Ministry of Infrastructure
and Water Management

HGV Charge TSP

Service description data exchange RDW

Reading guide

This document, Service Description Data Exchange RDW, describes the service and associated data specifications provided to the Toll Service Provider (TSP) for the purpose of data exchange between TSP and Toll Charger (TC). This document is aimed to provide information to the Main Service Provider (MSP) as well as European Electronic Toll System (EETS) Providers. In this document both MSP and EETS provider will be referred to as TSP, unless a clear distinction is necessary.

Data exchange between TSP and TC will be needed at several points in the Heavy Goods Vehicle (HGV) Charge chain. Message specifications for the data exchanges are defined in the standards EN 16986:2024 and ISO 12855:2022. The EN 16986:2024 standard defines a coherent set of transactions, triggers, conditions, data elements, transfer mechanisms and support functions for an interoperable data exchange between the central systems of TC and TSP, based on ISO 12855:2022.

The Netherlands: Toll Service Provider-dominant scenario

The EN 16986:2024 describes two different scenarios for toll collection systems: the Toll Service Provider-dominant scenario and the Toll Charger-dominant scenario. In the Toll Service Provider-dominant scenario, the Toll Service Provider handles the calculation and collection of the charge. In the Toll Charger-dominant scenario, the responsibility for calculating the charge is assigned to the Toll Charger. The Dutch system of HGV Charge is based on the Toll Service Provider-dominant scenario.

For the HGV Charge the Toll Charger will initially receive a “Billing Details” message per chargeable toll trip per vehicle in aggregated form from the Toll Service Provider. This statement will only contain the chargeable distance driven and the amount due for that toll trip. Subsequent movement data will not be exchanged and shall only be requested by the Toll Charger when needed, in a “Toll Declaration” message exchange. The “Payment announcement” message is then used to announce the remittance of the levy from the Toll Service Provider to the Toll Charger.

1	Daily operations
	Billing details
	Payment announcement
	Exception list - whitelist
	Exception list - blacklist
	Report abnormal OBE
	Anonymous movement data

2	Periodically
1010 0101 1010	**Efc context data**
	**Trust object**

3	Requested by TC
	**Toll declaration**
	**User details**

The data exchanges in this document are divided into three chapters, which are specified in separate paragraphs. The fourth chapter contains general technical specifications that apply to all ISO 12855:2022 data exchanges in the Dutch HGV Charge system.

1. **Daily operation** Interactions that are needed for the day-to-day operations
2. **Periodically** Exchange of data sets (e.g. 6-monthly)
3. **Requested by TC** Information requests initiated by the Toll Charger

The EN 16986:2024 defines different profiles with specific usage for certain transactions. For the Dutch HGV Charge the SectionAutonomous profile is applicable, since tolling is executed by means of autonomous positioning recognition (GNSS) for travelling in identified areas (road sections), with the TSP playing the dominant role.

Although all data exchanges in this document will technically be transferred through InfoExchange messages, in this document these messages will be referred to by its content. E.g. an InfoExchange message containing a BillingDetailsADU will be referred to as a Billing Details message. This is done for reading purposes in order to have a clear distinction between the different types of messages in this document.

This document contains a general description of each data exchange. For more detailed information on the usage of each operation as well as a message specification, please refer to document 'HGV Charge – TSP – Message description data exchange RDW.'

This document reflects the currect state of the service description and is intended to inform the reader on specifications and processing for each interaction. Is it however possible that changes to this description will be made during the realisation phase of HGV Charge project.

Change history

Version	Paragraph	Description
17-Jan-2024	-	Initial version
06-Mar-2024	1.1, 5	Definition of 'Toll trip' is further specified
	1.1.4, 5	More consequent use of the term 'OBE' (On-board equipment)
	1.4	A text is added to clarify when a vehicle with an Obe may drive when the Obe is no longer blacklisted
	2.1.4	Rounding of multiple trips for a single day is further clarified
	5	Definition for 'Day' is added
27-Mar-2024	1.1.4	Sending of Billing Details messages for new service users is further clarified
	1.3.4	New paragraph with specification for single day service users
25-Apr-2024	1, 1.3, 1.3.4	Use of incremental whitelist is added
	1.1, 5	Definition of a toll trip is extended
	1.1.4 Annex B	Specific requirements are added for new Efc context data version during a toll trip. Annex B 'Changes in Efc context data version during a toll trip' is added
	1.3	Section 'Ending an active service user' has been extended to elaborate on ending an active service user
	1.4	Section 'Ending an active exception' has been extended to elaborate on ending an active exception
	1.4.4	New paragraph with specification on use of specific blacklist reason codes
23-May 2024		New layout and textual corrections
18-Oct-2024	-	Textual corrections
	1.3	Added specification that vehicle train maximum weight corresponds with F.3 (in vehicle documents)
	1.3	Added information to 'Ending an active service user'
	1.4	Added information to 'Ending an active exception'
	1.4	Added information about implementation of whitelist and blacklist as two seperate lists for HGV Charge
	1.4	Reason codes 11, 12 and 17 are removed from 'Service agreements that have been suspended'
	3.1	Raw usage data is removed as part of Toll Declaration response

Table of content

1 Data exchange for daily operations

The RDW has several roles in the daily toll collection process. As a Toll Charger, but also as a Supervisor and an Enforcer. For the day-to-day operations the RDW needs to be informed by the TSP.

1. Billing details
For every chargeable toll trip made the TSP needs to provide the chargeable distance driven by a service user and the amount owed.

2. Payment announcement
In order to transfer the owed HGV levies the TSP needs to announce payments that it will be making including a reference to the billing details for which the payment will be made.

3. White list and 4. Black list
The TSP needs to share its full whitelist and blacklist with the TC. Incremental updates during the day may also be used for whitelist and blacklist.

5. Report abnormal OBE
When the RDW notices that On Board Equipment (OBE) abnormalities occur by vehicles when passing roadside equipment (observation), it can report these abnormalities to the TSP in order to increase compliance with the law. E.g. a difference in license plate between OBE and vehicle.

6. Anonymous movement data
The TSP must transfer movement data, which has been anonymized. This data contains movements of customer vehicles on the Dutch road network and is used for statistical purposes. This is a custom data exchange that is not part of the ISO 12855.

1.1 Data Exchange "Billing details"

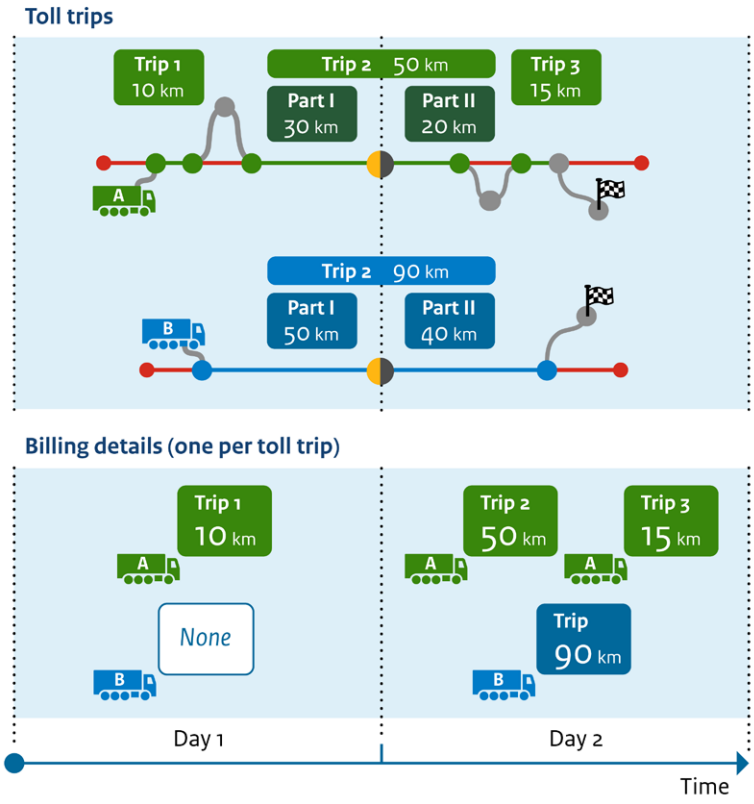
TSP will send a Billing details message
- for each toll trip that has ended; or
- for a 'zero km-notification' (MSP only)

Definition of a toll trip
A toll trip is a contiguous series of road sections starting with the first road section when a vehicle enters the chargeable road network and ends with:
- the road section where the vehicle leaves the chargeable road network;
- the road section where the vehicle is located at the time a new version of Efc Context Data comes into effect;
- the road section where the status of the OBE is changed to a NoGo status (ISO 12813:2023); or
- the road section that has been registered 72 hours after the start of the toll trip.

When a toll trip starts one day and ends another day, the toll trip and the total chargeable distance is attributed to the day on which the toll trip ended.

TSP must report a toll trip within a specific period of time that is calculated from the end of the toll trip (24 hours).

Examples



The figure above shows toll trips made by two trucks; truck A and truck B. In this example truck A makes several toll trips, while truck B makes just one toll trip. Truck A enters the chargeable network and leaves the network having driven 10 km on the network. When leaving the network, toll trip 1 ends. Then truck A enters the chargeable network again, which starts toll trip 2. After driving 50 km truck A again leaves the network, which ends toll trip 2. Then another short toll trip (3) is made on the chargeable network by truck A. Truck B only makes one toll trip; this trip starts day 1 and ends day 2.

Both examples point out that chargeable distance driven needs to be reported after a toll trip has ended. Both the second and third toll trip by truck A as well as the toll trip by truck B end on day 2.
Therefore the TSP needs to send the following Billing details messages (or ADU's) after each toll trip ends:

Day 1
- Truck A (toll trip 1) has driven 10 km on the chargeable network.
- No completed toll trips for truck B

Day 2
- Truck A (toll trip 2) has driven 50 km
- Truck A (toll trip 3) has driven 15 km
- Truck B (one toll trip) has driven 90 km

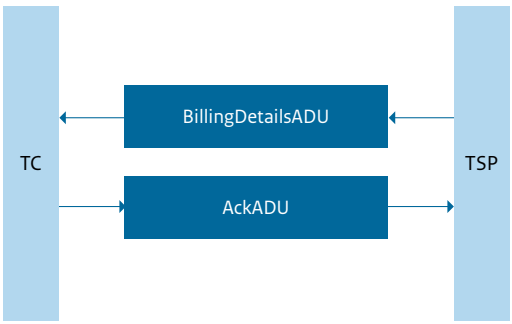
In the Billing details message the aggregated total amount of recorded chargeable metres per service user is transmitted to the Toll Charger for each toll trip made, confirming the presence of a motor vehicle in the EETS area.

The Billing Details message will contain (non-exhaustively):
- service user (pan, LPN, Obe ID)
- number of metres driven on the Chargeable Road Network,
- amount due, and
- applied local vehicle class
- aduIdentifier of a TollDeclaration

*'Zero km-notification' **
Part of the remuneration of a MSP is based on the number of active customers in a certain period. An active customer is one that uses the Dutch road network, regardless whether or not the chargeable network is entered. The MSP therefore needs to also send a Billing details message for every day for which a vehicle of a customer has driven on the Dutch road network where 0 (zero) chargeable kilometers have been driven. For obvious reasons it is not permitted to send a 'zero km-notification' for a day where a vehicle has only driven abroad or has not driven at all.

*) *Note: only applicable for the Main Service Provider*

1.1.1 Interaction diagram



1.1.2 Number of interactions

The following numbers are to be expected (estimate):
- 160,000 active vehicles on the chargeable road network
- average number of daily toll trips: 2 to 6 toll trips per vehicle
- 320,000 to 960,000 billing details ADU's per day*

*) *An InfoExchange-message can contain one or more BillingDetailsADU's. A TSP can send each ADU in a separate message, but may also send messages containing several BillingDetailsADU's*

1.1.3 Technical requirements

See: Chapter Technical requirements (p. 24).

1.1.4 Specific requirements for this interaction

A toll trip in a BillingDetails message can only be processed by the TC if the service user (pan, LPN, OBE ID) has already been transferred from TSP to TC as an active whitelist entry and has succesfully been acknowledged. See: 1.3 Data exchange "Exception list (whitelist)".
This means that, when a service user completes a toll trip the very same day the service agreement is concluded, the BillingDetails message containing this toll trip can only be sent after the new whitelist has succesfully been transferred from TSP to TC.

New Efc context data version
A toll trip that is in progress can be effected by a new Efc context data version (see: Toll trip definition in Chapter 5).

Changes in the Efc context data may occur during a toll trip. E.g. a truck starts a toll trip the 31st of December and ends that toll trip the next day; 1 January. On the 1st of January a new version of the Efc context data becomes valid. A new Efc context data version can contain tariff changes and can also contain changes to the chargeable network; implementing changes to the network by adding, removing or replacing chargeable road sections. A toll trip ends with the road section where a vehicle is located at the time a new version of Efc Context Data comes into effect.

Examples of specific situations that can occur are elaborated upon in Annex B - Changes in Efc context data version during a toll trip.

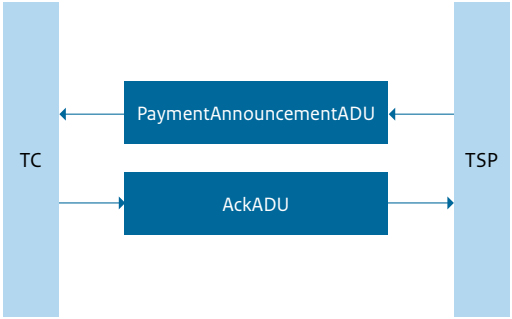
1.2 Data exchange "Payment announcement"

In order to transfer the owed HGV levies to the TC, the TSP needs to send a Payment announcement-message. This message is used to announce payments that the TSP will be making, including a reference to the billing details for which the payment will be made.

The message will contain (non-exhaustively):
- the amount to be paid,
- the payment reference; and
- the reference numbers (aduIdentiers) of the billing details for which levies will be transferred to the TC.

The TSP must pay the amount due, after the Payment announcement message has been confirmed by the TC.

1.2.1 Interaction diagram



1.2.2 Number of interactions

The number of messages may vary per TSP.

It is important to point out that the Dutch HGV law[1] states that a TSP must pay the amount due for a toll trip, within four weeks after reporting the toll trip.

1.2.3 Technical requirements

See: Chapter Technical requirements (p. 24).

1.2.4 Specific requirements for this interaction

Referenced billing details in a PaymentAnnoucement are only valid if they have already been transferred from TSP to TC in a BillingDetails message and have been confirmed by the TC with an AckADU (see: 1.1 Data exchange "Billing details").

1.3 Data exchange "Exception list (whitelist)"

After concluding a service agreement between Contractor and holder (service user), the service user and its vehicle will be added to the whitelist of the TSP. As service user can be exchanged through an incremental as well as a full list update.

Incremental list update
An incremental update may be used by the TSP to communicate new service users or changes to existing service users within the time window between the exchange of two full lists).

Full list
It is mandatory for the TSP to send a daily full whitelist. This full list is sent by TSP to TC and will contain all active service users.

The ExceptionList message (type: Whitelist Full, Whitelist Incremental) includes (non-exhaustive):
- Service user
- Vehicle train maximum weight (F.3)
- Euro value (meaning: Euro norm value class)
- Co_2 emission class
- Start date and time of the service agreement
- If applicable: end date and time of the service agreement

A service user will be identified by the unique combination of:
- Personal account number (pan)
- LPN
- Obe Id

E.g.
It is possible for the TSP to have two or more active whitelist entries with the same pan and LPN, but different Obe Id's.

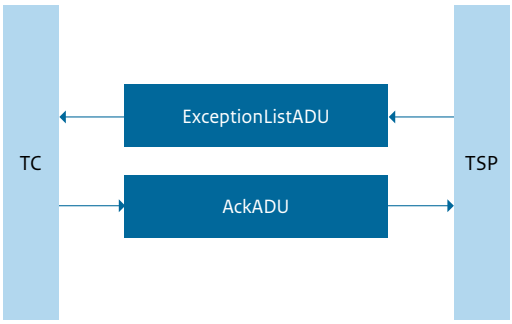
Ending an active service user
When a service agreement ends, this whitelist entry must be explicitly ended by the TSP. An updated entry, containing a value for entryValidityEnd, must transferred in an incremental or full list update by the TSP to the TC. The service user will end at the exact date and time specified as the entryValidityEnd value.

If an active entry is no longer included in an full whitelist transfer, it will remain active since a value for entryValidityEnd must be transferred.

After an entry with an entryValidityEnd has been succesfully transferred to the TC, this entry may not be part of future list exchanges. The TSP must therefore exclude this entry from future list exchanges.

[1] *Article 9 of the Dutch HGV Charge law (Wet Vrachtwagenhefffing)*

1.3.1 Interaction diagram



1.3.2 Number of interactions

It is mandatory for the TSP to send 1 message per day for a full list. When a TSP has no active service users, it has to send an empty list. The number of messages for incremental updates will depend on the number of new whitelist entries for a day.

1.3.3 Technical requirements

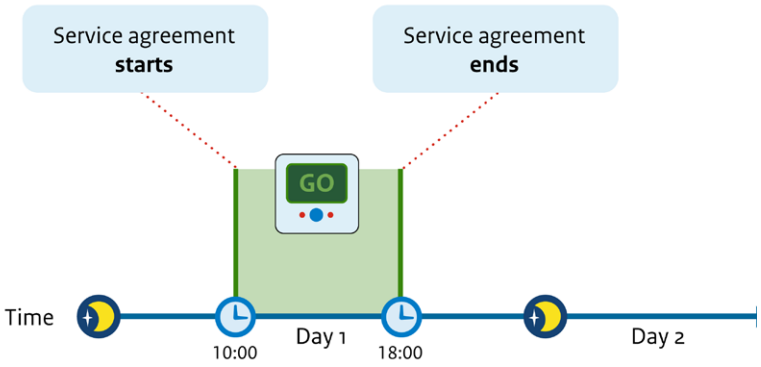
See: Chapter Technical requirements (p. 24).

1.3.4 Specific requirements for this interaction

Short-lived service agreements

It is possible a service user concludes a service agreement with a TSP and terminates its service agreement the same day.

Example A



A TSP can transfer the service user in a whitelist list entry for example A in several ways:

1. Sending two incremental updates
   - The first adding new whitelist entry starting at 10:00; and
   - The second transfer which update the entryValidityEnd to 18:00 for that day

2. Sending one incremental update
   - Adding an new whitelist entry starting a 10:00 and ending at 18:00

3. Sending a full list update
   - Adding an new whitelist entry starting a 10:00 and ending at 18:00

4. Sending an incremental and a full list update
   - The incremental update adding new whitelist entry starting at 10:00; and
   - The next full list which updates the entryValidityEnd to 18:00

1.4 Data exchange “Exception list (blacklist)”

A blacklist contains vehicles (users) for which the TSP will temporarily not accept responsibility. This list is used for reporting an exception for an active customer, for example, reporting a faulty OBE or a suspension following a non-payment. An exception can be exchanged through an incremental as well as a full list update.

The TC has implemented the whitelist and blacklist as two separate entities. This means that if a service user is blacklisted, this service user must also be on the whitelist.

Incremental list update
An incremental update may be used by the TSP to communicate exceptions within the time window between the exchange of two full lists.

Full list
It is mandatory for the TSP to send a daily full blacklist. This full list is sent by TSP to TC and will contain all active exceptions (users).

A vehicle (or user) will be uniquely identified by the combination of:
- Personal account number (pan);
- LPN
- Obe Id

The ExceptionList message (types: Blacklist Full, Blacklist Incremental) includes (non-exhaustive):
- Vehicle (or user)
- Start time of the exception
- Exception reason

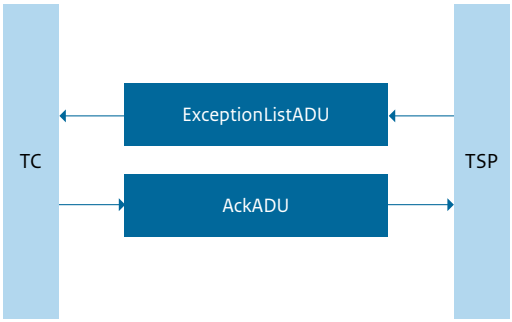
Ending an active exception
When an exception ends, this blacklist entry must be explicitly ended by the TSP. An updated entry, containing a value for entryValidityEnd, must transferred in an incremental or full list update by the TSP to the TC. The exception will end at the exact date and time specified as the entryValidityEnd value.

If an active entry is no longer included in an full blacklist transfer, it will remain active since a value for entryValidityEnd must be transferred.

After an entry with an entryValidityEnd has been succesfully transferred to the TC, this entry may not be part of future list exchanges. The TSP must therefore exclude this entry from future list exchanges.

Note: A vehicle is permitted to drive as soon as the Obe status is changed to a Go status (ISO 12813:2023).

1.4.1 Interaction diagram



1.4.2 Number of interactions

It is mandatory for the TSP to send 1 message per day for a full list. When a TSP has no active exceptions, it has to send an empty list.

The number of messages for incremental updates will depend on the number of new blacklist entries for a day.

1.4.3 Technical requirements

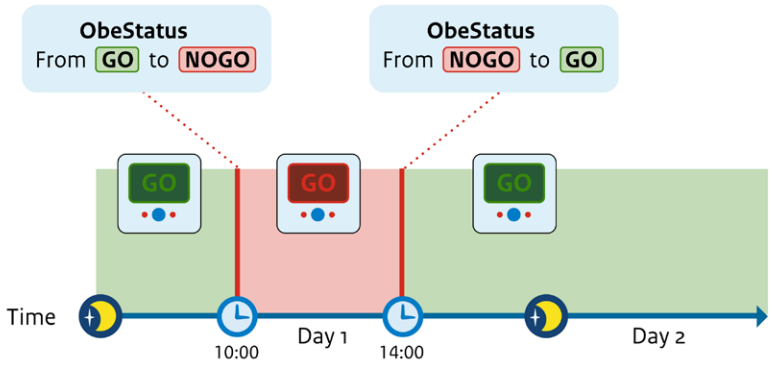
See: Chapter Technical requirements (p. 24).

1.4.4 Specific requirements for this interaction

Short-lived exceptions

If an exception starts and ends within a day (as shown in example A), it is important this exception is also transferred in the blacklist to the TC. This information can be used by the RDW, in its role as Supervisor. Blacklist entries are also used for key performance indicators to determine the performance of a TSP.

Example A



A TSP can transfer the exception list entry for example A in several ways:

1. Sending two incremental updates
   - The first adding new blacklist entry starting at 09:00; and
   - The second transfer which update the entryValidityEnd to 14:00 for that day

2. Sending one incremental update
   - Adding an new blacklist entry starting a 09:00 and ending at 14:00

3. Sending a full list update
   - Adding an new blacklist entry starting a 09:00 and ending at 14:00

4. Sending an incremental and a full list update
   - The incremental update adding new blacklist entry starting at 09:00; and
   - The next full list which updates the entryValidityEnd to 14:00

Use of blacklist reason codes

The Dutch law states specific requirements[2] that should be met by each holder of a heavy goods vehicle that enters the Dutch HGV toll domain. If a requirement is not met by the holder, this is a violation that can be penalized with a fine for the holder.

[2] *Articles 4, 8 and 13 of the Dutch HGV Charge law (Wet Vrachtwagenheffing)*

In order for the RDW, as Supervisor, to be able to determine if a holder is in conformity with the law, the use of reason codes for blacklist entries by the TSP must be in accordance with the table below. Other reason codes will not be accepted by the TC.

Requirement	Reason code(s)
On-Board Equipment that is not working properly or has been stolen	obeDeactivated (1) obeIsStolen (2) temporaryTechnicalProblem (3) suspicionOnTechnicalManipulation (4) obeNotValid (13) obeIsLost (14) obeReturnedMalfunction (18) suspicionOnUseOfJammingDevice (19)
Service agreements that have been suspended	latePayment (5) noPayment (6) contractHolderInsolvent (7) invalidatedPaymentMeans (30) insufficientPrepaidBalance (31)
On-Board Equipment that has been deliberately tampered with	N/A

1.5 Data exchange “Report abnormal OBE”

This exchange is used to report detected abnormal OBE behaviour as a push message from the TC to the TSP. Since the map matching process is performed by the TSP, the TC cannot report any misbehaviour in the map matching. The TC can however report abnormal behaviour derived from observation data; e.g. a vehicle passing with an OBE with a noGoContractual status while no active blacklist entry has been submitted. On receiving this information from the TC, the TSP can undertake the appropriate action to resolve this abnormality.

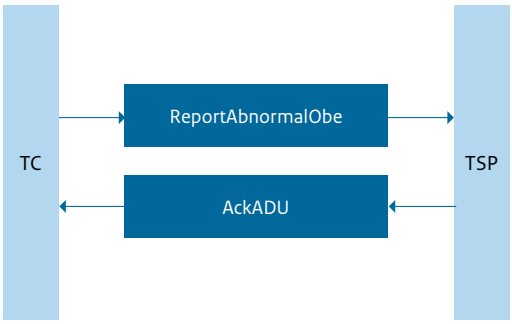
The purpose of this exchange is to promote compliance with the HGV Charge laws and regulations. The TSP plays an important role in this interaction.

Separately, the RDW can impose fines for offences. It is at the discretion of the RDW to determine whether or not to impose a fine. The imposing of fines can coincide with this data exchange. An imposed fine will not be communicated through this interaction, but is a direct interaction between TC and the holder of a vehicle.

The ReportAbnormalObe message includes (non-exhaustive):

- Vehicle (or user)
  - Containing at least a LPN with an optional:
    - Personal account number (pan), and/or
    - Obe Id
- Date and time of the detection of the abnormal behaviour
- Abnormal OBE reason

1.5.1 Interaction diagram



1.5.2 Number of interactions

The number of messages may vary per TSP.

1.5.3 Technical requirements

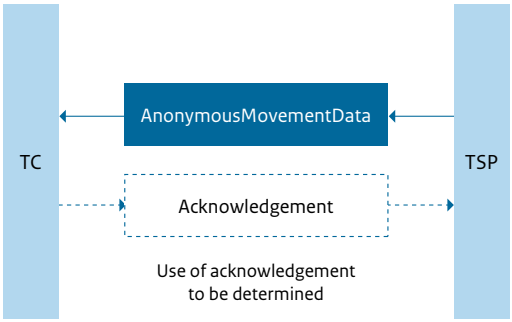
See: Chapter Technical requirements (p. 24).

1.6 Data exchange “Anonymous movement data”

This exchange is used to exchange raw anonymized movement data of its customer vehicles for statistical purposes. This data is used for traffic policy and to improve traffic management. This exchange is not in the ISO 12855 standards.

The details of this interaction will be specified at a later time.

1.6.1 Interaction diagram



1.6.2 Number of interactions

To be determined.

1.6.3 Technical requirements

See: Chapter Technical requirements (p. 24).

1.6.4 Specific requirements for this interaction

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2 Periodic data exchange

This chapter describes data exchanges that are performed periodically and are not part of the daily operations.

1. Efc context data

A periodic data exchange containing context data on (chargeable) road sections and tariff calculation.

2. Trust object

A periodic data exchange for the renewal of security keys for data exchange.

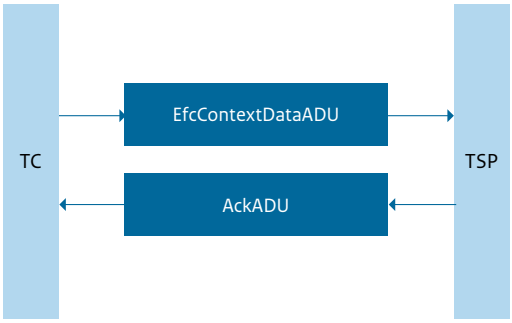
2.1 Data exchange “EFC Context data”

This exchange is used to send Electronic Fee Collection (EFC) context data from the TC to the TSP in order for the TSP to correctly determine the applicable tariff of a service user and the use of chargeable road sections and to calculate the charge amount for a toll trip.

The EfcContextData message includes (non-exhaustive):

- Road section data
- Tariff table data
  - Vehicle parameters
  - Tariff groups
  - Rate per tariff group

2.1.1 Interaction diagram



2.1.2 Number of interactions

It is expected for the TC to send one or two messages per year, through the regular process. Upon an urgency procedure, an incidental update can also be sent (e.g. adding or removing chargeable road sections).

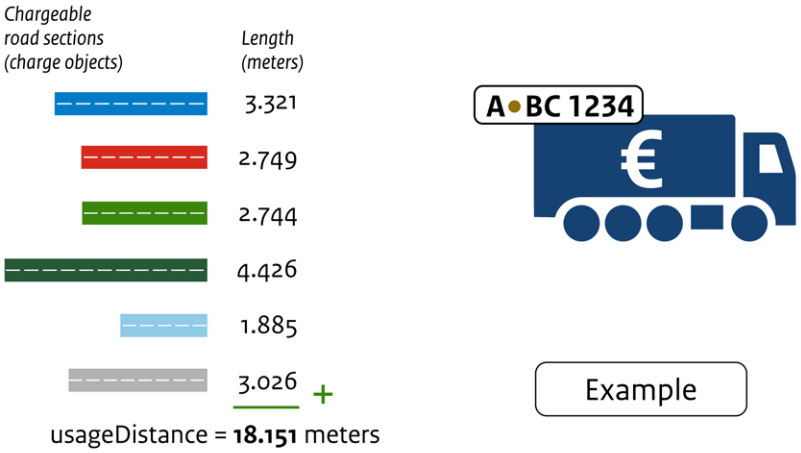
2.1.3 Technical requirements

See: Chapter Technical requirements (p. 24).

2.1.4 Specific requirements for this interaction

The road section data will be exchanged in this interaction. The EfcContextData message itself will contain data that has been formatted through the analytical method.

Rounding rule for total distance of a toll trip
Each chargeable road section is a charge object for which an exact length in meters is provided. The chargeable distance driven is the sum of the lenght (in meters) of all charge objects for a toll trip.
The chargeable distance driven, that is transferred in the Billing details message, is therefore an exact distance in meters. When calculating the chargeable amount for each toll trip, this distance driven however is charged per kilometer and needs to be rounded to 1 decimal (100 meters).



E.g. when six chargeable road sections are driven, having a total length of 18,151 meters, the usage-Distance is also the exact number of 18,151. When calculating the chargeable amount the distance in meters is rounded to a total distance of 18.2 kilometers. This rounded distance is than multiplied by the applicable basicFeePerChargeUnit (e.g. 15.3 eurocents per km). The billingDetailsAmount is rounded to eurocents (e.g. 18.2 km * €0.153 = €2.7846; which is rounded to eurocents: €2.78).
If more toll trips end the same day, each toll trip must be rounded seperately.

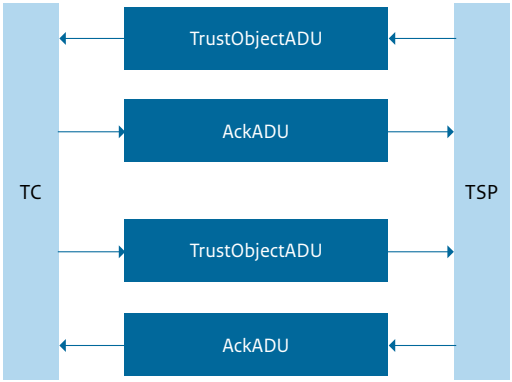
Rounding rule for single charge units
Since rounding should be implemented for the total distance instead of each single charge unit, the EfcContextData contains attributes that do not allow rounding for single charge units. Specific attributes for rounding are therefore not in use (see: table). Rounding to the nearest decimal for the total distance is however needed when calculating the chargeable amount, since the chargeable amount is calculated per 0.1 kilometer (100 meter).

Attribute	Value
chargeUnit	Will be defined as '1 kilometer'
roundingRuleForChargeUnitsUsed	Will be defined as 'no', as no rounding should be done for individual charge units (road sections); rounding should only be done for the total distance (number of kilometers).
roundingRuleForFee	Will be defined as 'no', as no rounding should be done for the fee itself

2.2 Data exchange "Trust object"

This exchange is used for the exchange of keys that secure the data exchange itself. A trust object must be sent from TSP to TC as well as from TC to TSP. For a periodic renewal of a key the TSP and TC sends a Trust object message containing the new key to respectively TC and TSP.

2.2.1 Interaction diagram



2.2.2 Number of interactions

The number of interactions will be determined by the validity period for each key.

2.2.3 Technical requirements

See: Chapter Technical requirements (p. 24).

3 Data exchange – Requested by TC

The transfer of data needs to be limited to the information that is necessary for the execution of the tolling process as well as the supervision and enforcement process. This means that for a great number of process activities the information specified in chapter 1 (Daily operations) is sufficient.
In specific situations there is a need for the TC to request the TSP to provide additional information. These interactions, which start when the TC sends a request to the TSP, are described in this chapter.

1. Request for Toll declaration

The TSP is requested by the TC to provide an extensive Toll Declaration concerning a specific toll trip or a specific period. This information needs to be obtained by the TC either for enforcement purposes or for contract management purposes (sample check).

2. Request for User details

The TSP is requested by the TC to provide details for a specific user, for which a service agreement has been made. This information can also be used in the enforcement process as well as for contract management.

3.1 Data exchange "Request for Toll Declaration"

The TC requests the TSP to send a Toll Declaration message to the TC. A Toll Declaration message contains all data that has been used by the TSP determining the driven route and (chargeable) distance as well as the calculation of the chargeable amount for a toll trip. The Toll Declaration message can be requested by TC for specific purposes, such as use of additional information in the enforcement process. It can also be used for sample checks by the TC. A request for a Toll Declaration can either be made for a specific toll trip or period of time.

A Toll Declaration also contains specific information on the chargeable road sections (charge objects) of the toll trip. The TC also requests information about the movement of a vehicle, that has taken place on the Dutch road network; on the chargeable network as well as outside of the chargeable network. Since the TC will only provide the TSP with all chargeable road sections (see: 2.1 Data exchange "EFC Context data"), in return, the TSP can only provide the TC with a list of chargeable road sections in a Toll Declaration message. Non-chargeable road sections can therefore not be included in this message. The TC however must be able to obtain the data of all movements on the entire Dutch road network for the TSP. For this reason the TSP needs to provide a geojson-file containing all these movements. This geojson-file must be included in the Toll Declaration message as an attachment. The (data of the) geojson-file must therefore be kept by TSP after the map matching process has concluded.

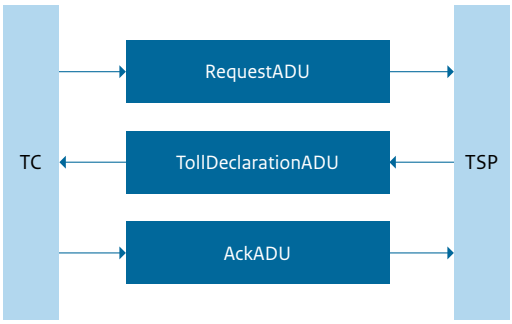
Toll trip - Request for additional information
When a toll trip is reported through a Billing Details message (par. 1.1), an ID[3] of a Toll Declaration is included. The TC can request the Toll Declaration that is identified by this ID. The TSP can then send the TC this specific Toll Declaration.

Period of time - Request for additional information
When requesting a Toll Declaration for a specific period of time, the TC will include a LPN and a 24-hour period (start and end date on a calender day) in its request to the TSP. The TSP will then send an InfoExchange response which includes all Toll Declaration ADU's for trips that have been in progress with this time window, meaning:
- all toll trips starting or ending within this time window; and
- a toll trip having started before and ended after this time window.

Response - Toll Declaration message
The Toll Declaration message includes (non-exhaustive):
- Toll context version
- Movement data including
  - Usage lists for chargeable road sections driven
    - Containing a charge object for each single road section
  - Additional usage information
    - containing a geojson as an attachment
- Tariff data for this user
  - Vehicle parameters
  - Tariff group and rate
- A geojson-file (as an attachment)
  - Containing all movement data for a service user that has driven on the Dutch road network; chargeable and non-chargeable (see: 3.1.4 Specific requirements for this interaction).

[3] *A Billing Details message contains an aduldentifier, which identifies a unique Toll Declaration*

3.1.1 Interaction diagram



3.1.2 Number of interactions

This number is expected to vary from day to day.

3.1.3 Technical requirements

See: Chapter Technical requirements (p. 24).

3.1.4 Specific requirements for this interaction

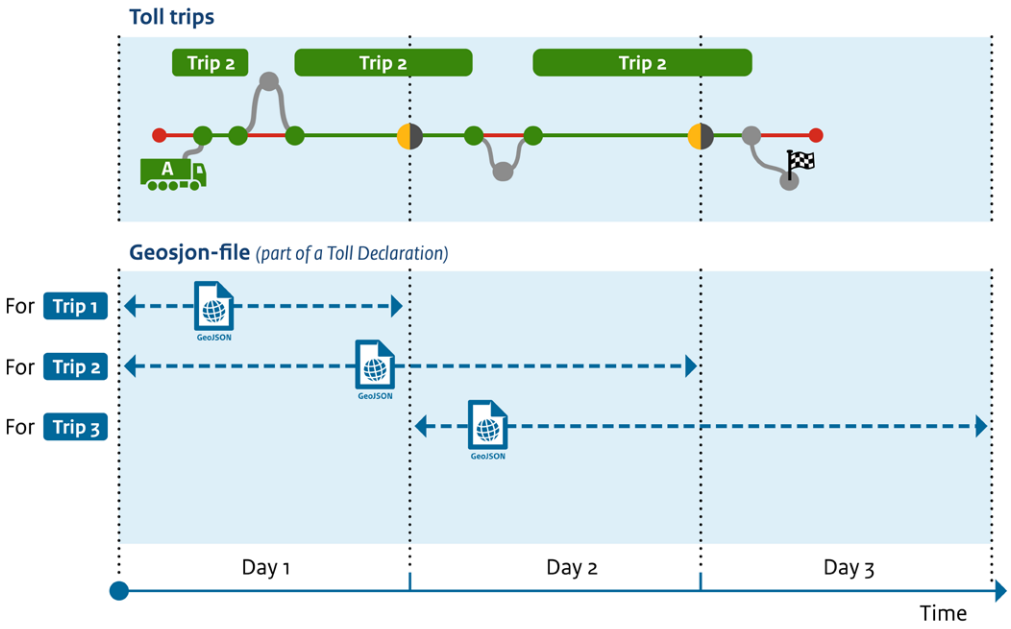
A Toll Declaration message must contain a geojson file as an attachment. This geojson file contains all movements on the Dutch road network for a period.

Content period for geojson file

A request for a Toll declaration can be made for a specific toll trip or a certain period for an Obe. The period for which movement data needs to be included in a geojson-file depends on the request. Both a request for a specific toll trip and for a specific period are described below.

Request for specific toll trip

When details for a specific toll trip are requested by TC, the Toll Declaration that is sent by TSP to TC, must contain all calender days in which a toll trip has taken place.



In the figure above three examples are shown.

- If a Toll declaration is requested for toll trip 1, the geojson file must contain all movements on the Dutch road network (chargeable and non-chargeable) for day 1 (the entire calender day, starting at 0:00:00; ending at 23:59:59).
- For toll trip 2 the geojson file must contain all movements for for both calender days (day 1 and 2).
- For toll trip 3 the geojson file must contain all movements for both calender days (day 2 and 3).

Request for specific period for an Obe
When a Toll declaration is requested for a specific period, the geojson file must contain all movements on the Dutch road network (chargeable and non-chargeable) for the requested period for a specific Obe.

Based on the example above: If day 2 is requested, the geojson file must contain all chargeable and non-chargeable movements on the Dutch road network during day 2; and therefore will also contain the parts/movements of toll trips 2 and 3 that have taken place during day 2.

3.2 Data exchange "Request for User Details"

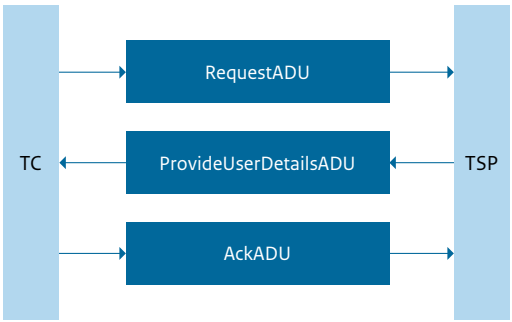
The TC requests the TSP to send a User Details message to the TC. A request for User Details will be made for a specific user by including:

- User id, including one or more of the following:
  - LPN and/or
  - Pan and/or
  - Obe ID
- Request reason
- Requested information
- Period

Response – User details message
The User details message includes (non-exhaustive):

- LPN
- Pan
- Obe ID
- User postal adress
- Vehicle weight limits

3.2.1 Interaction diagram



3.2.2 Number of interactions

It is estimated for the TC to request an average number of 1.800 User Details messages per day. This number will vary from day to day and is estimated to range from 900 requests to 3,500 requests.

3.2.3 Technical requirements

See: Chapter Technical requirements (p. 24).

4 Technical requirements

This chapter describes the technical requirements for every data exchange, between TSP and TC, that has been included in this document.

4.1 Security

- HTTPS
- TLS1.2 or higher
- 2-sided TLS
  (The service can only be used with the correct key based in 2-sided TLS)
- No VPN

4.2 Protocol

- XML, with XSD validation
- No FTP

4.3 Signing

The XML-message must be signed with a signing-key. The certificate for signing cannot be the same key as the key that is used for TLS transport. Please note that xmldsig signature checking is used instead of the standard ISO signing.

4.4 Processing

4.4.1 Message oriented processing

For each message that is sent by the TSP and is received by the TC a technical acknowledgement will be sent to confirm the completion of the technical transfer of this message. This is a synchronous transaction.

Each message will then be processed asynchronously. The TC validates the received message. If no errors are found during the checks, the processing of the message is acknowledged by the TC. The interaction protocol for each transaction type determines which message is returned.

If an error is found during the checks, an AckADU-message is returned containing the error code. The message is then not processed by the TC, unless specified otherwise (e.g. for ExceptionList entries).

4.4.2 Requests from TC to TSP

Each request (“RequestADU”), that is sent by the TC to the TSP, needs to be processed asynchronously. The reply (or answer) to the request is handled as described under 4.4.1 Interaction TSP - TC.

4.4.3 AckADU

The AckADU message is used to indicate that a specific message has been received. The AckADU indicates if this message is accepted or rejected. When the TC sends an AckADU message indicating the received message is accepted, this means that the TC has been succesfully processed and stored the data that was transferred in the received message.

If a received message is rejected, the AckADU will contain one or more issues to inform the sender about the reason of the rejection. It is possible that a message is accepted with issues. E.g. a whitelist message is accepted, but some entries are rejected.
When the TC rejects a received message, the TSP needs to fix the issue that has occured. After the issue is fixed the TSP will send a new message (with a new aduIdentifier).

4.5 Retry mechanism

If it is not possible for the TC to deliver messages to the TSP, a number of retries will be performed in order to successfully deliver the message. If a message still cannot be delivered, the delivery process for this message will be put on hold. An action by an operator is required.

4.6 Large files and compression

An InfoExchange-message containing e.g. an ExceptionListADU or an EfcContextDataADU can have a large file size. A message larger than parameter "MaxMessageFileSize" (default value: 100 Mb) will not be accepted. A large message can therefore be compressed (zip) in order to transmit a smaller message.

A response to a large received message can also be quite large (in case of issues). A TSP must therefore also be able to receive and process compressed messages from the TC.

4.6.1 Message file size and compression

The quantity structure presented in this paragraph is of an informative nature and reflects the TC's expectations of the data quantities transmitted.

The determination of the size of the data for e.g. an ExceptionListADU (whitelist) to be transmitted is derived on the basis of a maximum scenario. Assuming a 100% market share and user numbers from 2020 studies, around 850,000 user ID's will be active in the Dutch EETS-domain. If all user ID's are registered with one TSP, this results to the following quantity structure.

During a complete transmission, a whitelist containing 850,000 entries is submitted. If the InfoExchange-message is compressed to zipped form, this will result in a message of approx. 50 Mb. Without zip compression the size will be approx. 425 Mb.

List of definitions and abbreviations

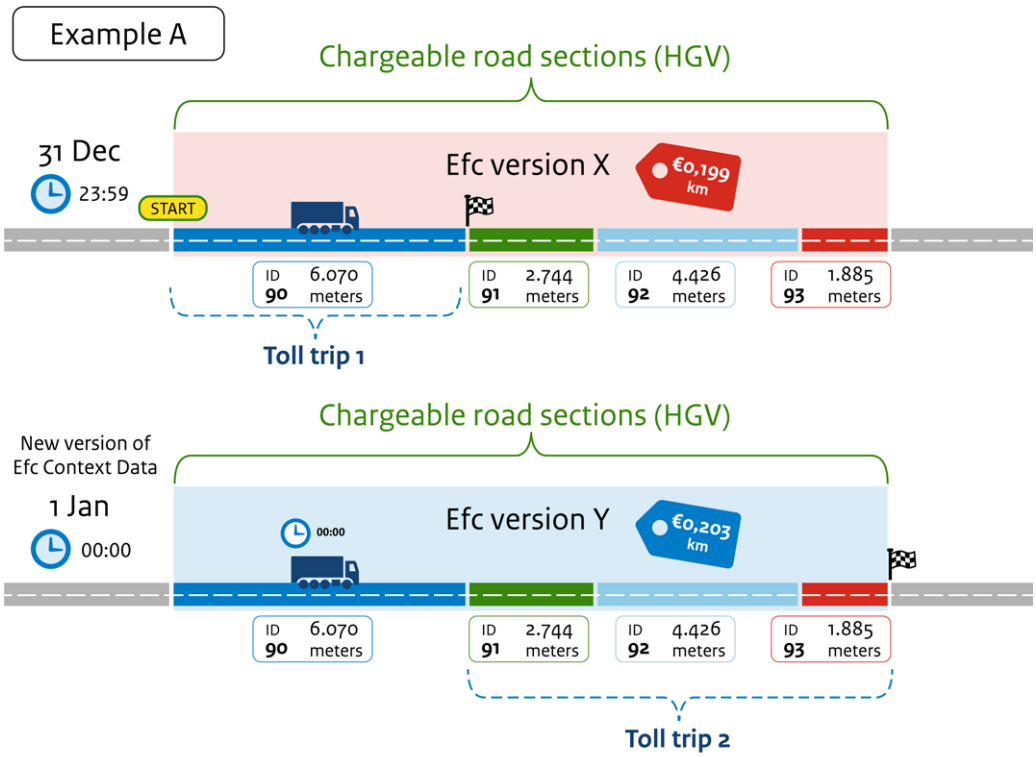
Abbreviation	Explanation
ADU	Application Data Unit; a data structure of a specific type
Chargeable road section	A road section for which a Heavy Goods Vehicle Charge is owed when it is used or driven.
Chargeable network	The network consists of chains of connected chargeable road sections. The chargeable network is entered when leaving a non-chargeable road section and entering a chargeable road section. The chargeable network is exited when driving on a chargeable road section is followed by driving on a non-chargeable road section.
Day	A calender day
EETS	European Electronic Toll Service
EFC	Electronic Fee Collection
HGV Charge	Heavy Goods Vehicle Charge
Holder	Person or organization that bears responsibility for a vehicle
LPN	License plate number
MSP	Main Service Provider (contractor); the MSP is a Toll Service Provider
OBE	On Board Equipment
Pan	Personal account number
RDW	The Dutch Vehicle Authority; the Toll Charger for the HGV Charge
TC	Toll Charger
Toll trip	A toll trip is a contiguous series of road sections starting with the first road section when a vehicle enters the chargeable road network and ends with: • the road section where the vehicle leaves the chargeable road network; • the road section where the vehicle is located at the time a new version of Efc Context Data comes into effect; • the road section where the status of the OBE is changed to a NoGo status (ISO 12813:213); or • the road section that has been registered 72 hours after the start of the toll trip.
TSP	Toll Service Provider
SU	Service user
Service user	User of a toll service that has concluded a service agreement for its vehicle with a toll service provider. A service user (and its vehicle) is identified by the unique combination of pan, LPN and Obe id.
Vrachtwagenheffing (VWH)	Heavy Goods Vehicle Charge (HGV Charge)
Zero-km notification	A Billing details message containing 0 (zero) chargeable kilometers, indicating a vehicle has driven on the Dutch road network without entering the chargeable network. This functionality must only be used by the Main Service Provider.

Annex A - Changes in Efc context data version during a toll trip

The following situations, when changes to the chargeable network come into effect with a new Efc context data version, are elaborated upon:

- Tariff changes
- Adding new chargeable roads or road sections
- Removing existing chargeable road sections
- Splitting existing chargeable road sections

Tariff changes

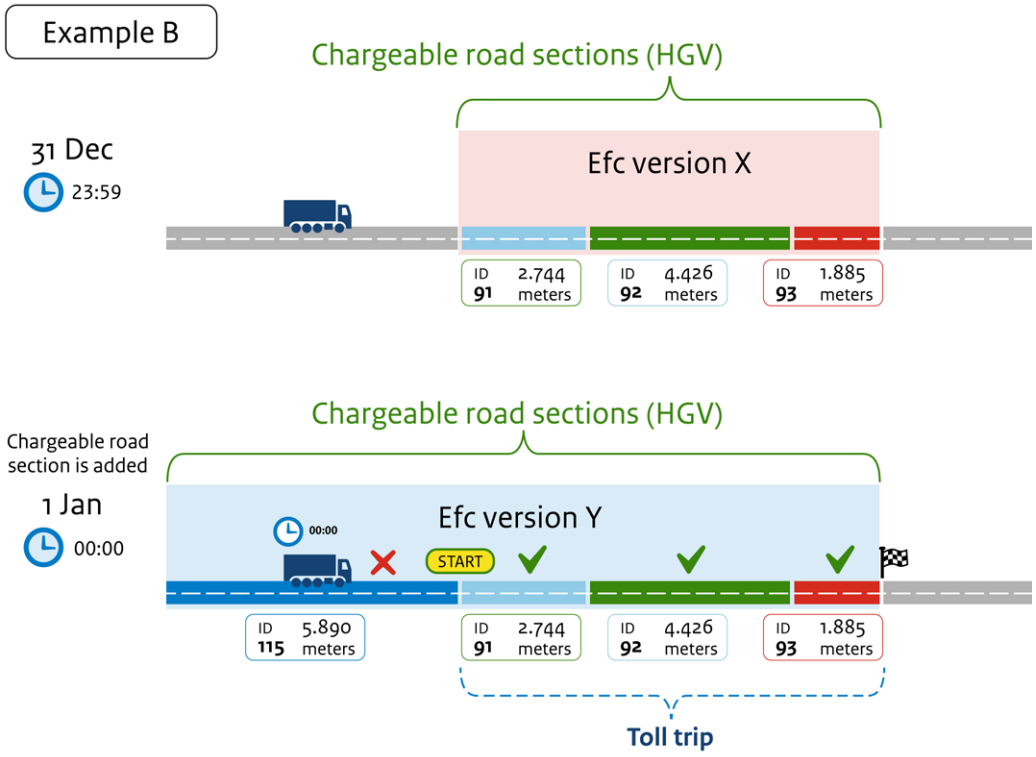


Example A shows a vehicle that has entered the chargeable network; the valid Efc context data version is X. While the vehicle is driving along road section 90, a new version of the Efc context data becomes valid: Y. Toll trip 1 ends and includes road section 90. Toll trip 1 is charged at the tariff of Efc context data version X: €0,199 per km.

A new toll trip (2) starts when the vehicle enters road section 91, as this road section is chargeable. The tariff of €0,203 per km in the new Efc context data version (Y) must be applied to this new toll trip (2).

Adding new chargeable roads or road sections

When a new road is added to the chargeable network, a situation can occur in which a vehicle starts driving on a road section that is not part of the chargeable network. However, before exiting this road section, a new version of the Efc Context Data becomes valid, adding this road section to the chargeable road network.



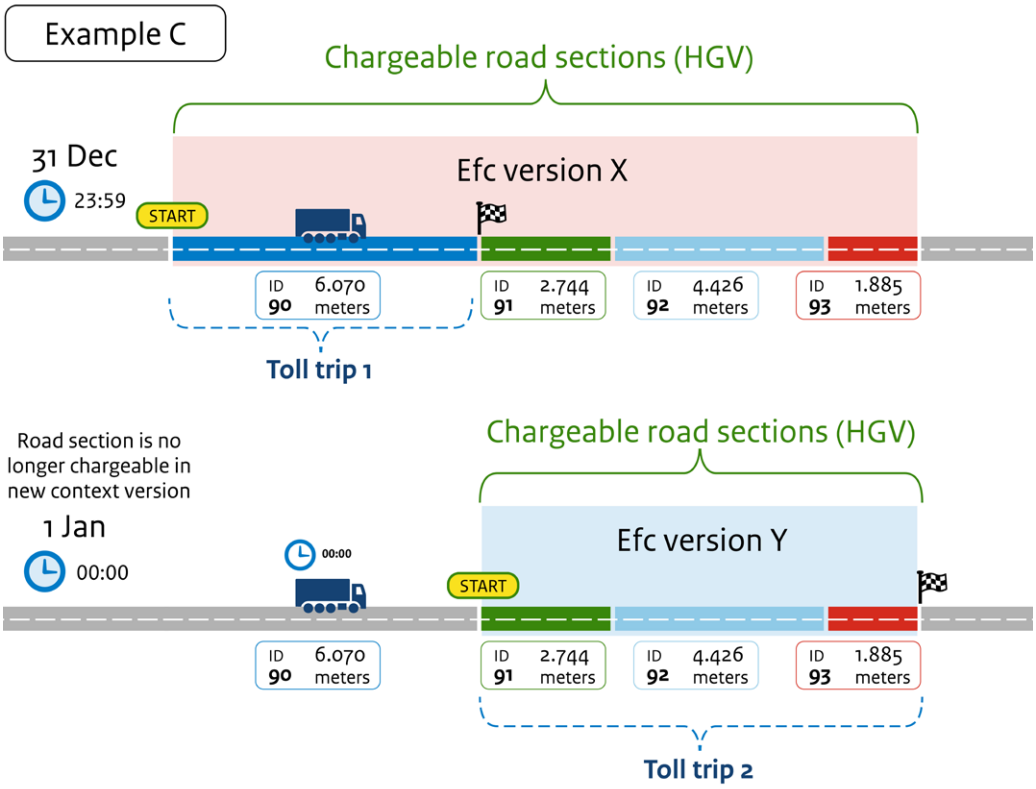
The holder of a vehicle is charged when its vehicle enters a chargeable road section. When a road section is added to the chargeable network, this road section may not be charged to the holder if its vehicle had already entered this road section.

In example B a vehicle is driving outside of the chargeable network; the valid Efc context data version is X. While the vehicle is driving, a new Efc context data version becomes valid: Y. This new version also contains a new road section: 115. Road section 115 may not be charged to the holder, since the vehicle had already entered this road section before Efc context data version Y became valid. When the vehicle enters chargeable road section 91, a toll trip starts with Efc context data version Y.

Note: This situation can also occur at the operational start of HGV Charge.

Removing existing chargeable road sections

When an existing road is removed from the chargeable network, the following situation can occur. A vehicle has entered a chargeable road section. While driving on this road section a new Efc context data version becomes valid. In this Efc context data version this road section is no longer present, because it is no longer chargeable.



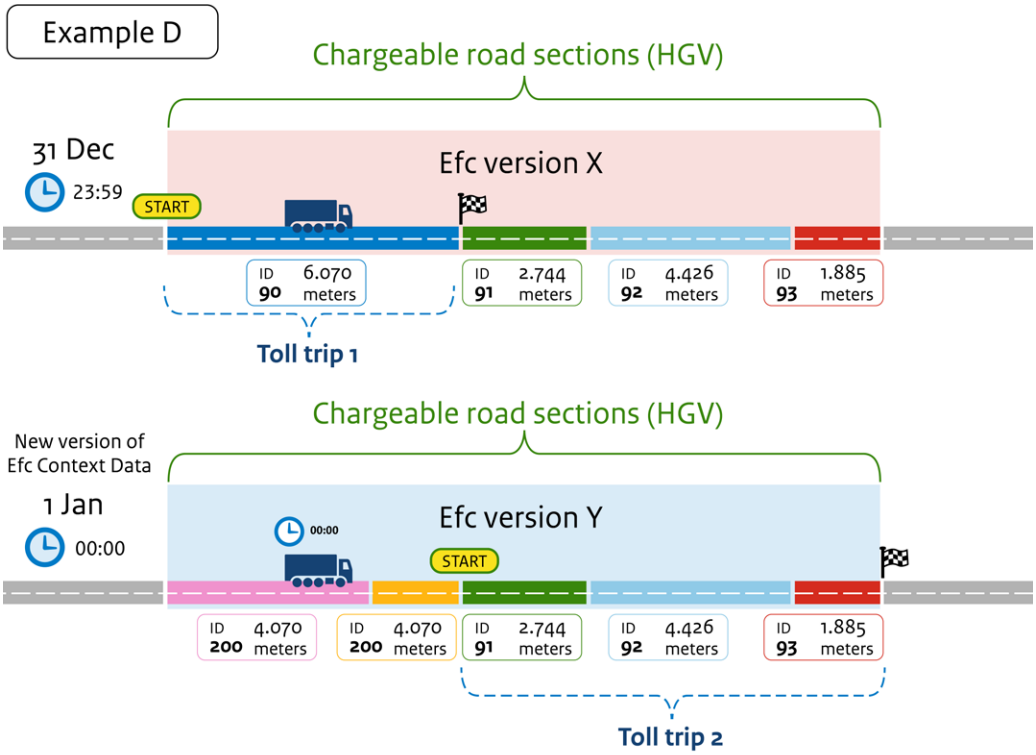
Example C shows a vehicle that has entered the chargeable network; the valid Efc context data version is X. While the vehicle is driving along road section 90, a new version of the Efc context data becomes valid:version Y. Toll trip 1 ends and includes road section 90. Toll trip 1 is charged at the tarif of Efc context data version X.

The fact that road section 90 is no longer chargeable in the new Efc context data version Y is not relevant for toll trip 1. When the vehicle enters chargeable road section 91, a toll trip starts with Efc context data version Y.

Splitting existing road sections

A road section can split in a new Efc context version. E.g. when a new highway exit is built. When a road section is split, it will actually be removed from the network, being replaced by two new road sections.

The following situation can occur. A vehicle has entered a chargeable road section. While driving on this road section a new Efc context data version becomes valid. In this Efc context data version this road section is no longer present because it as been split.



Example D shows a vehicle that has entered the chargeable network; the valid Efc context data version is X. While the vehicle is driving along road section 90, a new version of the Efc context data becomes valid: Y. Toll trip 1 ends and includes road section 90. The fact that road section 90 is no longer present in the new Efc context data version is not relevant for toll trip 1.

The new Efc context data version Y contains two new road sections, 200 and 201, which have replaced road section 90. Since use of a road may not be charged twice, road sections 200 and 201 may not be charged to the holder.

When the vehicle enters chargeable road section 91, a new toll trip (2) starts with Efc context data version Y.

This is a publication of:

The Ministry of Infrastructure and Water Management

Postbus 20901
2500 EX The Hague

October 2024