

## ETCB's X-Road interface specification

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## 1 Introduction

This document describes the general protocol for exchanging messages with the Estonian Tax and Customs Board via X-Road. This specification is shared by all the services provided and describes the technical aspects of communication.

The standard X-Road infrastructure is used for the transmission of data to the ETCB's customs systems [1]. To be able to use the services, a company is required to have signed up for X-Road [2]. The relevant manuals describe in general terms the interfacing of information systems with X-Road [3].

Different documents are processed by different customs systems. For instance, an entry summary declaration is submitted to the ICS system, a transit declaration to the NCTS system etc. A separate document is compiled for each system providing services via X-Road, describing the services provided, the messages used, the rules for the compilation of the messages and the codes used in the messages.

This document describes the general transport mechanisms used by all the customs information systems for the provision of services via X-Road.

### 1.1 Definitions and acronyms

Designation	Description
ETCB	Estonian Tax and Customs Board
MRN	Movement Reference Number. Unique reference number of a customs document
Customs	ETCB
Customs system	Subsystem of the information system of the ETCB, which processes customs documents (customs declaration, entry summary declaration, transit declaration, TIR carnet, ...).
X-Road	Information system data exchange layer between Estonian institutions and organisations [1]
XML	[4]
XSD	[5]
WSDL	[6]

### 1.2 References

1. EISA's X-Road website, <https://www.ria.ee/ee/x-tee.html>
2. Legal person signing up for X-Road, <https://www.ria.ee/ee/x-tee-liitumine.html>
3. X-Road manuals, <https://www.ria.ee/ee/x-tee-j-uhendid.html>
4. Extensible Markup Language (XML), <http://www.w3.org/XML/>
5. XML Schema (XSD), <http://www.w3.org/XML/Schema>
6. Web Services Description Language (WSDL), <http://www.w3.org/2002/ws/desc/>
7. WSDL of ETCB's X-Road service, xteeTolliOperatsioon.wsdl

8. X-Road message protocol, [http://x-road.eu/docs/x-road\\_message\\_protocol\\_v4.0.pdf](http://x-road.eu/docs/x-road_message_protocol_v4.0.pdf)

## 2 X-Road service

All the services of the information systems provided by the ETCB's customs information systems are available via the common X-Road service. The selection of the actual service occurs during the retrieval of the service by the company based on pre-provided parameters.

This solution speeds up the development and implementation of new services.

The name of the common X-Road service of the customs information systems is xteeTolliOperatsioon. The specification of this service is provided separately in a WSDL file [7].

This chapter describes the service and its use.

### 2.1 X-Road message

An X-Road message or reply consists of a header and a body. The composition and format of the information in the header are defined by the X-Road specification [3]. The composition and format of the information in the body are defined by this document.

### 2.2 Query header

The header of a message has to conform to the X-Road message protocol [8].

Values of elements describing the service (xrd:service):

1. xRoadInstance – EE
2. memberClass – GOV
3. memberCode – 70000349
4. subsystemCode – complex
5. serviceCode – xteeTolliOperatsioon
6. serviceVersion – v1

### 2.3 Query body

The body of an X-Road query of the ETCB's customs systems has the following elements:

1. system – system to which a document is sent. The name of the system is provided in the specification of the X-Road services of the relevant subsystem, prepared as an independent document. The names of the systems are in the form of ICS, ECS, NCTS etc.
2. operation – name of the operation utilised. The operation name is provided in the specification of the X-Road services of the relevant subsystem, prepared as an independent document.
3. automaticNotificationMailAddress – electronic mail address to which the ETCB's information system sends notices about notices sent to the company by the customs (see Chapter 4).
4. data – XML document in the format defined by the operation utilised. The format of the XML document is provided in the specification of the X-Road services of the relevant

subsystem, prepared as an independent document.

## **2.4 Reply body**

The body of an X-Road reply of the ETCB's customs systems has the following elements:

1. system – system that sent the reply. The name of the system is provided in the specification of the X-Road services of the relevant subsystem, prepared as an independent document. The names of the systems are in the form of ICS, ECS, NCTS etc.
2. result – operation result. The result of the operation defines the document type in the data field (name of the root element of the XML document).
3. data – XML document in the format defined by the operation utilised. The format of the XML document is provided in the specification of the X-Road services of the relevant subsystem, prepared as an independent document.

## **2.5 Description of a specific service – summary**

For the final specification of a service provided via the X-Road service described in this chapter, the following has to be described:

1. System name.
2. Operation name.
3. Format of the input document.
4. Formats of the output document(s).

These descriptions have been combined into independent system-relevant specifications.

## **3 Synchronous and asynchronous services**

This chapter describes three scenarios for communication between the company and the customs:

- 1) use of a synchronous service by the company;
- 2) transmission of a notice from the company to the customs;
- 3) transmission of a notice from the customs to the company.

### **3.1 Synchronous service**

In the case of a synchronous service, the company sends the customs system an XML document and immediately receives from the customs system in return another XML document notifying the company about the result of the operation.

In terms of X-Road, one X-Road query is submitted to the ETCB database, where the XML document sent by the company is in the company's query, whereas the XML document sent by the ETCB is in the ETCB's reply.

In the case of a synchronous service, the information system of the company immediately finds out the final result of the operation.

### **3.2 Transmission of a notice from the company to the customs**

In the case of the transmission of a notice from the company to the customs, the company sends the customs system an XML document and immediately receives from the customs system in return another XML document notifying the company about the result of the operation.

In terms of X-Road, an X-Road query is submitted to the ETCB database, where the XML

document sent by the company is in the company's query, whereas the XML document sent by the ETCB is in the ETCB's reply.

If a notice is sent to the customs, the information system of the company does not immediately find out the final result of the processing of the message. Usually, this is related to the launch in the ETCB's information system of a complex document processing process, potentially involving many parties, which makes the return of a synchronous reply impractical.

The information system of the company does not find out the final result of the operation but rather that the document has been accepted for processing.

### **3.3 Transmission of a notice from the customs to the company**

In certain operating processes, the initiative to begin communication is taken by the customs. A notice has to be sent by the customs to the information system of the company. The infrastructure of X-Road is asymmetrical: there are distinguished those running queries, or institutions in X-Road jargon, and those replying to queries, or databases in X-Road jargon. The technical requirements for the database are much higher than those for the institution. Therefore, provision of two-way communication between two organisations using solely the facilities of X-Road would end up being significantly costlier for companies.

A solution is provided by a mailbox service added to the customs information system. Messages sent to companies are transmitted by customs information systems transmit to the mailbox. The mailbox notifies the information system of the company (see Chapter 4), whereupon the information system of the company requests from the mailbox all the messages put on hold, using for this a dedicated service provided via the standard X-Road service of the customs.

Transmission of a notice from the customs information system to the company consists of the following steps:

1. The customs system sends the mailbox an XML document. The header of the message states the registration number of the company, the sender's system and the message type.
2. The mailbox stores the message.
3. The mailbox searches the database of notification addresses for the electronic mail address of the information system of the company.
4. If the mailbox finds the address, it sends an e-mail to this address to trigger activity on the part of the company.
5. The information system of the company receives the e-mail sent by the mailbox.
6. The information system of the company uses the service of reading the message in the mailbox (see Chapter 5) and reads the message put on hold by the customs system.
7. The information system of the company processes the message received, launching the necessary processes or the like.

## **4 Feedback service**

The feedback service is a service external to X-Road, whereby the customs information system notifies the company about any messages put on hold.

The feedback service is performed by the transmission of an e-mail by the customs information system to the e-mail address of the company.

For the feedback service to function, the company has to do two things:

1. Allocate an e-mail address not used for any other purpose apart from receiving notifications from the customs and configure its e-mail system so that the arrival of a letter at this address activates a previously defined process in the information system of the company.
2. Include the allocated e-mail address in the automaticNotificationMailAddress field of all the X-Road service queries of the customs.

The X-Road service picks this e-mail address out of the query and stores in the address base of the mailbox the link between the registration number of the company and the e-mail address.

If, subsequently, a notice is received in the mailbox for this company, the mailbox searches the address base for the email address based on the registration number of the company and sends an e-mail to this address.

The e-mail address is shared by all the systems. If the company has sent the customs a notification address, for example, during the use of ICS, it is also used by the customs, for instance, for notification about NCTS events.

## 5 Mailbox service

For the company, the mailbox is a customs system that provides one service.

1. The name of the system (query parameter system) is POBOX.
2. The name of the service (query parameter operation) is fetchMessage.
3. The query is not accompanied by an XML document (the data element is missing).

A reply to a query includes information about the system that has put a message into the mailbox:

1. The name (not POBOX!) of the system that has sent the message. Based on this parameter, the information system of the company can direct the message into the right subsystem.
2. Message type (name of the root element of the XML document).
3. Message sent by the customs system.

If there was no message in the mailbox, the mailbox returns a reply in which the system is POBOX, the message type is 'OK' and there is no XML document.

The information system of the company could or should request messages from the mailbox until receiving a notice that the mailbox has become empty.