Specification of secure electronic communication between organisations in the insurance sector

(Version 1.1)

Version	**Date**	**Description**
V.1.0	10.09.2002	Original version
V.1.1	28.04.2003	- Restructuring of the specification - Defined security levels - Registered namespace, ssek.org. for the scheme - Adaptation of SSEK to WS-Security - Defined receipt - Defined TxHeader - Support for version management of SSEK through namespace on TxHeader - Defined error management through soap fault

1. Introduction

1.1 Background

SSEK ("Specifikation av säker elektronisk kommunikation mellan aktörer i försäkringsbranschen", in english "Specification of secure electronic communication between organisations in the insurance sector") fulfils the business need for a standard for secure electronic communication in the insurance sector. By following the specification, organisations will reduce the risk of having to build up several different communication solutions or of insecure communication solutions being constructed.

1.2 Purpose

This document is a specification of how electronic communication should be carried out securely over the Internet. The document is ideal for use as underlying information and could be included in agreements concerning how communication should be carried out between one's own organisation and another organisation.

1.3 Notation

In this document, the keywords SHOULD, CAN, MUST and MUST NOT have the following meaning.

Keyword	**Meaning**
SHOULD	The text being referred to is recommended but is not a requirement for fulfilling the specification.
CAN	The text being referred to can be used if the transactions require it but it is not a requirement for fulfilling the specification.
MUST	The text being referred to is a requirement for fulfilling the specification.
MUST NOT	The text being referred to is not permitted under the specification.

1.4 Management of the specification

SSEK is being managed with the SFM ("Svenska Försäkrings Mäklares förening", in english "the Swedish Insurance Brokers' Association"). The group that is handling the publication of the specification has representatives from the organisations Skandia Liv, SEB Trygg-Liv, Länsförsäkringar, Alecta, Aspispronia, Danica, Folksam, SPP and SFM.

1.5 Versions and backwards compatibility

This specification is not static and may be amended in order to adapt it to new or amended standards, e.g. concerning signature management. Implementations of the specification must be able to handle different versions of the specification by programmatically determining the version of SSEK for a particular incoming message. This is handled through giving TxHeader a new namespace for each version of SSEK, where the changes are such that they affect the implementations. This applies regardless of whether or not the actual content or structure of TxHeader has been altered.

For version 1.1 of the SSEK, the following namespace applies for TxHeader:
http://schemas.ssek.org/txheader/2003-04-03/

For any future version 1.2 of SSEK the namespace for TxHeader could be:
http://schemas.ssek.org/txheader/2004-01-12/

1.6 Affiliated organisations

The organisations that have adopted the specification have decided to communicate electronically in accordance with the SSEK and have a completed platform for SSEK or are in the process of developing such a platform. It will therefore be possible for communication with affiliated organisations to be carried out after a commercially acceptable period of time by both parties.
We (the group for SSEK within SFM) also naturally encourage organisations that have not adopted the specification to use the SSEK for secure electronic communication.

The following organisations have adopted SSEK.

- Skandia Liv
- SEB Trygg-Liv
- Länsförsäkringar

1.7 Standards

This document, SSEK, describes what electronic communication between parties in the insurance sector should look like. SSEK is based on a number of existing standards, specifications and recommendations from acknowledged standardising bodies such as IETF (Internet Engineering Task Force), W3C (World Wide Web Consortium) and OASIS (Organisation for the Advancement of Structured Information Standards).

For information on which standards SSEK is based on, see *Appendix A Standards* and *Appendix B Web Services Security*.

The standards and specifications that are listed in *Appendix A Standards* are fully covered by SSEK with the exception of WS-Security (Web Services-Security) and therefore also XMLSignature, where selected parts are used in accordance with *Appendix B Web Services Security*.
Like SSEK, WS-Security is based on a collection of standards and describes how electronic communication is carried out securely. SSEK is however direct adapted to the needs for electronic communication in the insurance sector. Only the parts of the WS-Security specification for which there is a commercial need are therefore used.

A major advantage of supporting parts of WS-Security is that the products that are developed with support for WS-Security can be used. SSEK messages can therefore be created and handled using the frameworks that following the WS-Security specification.

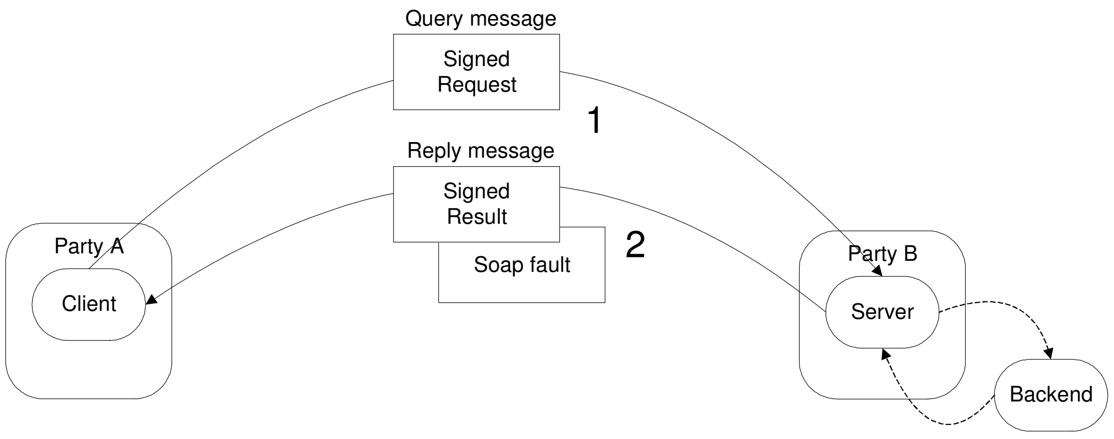
2 Communication

In connection with electronic communication, the flow MUST be specified between the communicating parties. This section describes the flow of communication for synchronous and asynchronous communication.

All communication in accordance with SSEK takes place synchronously with a **query message** and a **reply message** in the form of SOAP messages. An asynchronous flow can be achieved by combining two synchronous transmissions. To separate the synchronous transmissions in an asynchronous flow, we will hereafter refer to these as the **request** and the **result**. In order to link together an asynchronous flow, i.e. connecting the request to the result, TxId is used in accordance with *3.4 Technical message header*.

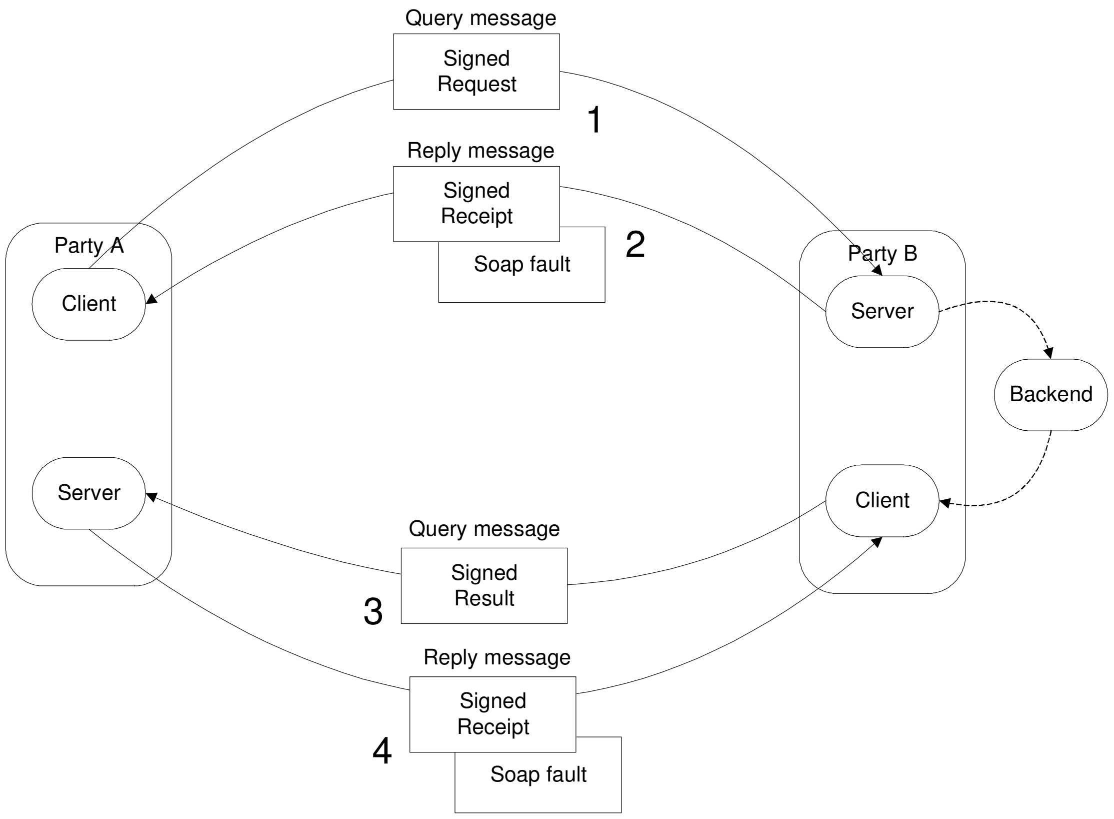
2.1 Communication flow

The following diagram and description show how the flow MUST look in the case of **synchronous** communication when a signature is used. The signature is not essential but is used depending on the business requirement.



1. Party A sends a signed query message for a request to Party B.
2. Part B verifies the signature and the format in the query message, processes the message and returns a signed result that describes how the processing went. In the event of an error that is discovered in connection with the reception, a soap fault message is returned in accordance with section *3.6 Soap fault*.

The following diagram and description show how the flow MUST look in the case of **asynchronous** communication when a signature is used. The signature is not essential but is used depending on the business requirement.



1. Party A sends a signed query message with a unique TxId for a request to Party B.
2. Party B returns a signed receipt after having verified the signature and the format in the query message. Party A have then received proof that Party B has received the message. Note that Party B has **not** given any guarantees that the message in the query message can be processed. In the event of an error in connection with the reception, a soap fault message is returned in accordance with section *3.6 Soap fault.*
3. After having processed the request, Party B sends a signed query message with the original TxId and a result that describes how the processing went to Party A.
4. Party A links the result to the request using the TxId (see section *3.4 Technical message header)* and returns a signed receipt after having verified the signature and the format in the result received from Party B. In the event of an error in connection with receiving, a soap fault message is returned in accordance with section *3.6 Soap fault.*

2.2 An error in the communication flow

Situations can arise where there is uncertainty concerning whether a query message has been received or processed. This can for example arise if the secure channel (the SSL tunnel) goes down after the receiver has received a query message but before the sender has received a reply message. In this situation, the sender of the query message may not know whether the receiver has received the query message.

If such a situation arises, the sender of the query message MUST contact the receiver to determine whether the message has been processed. The sender MUST NOT send the message again until he or she has contacted the receiver.

Despite the fact that no receipt has been received by the sender, the receiver of a query message can process the message and send a result and receive a receipt for the result. If this is a service which is defined by the fact that archiving must be carried out, the sender of the request in this situation will have an incomplete transaction in his or her archive. There will be no receipt for the request. When requested to do so by the other party, the receiver of the query message MUST send such a receipt so that both parties can archive the complete transaction.

When the sender has contacted the receiver and it is apparent that the query message for the request has not been processed or received by the other party, the sender MUST generate a new unique TxId and send the message again.

2.3 Handling TxId

Based on the above paragraph, the following MUST apply to the sender and the receiver of a query message.

2.3.1 The sender's responsibilities

The sender of a query message for a request is responsible for generating a unique TxId. In the event of uncertainty as to whether the message has been received by the other party, the sender MUST contact the other party in order to determine the status of the transaction.

2.3.2 The receiver's responsibilities

The receiver of a message is responsible for checking whether the incoming TxId is unique. In the event of a duplicate, the receiver MUST return a soap fault message with a fault code "Client.TxHeader.TxId.Duplicate". In the case of asynchronous processing, the receiver is responsible for ensuring that TxId flows unaltered throughout the entire transaction.

3 Messages

Messages in communication in accordance with SSEK follow the standard SOAP 1.1.

3.1 Namespaces

The following namespaces MUST be used when creating messages in accordance with SSEK.

Prefix	**Namespace**	**Used in connection with:**
Soap	http://schemas.xmlsoap.org/soap/envelope/	All cases
Txh	http://schemas.ssek.org/txheader/2003-04-03/	All cases
Wsu	http://schemas.xmlsoap.org/ws/2002/07/utility	Signing
Wsse	http://schemas.xmlsoap.org/ws/2002/07/secext	Signing
	http://www.w3.org/2000/09/xmldsig#	Signing
R	http://schemas.ssek.org/receipt/2003-04-03/	Receipt

The prefix is used here to clarify the example in the document.

3.2 Algorithms

The following algorithms are used in this document. These algorithms MUST be used.

Use	Algorithm
CanonicalizationMethod	http://www.w3.org/2001/10/xml-exc-c14n#
SignatureMethod	http://www.w3.org/2000/09/xmldsig#rsa-sha1
Transform	http://www.w3.org/2001/10/xml-exc-c14n#
DigestMethod	http://www.w3.org/2000/09/xmldsig#sha1

3.3 Certificates in signed messages

In signed messages, the certificate that is used to create the signature MUST be attached to the message in accordance with the specification for WS-Security, see *Appendix B Web Services Security*. The attached certificate can be used by the receiver to validate the signature. The receiver of a signed message SHOULD check that the attached certificate is correct.

3.4 Technical message header

All messages MUST include a message header with technical information, TxHeader, in accordance with the scheme in *Appendix C SSEK-specific schemes* with the following namespace: http://schemas.ssek.org/txheader/2003-04-03/.

The purpose of this information is to control the messages, handle asynchronous communication and obtain a manageable log of communicated documents.

Field name	**Description**	**Attribute**
SenderId	ID of the sender of the document.	**Type:** type of identity which is used for the sender of a message
ReceiverId	ID of the recipient of the document.	**Type:** type of identity which is used for the receiver of a message
TxId	UUID (Universal Unique Identifier in accordance with DCE).	
Timestamp	Time when the message was created in accordance with the form yyyy-mm-ddThh:mm:ss, where T is constant.	

The TxId in the message header is primarily used to keep an asynchronous transaction together. TxId is not obligatory but MUST be agreed between the communicating parties for each service based on the business need.

The type of identity that is used for SenderId and ReceiverId MUST be agreed between the communicating parties. The types which can be used are defined by the scheme for Txheader and are explained in the table below:

Value	**Explanation**
APP	Application name, can be own clients where traceability is required concerning the application that was used.
CN	Common Name, obtained from the client certificate.
DN	Distinguished Name, the entire name for the client certificate.
ORGNR	Organisation number

An example of a technical message header, TxHeader, is given below:

```
<txh:TxHeader soap:mustUnderstand="1" xmlns:txh="http://schemas.ssek.org/txheader/2003-04-03/">
    <txh:SenderId txh:type="CN">Company A</txh:SenderId>
    <txh:ReceiverId txh:type="CN">Company B</txh:ReceiverId>
    <txh:TxId>C61B0B07-EF5F-46a1-92B4-6E5FA574E46E</txh:TxId>
    <txh:Timestamp>2003-03-27T12:50:00</txh:Timestamp>
 </txh:TxHeader>
```

3.5 Receipts

The purpose of a receipt is to enable the sender to be certain that the query message has been received by the receiver. A receipt MUST be used in connection with asynchronous communication when a message is received and approved for processing by the receiver. However, a receipt does not guarantee that the information in the received message will be processed without any errors.

In connection with the acknowledgement of a signed message, the receipt MUST contain the signature of the acknowledged message. The signature contains a representation of the original message in the form of a hash value. Representation in the form of the signature from the received message can of course only be used if the received message has been signed.

The receipt can also be used to announce the result of the processing synchronously. The scheme allows company-specific information to be added.

The namespace for a receipt is http://schemas.ssek.org/receipt/2003-04-03/. See also the scheme in *Appendix C SSEK-specific schemes*. The content is as follows:

Field name	**Description**
ResponseCode	Response code (OK)
ResponseMessage	Response message, e.g. “The message has been received and will be processed”
RequestSignatureValue	The signature of the acknowledged message.

An example of an unsigned receipt (for a request) is given below:

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
   <soap:Header>
       <txh:TxHeader soap:mustUnderstand="1" xmlns:txh="http://schemas.ssek.org/txheader/2003-
          04-03/">
          <txh:SenderId txh:type="CN">Company B</txh:SenderId>
          <txh:ReceiverId txh:type="CN">Company A</txh:ReceiverId>
          <txh:TxId>C61B0B07-EF5F-46a1-92B4-6E5FA574E46E</txh:TxId>
          <txh:Timestamp>2003-03-27T12:50:01</txh:Timestamp>
       </txh:TxHeader>
    </soap:Header>
   <soap:Body>
     <r:Receipt xmlns:r="http://schemas.ssek.org/receipt/2003-04-03/">
          <r:ResponseCode>OK</r:ResponseCode>
          <r:ResponseMessage>The message has been received and will be
             processed</r:ResponseMessage>
             <r:RequestSignatureValue>X1os6m3YReQJlk1JBzwvLe5hScdz09uBx4EhnJplKZVl2uSc
             Mpj4FPnnyfIPBJ3vkI59aPcbQlzqTEgaHBwiIpcwRNnnOJ4tYeY3/HekPSlBFB9pOFqh7
             3O8qqK0v1/ZK2IYOBT/WBFNdYD6nf8gP8nSjAKUPx1QFC8RCUKVeZk=</r:RequestSi
             gnatureValue>
       </r:Receipt>
    </soap:Body>
 </soap:Envelope>
```

An example of a signed receipt (for a request) is given below:

```xml
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
   <soap:Header>
      <txh:TxHeader soap:mustUnderstand="1" xmlns:txh="http://schemas.ssek.org/txheader/2003-
            04-03/" xmlns:wsu="http://schemas.xmlsoap.org/ws/2002/07/utility"
            wsu:Id="txHeader">
         <txh:SenderId txh:type="CN">Company B</txh:SenderId>
         <txh:ReceiverId txh:type="CN">Company A</txh:ReceiverId>
         <txh:TxId>C61B0B07-EF5F-46a1-92B4-6E5FA574E46E</txh:TxId>
         <txh:Timestamp>2003-03-27T12:50:01</txh:Timestamp>
       </txh:TxHeader>
      <wsse:Security soap:mustUnderstand="1"
            xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/07/secext">
         <wsse:BinarySecurityToken ValueType="wsse:X509v3" EncodingType="wsse:Base64Binary"
            xmlns:wsu="http://schemas.xmlsoap.org/ws/2002/07/utility"
            wsu:Id="SecurityToken-aca9eb37-8ba1-4ca4-8a98-
            50df7b66b87f">MIICcjCCAdugAwIBAgIBAzANBgkqhkiG9w0B...
            </wsse:BinarySecurityToken>
        <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
          <SignedInfo>
              <CanonicalizationMethod
                 Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
              <SignatureMethod
                 Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />
            <Reference URI="#txHeader">
               <Transforms>
                  <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
                </Transforms>
                <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
                   DigestValue>9lvyLVeHMTWsmyP0tEvjaAAuN0w=</DigestValue>
              </Reference>
            <Reference URI="#soapBody">
               <Transforms>
                  <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
                </Transforms>
                <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
                   DigestValue>CTxmSaf2GFELSDEs7qkZE8PLWn0=</DigestValue>
              </Reference>
           </SignedInfo>
          SignatureValue>bCTgHvWanAVpqTD9MCp1zK6AlD7lDi6r18STl+4Mco...
              </SignatureValue>
          <KeyInfo>
            <wsse:SecurityTokenReference>
                <wsse:Reference URI="#SecurityToken-aca9eb37-8ba1-4ca4-8a98-
                   50df7b66b87f" />
              </wsse:SecurityTokenReference>
           </KeyInfo>
        </Signature>
       </wsse:Security>
    </soap:Header>
   <soap:Body xmlns:wsu="http://schemas.xmlsoap.org/ws/2002/07/utility" wsu:Id="soapBody">
      <r:Receipt xmlns:r="http://schemas.ssek.org/receipt/2003-04-03/">
         <r:ResponseCode>OK</r:ResponseCode>
         <r:ResponseMessage>The message has been received and will be
            processed</r:ResponseMessage>
        <r:RequestSignatureValue>X1os6m3YReQJlk1JBzwvLe5hScdz09uBx4JplKZ...
            </r:RequestSignatureValue>
       </r:Receipt>
    </soap:Body>
  </soap:Envelope>
```

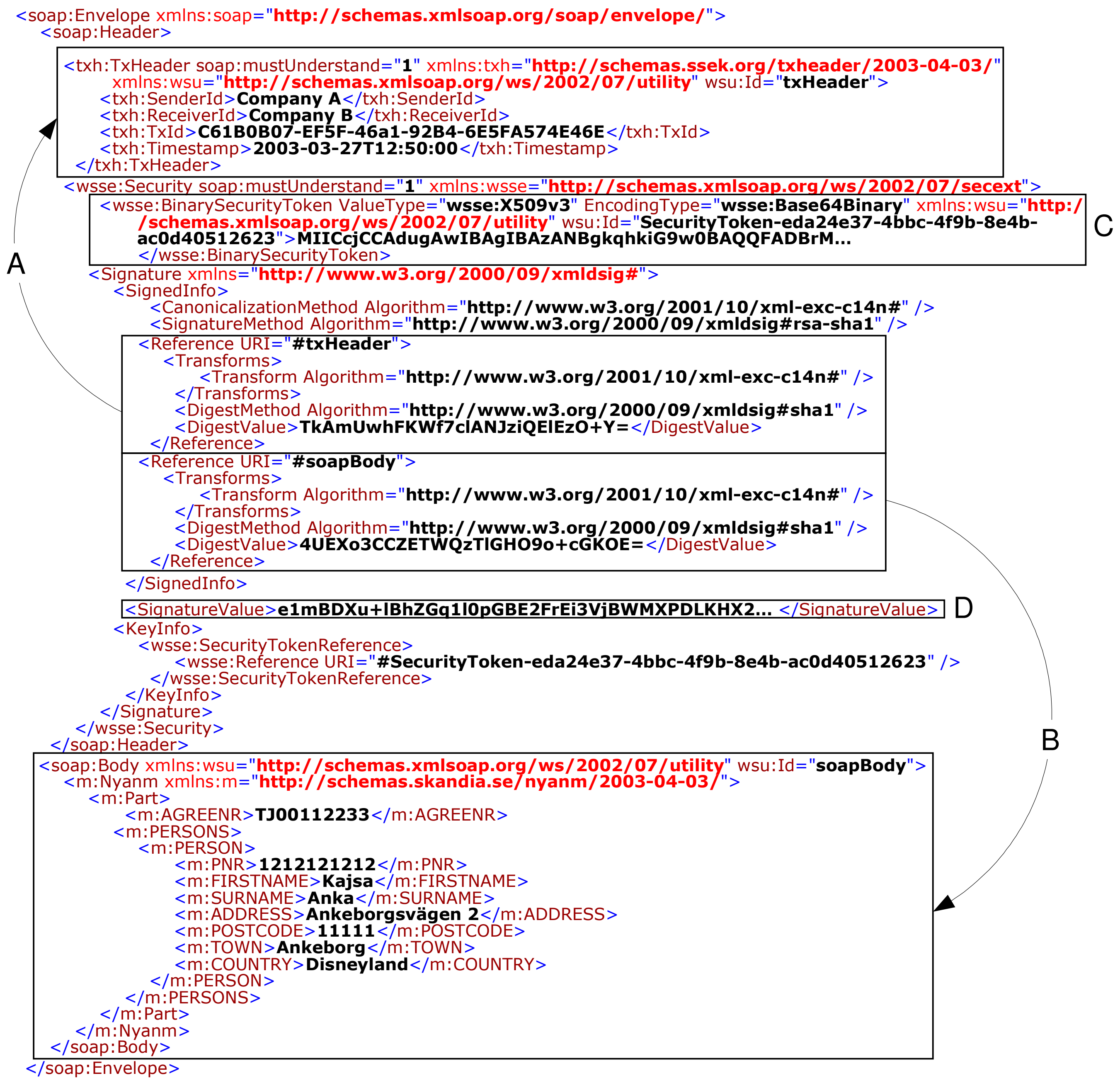
3.6 Soap fault

In the event of an error occurring which can be notified synchronously for a query message, the receiver MUST return a soap fault message with a fault code in accordance with *Appendix D Fault codes*. The Soap fault message CAN be signed.

An example of an unsigned soap fault (for a request) is given below:

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
   <soap:Body>
      <soap:Fault>
          <soap:faultcode>Client.InvalidXml</soap:faultcode>
          <soap:faultstring>Non valid XML</soap:faultstring>
          <soap:detail>Element 'PNR' more than 12 digits</soap:detail>
       </soap:Fault>
    </soap:Body>
 </soap:Envelope>
```

3.7 Example of a signed query message



```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
  <soap:Header>
    <txh:TxHeader soap:mustUnderstand="1" xmlns:txh="http://schemas.ssek.org/txheader/2003-04-03/"
        xmlns:wsu="http://schemas.xmlsoap.org/ws/2002/07/utility" wsu:Id="txHeader">
      <txh:SenderId>Company A</txh:SenderId>
      <txh:ReceiverId>Company B</txh:ReceiverId>
      <txh:TxId>C61B0B07-EF5F-46a1-92B4-6E5FA574E46E</txh:TxId>
      <txh:Timestamp>2003-03-27T12:50:00</txh:Timestamp>
    </txh:TxHeader>
    <wsse:Security soap:mustUnderstand="1" xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/07/secext">
      <wsse:BinarySecurityToken ValueType="wsse:X509v3" EncodingType="wsse:Base64Binary" xmlns:wsu="http:/
        /schemas.xmlsoap.org/ws/2002/07/utility" wsu:Id="SecurityToken-eda24e37-4bbc-4f9b-8e4b-
        ac0d40512623">MIICcjCCAdugAwIBAgIBAzANBgkqhkiG9w0BAQQFADBrM...
        </wsse:BinarySecurityToken>
      <Signature xmlns="http://www.w3.org/2000/09/xmldsig#">
        <SignedInfo>
          <CanonicalizationMethod Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
          <SignatureMethod Algorithm="http://www.w3.org/2000/09/xmldsig#rsa-sha1" />
          <Reference URI="#txHeader">
            <Transforms>
              <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
            </Transforms>
            <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
            <DigestValue>TkAmUwhFKWf7clANJziQElEzO+Y=</DigestValue>
          </Reference>
          <Reference URI="#soapBody">
            <Transforms>
              <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#" />
            </Transforms>
            <DigestMethod Algorithm="http://www.w3.org/2000/09/xmldsig#sha1" />
            <DigestValue>4UEXo3CCZETWQzTlGHO9o+cGKOE=</DigestValue>
          </Reference>
        </SignedInfo>
        <SignatureValue>e1mBDXu+lBhZGq1l0pGBE2FrEi3VjBWMXPDLKHX2... </SignatureValue>
        <KeyInfo>
          <wsse:SecurityTokenReference>
            <wsse:Reference URI="#SecurityToken-eda24e37-4bbc-4f9b-8e4b-ac0d40512623" />
          </wsse:SecurityTokenReference>
        </KeyInfo>
      </Signature>
    </wsse:Security>
  </soap:Header>
  <soap:Body xmlns:wsu="http://schemas.xmlsoap.org/ws/2002/07/utility" wsu:Id="soapBody">
    <m:Nyanm xmlns:m="http://schemas.skandia.se/nyanm/2003-04-03/">
      <m:Part>
        <m:AGREENR>TJ00112233</m:AGREENR>
        <m:PERSONS>
          <m:PERSON>
            <m:PNR>1212121212</m:PNR>
            <m:FIRSTNAME>Kajsa</m:FIRSTNAME>
            <m:SURNAME>Anka</m:SURNAME>
            <m:ADDRESS>Ankeborgsvägen 2</m:ADDRESS>
            <m:POSTCODE>11111</m:POSTCODE>
            <m:TOWN>Ankeborg</m:TOWN>
            <m:COUNTRY>Disneyland</m:COUNTRY>
          </m:PERSON>
        </m:PERSONS>
      </m:Part>
    </m:Nyanm>
  </soap:Body>
</soap:Envelope>
```

Arrow A points from the hash value of the header to the part that the hash value represents.

Arrow B points from the hash value of the document body to the part that the hash value represents.

Box C contains the certificate that was used to create the signature.

Box D contains the signature of SignedInfo.

The actual signature is therefore contained in SignatureValue, which signs the information in SignedInfo, including the hash values which represent information in the document header and body.

3.8 Example of an unsigned query message

An example is given below of an unsigned query message (for a request):

```
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/">
   <soap:Header>
      <txh:TxHeader soap:mustUnderstand="1" xmlns:txh="http://schemas.ssek.org/txheader/2003-04-03/">
          <txh:SenderId txh:type="CN">Company A</txh:SenderId>
          <txh:ReceiverId txh:type="CN"> Company B</txh:ReceiverId>
          <txh:TxId>C61B0B07-EF5F-46a1-92B4-6E5FA574E46E</txh:TxId>
          <txh:Timestamp>2003-03-27T12:50:00</txh:Timestamp>
       </txh:TxHeader>
    </soap:Header>
   <soap:Body>
      <m:Nyanm xmlns:m="http://schemas.foretagb.se/nyanm/2003-04-03/">
         <m:Part>
             <m:AGREENR>TJ00112233</m:AGREENR >
            <m:PERSONS>
               <m:PERSON>
                   <m:PNR>1212121212</m:PNR>
                   <m:FIRSTNAME>Kajsa</m:FIRSTNAME>
                   <m:SURNAME>Anka</m:SURNAME>
                   <m:ADDRESS>Ankeborgsvägen 2</m:ADDRESS>
                   <m:POSTCODE>11111</m:POSTCODE>
                   <m:TOWN>Ankeborg</m:TOWN>
                   <m:COUNTRY>Disneyland</m:COUNTRY>
                </m:PERSON>
             </m:PERSONS>
          </m:Part>
       </m:Nyanm>
    </soap:Body>
 </soap:Envelope>
```

4 Security

As the information which is being communicated is sensitive and valuable, there is a need to prevent unauthorized persons from reading or manipulating the information. There may also be a need to trace information to the sender.

In order to fulfil the above requirements, SSEK describes how the following security aspects are handled in connection with electronic communication.

- **Authentication**
  Identification of the sending organisation (client) and the receiving organisation (server).
- **Confidentiality**
  Information that is sent cannot be read by external parties.
- **Correctness and Integrity**
  Information that is sent cannot be altered after it has left the sender and follows the agreed format.
- **Non-repudiation**
  The party that created and sent the information cannot deny that the information in question was created.

PKI (Public Key Infrastructure) is used in connection with the handling of the above security aspects.

4.1 Security levels

In order to fulfil all, or just a few, of the security aspects described above, signatures and client certificates can be combined. The permissible combinations are defined in four different security levels where level 4 is the highest security and level 1 is the weakest security.

Common to all SSEK security levels is the fact that an SSL tunnel is set up, through which confidentiality is maintained during the transmission and that the server authenticates itself with a server certificate.

Further information concerning certificates and signatures can be found in section *4.3 Signing* and *4.4 CA and certificates.*

SSEK level	**SSL – with server certificate**	**Signature**	**Client certificate**
4	Used	Used	Used
3	Used	Used	
2	Used		Used
1	Used		

Information on the SSEK security levels:

1. Gives confidentiality in connection with transmission and authentication of the server. Does **not** give authentication of the client or non-repudiation because signatures and client certificates are not used.
   Appropriate level for public services.
2. Gives confidentiality in connection with transmission and authentication of both the server and the client. Does **not** give non-repudiation because signatures are not used.
   Appropriate level for services that are aimed at certain competent authorities but where the information sent does not subsequently have to be used as evidence.
3. Gives confidentiality in connection with transmission, authentication of the server and non-repudiation. Does **not** give authentication of the client because client certificates are not used.
   Appropriate level for services where the sender does not need to be authenticated but where the receiver has a need to demonstrate which organisation created the information that is received.
4. Gives confidentiality in connection with transmission, authentication of both the server and the client and non-repudiation. Both signatures and client certificates are used.
   Appropriate level for sensitive services that are aimed at certain competent authorities and where the receiver has a need to demonstrate which organisation created the information that is received.

4.2 Secure communication

Both parties can initiate the communication. A party can do this by connecting up what is known as a secure tunnel between itself and the other party. The secure tunnel MUST be created with SSL, for which the protocol HTTPS (HTTP via SSL) is used. In this case, both parties are authenticated, i.e. both client and server authentication using their certificates.

The tunnel MUST be encrypted with a secure key.
At least a 128-bit key must be used.

4.3 Signing

A digital signature gives technical proof of the organisation that created certain information. As messages are signed, the directives that are described in this document concerning signatures MUST be followed.

Certificates MUST be used to create signatures.

4.4 CAs and certificates

The certificates that are required to create the signature and authenticate each party MUST be issued by a CA (Certificate Authority) approved by both parties and be approved with regard to type and procedures for the issuing of certificates. The certificates MUST follow the standard X.509 v3 and have a sufficiently secure public key. At least a 1024-bit key applies to this.

The use of digital signatures is based on the trust that the communicating parties have in the CA that issued the certificate.

4.5 Revoking of certificates

If the certificate can no longer be considered as trustworthy, the parties that are using the certificate MUST be informed of this.

The party that uses a certificate for verifying an organisation's identity and signatures SHOULD collect the CRL (Certificate Revocation List) issued by the certificate's CA and check that the certificate has not been revoked each time the certificate is used. The revoking of the certificate by the certificate's CA MUST be carried out by the owner of the certificate. In connection with this revoking, the certificate is placed in the CRL, which is regularly issued by the certificate's CA, e.g. every 2 hours.

If there are no procedures or techniques in place for automatic revoking checks to retrieve and read a CRL, "manual revoking" MUST be used. This is carried out by the party that wants to make a certificate invalid contacting the person responsible on behalf of the other party as soon as possible, preferably by telephone. This person will then remove the certificate so that it cannot be used. In this case, the certificate MUST also be revoked by the certificate's CA. This will therefore also work for those who actually use the CRL that is issued.

If "manual revoking" is used between two communicating parties, procedures for the two parties MUST be specified. Both parties must agree on the specified procedures.

If no procedure for revoking has been established, there is a greater risk of a fraudulent party, which has stolen the certificate's private key, using the key for a long period of time before notification that the certificate has been stolen and cannot be considered as a secure identification of the other party.

4.6 Approved CAs and certificate types

Telia eCommerce (issues certificates with Verisign as the CA) and Posten eSäkerhet are currently approved to issue certificates by parties who use this specification for their electronic communication.

Other types of certificate that are issued by approved CAs and used by the parties MUST be approved for use by both parties. In this case, the requirement for the certificate type is that a sufficient validation of the organisation’s identity is carried out in connection with the issuing of the certificate.

If an insecure CA or certificate is used without adequate validation of the organisation's identity, there is a greater risk of a fraudulent organisation managing to pass itself off as the other party in connection with communication. This could have important consequences.

4.7 Handling private keys

Authentication and signing is carried out with a private key, which is linked to a certificate. The authentication or signature is then used to prove that certain information has been created and sent by the sending party. The private key MUST therefore be protected in a sufficiently secure manner so that no unauthorised parties can steal the key.

If the private keys are not adequately protected, there is a greater risk of them being stolen.

A fraudulent party that has stolen a key can claim to be the organisation to which the key belongs and act in its place. The consequences can therefore be considerable.

5 Appendix A Standards

[IETF]
IETF (Internet Engineering Task Force), http://www.ietf.org/

[OASIS]
OASIS (Organisation for the Advancement of Structured Information Standards), http://www.oasis-open.org/

[PKI certificate]
Public Key Infrastructure certificate, http://www.ietf.org/html.charters/pkix-charter.html

[Posten]
Posten http://digitalid.postnet.se/

[SHA-1]
http://www.itl.nist.gov/fipspubs/fip180-1.htm

[SOAP]
W3C Note, "SOAP: Simple Object Access Protocol 1.1," 08 May 2000.

[SSL]
Secure Sockets Layer http://home.netscape.com/security/techbriefs/ssl.html

[WS-Security]
Web Services Security (WS-Security), Version 1.0 05 April 2002,
http://www-106.ibm.com/developerworks/webservices/library/ws-secure/

[W3C]
W3C (World Wide Web Consortium), http://www.w3.org/

[X.509 v3]
X.509 v3, http://www.ietf.org/rfc/rfc2459.txt

[XML]
Extensible Markup Language (XML) 1.0 (Second Edition),
W3C Recommendation 6 October 2000, http://www.w3.org/TR/2000/REC-xml-20001006

[XML-C14N]
Exclusive XML Canonicalization,
Version 1.0, W3C Recommendation 18 July 2002, http://www.w3.org/TR/2002/REC-xml-exc-c14n-20020718/

[XML-Scheme1]
W3C Recommendation, "XML Schema Part 1: Structures," 02 May 2001.

[XML-Scheme2]
W3C Recommendation, "XML Schema Part 2: Datatypes," 02 May 2001.

[XML Signature]
http://www.w3.org/Signature/

6 Appendix B Web Services Security

The following parts of the specification for WS-Security are used within SSEK.

Section	Clarification

4.2 Encoding Binary Security Tokens	Only X.509 certificates are used.
	X.509 certificate specified by using BinarySecurityToken:
	`<wsse:BinarySecurityToken`
	
	`xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/04/secext"`
	`Id="myToken"`
	`ValueType="wsse:X509v3"`
	`EncodingType="wsse:Base64Binary">`
	`MIIEZzCCA9CgAwIBAgIQEmtJZc0...`
	`</wsse:BinarySecurityToken>`

4.3 SecurityTokenReference Element	
4.5 ds:Signature	

The following parts of the specification for Web Services Security Addendum are used within SSEK

Section	Clarification
3. ID References	

3.2 Id Scheme	`<x:myElement wsu:Id="ID1" xmlns:x="..."`
	`xmlns:wsu="http://schemas.xmlsoap.org/ws/2002/07/utility"/>`

4. Placement of X.509 Certificates	X.509 certificate specified by using BinarySecurityToken

7 Appendix C SSEK-specific schemes

Scheme for TxHeader:

```
<xsd:schema targetNamespace="http://schemas.ssek.org/txheader/2003-04-03/"
      xmlns:tns="http://schemas.ssek.org/txheader/2003-04-03/"
      xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified"
      attributeFormDefault="qualified">
   <xsd:element name="TxHeader">
      <xsd:complexType>
         <xsd:sequence>
            <xsd:element name="SenderId">
               <xsd:complexType>
                  <xsd:simpleContent>
                     <xsd:restriction base="xsd:anyType">
                        <xsd:simpleType>
                           <xsd:restriction base="xsd:string">
                               <xsd:maxLength value="256" />
                            </xsd:restriction>
                         </xsd:simpleType>
                        <xsd:attribute name="type" use="optional" default="CN">
                           <xsd:simpleType>
                              <xsd:restriction base="xsd:string">
                                  <xsd:enumeration value="APP" />
                                  <xsd:enumeration value="CN" />
                                  <xsd:enumeration value="DN" />
                                  <xsd:enumeration value="ORGNR" />
                                  <xsd:maxLength value="16" />
                               </xsd:restriction>
                            </xsd:simpleType>
                         </xsd:attribute>
                      </xsd:restriction>
                   </xsd:simpleContent>
                </xsd:complexType>
             </xsd:element>
            <xsd:element name="ReceiverId">
               <xsd:complexType>
                  <xsd:simpleContent>
                     <xsd:restriction base="xsd:anyType">
                        <xsd:simpleType>
                           <xsd:restriction base="xsd:string"> <xsd:maxLength
                                value="256" />
                            </xsd:restriction>
                         </xsd:simpleType>
                        <xsd:attribute name="type" use="optional" default="CN">
                           <xsd:simpleType>
                              <xsd:restriction base="xsd:string">
                                  <xsd:enumeration value="APP" />
                                  <xsd:enumeration value="CN" />
                                  <xsd:enumeration value="DN" />
                                  <xsd:enumeration value="ORGNR" />
                                  <xsd:maxLength value="16" />
                               </xsd:restriction>
                            </xsd:simpleType>
                         </xsd:attribute>
                      </xsd:restriction>
                   </xsd:simpleContent>
                </xsd:complexType>
             </xsd:element>
             <xsd:element name="TxId" minOccurs="0">
               <xsd:simpleType>
                  <xsd:restriction base="xsd:string">
                      <xsd:length value="36" />
```

```
                    </xsd:restriction>
                </xsd:simpleType>
            </xsd:element>
            <xsd:element name="Timestamp" type="xsd:dateTime" />
        </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>
```

Scheme for receipt:

```
<xsd:schema targetNamespace="http://schemas.ssek.org/receipt/2003-04-03/"
        xmlns:tns="http://schemas.ssek.org/receipt/2003-04-03/"
        xmlns:xsd="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">
  <xsd:element name="Receipt">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element name="ResponseCode" type="xsd:string" />
        <xsd:element name="ResponseMessage" type="xsd:string" minOccurs="0" />
        <xsd:element name="RequestSignatureValue" type="xsd:string" minOccurs="0" />
        <xsd:any minOccurs="0" maxOccurs="unbounded" namespace="##any"
            processContents="lax" />
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
</xsd:schema>
```

8 Appendix D Fault codes

Definitions of the fault codes that can be inserted in fault messages. The values that should be set in Faultstring and Detail are not defined here. These can be set to arbitrary values that are agreed between the communicating parties. A scheme for soap fault is shown below:
http:/schemas.xml.org/soap/envelope/

8.1 Faults concerning the document

Fault code	Description
VersionMismatch	An unknown version of soap was specified
MustUnderstand.TxHeader	Incorrect format for TxHeader
MustUnderstand.Security	Incorrect format for security header
Client.InvalidXml	Incorrect format for message
Client. WebService.Unknown	The combination of TxHeader, MessageName and nsuri for the message is incorrect.
Client.TxHeader.SenderId.Unknown	
Client.TxHeader.ReceiverId.Unknown	
Client.TxHeader.Timestamp.Invalid	

8.2 Faults concerning the transaction ID

Fault code	Description
Client.TxHeader.TxId.Missing	TxId has not been specified
Client.TxHeader.TxId.Unknown	
Client.TxHeader.TxId.Invalid	Incorrect format for TxId
Client.TxHeader.TxId.Duplicate	TxId is not unique
Client.TxHeader.TxId.NotAllowed	TxId must not be specified for this service

8.3 Faults on the server side

Fault code	Description
Server.MessageNotProcessed	Internal fault
Server.WebService.Unavailable	The service is closed
Server.WebService.Unsupported	The service is not supported by the receiver

8.4 Logical faults in transaction data

Fault code	Description
Client.Receivername.arbitrary faultcode	Faults in business data concerning business logic, e.g. salary too high, can be notified in this way, e.g. "Client.Skandia. InvalidSalary"

8.5 Faults concerning certificates or signatures

Fault code	Description
Client.UnregisteredClientCertificate	DN in http header in client certificate does not agree with the saved DN.
Client.InvalidSecurityToken	The certificate is invalid with regard to the validity period.
Client.InvalidSecurityToken	The certificate has been revoked
Client.FailedAuthentication	The specified security token could not be authenticated or authorised.
Client.UnsupportedSecurityToken	An unknown security token was specified, not X509
Client.UnregisteredSecurityToken	DN in signaturcert does not agree with the saved DN.
Client.UnsupportedAlgorithm	An unknown algorithm for signature or encryption was specified
Client.InvalidSecurity	A fault was discovered in connection with the processing of the <Security> header
Client.InvalidSecurityToken	
Client.FailedCheck	
Client.SecurityTokenUnavailable	

8.6 Other faults which are not reported via SOAP fault

Fault code	Description
http	Server unavailable
TimeOut	The client cannot receive a response