>2. Introduction.....</b>	<b>14</b>
2.1. General problem definition .....	14
2.1.1. Swiss Federal Office of Transport (FOT) mandate ( <i>expanded SBB text</i> ).....	14
2.2. Requirements on the data exchange.....	14
2.2.1. Transmission of updated scheduling and operational data.....	14
2.2.2. Referencing the actual data .....	15
2.2.3. Supplying the planning data .....	16
2.2.4. Definition of values to be used uniformly .....	17
<b>3. Introduction and basic terms .....</b>	<b>18</b>
3.1. Structure of the interface .....	18
3.2. AUS timetable information data service .....	18
3.2.1. Overview .....	18
3.2.2. REF-AUS and AUS technical services .....	18
3.2.3. REF-AUS functional scope.....	18
3.2.4. AUS functional scope .....	18
3.2.5. Demarcation to technical service DFI .....	18
3.2.6. Data exchange with REF-AUS (VDV-RV 454 expansion) .....	18
3.3. Metadata, representation of the stops and routes .....	19
3.3.1. HaltID (stop position) ( <i>expanded VDV-RV 454 text</i> ) .....	19
3.3.2. Route and direction references ( <i>expanded SBB text</i> ).....	20
3.3.3. ProduktID ( <i>expanded SBB text</i> ) .....	20
3.3.4. VerkehrsmittelText ( <i>expanded SBB text</i> ).....	21
3.4. Estimate of data volumes.....	21
3.4.1. General estimate of data volumes.....	21
3.4.2. Estimate of data volumes for train composition data .....	21
3.5. Estimate of data currency .....	21
3.6. Time formatting.....	22
<b>4. 'Basic infrastructure' interface description.....</b>	<b>23</b>
4.1. Preliminary remarks .....	23
4.2. Subscription procedure .....	23
4.2.1. Division of large data packets ( <i>expanded VDV-RV 454 text</i> ).....	23
4.3. Protocols.....	23

## SBB AG

4.4. Service detection/query URL.....	23
4.4.1. Control centre identifier .....	24
4.5. Reused data types .....	24
4.6. Utilization of optional fields.....	24
<b>5. Technical services .....</b>	<b>25</b>
5.1. REF-AUS planning data service.....	25
5.1.1. Timetable data request (AboAusRef) .....	25
5.1.2. Transmitting data (AUSNachricht).....	26
5.1.3. Route-based timetable data transmission (Linienfahrplan).....	26
5.1.4. Traffic-related journey data transmission (SollUmlauf) .....	31
5.2. AUS actual data service.....	32
5.2.1. Actual data query (AboAUS) .....	32
5.2.2. Transmitting actual data.....	32
5.2.3. Traffic-related actual data transmission (IstUmlauf) .....	45
5.3. Assured connection relationships.....	45
5.4. Transmission of train composition information .....	45
5.5. Transmission of journey associations (connection of mode of transport journeys) .....	45
<b>6. Handling the AUS actual data service .....</b>	<b>46</b>
6.1. Implementation notes and regulations.....	46
6.1.1. ITCS forecast competence.....	46
6.1.2. Addition rules for the delay profile .....	46
6.1.3. Aggregation of messages relating to a journey.....	46
6.1.4. Beispiel "Durchfahren an einer Haltestelle" (Attributänderung).....	46
6.1.5. Beispiel "Bedienung einer Bedarfsverkehrshaltestelle" .....	46
6.1.6. Beispiel "Fahrwegänderung" .....	46
6.1.7. Initial message and preview time .....	46
6.1.8. Temporal reporting behaviour – hysteresis .....	46
6.1.9. PrognoseUngenau element.....	47
6.1.10. Unscheduled log-off .....	47
6.1.11. Actual arrival and departure times.....	47
6.1.12. Cancellations .....	47
6.1.13. Additional journeys.....	47
6.1.14. Implementation for rail applications .....	47
6.1.15. Special features for integrated service journeys (expanded SBB text) .....	47
6.1.16. Special features of associated trains (expanded SBB text) .....	48
6.1.17. Special features of feeder trains (expanded SBB text) .....	48
6.2. Connection information .....	49
<b>7. Glossary .....</b>	<b>50</b>
<b>8. English alias designation .....</b>	<b>51</b>
<b>9. Appendix: Transmission of forecast quality .....</b>	<b>52</b>
<b>10. Appendix: Values list (enum).....</b>	<b>53</b>
10.1. FoFahrzeugTyp.....	53
10.2. FoFahrzeugAusstattungsCode.....	53
10.3. FoSprachCode.....	53
10.4. FoTechnischesAttributCode .....	54

10.5. FoAenderungsCode & FoAenderungsCodeAmHalt .....	54
10.6. FoZustandsCode .....	54
10.7. FoOrientierung .....	54
10.8. FoFahrtrichtung.....	54
10.9. ProduktID.....	54
10.10. VerkehrsmittelText .....	54
<b>11. Appendix: XML examples.....</b>	<b>55</b>

Change history from V 2.2 to 2.3

Location	Change	Author	Date
chapter 2.2	The behaviour of subscription for REF-AUS was defined more precisely.  The whole definition can be found in the VDV454 RV. This definition is now implemented in CUS 5.6.	Jürg Wichtermann	13.04.16
chapter 3.3.1 chapter 5.1.1 chapter 5.1.1.6 chapter 5.1.3.3 chapter 5.2.2.1 chapter 5.2.2.3 chapter 5.2.2.4.8 chapter 5.2.2.5.1	HaltID is now validated on country code:  [UIC-Ländercode][UIC-Hatstellencode][Halteposition-Code].	Jürg Wichtermann	13.04.16
chapter 5.1	Blocking time is included in chapter 5.1.	Jürg Wichtermann	04.10.16
chapter 5.1.1 VDV453, chapter 5.1.2.2	In CUS 5.6 outbound: subscriptions with more than one "Abo" can be processed.	Jürg Wichtermann	13.04.16

Location	Change	Author	Date
chapter 5.2.2.1	<p>following definitions were defined more precisely:</p> <p>UmlaufID: Element not transmitted: no change to last message or periodic/annual timetable</p> <p>LinienfahrwegID: Element not transmitted: no change to last message or periodic/annual timetable</p> <p>Zusatzfahrt: Element not transmitted: no change to last message or periodic/annual timetable</p> <p>ServiceAttribut: Element not transmitted: no change to last message or periodic/annual timetable</p>	Jürg Wichtermann	13.10.16
chapter 5.2.2.3	<p>Following definitions has changed:</p> <p>IstAbfahrtPrognoseStatus: „Analog Fahrlöschen bei Abfahrt an einem BP beim VDV453“ was deleted.</p> <p>IstAnkunftPrognoseStatus: „Entspricht AufAZB/AufASB=true bei VDV453“ was deleted.</p>	Jürg Wichtermann	13.10.16
chapter 6.1.2	<p>CUS supports the additional rules for the delay profile for inbound (SBB as a client) but only for NAV (BUS, Tram, etc.). CUS only supports <i>Komplettfahrt=true</i> for rail services.</p> <p>The whole definition can be found in the “VDV-Schrift 454”. This definition is now implemented in CUS 5.6.</p>	Jürg Wichtermann	13.04.16
chapter 10.2	<p>New values:</p> <ul style="list-style-type: none"> <li>• AbteilBusiness,</li> <li>• AbteilFamilie</li> </ul> <p>Please read section 10.2 in RV and VDV-Schrift 454 as well.</p>	Jürg Wichtermann	13.10.16

## Change history from V 2.4 to 2.5

Location	Change	Author	Date
chapter 2.1.1	New performance agreement 2017 – 2020	Jürg Wichtermann	30.03.17
General	In all of the descriptions of the elements from the XSD, only the changes to VDV-RV 454 are now listed.	Jürg Wichtermann	30.03.2017
chapter 2.2.3.1	More precise detail added	Jürg Wichtermann	30.03.2017
chapter 3.2.6.3	More precise detail about the organisational agreement from VDV-RV 454.	J. Wichtermann	22.03.2017
chapter 3.3.2	More precise detail about route and direction references.	J. Wichtermann	22.03.2017
chapter 3.3.3	More precise detail about the ProduktID.	J. Wichtermann	22.03.2017
chapter 4.2.1	More precise detail about division into data packets: a route timetable is transmitted in its entirety in one packet.	J. Wichtermann	22.03.2017
chapter 4.4.1	More precise detail about the control centre identifier.	J. Wichtermann	22.03.2017
chapter 3.2.6.4	Chapter with CUS blocking times added.	J. Wichtermann	22.03.2017
chapters 5.1.1, 5.2.1.	The BetreiberFilter is now mandatory.	J. Wichtermann	22.03.2017
chapter 5.1.1.1	The chapter matched that of VDV-RV 454 and was removed.	J. Wichtermann	22.03.2017
chapter 5.1.3	The format for the BetreiberID is no longer required, as it is already defined in VDV-RV 454.  The description of the VerkehrsmittelText was modified.  These changes have no impact on the implementation.	J. Wichtermann	22.03.2017
chapter 5.1.3.2	The table matched VDV-RV 454 and was removed.	J. Wichtermann	22.03.2017
chapter 5.2.2.1	The format for the LinienID is no longer required, as it is already defined in VDV-RV 454.  These changes have no impact on the implementation.	J. Wichtermann	22.03.2017

Location	Change	Author	Date
chapter 5.2.2.2.1	FahrtStartEnde complies with the standard and was removed.	J. Wichtermann	22.03.2017
chapter 5.2.2.3	IstAbfahrtPrognoseStatus and IstAnkunftPrognoseStatus: The description was made more precise, both elements are mandatory for rail traffic.	J. Wichtermann	22.03.2017
chapter 10.4	New FoTechnischesAttributCode: NiederflurEinstieg	J. Wichtermann	22.03.2017

## Change history from V 2.5 to 2.5.1

Location	Change	Author	Date
chapter: 2.2.3.1	removed	J. Wichtermann	05.04.2017
chapter: 3.3.2	Precise processing of CUS	J. Wichtermann	05.04.2017
chapter: 3.3.3	Precise processing of CUS	J. Wichtermann	05.04.2017
chapter: 5.1.3	Precise processing of CUS: <ul style="list-style-type: none"> <li>LinienText</li> <li>VerkehrsmittelText</li> </ul>	J. Wichtermann	05.04.2017
chapter: 5.1.3.1	Precise processing of CUS: <ul style="list-style-type: none"> <li>LinienText</li> <li>HinweisText</li> <li>VerkehrsmittelText</li> <li>FahrradMitnahme</li> <li>FahrzeugTypID</li> </ul>	J. Wichtermann	05.04.2017
chapter: 5.2.2.1	Precise processing of CUS: <ul style="list-style-type: none"> <li>LinienText</li> <li>HinweisText</li> <li>VerkehrsmittelText</li> <li>FahrradMitnahme</li> <li>FahrzeugTypID</li> </ul>	J. Wichtermann	05.04.2017
chapter: 5.2.2.2.1	FahrtStartEnde added	J. Wichtermann	05.04.2017
chapter: 5.2.2.3	Precise processing of CUS: <ul style="list-style-type: none"> <li>IstAnkunftPrognoseStatus</li> <li>IstAbfahrtPrognoseStatus</li> </ul>	J. Wichtermann	05.04.2017
chapter: 6.1.6	Precise processing of CUS	J. Wichtermann	05.04.2017
chapter: 6.1.13	Precise processing of CUS	J. Wichtermann	05.04.2017

## Change history from V 2.5.1 to 2.5.2

Location	Change	Author	Date
chapter:1.2.3	This information is already available in the VDVRV 454 and can therefore be deleted in the SBB-Spec.	Jürg Wichtermann	20.07.2017
chapter:3.3	The "ProduktID" must match the "VM-Gattung" of INFO +. INFO + does not know a tram, nevertheless the tram is allowed as a "ProduktID".	Jürg Wichtermann	20.07.2017
chapter:3.4.1	There ist a reference to VDV-RV 454.	Jürg Wichtermann	20.07.2017
chapter:: 5.1.3 chapter:: 5.2.2.1	Calarification for the element „LinienID“: <a href="#">"CUS as a railway data producer – RDP (client)"</a> CUS does not need the „LinienID“ in the format for trains when data is input, the train number is obtained from the "Fahrtbezeichner".	Jürg Wichtermann	20.07.2017
chapter:5.2.2.3	Calarification for submitting data for trains: <ul style="list-style-type: none"> <li>• "IstAnkunftPrognoseStatus"</li> <li>• "IstAbfahrtPrognoseStatus"</li> </ul>	Jürg Wichtermann	20.07.2017
chapter:5.2.2.8	New element „FahrtBeziehung“ is not supported.	Jürg Wichtermann	20.07.2017

## Change history from V 2.5.2 to 2.6

Location	Change	Author	Date
chapter:5.2.1	CUS provides and supports only subscriptions with RealVersion = true.	Jürg Wichtermann	07.09.2017
chapter:3.3.2, 5.1.3, 5.1.3.1 und 5.2.2.1	The "LinienText" can be delivered with or without "VM-Art".	Jürg Wichtermann	07.09.2017
chapter:10.5	New "FoAenderungsCodeAmHalt" / "FoAenderungsCode": <ul style="list-style-type: none"> <li>• „FehlendeRollstuhlplaetze“ (not approved in VDV-Schrift (and not in "XSD 2017a").</li> <li>• „FehlendeNiederflurwagen“ (not approved in VDV-Schrift (and not in "XSD 2017a").</li> <li>• „FehlendeFamilienwagen“</li> <li>• "FehlendeRestaurantwagen"</li> <li>• "FehlendeWagen"</li> </ul>	Jürg Wichtermann	07.09.2017



## Change history from V 2.6 to 2.7

Location	Change	Author	Date
chapter:3.2.2	«RichtungsID» new contains the direction code H or R instead of the end stop.	J. Wichtermann	29.03.2019
chapter:5.2.2.2.1	CUS does not need "FahrtStartEnde" for trains anymore.	J. Wichtermann	29.03.2019
chapter:5.2.2.3	<p>Only text has changed:</p> <p>"IstAbfahrtdPrognose" and "IstAnkunftPrognose":</p> <ul style="list-style-type: none"> <li>correspond to the standard.</li> </ul> <p>"IstAbfahrtPrognoseStatus" and "IstAnkunftPrognoseStatus":</p> <ul style="list-style-type: none"> <li>correspond to the standard, but is mandatory for trains</li> </ul> <p>"IstAbfahrtPrognoseQualitaet", "IstAnkunftPrognoseQualitaet", "IstAbfahrtDisposition" and "IstAnkunftDisposition"</p> <ul style="list-style-type: none"> <li>is not supported for trains.</li> </ul> <p>"AbfahrtssteigText":</p> <ul style="list-style-type: none"> <li>Preview removed.</li> </ul>	J. Wichtermann	29.03.2019
chapter:6.1.2	CUS supports «addition rule for delay profile for trains	J. Wichtermann	29.03.2019
chapter 6.1.13	<p>Only text removed:</p> <p>The processing of the flag "Zusatzfahrt" corresponds to the standard.</p>	J. Wichtermann	29.03.2019
chapter 7	GO-Nr: dead link removed.	J. Wichtermann	29.03.2019
chapter 6.1.7	<p>Only text removed:</p> <p>Die Erstmeldung ist im Standard schon eine Komplettfahrt und muss daher hier nicht mehr erwähnt werden.</p> <p>The first message is in the standard already a complete trip and therefore does not have to be mentioned here anymore.</p>	J. Wichtermann	29.03.2019

---

## 1. Preliminary remarks

This SBB VDV454 interface specification describes the deviations and clarifications of the VDV454 interface operated by SBB for the CUS customer information platform with reference to the official document “VDV-Realisierungsvorgabe 454 - öV Schweiz” (VDV-RV 454) [1] and therefore also indirectly to “VDV Schrift 454 - Ist-Daten-Schnittstelle (Fahrplanauskunft)” [3], which are published by the Association of German Transport Companies (“Verband Deutscher Verkehrsunternehmen”, or “VDV”).

Partners wishing to use this interface to draw down data from SBB or to supply their own data to SBB must, in order to ensure correct operation of the interface, adapt their own VDV implementation to the specification details described here.

### 1.1. Supported versions

The currently supported version of “VDV-Realisierungsvorgaben 454 - öV Schweiz” [1] is **Version 1.1**.

The XSD used to validate the XML messages is XSD **Version 2015a** (without SIRI). This XSD contains schemas for both VDV453 and VDV454 (see [4]).

### 1.2. Document structure and the limits to its scope

#### 1.2.1. Limits

(see VDV-RV 454)

#### 1.2.2. Uniform section structure

The CUS VDV454 interface of SBB is based as closely as possible on the official “VDV-Realisierungsvorgaben 454 – öV Schweiz” [1]. Therefore, **beginning at section 2**, this document consistently emulates the sectional structure of the referenced VDV-RV 454 [3] and only describes clarifications, changes and deviations of the SBB VDV implementation with regard to the official “VDV-Realisierungsvorgaben 454 – öV Schweiz” [1]. This ensures that the two recommendations can be compared easily.

This document shall replace **neither** “VDV-Realisierungsvorgaben 454 - öV Schweiz” [1] nor the official VDV recommendation 454 [3]. This document also **does not** contain the complete information required for the implementation or understanding of the VDV454 interface. The reader is assumed to be familiar with the details of “VDV-Realisierungsvorgaben 454 – öV Schweiz” [1] and the official VDV recommendation 454 [3].

To be more precise:

- In general, the “VDV-Realisierungsvorgabe 454 – öV Schweiz” (VDV-RV 454) [1] shall apply. The statements and specifications contained therein will not be repeated in this document <sup>1</sup>

---

<sup>3</sup> Due to its high degree proliferation, the HAFAS raw data format is considered the unofficial “quasi-standard” for exchange timetable data in the Swiss public transport network.

- 
- If there are no changes to the referenced “VDV-Realisierungsvorgaben 453 – öV Schweiz” [2] in an entire (sub)section, this will be indicated with a reference in the following form: “(see VDV-RV 453)”
  - In cases where a deviation from VDV-RV 454 [1] or the VDV recommendation 454 [3] is necessary or sensible due to special circumstances at SBB, this deviation will be described specifically in the relevant section
  - The structures and scope of the master data and metadata for the data exchange between VDV partners, if not already established by VDV-RV 454 [1], are described in concrete terms in the relevant sections of this document <sup>2</sup>
  - Sections from VDV-RV 454 [1] that are not relevant for the VDV interface of SBB will be explicitly designated as such

**The layout of the sections is identical except as follows:**

In cases where there is a need for some additional clarification or explanation, which would not fit into the original structure of the document, a separate section has been inserted at the end of each relevant section with the words “(**expanded SBB text**)”. This section (including any sub-sections) therefore has no corresponding section in “VDV-Realisierungsvorgabe 454 – öV Schweiz” [1] and, due to its position at the end of a section level, also does not change the order of the sections that follow.

**1.2.3. Mandatory, optional and non-supported fields**

(see VDV-RV 454)

**1.2.4. Distinction of server and client** (*expanded SBB text*)

It is sometimes important to distinguish whether CUS functions as a data retriever (client) or a data supplier (server) in relation to the service in question. The relevant sections are marked as follows:

CUS as a data supplier:

- [“CUS as a data hub – DH \(server\)”](#) (*standard, not indicated*)
- [“CUS as a railway data producer – RDP \(server\)”](#) (*indicated*)

CUS as a data retriever:

- [“CUS as a data hub – DH \(client\)”](#) (*standard, not indicated*)
- [“CUS as a railway data producer – RDP \(client\)”](#) (*indicated*)

**1.2.5. CUS as a data hub** (*expanded SBB text*)

This document generally describes the interface functionalities of CUS as a data hub in reference to data exchange with partners in accordance with the VDV454 standard.

Any special courses of action or exceptions are explicitly indicated in the document. (see 1.2.4 Distinction of server and client (*expanded SBB text*))

CUS, as a data hub for Swiss public transport, must fulfil the following requirements:

---

<sup>3</sup> Due to its high degree proliferation, the HAFAS raw data format is considered the unofficial “quasi-standard” for exchange timetable data in the Swiss public transport network.

- 
- CUS as a data hub distributes data, which is provided by means of one of the VDV454 data services (REF-AUS, AUS). Provided it conforms to the standard, the incoming data is stored in CUS and relayed to the recipients unchanged:
  - CUS as a data hub ensures that the individual VDV data services can be used in a standalone manner and independently of one another:
    - From a technical standpoint, CUS as a data hub keeps VDV453 data and VDV454 data strictly separate.
    - From a technical standpoint, CUS as a data hub keeps the data of the VDV454 REF-AUS data services strictly separate from that of the AUS data service.
  - CUS as a data hub regularly deletes data from previous operating days. However, recipients are generally able to access data from the previous day in addition to that of the current operating day.

The requirements for CUS as a data hub, with regard to referencing actual data and supplying planning data, are listed in sections 2.2.2 and 2.2.3.

#### **1.2.6. CUS as a railway data producer – RDP (expanded SBB text)**

In addition to its role as a data hub for Swiss public transport, CUS also adopts the role of a data producer/supplier for rail services (this involves rail transport except for trams).

In this regard, the following assumptions are made:

- CUS, as a data producer for railway transport, consolidates incoming raw data from railway operating systems for the actual timetable generation and makes it available as produced data for interested recipients via the Swiss public transport data hub
- In this case, CUS as a data producer is responsible for the production of timetable data and the use of the associated required algorithms, rounding rules, threshold values and semantic formatting
- CUS as a data producer makes actual timetable data and daily scheduled timetable data available from the AUS and REF-AUS data services in accordance with the VDV standards. The periodic timetable (annual scheduled timetable) still has to be obtained from INFO+.

The requirements for CUS as a data producer, with regard to referencing actual data and supplying planning data, are listed in sections 2.2.2 and 2.2.3.

Specific procedures relating to the production of timetable data can be found in the relevant sections, e.g. under “CUS as a data producer”.

### **1.3. Compulsoriness**

This specification demonstrates how the VDV454 standard [3] is specifically implemented by both SBB and its partners, with additional reference to modifications and deviations:

---

The document should not be construed as a contract. The contractual situation between partners and/or their suppliers is not part of this document.

#### **1.4. Documents referenced**

- [1] Verband öffentlicher Verkehr (VöV – Swiss association of public transport)  
**VDV454-Realisierungsvorgaben öV-Schweiz Version 1.2**, Bern (CH), 2017
- [2] Verband öffentlicher Verkehr (VöV – Swiss association of public transport)  
**VDV453-Realisierungsvorgaben öV-Schweiz Version 1.1**, Bern (CH), 2015
- [3] Verband Deutscher Verkehrsunternehmen (VDV – “Association of German Transport Companies”)  
**VDV-Schrift 454 - Ist-Daten-Schnittstelle Fahrplanauskunft Version 2.0**, Cologne (D), 2015
- [4] Verband Deutscher Verkehrsunternehmen (VDV – “Association of German Transport Companies”)  
**XML-Schema für VDV453 V2.5 und VDV454 V2.0** (Version: “2015a”), Cologne (D), 2015
- [5] Federal Office of Transport (FOT)  
**Stops (DiDok list)**, Bern (CH), 2015

---

## 2. Introduction

### 2.1. General problem definition

The aim of the VDV454 interface is the exchange of journey-based timetable data (daily scheduled timetable, forecasts and actual data) among interested VDV partners.

This document, together with the official VDV recommendation 454 [3] and VDV-RV 454 [1], specifies the implementation of the interface in CUS for the mutual exchange of scheduled and real-time information for journeys using Swiss public transport, particularly with regard to timetable information. Taken together, these documents describe the VDV454 interface, as implemented by SBB.

Among other information, they describe:

- what data can be exchanged between SBB and the public transport partners
- which elements of the VDV recommendation 454 [3] and VDV-RV 454 [1] are supported by SBB
- explicit deviations from VDV-RV 454 [3]
- the format of individual data elements
- the data flows in terms of content and time
- what agreements are necessary with respect to master data
- what needs to be taken into account when operating the interface

#### 2.1.1. Swiss Federal Office of Transport (FOT) mandate (expanded SBB text)

The SBB infrastructure fulfils two mandates from the Federal Office of Transport (FOT) which ensure access to journey data without discrimination:

- Timetable collection (SLA 2017-2020) => ensured with INFO+
- Real time information (SLA 2017-2020) => ensured with CUS Central

Limits: Services related to the **periodic timetable** or **annual timetable** are displayed based on the performance agreement LV 2017 – 2020 in the INFO+ product.

The specification in the present document relates to VDV recommendation 454 [3], which (as with VDV 453) ensures the exchange of **real-time data** (LV 2017-2020) by means of the AUS data service and of the daily scheduled timetable by means of the REF-AUS data service.

While real-time data (AUS) and daily scheduled timetables (REF-AUS) are always exchanged via the VDV data services, periodic timetable data must be obtained directly from the relevant timetable systems (e.g. from the timetable collection of Swiss public transport – INFO+).

## 2.2. Requirements on the data exchange

### 2.2.1. Transmission of updated scheduling and operational data

(see VDV-RV 454)

---

## 2.2.2. Referencing the actual data

(see VDV-RV 454)

A distinction can be made between the following possible references:

- AUS service to REF-AUS service (actual/forecast/scheduled scheduled):
  - Referencing is carried out using “FahrID” (see section 5.2.2.2) in VDV454
- AUS service to periodic timetable (actual/forecast/scheduled timetable):
  - Initial situation: today the alignment in the information system is performed in accordance with the matching algorithms defined by HaCon
  - Desired outcome: RichtungsID
- REF-AUS service to periodic timetable (scheduled timetable):
  - Initial situation: today the alignment in the information system is performed in accordance with the matching algorithms defined by HaCon
  - Desired outcome: referencing and aligning the data from the VDV service REF-AUS with the periodic timetable is performed in accordance with the VDV recommendation as per the definition of the route timetables and subject to the criteria established by the data producers.

The services AUS and REF-AUS can also be used independently of one another. Referencing of the AUS data on the daily timetable (REF-AUS) or the periodic timetable is therefore not provided and necessary in every case.

### CUS as a data hub – DH:

CUS, as the central Swiss public transport data hub, does not perform any referencing between the data of the various VDV data services or the periodic timetable. This referencing must be facilitated by the data-producing transport company itself and carried out by the data retriever (display system, timetable information system, etc.):

- In this regard, the data-producing transport companies are responsible for the quality of the data provided and must ensure that the journeys of the various VDV data services can be referenced to each other by means of “FahrID” (see section 5.2.2.2)
- The matching criteria required for all referencing to the periodic timetable (e.g. INFO+ for Swiss public transport) must be specified by the data-producing transport companies. These make sure that the information on journey referencing corresponds to the information on unique journey identification in the periodic timetable in terms of content

### CUS as a railway data producer – RDP:

- is responsible for the quality of the railway data supplied and ensures that the journeys of the various VDV data services can be referenced to one another using “FahrID” (see section 5.2.2.2)
- publishes the alignment criteria for Swiss public railway transport needed for any referencing or alignment of the data from the VDV services to the periodic timetable (e.g. INFO+ for Swiss public transport), and ensures that the information for journey referencing from the VDV services corresponds to the information on unique journey identification in the periodic timetable in terms of content

---

### 2.2.3. Supplying the planning data

(See VDV-RV 454)

The data relating to periodic or annual timetables within the Swiss public transport network are collected centrally in the INFO+ timetable database and are available to interested recipients in proprietary HAFAS raw data format<sup>3</sup>.

The VDV454 service AUS is supported by CUS on both sides (CUS as client or server). This ensures that intraday planning and real-time data relating to the journeys of the Swiss public transport companies is integrated into the central customer information platform of the Swiss public transport network and can therefore be accessed from there by interested recipients. The provision of planning data begins for the first time once the preview time has been reached in the context of the initial message.

If data recipients also require timetable data which goes beyond the preview time or validity window of the REF-AUS service, this can be obtained via the up-to-date periodic timetable from INFO+.

SBB will assume in this case that the partner has access to the relevant data from the periodic timetable and that it is therefore possible to map the operational data received onto the periodic timetable.

**The relevant data recipient is responsible for ensuring that he/she has the valid data platform as a reference.**

Regarding referencing between the VDV services AUS and REF-AUS to the periodic timetable, see also section 2.2.2.

#### 2.2.3.1. Special case: values deviating from the periodic timetable (expanded SBB text)

Due to technical and organisational circumstances within the system landscape of the Swiss public transport network relating to the processing of timetable, planning and real-time data, the planning data obtained from INFO+ (periodic timetable) is not always guaranteed to correspond in all fields to the planning and real-time data retrieved from the VDV454 interface.

##### CUS as a railway data producer – RDP:

Trains used for **cross-border rail transport** may be represented differently (e.g. division into foreign and domestic, incl. separate train numbers) in the INFO+ and CUS systems. In some cases, the TC code, MoT type and even the train number can differ for trains that are actually the same:

- In the case of international transport, the sections within Switzerland are retrieved from the NeTS planning system and those outside of Switzerland are obtained from EVAplus. These sections are then connected in CUS as a long, continuous train. The train bears the attributes of the Swiss train (normally TC code “11”)
- In the case of transport crossing into France (Geneva/Bellegarde), only the section from Switzerland to the first change of the train number will be relayed

---

<sup>3</sup> Due to its high degree of proliferation, the HAFAS raw data format is considered the unofficial “quasi-standard” for exchange timetable data in the Swiss public transport network.



- 
- When manually recording MoT trains in INFO+, the MoT journeys are assigned a virtual TC code which is set correctly when imported into CUS

#### **2.2.4. Definition of values to be used uniformly**

(See VDV-RV 454)

---

## **3. Introduction and basic terms**

### **3.1. Structure of the interface**

(See VDV-RV 454)

### **3.2. AUS timetable information data service**

(See VDV-RV 454)

#### **3.2.1. Overview**

(See VDV-RV 454)

#### **3.2.2. REF-AUS and AUS technical services**

(See VDV-RV 454)

#### **3.2.3. REF-AUS functional scope**

(See VDV-RV 454)

#### **3.2.4. AUS functional scope**

(See VDV-RV 454)

#### **3.2.5. Demarcation to technical service DFI**

(See VDV-RV 454)

#### **3.2.6. Data exchange with REF-AUS (VDV-RV 454 expansion)**

(See VDV-RV 454)

##### **3.2.6.1. Daily timetable**

(See VDV-RV 454)

##### **3.2.6.2. Transmission sequence for REF-AUS and AUS**

(See VDV-RV 454)

##### **3.2.6.3. Organisational agreement in CUS for the transmission of REF-AUS data**

(See VDV-RV 454)

VDV-RV 454 already explains how and when REF-AUS data is received in the data hub.

CUS as a railway data producer makes its REF-AUS data for the day of operation available on CUS from 22:00 hours the day before. In the case of local services, it is by no later than 04:30 on the day of operation.

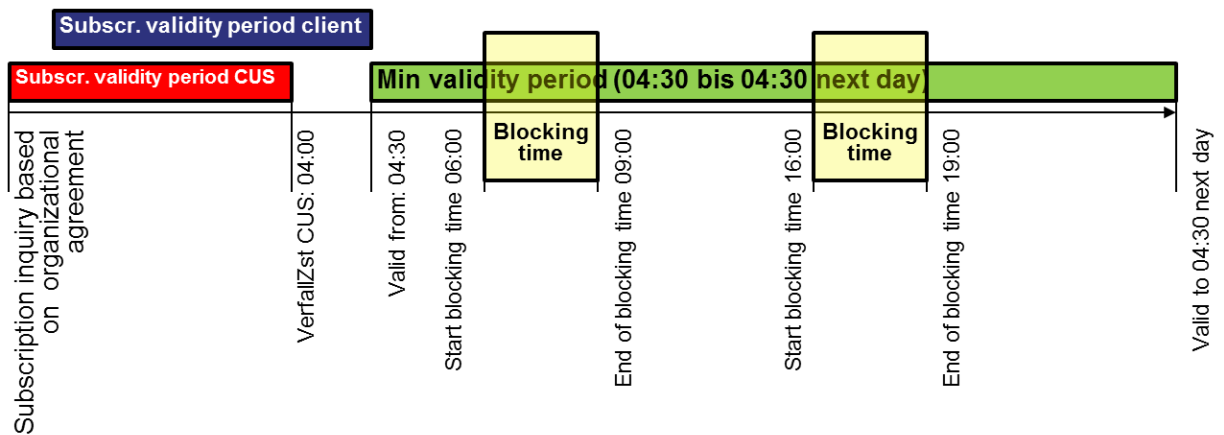
## **SBB AG**

It is recommended that the individual operators' data should be obtained within the time window 04:00–04:30. The expiry time (VerfallZst) for the REF-AUS subscription should be set to no later than 06:00 in order to ensure that no active subscriptions remain set up during the day. (also see chapter 3.2.6.4 for information about CUS blocking times).

### 3.2.6.4. CUS blocking times (expanded SBB text).

Blocking time in CUS:

- Due to potential overloading of the system, a blocking time may be set during times of peak traffic (the following values are currently configured: 06:00 to 09:00 and 16:00 to 19:00).
- During the blocking time, no subscriptions are accepted, and no messages must be delivered either.
- For logical reasons, the recipient sets no new subscription during the blocking time and concludes the subscriptions no later than the start of the blocking time.
- During the blocking time, the back-up level for the REF-AUS is the AUS service and the periodic timetable (from INFO+).



### 3.3. Metadata, representation of the stops and routes

Separate sections have been dedicated to the individual list items from the VDV454 recommendation [3] [2] for purposes of clarity and inclusion in the table of contents <sup>4</sup>.

#### 3.3.1. HaltID (stop position) (expanded VDV-RV 454 text)

(See new definition in VDV-RV 454)

#### CUS as a railway data producer – RDP:

For railway travel, the optional “Haltepositions-Code” (stop position code) is not used:

#### Example for trains:

UIC-country code Switzerland: **85**

UIC-Code Zurich main station: **3000**

<sup>4</sup> In order to preserve format, these are marked up with the note “expanded SBB text”.

---

⇒ <HaltID> "8503000"

### 3.3.2. Route and direction references (expanded SBB text)

(See VDV-RV 454)

#### CUS as a data hub – DH (server):

- The elements <LinienID>, <LinienText> and <RichtungsID> are relayed to the data retrievers as they are provided by the data suppliers in CUS
- The element <LinienID> is assigned a value in the following format in Swiss public transport (not including railway transport): [UIC country code]:[BO number as per the DiDok list[5]][:technical route reference]. BO number as per the DiDok list[5] must be the same as in <BetreiberID>. The LinienID (route ID) is validated by CUS

#### CUS as a railway data producer – RDP (Client):

- The element <RichtungsID> is filled with the value "H" or "R" (see 3.3.1). contrary to the realization specification for paths. The direction ID does not match INFO+ until CUS 5.12.
- The element <LinienID> is assigned the MoT journey number ("train number") for rail travel.
- The "LinienText" must always be transmitted for additional journeys, since in this case the value cannot be obtained from Info+. The "LinienText" can be delivered with or without "VM-Art". The line S18 can be delivered as:
  - o VerkehrsmittelText=S
  - o LinienText=18or
  - o Verkehrsmitteltext=S
  - o LinienText=S18

Remarks: The "LinienText" will always be delivered from CUS to partners as S18.

Remarks for CUS: The "LinienText" must only be delivered to CUS if it is an additional train otherwise it will be obtained from Info+.

#### CUS as a railway data producer – RDP (Server):

- The element <LinienID> (route ID) is assigned the MoT journey number ("train number") for rail travel. The value for the VDV element <LinienText> is relevant to the customer and created in CUS based on the technical values **MoT type** and **route number**.

MoT type (VerkehrsmittelText)	Route number	Text für line (LinienText)
S		S
S	1	S1
IC		IC
ICE		ICE

Table 1: Examples from the route table

The LinienID (route ID) is validated by CUS.

### 3.3.3. ProduktID (expanded SBB text)

The element <ProduktID> specifies the relevant product class (MoT type):

## SBB AG

---

→ “Bus”, “Schiff”, «Tram“, “Zug”, etc.

Note: The <ProductID> must match the “VM-Gattung” of INFO +. INFO + does not know a “Tram”, nevertheless a “Tram” can be delivered with a <ProductID> = “Tram”.

See also section 10.9.

### 3.3.4. VerkehrsmittelText (expanded SBB text)

The mode of transport type (MoT type) is relayed via <VerkehrsmittelText>:

→ “ICE”, “RE”, “R”, “NFB”, “S”, “FUN”, “LB”, etc.

The “VerkehrsmittelText” (mode of transport text) is validated by CUS.

See also section 10.10.

### CUS as a railway data producer – RDP (Client/Server):

If a company provides railway data via VDV454 in CUS, the MoT type **must** be specified in the element “VerkehrsmittelText”.

## 3.4. Estimate of data volumes

### 3.4.1. General estimate of data volumes<sup>5</sup>

(See VDV-RV 454)

### 3.4.2. Estimate of data volumes for train composition data

(See VDV-RV 454)

## 3.5. Estimate of data currency

(See VDV-RV 454)

The hysteresis should always be set to the value of 30 seconds for the Swiss public transport network. This is managed in this way in VDV454 and VDV453 for logical reasons.

### CUS as a Swiss public transport data hub – DH:

- Messages providing new data are not sent immediately, but at configurable intervals. The reasons for this include preventing overloading of SBB's internal systems and partner systems. The transmission intervals are in the two-digit second range (currently 20 seconds)

### CUS as a railway data producer – RDP (server):

- Because of internal processing mechanisms and latency due to electronic data transmission, the transmitted data is subject to a certain delay.
- Messages relating to new forecasts are subject to a fixed hysteresis of 30 seconds which acts as a buffer for minor variations in journey times
- Messages providing new data are not sent immediately, but at configurable intervals. The reasons for this include preventing overloading of SBB's internal systems and partner

---

<sup>5</sup> Estimation is no longer up to date and should be estimated on the final completion of NAV real-time data.

---

systems. The transmission intervals are in the two-digit second range (currently 20 seconds)

### **3.6. Time formatting**

(See VDV-RV 454)

---

## 4. 'Basic infrastructure' interface description

### 4.1. Preliminary remarks

(See VDV-RV 454)

### 4.2. Subscription procedure

(See VDV-RV 454)

#### 4.2.1. Division of large data packets (expanded VDV-RV 454 text)

(See VDV-RV 454)

Data packets that are associated with each other must be transmitted promptly.<sup>6</sup>

A route timetable must be transmitted in a data packet. It is therefore not possible to consult scheduled journeys of a route timetable (via "WeitereDaten = true").

#### CUS as a server:

The maximum number of "IstFahrten" (actual journeys) contained in a data packet is defined in the master data. For this purpose, there is a global threshold value (100 "IstFahrten" are currently defined in CUS) which applies generally for all data recipients (Note: A timetable always has to be transmitted in one package, even if the max. Number is exceeded). In addition, one deviating value can be stored per partner.

### 4.3. Protocols

(See VDV-RV 454)

### 4.4. Service detection/query URL

The query URL of partners must be adjusted to the requirements of the SBB system landscape. As the interface is located within a shared platform, it is necessary to state the application responsible for the query within the address.

A full address for a VDV service in CUS is therefore structured as follows:

```
http://<host>[:<port>]/<applikationspfad>/<leitstellenkennung>/  
    <dienstkennung>/<anfragekennung>
```

The current application path is: **kihub/kivdv**

Beispiel: `http://192.168.0.1/kihub/kivdv/xyz_prod/aus/status.xml`

Note: Because the address of the application can change in the event of changes within the system environment, all VDV partners are advised to keep the address of the VDV queries in a configurable format.

---

<sup>6</sup> This is yet to be added to VDV-RV 454 v1.1

---

#### 4.4.1. Control centre identifier

(see also VDV-RV 453)

SBB supports the four platforms defined in VDV-RV 453.

##### [SBB as client](#)

This results in the source identifiers shown below for the SBB platforms:

Platform	Source identifier
Development	sbb_entw
Testing	sbb_test
Integration	sbb_int
Production	sbb_prod

**Table 2: The SBB source identifiers**

##### [SBB as server](#)

The example below shows the partner source identifiers for the four possible platforms of the Zurich Transport Network (ZVV) partner. The source identifiers for other partners are formed in the same way.

The source identifiers for the (possible) ZVV platforms are shown below:

Platform	Source identifier
Development	zvv_entw
Testing	zvv_test
Integration	zvv_int
Production	zvv_prod

**Table 3: Source identifiers of partner platforms (Zurich Transport Network)**

#### 4.5. Reused data types

(See VDV-RV 454)

#### 4.6. Utilization of optional fields

(See VDV-RV 454)



---

## 5. Technical services

### 5.1. REF-AUS planning data service

(See new definition in VDV-RV 454)

#### 5.1.1. Timetable data request (AboAusRef)

(See new definition in VDV-RV 454)

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
LinienFilter <sup>7</sup>	As per VDV-RV 454	optional
BetreiberFilter	As per VDV-RV 454  The BetreiberFilter is mandatory for all CUS partners (inbound and outbound).	mandatory; exceptions are possible by agreement
ProduktFilter	As per VDV-RV 454	n/a
VerkehrsmittelTextFilter	As per VDV-RV 454	n/a
HaltFilter	As per VDV-RV 454	n/a
UmlaufFilter	Not supported.	[n/a]
MitGesAnschluss	Not supported.	[n/a]
MitBereitsAktivenFahrten	Not supported.	[n/a]
MitFormation <sup>8</sup>	Subscribe to journeys with or without train composition data: true: transmission with train composition data (where available). false: Or not specified: transmission without train composition data.	optional

**Table 4: Structure of <AboAUSRef>**

More information regarding combined filters is defined in VDV-RV 454 [1] and the VDV454 recommendation [3].

Wildcards are not permitted in CUS.

#### Note:

The partner should only make subscriptions when they are sure that the data is also available (subscription definition). See also section 2.2.3.

#### [CUS as a data retriever \(client\)](#)

CUS does not set any subscriptions with compositions.

#### 5.1.1.1. Data restriction by time (window)

(See VDV-RV 454)

---

<sup>7</sup> Subscribing to individual mode of transport numbers in rail transport is not permitted.

<sup>8</sup> Compositions are only supported by CUS for outbound.

---

### 5.1.1.2. Data restriction by route (LinienFilter)

(See VDV-RV 454)

#### Note:

Subscribing to individual mode of transport numbers in rail transport is not permitted

### 5.1.1.3. Data restriction by operator (BetreiberFilter)

(See VDV-RV 454)

Suggested by SBB:

Filtering is performed using the "BetreiberID" (operator ID). The "BetreiberID" is assigned with the country code + ':' + the TC code (BO no.) from DiDok[5], in a similar way to the values in INFO+. The effective values without leading zeros are used.

### 5.1.1.4. Restrictions by product (ProduktFilter)

n/a

### 5.1.1.5. VerkehrsmittelTextFilter (MoT text filter)

n/a

### 5.1.1.6. HaltFilter (stop filter)

n/a

## 5.1.2. Transmitting data (AUSNachricht)

The <AUSNachricht> is a container for both scheduled timetable data and real-time data transmission. Depending on the intended purpose, either the sub-element <Linienfahrplan> or <IstFahrt> is assigned a value. All other elements except for the attribute <AbolID> are insignificant.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
SollUmlauf	Not supported.	[n/a]
IstUmlauf	Not supported.	[n/a]
GesAnschluss	Not supported.	[n/a]
FahrtVerband	Not supported.	[n/a]

**Table 5: Structure of <AUSNachricht>**

### 5.1.3. Route-based timetable data transmission (Linienfahrplan)

Individual elements from the <Linienfahrplan> (route timetable) can be overridden by specifying on level <SollFahrt> (scheduled journeys).

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
LinienID	As per VDV-RV 454 The "LinienID" (route ID) is validated by CUS.  <a href="#">CUS as a railway data producer – RDP (Client):</a> CUS does not need the line ID in the railway format for the delivery of railway data, the train number is taken from the journey identifier.	mandatory
BetreiberID	As per VDV-RV 454  The "BetreiberID" element is relevant in relation to the subscription and filtering of data by the data retrievers (Abo-Filter; see 5.1.1.3)	mandatory
RichtungsID	(See 3.3)  <a href="#">CUS as a railway data producer – RDP (Client):</a> CUS does not need the "RichtungsID" in the railway format for the delivery of railway data.	mandatory
ProduktID	(See 3.3)	optional
LinienText	(See 3.3)  Suburban traffic: The line text is often used by information systems to match the journeys to the period schedule.  <a href="#">CUS as a railway data producer – RDP (Client):</a> If a company delivers railway data in CUV via VDV454, the <LinienText> is compulsory. CUS determines the <LinienText> from INFO +, but this is only possible for trains if the train has already been made available in INFO +, but not for additional journeys.	Optional / mandatory
RichtungsText	As per VDV-RV 454 (See also section 6.1.17)	optional
VonRichtungsText	As per VDV-RV 454 (See also section 6.1.17)	optional
VerkehrsmittelText	(See 3.3) The "VerkehrsmittelText" (mode of transport text) is validated by CUS.  <a href="#">CUS as a railway data producer – RDP (Client):</a> If a company delivers railway data in CUV via VDV454, the VM Gattung must be delivered in the element <VerkehrsmittelText>.	optional

**Table 6: Structure of <Linienfahrplan>**

### 5.1.3.1. Single journey data (SollFahrt)

The <SollFahrt> (scheduled journey) element represents a single journey. Individual journeys can be collected inside the surrounding <Linienfahrplan> (route timetable) into a logical unit as a route.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
SollHalt	In case of a change to a scheduled arrival or scheduled departure time in "AUS", it is expected that the partner will provide a complete journey. Otherwise, the corresponding actual stop cannot be found for an update. The update is performed using HaltID (stop ID) and scheduled departure or arrival times.  (See 5.1.3.3)	optional
LinienText	(See 3.3)  Suburban traffic: The line text is often used by information systems to match the journeys to the period schedule.  <a href="#">CUS as a railway data producer – RDP (Client):</a> If a company delivers railway data in CUV via VDV454, the <LinienText> is compulsory. CUS determines the <LinienText> from INFO +, but this is only possible for trains if the train has already been made available in INFO +, but not for additional journeys.	Optional / mandatory
ProduktID	(See 3.3.3)	optional
RichtungsText	As per VDV-RV 454  <a href="#">CUS as RDP (railway production):</a> Final stop of the journey as text, e.g. "Zurich Central" (See also section 6.1.17)	optional
VonRichtungsText	As per VDV-RV 454  <a href="#">CUS as RDP (railway production):</a> Initial stop of the journey as text, e.g. "Zurich Central" (See also section 6.1.17)	optional
HinweisText	As per VDV-RV 454  <a href="#">CUS as a railway data producer – RDP (Server):</a> CUS as a railway data producer delivers no <HinweisText>.	optional

Element	Comments	Field
VerkehrsmittelText	(See chapter 3.3 und 10.10) The "VerkehrsmittelText" (mode of transport text) is validated by CUS.  <a href="#">CUS as a railway data producer – RDP (Client):</a> If a company delivers railway data in CUV via VDV454, the VM Gattung must be delivered in the element <VerkehrsmittelText>.	optional
FahrradMitnahme	As per VDV-RV 454  <a href="#">CUS as a railway data producer – RDP (Server):</a> CUS as a data producer railway does not provide any <FahrradMitnahme>  Instead, the <FahrradMitnahme> must be determined by the customer by evaluating the <FoFahrzeugAusstattungsCode>. Changes by comparing the current transmission with the period schedule.	optional
FahrzeugTypID	As per VDV-RV 454  <a href="#">CUS as a railway data producer – RDP (Server):</a> CUS as a data producer railway does not provide any <FahrzeugTypID >  The exact compositions of the trains with the individual vehicle types (sequence of <FoFahrzeugTyp>) and certain deviations of the scheduled and actual compositions of the trains (<FoAenderungsCode >) must be taken from the compositions of the trains.	optional
SollFormation <sup>9</sup>	(See 5.1.3.4)	optional

**Table 7: Structure of <SollFahrt>**

### 5.1.3.2. Information on the service of the journey (ServiceAttribut)

(See VDV-RV 454)

### 5.1.3.3. Information on the stop (SollHalt)

Specifying all commercial stopping points of an MoT journey is mandatory. They are specified as a list of <SollHalt> elements which are sorted in ascending order in the effective order of operating points travelled.

The following table contains only changes to VDV-RV 454:

<sup>9</sup> The structure of the compositions can be found in section.

Element	Comments	Field
AbfahrtssteigText	Platform and, for “double deployments” (two MoT journeys on the same boarding area), if available, the sector, e.g.:7 A (omitted for the terminus)	optional
AnkunftssteigText	Corresponding to AbfahrtssteigText (omitted for the first stop)	optional
Einsteigverbot	As per VDV-RV 454 <a href="#">CUS as a railway data producer – RDP:</a> Service stops at which the elements “Einsteigverbot” (boarding not allowed) and “Aussteigverbot” (alighting not allowed) are assigned the value “true” are not transmitted in REF_AUS. <sup>10</sup>	optional
Aussteigverbot	As per VDV-RV 454 <a href="#">CUS as a railway data producer – RDP:</a> Service stops at which the elements “Einsteigverbot” (boarding not allowed) and “Aussteigverbot” (alighting not allowed) are assigned the value “true” are not transmitted in REF_AUS. <sup>10</sup>	optional
Durchfahrt	“true” for unscheduled non-stopping passes. Otherwise, non-stopping passes are not transmitted <sup>10</sup> .	optional
SollAnschluss	As per VDV-RV 454	n/a

**Table 8: Structure of <SollHalt>**

If the elements “Einsteigverbot” (boarding not allowed), “Aussteigverbot” (alighting not allowed) and “Durchfahrt” (non-stopping pass) are not specified, CUS assumes a normal stop (stop code H).

[CUS as a railway data producer – RDP:](#)

Service stops at which the elements “Einsteigverbot” (boarding not allowed) and “Aussteigverbot” (alighting not allowed) are assigned the value “true” are not transmitted in REF\_AUS.

**5.1.3.4. Information on the composition of the scheduled journey (SollFormation)**

The compositions of the trains (for which composition data is available), which are planned specific to the day, are transmitted to the partners by the structure <SollFormation> (scheduled composition) at the start of the operating day.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFremdFahrzeuge	Not supported.	[n/a]
FoFahrzeugGruppen FahrtAbschnitte	Journey segments in which the rolling stock groups run unchanged. CUS always transmits this information (if available). (See 5.2.2.4.4)	optional
FoFahrzeugAusstattu ngFahrtAbschnitte	Not supported.	[n/a]
FoFahrzeugZustandF ahrtAbschnitte	Not supported.	[n/a]

---

Element	Comments	Field
FoFahrzeugBelegung FahrtAbschnitte	Not supported.	[n/a]

**Table 9: Structure of <SollFormation>**

**5.1.3.5. Planned connections (SollAnschluss)**

n/a

**5.1.4. Traffic-related journey data transmission (SollUmlauf)**

n/a

---

## 5.2. AUS actual data service

(See VDV-RV 454)

### 5.2.1. Actual data query (AboAUS)

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
LinienFilter <sup>11</sup>	As per VDV-RV 454	optional
BetreiberFilter	As per VDV-RV 454, see also section 5.1.1.3  The BetreiberFilter is mandatory for all CUS partners (inbound and outbound).	mandatory; exceptions are possible by agreement
HaltFilter	As per VDV-RV 454	n/a
UmlaufFilter	Not supported.	[n/a]
Hysteresese	As per VDV-RV 454 Hysteresis is fixed at 30 seconds <sup>12</sup> .	mandatory
MitGesAnschluss	Not supported.	[n/a]
MitRealZeiten	As per VDV-RV 454  <a href="#">CUS as a client</a> CUS as a client always sets subscriptions and delivers data with "MitRealZeiten=true".	optional
MitFormation <sup>13</sup>	Subscribe to journeys with or without train composition data: <ul style="list-style-type: none"><li>• true: transmission with train composition data (where available).</li><li>• false or not specified: transmission without train composition data.</li></ul>	optional

Table 10: Structure of <AboAUS>

See also sections 2.2.2 and 2.2.3.

### 5.2.2. Transmitting actual data

(See VDV-RV 454)

#### Note:

If the element <DatensatzAlle> is assigned the value of true during a <DatenAbrufenAnfrage>, all journeys relevant and active at the time are transmitted as a complete journey.

#### 5.2.2.1. Actual data for a journey (IstFahrt)

The following table contains only changes to VDV-RV 454:



Element	Comments	Field
LinienID	<p>As per VDV-RV 454</p> <p>“Technical route reference”: Technical number for identifying the route. Can deviate from the route reference relevant to publication in the element “LinienText” (route text).</p> <p><a href="#">CUS as a railway data producer – RDP:</a> CUS does not need the “LinienID” in the railway format for the delivery of railway data, the train number is taken from the journey identifier.</p>	mandatory
RichtungsID	<p>(siehe 3.3)</p> <p><a href="#">CUS as a railway data producer – RDP:</a> CUS does not need the “RichtungsID” in the railway format for the delivery of railway data.</p>	mandatory
Komplettfahrt	<p>As per VDV-RV 454</p> <p><a href="#">CUS as a railway data producer – RDP:</a> Initial messages (regular and additional journeys), changes to the route (partial cancellations, extensions, diversions) and complete cancellations are always reported by SBB as a complete journey.</p> <p>In the case of a complete cancellation, the complete journey, including all cancelled actual stops, is transmitted. (See section 6.1.6).</p> <p>In the case of a complete journey, it is expected that the scheduled and actual stops are already provided to the data suppliers in the correct order in which they run.</p>	mandatory
IstFormation	<p><a href="#">CUS as a client:</a> Provision of compositions in CUS via VDV454 is not supported.</p> <p><a href="#">CUS as a server:</a> CUS supports the provision of compositions in rail transport (in the case of corresponding subscription by the data retriever). (See 5.2.2.4)</p>	optional

Element	Comments	Field
LinienText	<p>(See 3.3)</p> <p>Suburban traffic: The line text is often used by information systems to match the journeys to the period schedule.</p> <p><a href="#">CUS as a railway data producer – RDP (Client):</a> If a company delivers railway data in CUV via VDV454, the &lt;LinienText&gt; is compulsory. CUS determines the &lt;LinienText&gt; from INFO +, but this is only possible for trains if the train has already been made available in INFO +, but not for additional journeys.</p>	Optional / mandatory
RichtungsText	<p>As per VDV-RV 454</p> <p><a href="#">CUS as RDP (railway production):</a> Terminus of the journey relevant to the customer as text, e.g. “Zurich Central” (See also section 6.1.17)</p>	optional
VonRichtungsText	<p>As per VDV-RV 454</p> <p><a href="#">CUS as RDP (railway production):</a> First stop of the journey relevant to the customer as text, e.g. “Zurich Central” (See also section 6.1.17)</p>	optional
HinweisText	<p>As per VDV-RV 454</p> <p><a href="#">CUS as a railway data producer – RDP (Server):</a> CUS as a railway data producer delivers no &lt;HinweisText&gt;.</p>	optional
VerkehrsmittelText	<p>(See chapter 3.3 und 10.10)</p> <p>The “VerkehrsmittelText” (mode of transport text) is validated by CUS.</p> <p><a href="#">CUS as a railway data producer – RDP (Client):</a> If a company delivers railway data in CUV via VDV454, the VM Gattung must be delivered in the element &lt;VerkehrsmittelText&gt;.</p>	optional

Element	Comments	Field
FahrradMitnahme	<p>As per VDV-RV 454</p> <p><a href="#">CUS as a railway data producer – RDP (Server):</a>  CUS as a data producer railway does not provide any &lt;FahrradMitnahme&gt;</p> <p>Instead, the &lt;FahrradMitnahme&gt; must be determined by the customer by evaluating the &lt;FoFahrzeugAusstattungsCode&gt;. Changes by comparing the current transmission with the period schedule.</p>	optional
FahrzeugTypID	<p>As per VDV-RV 454</p> <p><a href="#">CUS as a railway data producer – RDP (Server):</a>  CUS as a data producer railway does not provide any &lt; FahrzeugTypID &gt;</p> <p>The exact compositions of the trains with the individual vehicle types (sequence of &lt;FoFahrzeugTyp&gt;) and certain deviations of the scheduled and actual compositions of the trains (&lt;FoAenderungsCode &gt;) must be taken from the compositions of the trains.</p>	optional
StoerungsInfo	As per VDV-RV 454	n/a

**Table 11: Structure of <IstFahrt>**

### 5.2.2.2. Referencing the journey data (FahrtRef)

(See VDV-RV 454)

#### 5.2.2.2.1. Alternative referencing information (FahrtStartEnde)

(See VDV-RV 454)

### 5.2.2.3. Information about the stop (IstHalt)

(See VDV-RV 454)

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
IstAbfahrtPrognoseStatus	<p>As per VDV-RV 454</p> <p>CUS as a railway data producer – RDP (Client): Information is obligatory for the submission of data for railway production. CUS requires the information directly at the departure to correctly determine and publish the connections.</p> <p>Note: CUS transmits real times for lanes with normal track only when the exit signal is reached.</p>	<p><b>General:</b> optional</p> <p><b>Real time:</b> <b>local traffic:</b> optional</p> <p><b>Rail:</b> <b>mandatory;</b> exceptions are possible by agreement</p>
IstAnkunftPrognoseStatus	<p>As per VDV-RV 454</p> <p><a href="#">CUS as a railway data producer – RDP (Client):</a> Information is obligatory for the submission of data for railway production. CUS requires the information directly at the departure to correctly determine and publish the connections.</p> <p>Note: CUS transmits real times for lanes with normal track only when the exit signal is reached.</p>	<p><b>General:</b> optional</p> <p><b>Real time:</b> <b>local traffic:</b> optional</p> <p><b>Rail:</b> <b>mandatory;</b> exceptions are possible by agreement</p>
IstAbfahrtPrognoseQualitaet	<p>As per VDV-RV 454</p> <p><a href="#">“CUS as a railway data producer – RDP (client / server)”</a>: Not supported in rail traffic.</p>	optional
IstAnkunftPrognoseQualitaet	<p>As per VDV-RV 454</p> <p><a href="#">“CUS as a railway data producer – RDP (client / server)”</a>: Not supported in rail traffic.</p>	optional
IstAbfahrtDisposition	<p>As per VDV-RV 454</p> <p><a href="#">“CUS as a railway data producer – RDP (client / server)”</a>: Not supported in rail traffic.</p>	optional

Element	Comments	Field
IstAnkunftDisposition	As per VDV-RV 454  <a href="#">“CUS as a railway data producer – RDP (client / server)”</a> : Not supported in rail traffic.	optional
PrognoseUngenau	As per VDV-RV 454 (see 6.1.9)	optional
AbfahrtssteigText	As per VDV-RV 454 Specification of boarding area (e.g. platform) and, if available, the sector, e.g. 7 A (e.g. for “double deployments” – two MoT journeys on the same boarding area), as per VDV-RV 454	optional
AnkunftssteigText	Corresponding to AbfahrtssteigText	optional
Einsteigeverbot:	As per VDV-RV 454 <a href="#">CUS as a railway data producer – RDP</a> : In the case of unscheduled service stops, the elements “Einsteigeverbot” (boarding not allowed) and “Aussteigeverbot” (alighting not allowed) are set to “true” (as long as an “IstHalt” – actual stop – was previously transmitted by CUS). Otherwise, service stops are not transmitted.	optional
Aussteigeverbot:	As per VDV-RV 454 <a href="#">CUS as a railway data producer – RDP</a> : In the case of unscheduled service stops, the elements “Einsteigeverbot” (boarding not allowed) and “Aussteigeverbot” (alighting not allowed) are set to “true” (as long as an “IstHalt” – actual stop – was previously transmitted by CUS). Otherwise, service stops are not transmitted.	optional
Durchfahrt	As per VDV-RV 454 <a href="#">CUS as a railway data producer – RDP</a> : “true” in the case of unscheduled non-stopping pass (as long as an “IstHalt” – actual stop – was previously transmitted by CUS). Otherwise, non-stopping passes are not transmitted.	optional
RichtungsText	As per VDV-RV 454 (See also section 6.1.17)	optional
VonRichtungsText	As per VDV-RV 454 (See also section 6.1.17)	optional
StoerungsInfo	As per VDV-RV 454	n/a

**Table 12: Structure of <IstHalt>**

#### 5.2.2.4. Train composition of the IstFahrt (IstFormation)

##### [CUS as a client:](#)

Provision of compositions in CUS via VDV454 (CUS as a client) is not supported.

##### [CUS as a railway data producer – RDP \(server\):](#)

The element <MitFormation> must be set to “true” when setting up the subscription for the transmission of composition information in the actual journeys (see 5.2.1).

An initial message will always be sent as a complete journey for all journeys for which composition information is transmitted. Train composition modifications over the initial message are also sent as a complete journey. Transmitted compositions retain their validity until the next transmission of a complete journey with compositions.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFahrzeuge	All rolling stock running in the actual journey. (See 0)	mandatory
FoFremdFahrzeuge	Not supported.	[n/a]
FoFahrzeugGruppen	All FahrzeugGruppen (rolling stock in ordered sequence) within the actual journey. CUS always transmits this information (if available). (See 5.2.2.4.3)	optional
FoFahrzeugGruppen FahrtAbschnitte	Journey segments in which the rolling stock groups run unchanged. CUS always transmits this information (if available). (See 5.2.2.4.4)	optional
FoFahrzeugAusstattung FahrtAbschnitte	Not supported.	[n/a]
FoFahrzeugZustand FahrtAbschnitte	Journey segments created for the actual journey because of the statuses of the individual rolling stock. (See 5.2.2.4.6)	[n/a]
FoFahrzeugBelegung FahrtAbschnitte	Not supported.	[n/a]
FoHalte	Stop information relevant to the train composition, for arrival at/departure from a stop (stop positions for the individual rolling stock). CUS always transmits this information (if available). (See 5.2.2.4.8)	optional

**Table 13: Structure of <IstFormation>**

CUS as a data hub does not support the provision of composition data.

#### 5.2.2.4.1. Rolling stock in the train composition (FoFahrzeuge)

The element <FoFahrzeuge> (rolling stock in composition) contains many sub-elements of type <FoFahrzeug>. A <FoFahrzeug> element contains the description of one of the rolling stock involved in the journey. As a whole, they describe all the rolling stock relevant to the journey (other rolling stock **cannot** be in the composition). Until further notice, potential <FoFremdfahrzeuge> (third-party rolling stock in composition) affecting the journey are specified in the set of <FoFahrzeuge> elements.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFahrzeugTyp	Rolling stock must have a rolling stock type which identifies its characteristics The permissible rolling stock types are defined by the values list in section 10.1.	mandatory

Element	Comments	Field
FoFahrzeugNummer	Not supported.	[n/a]
FoFahrzeugAusstattung	Transmitted by CUS as long as the necessary information is made available by the source systems providing the data. (See 5.2.2.4.1.1)	optional
FoTechnischeAttribute	Not supported.	[n/a]

**Table 14: Structure of <FoFahrzeug>**

#### 5.2.2.4.1.1. Equipment of rolling stock (FoFahrzeugAusstattungen)

The element <FoFahrzeugAusstattungen> (equipment of rolling stock in composition) contains many <FoFahrzeugAusstattung> elements. A <FoFahrzeugAusstattung> element contains the definition of a specific item of equipment of the referenced rolling stock.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFahrzeugAusstattungCode	An enum for defining the equipment (See 10.2)	mandatory
FoBezeichnung	Not supported.	[n/a]
FoSprachcode	Not supported.	[n/a]
FoAnzahl	Not supported.	[n/a]

**Table 15: Structure of <FoFahrzeugAusstattung>**

#### 5.2.2.4.1.2. Technical attributes of rolling stock (FoTechnischeAttribute)

n/a

#### 5.2.2.4.2. Third-party rolling stock in the train composition (FoFremdFahrzeuge)

Third-party rolling stock is not sent as <FoFremdFahrzeuge> (third-party rolling stock in the composition) but rather as <FoFahrzeuge> (rolling stock in the composition). Third-party rolling stock is thus treated the same way as rolling stock belonging to the journey.

#### 5.2.2.4.3. Rolling stock groups in the train composition (FoFahrzeugGruppen)

The element <FoFahrzeugGruppen> (rolling stock groups in the composition) contains many <FoFahrzeugGruppe> (rolling stock group in the composition) elements. A <FoFahrzeugGruppe> element contains the description of a rolling stock group in the journey (see VDV454 recommendation [3]). The entire set defines all the rolling stock groups arising for the complete journey.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFahrzeugPositionen	Position of the individual rolling stock within the rolling stock group (see 5.2.2.4.3.1).	mandatory
FoVerkehrlicheNummer	Not supported.	[n/a]

Element	Comments	Field
FoFahrzeugGruppenZielText	A target text can be specified for a rolling stock group. The target text applies to all sections of the journey on which the rolling stock group runs.  CUS as a railway data producer – RDP (server):  CUS provides the official designation of the relevant rolling stock destination as per DiDok	optional
FoFahrzeugGruppenStartText	Not supported.	[n/a]

**Table 16: Structure of <FoFahrzeugGruppe>**

#### 5.2.2.4.3.1. Rolling stock with position in the rolling stock group (FoFahrzeugPositionen)

The element <FoFahrzeugPositionen> (rolling stock positions in composition) contains many <FoFahrzeugPosition> (rolling stock position in composition) elements. A <FoFahrzeugPosition> element uniquely defines the position of particular rolling stock within the relevant rolling stock group.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoPosition	Unique position within the rolling stock group as a positive integer.	mandatory
FoOrientierung	Not supported.	[n/a]

**Table 17: Structure of <FoFahrzeugPosition>**

#### 5.2.2.4.4. Journey segments for rolling stock groups (FoFahrzeugGruppenFahrtAbschnitte)

The element <FoFahrzeugGruppenFahrtAbschnitte> (journey segments for rolling stock groups in composition) contains many <FoFahrzeugGruppenFahrtAbschnitt> (journey segment for rolling stock groups in composition). A <FoFahrzeugGruppenFahrtAbschnitt> describes the route on which the specified rolling stock groups remain unaltered. The segments need to be redefined in the event of changes within rolling stock groups.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoAbschnitt	Segment along which the rolling stock groups concerned remain unchanged. (See 5.2.2.5.1)	mandatory
FoFahrtAbschnittFahrzeugGruppen	The individual rolling stock groups with their position (configuration) on the journey segment (See 5.2.2.4.4.1)	mandatory
FoFahrtrichtung	Not supported.	[n/a]
FoAenderungen	Not supported.	[n/a]

**Table 18: Structure of <FoFahrzeugGruppenFahrtAbschnitt>**



#### 5.2.2.4.4.1. Rolling stock groups with position on the journey segment (FoFahrtAbschnittFahrzeugGruppen)

The element <FoFahrtAbschnittFahrzeugGruppen> (journey segment rolling stock groups in composition) contains many <FoFahrtAbschnittFahrzeugGruppe> (journey segment rolling stock group in composition) elements, which in turn define the position of a rolling stock group on a journey segment (configuration of rolling stock groups). The position of the rolling stock within the group is specified as a positive integer (the front rolling stock group [in the direction of travel] contains the lowest value in the <FoPosition> field).

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoDurchgaenge	Not supported.	[n/a]
FoAenderungen	Not supported.	[n/a]

**Table 19: Structure of <FoFahrtAbschnittFahrzeugGruppe>**

#### 5.2.2.4.4.1.1. Transit possibilities to adjacent rolling stock groups (FoDurchgang)

n/a

#### 5.2.2.4.4.2. Direction-of-travel change during a journey (FoFahrtrichtung)

n/a

#### 5.2.2.4.4.2.1. Processing without transmitting FoFahrtrichtung

The element <FoFahrtrichtung> (composition direction of travel) is currently not transmitted by CUS. The default value “forward” thus always applies as the direction of travel.

#### 5.2.2.4.4.2.2. Processing with FoFahrtrichtung transmitted

n/a

#### 5.2.2.4.4.5. Journey segments for rolling stock equipment (FoFahrzeugAusstattungFahrAbschnitte)

n/a

#### 5.2.2.4.4.6. Journey segments for rolling stock statuses (FoFahrzeugZustandFahrAbschnitte)

n/a

#### 5.2.2.4.4.7. Journey segments for rolling stock occupations (FoFahrzeugBelegungFahrAbschnitte)

(See VDV-RV 454)

#### 5.2.2.4.7.1. Rolling stock occupation on the journey segment (FoFahrzeugBelegung)

The element <FoFahrzeugBelegungen> (rolling stock assignments in composition) contains many <FoFahrzeugBelegung> (rolling stock assignment in composition) elements.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFahrzeugIDREF	Reference to the rolling stock for which the occupations in this structure are applicable. (See 0)	mandatory

Element	Comments	Field
FoBelegungProzentual	Not supported.	[n/a]
FoReisegruppen	Always provided by CUS so that the existence of a travel group (=occupation) can be marked up. (See 5.2.2.4.7.1.1)	optional

**Table 20: Structure of <FoFahrzeugBelegung>**

#### 5.2.2.4.7.1.1. Specification of travel groups on the rolling stock (FoReisegruppen)

The element is specified once an occupation exists (boarding groups) or once the rolling stock is occupied by groups to a certain degree (transit). SBB currently only transmits the occupation by travel groups.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoReisegruppeVorhanden	Always "true" in CUS because the element is also only specified if at least one travel group exists.	mandatory
FoReisegruppenNamen	Not supported.	[n/a]

**Table 21: Structure of <FoReisegruppen>**

#### 5.2.2.4.8. Train composition at the stop (FoHalte)

(See VDV-RV 454)

##### [CUS as a railway data producer – RDP \(server\):](#)

The element <FoHalte> (compositions stops) contains many <FoHalt> (composition stop) elements. CUS generally provides **all** stops in a journey for which composition information is available (transmission of the journey as a complete journey).

In order to ensure referencing even in cases of multiple visits of a stop, the elements <Ankunftszeit> (arrival time) and <Abfahrtszeit> (departure time) are always provided (in the first or last stop of the journey, only the departure or arrival time will be transmitted accordingly).

#### 5.2.2.4.8.1. Technical description of the arrival at/departure from stop

(See VDV-RV 454)

#### 5.2.2.4.8.2. Train compositions for the arrival at stop (FoAnkunft)

(See VDV-RV 454)

##### 5.2.2.4.8.2.1. Rolling stock, statuses and stop positions on arrival at stop (FoFahrzeugeAmHalt)

The element <FoFahrzeugeAmHalt> (rolling stock at stop) contains many <FoFahrzeugAmHalt> elements.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFahrzeugeIDREF	Reference to the rolling stock or third-party rolling stock relevant for the arrival at the stop. (See 0)	mandatory

FoZustand	Status of the rolling stock on arrival at the stop. (See 5.2.2.5.3)	optional
FoErweiterung	Not supported.	[n/a]

**Table 22: Structure of <FoFahrzeugAmHalt>**

5.2.2.4.8.2.1.1. Rolling stock stop position on arrival at stop (FoHaltPosition)  
(See VDV-RV 454)

5.2.2.4.8.2.2. Sector designation and positioning on arrival at stop (FoSektorPositionen)  
(See VDV-RV 454)

5.2.2.4.8.2.2.1. Sector on arrival at the stop (FoHaltPosition)  
(See VDV-RV 454)

5.2.2.4.8.3. Train compositions for the departure from the stop (FoAbfahrt)  
(See VDV-RV 454)

5.2.2.4.8.3.1. Rolling stock, statuses and stop positions on departure from stop  
(FoFahrzeugeAmHalt)

The element <FoFahrzeugeAmHalt> (composition rolling stock on stop) contains many <FoFahrzeugAmHalt> elements.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoFahrzeugeIDREF	Reference to the rolling stock or third-party rolling stock relevant for the departure from the stop. (See 0)	mandatory
FoZustand	Rolling stock status on departure from the stop. (See 5.2.2.5.3)	optional
FoErweiterung	Not supported.	[n/a]

**Table 23: Structure of <FoFahrzeugAmHalt>**

5.2.2.4.8.3.1.1. Stop position of rolling stock on departure from stop (FoHaltPosition)  
(See VDV-RV 454)

5.2.2.4.8.3.2. Sector designation and positioning on departure from stop (FoSektorPositionen)  
(See VDV-RV 454)

[CUS as a railway data producer – RDP \(server\):](#)

The element is transmitted by CUS once a railway boarding area on the <IstHalt> (actual stop) has a sector classification.

5.2.2.4.8.3.2.1. Sector on departure from the stop (FoHaltPosition)  
(See VDV-RV 454)

---

### 5.2.2.5. Multiple use of element structures within IstFormation

#### 5.2.2.5.1. Description of segment (FoAbschnitt)

(See VDV-RV 454)

#### 5.2.2.5.2. Description of changes from specifications (FoAenderungen)

The element <FoAenderungen> (composition changes) contains many <FoAenderung> (composition change) elements. In the case of a change to the composition affecting customers, this is transmitted to the relevant subscribers. The <FoAenderungsCodeAmHalt> (composition change code on stop) element is used for change information regarding the relevant actual stop.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoAenderungsCodeAmHalt	Change code, indicating the nature of the change. (The valid values are defined in section 10.5)	mandatory
FoAenderungsTexte	Not supported.	[n/a]

**Table 24: Structure of <FoAenderung>**

#### 5.2.2.5.2.1. Description of change texts (FoAenderungsTexte)

n/a

#### 5.2.2.5.3. Description of statuses (FoZustand)

Using the element <FoZustand> (composition status), the status of particular composition elements (e.g. for rolling stock or rolling stock equipment) is transmitted.

The following table contains only changes to VDV-RV 454:

Element	Comments	Field
FoZustandsCode	Identifier for a status. (The valid values are defined in section 10.6)	mandatory
FoZustandsKurzform	Not supported.	[n/a]
FoZustandsText	Not supported.	[n/a]
FoZustandsEmpfehlung	Not supported.	[n/a]

**Table 25: Structure of <FoZustand>**

#### 5.2.2.5.4. Description of structural access points for extensions (FoErweiterung)

n/a

### 5.2.2.6. Additional information (StoerungsInfo)

n/a

### 5.2.2.7. Forecast quality (IstAnkunftPrognoseQualitaet and IstAbfahrtprognoseQualitaet): (ZeitQualitaet)

n/a

### 5.2.2.8. Reference to the originally planned trip: (FahrtBeziehung)

n/a

## SBB AG

---

### **5.2.3. Traffic-related actual data transmission (IstUmlauf)**

n/a

### **5.3. Assured connection relationships**

n/a

### **5.4. Transmission of train composition information**

(See VDV-RV 454)

### **5.5. Transmission of journey associations (connection of mode of transport journeys)**

n/a

---

## 6. Handling the AUS actual data service

### 6.1. Implementation notes and regulations

#### 6.1.1. ITCS forecast competence

(See VDV-RV 454)

#### [CUS as a data producer \(server\)](#)

SBB calculates and reports forecasts for all MoT journeys which run on their network (i.e. trains from SBB, BLS, SOB, TPF, RA, etc., as well as foreign railway networks on SBB routes). The same is true for operators who use RCS for scheduling (e.g. BLS).

RCS is likewise *able* to calculate forecasts for railways not having a VDV interface or any scheduling system in the area around joint stations (e.g. Waldenburgerbahn in Liestal).

#### 6.1.2. Addition rules for the delay profile

(See VDV-RV 454)

#### 6.1.3. Aggregation of messages relating to a journey

n/a

#### 6.1.4. Beispiel "Durchfahren an einer Haltestelle" (Attributänderung)

(See VDV-RV 454)

#### 6.1.5. Beispiel "Bedienung einer Bedarfsverkehrshaltestelle"

(See VDV-RV 454)

#### 6.1.6. Beispiel "Fahrwegänderung"

(See VDV-RV 454)

#### Note: REF-AUS:

Fahrwegrelevante Änderungen werden vorläufig als Ausfall/Zusatzfahrt übermittelt. Kurzfristige Umleitungen mit gleicher Zugnummer erscheinen nur im AUS.

Changes of a route (partial cancellations, extensions, diversions) are provisionally transmitted as a failure / additional journey. Short-term diversions with the same train number appear only in "AUS".

#### 6.1.7. Initial message and preview time

#### [\(See VDV-RV 454\) << CUS as a data producer \(server\)](#)

CUS accepts no less than 10 minutes and no more than 180 minutes as <Vorschauzeit> (preview time) for subscriptions set in CUS. Times less than 10 minutes or greater than 180 minutes are rounded to the respective boundary values (10, 180).

#### 6.1.8. Temporal reporting behaviour – hysteresis

(See VDV-RV 454)

## SBB AG

---

#### CUS as a server:

Hysteresis is fixed at 30 seconds and, contrary to the VDV454 recommendation [3][1], cannot be changed by the subscription setter<sup>14</sup>.

#### **6.1.9. PrognoseUngenau element**

(See VDV454 RV)

#### CUS as a railway data producer – RDP (server):

If the SBB scheduling system detects that one of its trains is not at the expected location<sup>15</sup> or if a forecast is not possible for some other reason, a message is generated in which the element <PrognoseUngenau> (forecast indefinite) contains the value "fehlende Aktualisierung" (missing update). The forecast fields nonetheless contain the last known forecast time in accordance with the VDV454 recommendation [3].

The additional possible values, from the set of values defined by the VDV recommendation 454 [2][3], are not used by CUS.

#### CUS as a railway data producer – RDP (client):

CUS accepts the element <PrognoseUngenau> (forecast indefinite). Internally, however, only the value "fehlende Aktualisierung" (missing update) is analysed.

#### **6.1.10. Unscheduled log-off**

(See VDV-RV 454)

#### **6.1.11. Actual arrival and departure times**

(See VDV-RV 454)

#### **6.1.12. Cancellations**

(See VDV-RV 454)

#### **6.1.13. Additional journeys**

(See VDV-RV 454)

#### Implementation information for information systems:

All journeys received by an information system via the REF-AUS or AUS data service that cannot be mapped onto the periodic timetable are deemed to be additional journeys and must be added as a complete journey independently of whether the flag "Zusatzfahrt" (additional journey) is set to "true". Setting the flag creates clarity, and it should therefore be set by the data producer wherever possible.

#### **6.1.14. Implementation for rail applications**

(See VDV-RV 454)

#### **6.1.15. Special features for integrated service journeys (expanded SBB text)**

#### CUS as a railway data producer – RDP (server):

## **SBB AG**

---

For modes of transport of any type, generally only the part of an MoT run that is relevant to customers is transmitted via the VDV interface. Sections relating to service journeys are removed from the run before sending.

#### **6.1.16. Special features of associated trains (expanded SBB text)**

##### [CUS as a data producer \(server\)](#)

In the case of cross-border travel, SBB combines partial journeys having the same train number and connects up the individual partial runs to form a single MoT journey. This procedure means that the MoT journeys in the periodic timetable differ from the MoT journeys in the actual messages.

#### **6.1.17. Special features of feeder trains (expanded SBB text)**

##### [CUS as a data producer \(server\)](#)

Both splitting (where one train is split into two trains) and combining (where two trains are coupled into one) are considered to be feeder trains. In both cases there are different variants related to the representation in the planning data:

- Splitting: a mode of transport travels from A to B where it splits. One part then travels to C, the other to D.
  - Variant 1:
    - MoT with route A-B
    - MoT with route B-C
    - MoT with route B-D
  - Variant 2:
    - MoT with route A-C
    - MoT with route B-D
- Coupling: a mode of transport travels from A to C and a different mode of transport travels from B to C. The two modes of transport are coupled together at C and the new mode of transport travels from C to D.
  - Variant 1:
    - MoT with route A-C
    - MoT with route B-C
    - MoT with route C-D
  - Variant 2:
    - MoT with route A-D
    - MoT with route B-C

The respective MoT journeys clearly differ due to their train numbers.

As with planning data, individual MoT journeys are also represented in VDV454. <Elements such as <RichtungsText> (DirectionText), <VonRichtungsText> (FromDirectionText) and <FahrtStartEnde> (TripStartEnd) are aligned with the relevant MoT journeys.

Without additional linking information included in the planning data (see element “SollAnschluss” [PlannedConnection] in REF-AUS), it is not possible to recognise joined journeys as such.



---

While this is mostly not a problem for buses, trams, etc. because joined journeys seldom arise in these areas, constructs such as feeder trains and linked journeys are commonplace for cross-border travel at SBB.

For these reasons, the values in the following elements are not suitable for publication to customers **in the case of joined journeys**, without specification or interpretation of the relevant linking information by the information system (see “Using planned connections”, section 5.1.3.5):

- <RichtungsText>
- <VonRichtungsText>
- <FahrtStartEnde>

## **6.2. Connection information**

n/a

---

## 7. Glossary

(See VDV-RV 454)

Specific terms in this document:

Term	Meaning
Real-time data	In the ITCS Central, short-term timetable forecasts are calculated or assignment measures are defined that are effective in the short term. This term describes actual data from the processes that are transmitted via the VDV454 AUS data service.
Periodic timetable	The periodic timetable contains the (scheduled) timetable data for a particular period – normally a timetable period. It can be adjusted to arising circumstances on an ongoing basis. Example: INFO+. The complete periodic timetable is not available via the VDV interfaces.
Daily scheduled timetable	The daily scheduled timetable contains the (scheduled) timetable data over a short amount of time (approx. 24–48 hours). This data is exchanged via the VDV454 REF-AUS data service.
Scheduled timetable data	Scheduled timetable data refers to all scheduled timetable data (e.g. daily and periodic scheduled timetable data)
Data retriever	This document principally mentions the following data retrievers: <ul style="list-style-type: none"><li>- Display system</li><li>- Timetable information system</li><li>- Data hub</li></ul> In individual cases, the data retrievers are restricted.
Data producers	The following systems are referred to as data producers: <ul style="list-style-type: none"><li>- All systems that prepare data and send it to a data hub</li></ul> Data hubs are not data producers!
BO no.	Business organisation number: In DiDok 2.0 [5], a directory is maintained for business organisations. This can refer to business organisations of transport companies (e.g. sub-organisations such as SBB-P, SBB-I, etc.), but also to other business organisations (e.g. the BO “Hotelplan Schweiz”). The unique identifier of the business organisations is the BO no. The peripheral systems of DiDok almost exclusively require the BO no. (synonym: TC code) and not the TC number.

---

## **8. English alias designation**

(See VDV-RV 454)

---

## **9. Appendix: Transmission of forecast quality**

(See VDV-RV 454)

---

## 10. Appendix: Values list (enum)

(See VDV-RV 454)

The values lists indicate which values are currently supported by SBB. The **[Supported]** column indicates with a “” whether the information – if available – is transmitted by SBB within `<DatenAbrufenAntwort>` (DataSupplyAnswer).

### 10.1. FoFahrzeugTyp

SBB transmits the type of rolling stock in accordance with the following values list:

Value	Meaning	Supported
“1”	1st class day coach	
“12”	1st and 2nd class day coach	
“2”	2nd class day coach (also “declassified” 1st class coaches)	
“CC”	Couchette car	
“D”	Luggage car	
“K”	No-class railway carriage	
“FA”	Family coach	
“LK”	Motive power unit	
“WC”	Combined sleeping/couchette coach	
“WL”	Sleeping car	
“WR”	Restaurant (dining car)	
“W1”	Combined car: 1st class restaurant and seats	
“W2”	Combined car: 2nd class restaurant and seats	

**Table 26: Values list <FoFahrzeugTyp>**

### 10.2. FoFahrzeugAusstattungsCode

SBB transmits the features of individual rolling stock in accordance with the following values list:

Value	Meaning	by SBB
AbteilBusiness	Rolling stock with business compartment	
AbteilFamilien	Rolling stock with family zone	
AbteilFahrrad	Bike platform	
AbteilRollstuhl	Rolling stock with compartment for wheelchair users	
AbteilFahrradResPflicht	Reserved bike compartment	
PlaetzeFahrradResPflicht	Reserved bike space	

**Table 27: Values list <FoFahrzeugAusstattungsCode>**

### 10.3. FoSprachCode

n/a

## SBB AG

#### 10.4. FoTechnischesAttributCode

SBB transmits the following information on vehicles:

Value	Meaning	Supported
NiederflurEinstieg	Vehicle with low-floor entry	✓

#### 10.5. FoAenderungsCode & FoAenderungsCodeAmHalt

SBB transmits the following change codes for changes to the composition at the stop:

Value	Meaning	by SBB
GeaenderteWagenreihung	Train is operating in modified train composition (general composition change without more precise specification of the change)	✓
FehlendeFamilienwagen	Train is operating without wagon for family (Familienwagen)	✓
FehlendeRestaurantwagen	Train is operating without dining wagon (Speisewagen)	✓
FehlendeWagen	Train is operating with less wagons than plannend	✓
FehlendeRollstuhlplaetze	No special facilities for wheel chair	✓
FehlendeNiederflurwagen	No Vehicle with low-floor entry	✓

Table 28: Values list <FoAenderungsCodeAmHalt>

#### 10.6. FoZustandsCode

SBB transmits the following status codes for rolling stock:

Value	Meaning	by SBB
“geschlossen”	Coach is closed	
“offen”	Coach is open	
“nicht_bedient”	Coach is open, but the restaurant is not being served	

Table 29: Values list <FoZustandsCode>

#### 10.7. FoOrientierung

n/a

#### 10.8. FoFahrtrichtung

The MoTs are always transmitted with the “vorwaerts” (forwards) direction of travel by default. Transmission of the direction of travel by <FoFahrtrichtung> (composition direction of travel) is not supported.

#### 10.9. ProduktID

(See VDV-RV 454)

#### 10.10. VerkehrsmittelText

(See VDV-RV 454)

### SBB AG

---

## **11. Appendix: XML examples**

(See VDV-RV 454)