

Specification of X-Road Interface of ETCB

Date	Version	Description	Author
02.02.09	0.1	Second version	Arne Ansper

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1 Introduction

This document describes the general protocol for exchange of messages with Estonian Tax and Customs Board (ETCB) via X-Road. This is the common specification for all the provided services and describes the technical aspects of communication.

Standard X-Road infrastructure is used for data transfer to the customs information systems of ETCB [1]. Traders can use the services if they have acceded to the X-Road [2]. Interfacing of the information systems with the X-Road is described in the respective instructions [3].

Different customs systems are processing different documents. For example entry summary declarations are lodged with the ICS system, transit declarations with NCTS system, etc. Separate documents describing the services provided, messages used, rules for compiling messages and codes used in messages will be prepared for each system providing services via X-Road.

This document describes general transporting mechanisms used by all customs information systems for providing services via X-Road.

1.1 Definitions and abbreviations

Definition	Description
ETCB	Estonian Tax and Customs Board
MRN	Movement Reference Number.
Customs	ETCB
Customs system	Sub-system of the information system of ETCB processing customs documents (customs declarations, entry summary declarations, transit declarations, TIR-Carnets, ...).
X-Road	Data exchange layer used for data exchange between the information systems of Estonian institutions and organisations [1]
XML	[4]
XSD	[5]
WSDL	[6]

1.2 References

- 1: RIA X-Road website, <http://www.ria.ee/xtee>
- 2: Accession of a legal person with the X-Road, <http://www.ria.ee/26431>
- 3: Instructions of X-Road, <http://www.ria.ee/26436>
- 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 X-Road service of ETCB, `xteeTolliOperatsioon.wsdl`

2 X-Road service

All the services provided by customs information systems of ETCB are available via one common X-Road service. Selection of a certain service is done by retrieval of a service according to the parameters predetermined by a trader.

Such solution accelerates the development and implementation of new services.

The name of common X-Road service of customs information systems is `xteeTolliOperatsioon`. Specification of this service is provided in a separate WSDL file [7].

This chapter describes the X-Road service and its usage.

2.1 X-Road message

The X-Road message and the reply consist of a header and of a body. Composition and format of the information in the header are determined by the X-Road specification [3]. Composition and format of the information in the body are determined by this document.

2.2 Header of a query

The header of the X-Road query contains the following elements:

1. agency – registry code of a trader sending a query
2. database – name of a database. For ETCB services always „ETCB“
3. personal ID code – ID code of a service user to be preceded by a two letter country code. When the X-Road service of ETCB is used according to the process, which is started up by a certain user (vs according to the process started automatically by the system), then this field must contain the personal ID code of the user.
4. id – unique identifier of a service retrieval. The trader's information system must generate a unique identifier for each X-Road service retrieval.
5. name – name of the used service. For ETCB customs information systems it is always „`xteeTolliOperatsioon`“.
6. file – number of a document related to a service retrieval. Completion of this field is not mandatory.

The relevant unique number of a customs document (MNR) may be indicated if desired.

2.3 Body of a query

The body of ETCB customs systems X-Road query contains the following elements:

1. system – system where the query is addressed to. The name of a system is specified in the specification of a respective sub-system of X-Road services, which is a separate document. Names of the systems are expressed like this: ICS, ECS, NCTS, etc.
2. operation – name of the applied operation. The name of an operation is specified in the specification of a respective sub-system of X-Road services, which is a separate document.
3. automaticNotificationMailAddress – e-mail address where the ETCB information system will send messages about notifications sent to a trader by customs (see Chapter 4).
4. data – XML document in the format designated by the applied operation. The format of an XML document is specified in the specification of a respective sub-system of X-Road services, which is a separate document.

2.4 Body of a reply

The body of ETCB customs systems X-Road reply contains the following elements:

1. system – system that sent the reply. The name of a system is specified in the specification of a respective sub-system of X-Road services, which is a separate document. Names of the systems are expressed like this. ICS, ECS, NCTS, etc.
2. result – operation result. Operation result will determine the document type in the data field (name of the root element of an XML document).
3. data – XML document in the format designated by the applied operation. The format of an XML document is specified in the specification of a respective sub-system of X-Road services, which is a separate document.

2.5 Description of a service - summary

The following description must be given for complete specification of a service provided via X-Road services as described in this chapter:

1. Name of a system.
2. Name of an operation.
3. Format of an input document.
4. Format/formats of output document/documents.

These descriptions have been consolidated in separate specifications prepared for different systems.

3 Synchronous and asynchronous services

This chapter describes the three communication types between customs and traders:

- 1) Use of a synchronous service by a trader;
- 2) Sending a message to customs by a trader;
- 3) Sending a message to a trader by customs.

3.1 Synchronous service

In case of a synchronous service a trader will send an XML document to customs and will immediately receive another XML document from the customs system as a reply, notifying the trader on the results of the operation.

In terms of X-Road it must be regarded as the submission of one X-Road query to the database of ETCB, whereas the XML document sent by the trader is in the query of the trader and the XML document sent back by ETCB is in the reply to the query.

In case of the synchronous service the trader's information system will get the final result of the operation immediately.

3.2 Sending a message to customs by a trader

When sending a message to customs a trader will send an XML document to the customs system and will immediately receive another XML document from the customs system as a reply, informing the trader about the receipt of the document and on successful conduct of elementary checks.

In terms of X-Road it must be regarded as the submission of one X-Road query to the database of ETCB, whereas the XML document sent by the trader is in the query of the trader and the XML document sent back by ETCB is in the reply to the query.

When sending a message to customs the trader's information system will not receive immediately the final result of processing of the message. Normally this will start up a complicated document processing process in the information system of ETCB, possibly involving communication with a number of parties, which will make sending of the synchronous reply unpractical.

The trader's information system will not get the final result of the operation but will only be informed that the document has been accepted for processing.

3.3 Sending a message to a trader by customs

In certain operational processes customs will take the initiative for commencement of the communication. Customs have to send a message to a trader's information system. X-Road has asymmetric infrastructure – distinction is made between the bodies sending queries, or institutions in X-Road terms, and the bodies replying to queries, or the databases in X-Road terms. Technical requirements for a database are much higher than for institutions. Therefore, enabling the bidirectional communication between two organisations via X-Road would make it too expensive for traders.

Postbox service added to the customs information system provides a solution to this problem. Customs information systems will send the messages received from traders into the postbox. Postbox notifies the trader's information system (see Chapter 4), upon what the trader's information system enquires for all the delayed messages from the postbox using a special service provided in addition to the standard X-Road service.

Sending a message from customs information system to a trader consists of the following stages:

1. Customs system will send an XML document to the postbox. Header of the message contains the trader's registry code, name of the sender's information system and message type.
2. Postbox will store the message.
3. Postbox will search the e-mail address of the trader's information system from the database of notification addresses.

4. When the postbox finds the address, it will send the e-mail to the trader, which will activate the trader's operations.
5. The trader's information system will receive the e-mail sent by the postbox.
6. The trader's information system uses the service for reading the messages stored in the postbox (see Chapter 5) and will read the message delayed by the customs system.
7. The trader's information system processes the received message – will start up necessary processes, etc.

4 Feedback service

Feedback service, through which the customs information system informs traders about the delayed messages, is the service provided outside the X-Road services.

Feedback service is implemented by sending the e-mail by the customs information system at the trader's e-mail address.

In order to make use of the feedback service traders are expected to:

1. Create an e-mail address, which will be used only for receiving the messages sent by customs and for nothing else. The mailing system must be configured so that the arrival of a message at this address would activate the predetermined process in the trader's information system.
2. Add this e-mail address to the query field `automaticNotificationMailAddress` of all customs X-Road services.

Customs X-Road service will pick this e-mail address out of the query and will store the connection between the trader's registry code and the e-mail address in the postbox database of addresses.

If then a message will arrive in the postbox for this trader the postbox will find the e-mail address of the trader according to its registry code and will send the e-mail at this address.

This mailing address is the same for all systems. If a trader has sent the mailing address to customs in the course of using ICS then customs will use it also for notification of NCTS operations.

5 Postbox service

Postbox is one of the customs systems for a trader, which provides only one service.

1. Name of the system (parameter of the query - system) is `POBOX`.
2. Name of the service (parameter of the query - operation) is `fetchMessage`.
3. XML document is not attached to the query (element 'data' is missing).

Reply to the query contains the data of the system that stored the message in the postbox:

1. Name of the system that sent a message (not `POBOX`!). According to this parameter the trader's information system can address the message to an appropriate sub-system.
2. Message type (name of the root element of an XML document).
3. Message sent by the customs system.

In case there were no messages in the postbox it will send the reply, in which the system is `POBOX`, message type is „OK“ and the XML document is missing.

The trader's information system could or should enquire the messages from the postbox until it receives the message that the postbox is empty.