Danske Bank

Encryption, Signing and Compression in Financial Web Services

Details of how to call the Danske Bank financial web service

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Version history

Version	Date	Description of change	Author
2.2	5. January 2010	RFC 1952 added to clarify gzip. Section on future changes removed. Example XML added. Section on signatures added.	Mikkel T. Jensen
2.3	22. February 2010	RSA-OAEP replaced by RSA-v1.5. More requirements to signatures added.	Mikkel T. Jensen
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2.4.8	27. July 2017	Added references to EDI WS and PKI documents	Andreja Andric
2.5.0	15. February 2023	Added an introductory recap of the integration process. Fixed broken bookmarks and cross-references. Removed references of an old version of the Financial Messages specification document.	Andreja Andric
2.6.0	5. September 2023	Updated algorithms.	Andreja Andric

Introduction

The Danske Bank Web Services solution is build on the Web Services specifications from the Federation of Finnish Financial services [1].

This document clarifies the use of XML encryption and compression and how it is implemented in Danske Bank.

Principal aim of this document is to cover the details of the security elements in the first group (EDI Web Services [2]). However, the requirements on XML encryption and enveloped signatures also apply to the second group (PKI Service [3]).

Overview of the Integration Process

As we have seen in the introductory page on our website (danskeci), the solution is divided into two categories of service:

1) EDI Web Services

2) PKI Web Services

The first regards sending and receiving authenticated and encrypted files. The second regards certificate management, whose aim is to maintain the communication secure. Because the security is indispensable for communication, you have to start your integration process with PKI Web Services.

First you have to obtain the bank certificate. Therefore, the first call you have to implement is GetBankCertificate. This message you neither sign nor encrypt, as the bank certificate is available publicly. You will use this certificate to encrypt your further messages to the bank. Moreover, we recommend that, in further communication with the bank, you make this call on a regular basis, in order to make sure that you always have the most recent version of the certificate. To make sure the bank certificate is correct, you can verify it using the Danske Bank Root certificate, provided on our danskeci website.

Next, you have to create your own certificate, by calling CreateCertificate. Your message will contain a secret four digit pin, and for this reason you'll have to encrypt the message using the public bank certificate you obtained in the previous call.

When you have created your own certificate, you are ready to start making calls to EDI Web Services. However we recommend to implement at least RenewCertificate call as well, as you will need it when your current certificate expires.

Examples of all the messages are given on our danskeci website. Some of the messages are also reproduced in the Appendices to this document, for easier reference. However, avoid copying and pasting the examples from this document, because some characters, like dash ('-') might be interpreted incorrectly when pasting. Use the examples from our danskeci website instead.

Regarding encryption

Our implementation of encryption

XML encryption is applied at the ApplicationRequest/ApplicationResponse level. This means that the ApplicationRequest (or ApplicationResponse) element is replaced by an EncryptedData element from the XML encryption standard. The EncryptedData contains the actual encrypted data (in a CipherData subelement) as well as sub-elements necessary for decryption (EncryptionMethod and KeyInfo). The reason this approach can work is that the ApplicationRequest/ApplicationResponse/EncryptedData element is base64 encoded when the actual web service call is made. This means that there is no schema-check of the ApplicationRequest/Response schema on the web service level. The schema-check of the ApplicationRequest/Response should not be done until the actual XML has been reconstructed using base64 decoding, followed by decryption. The order of processing when receiving a web service call should be as follows:

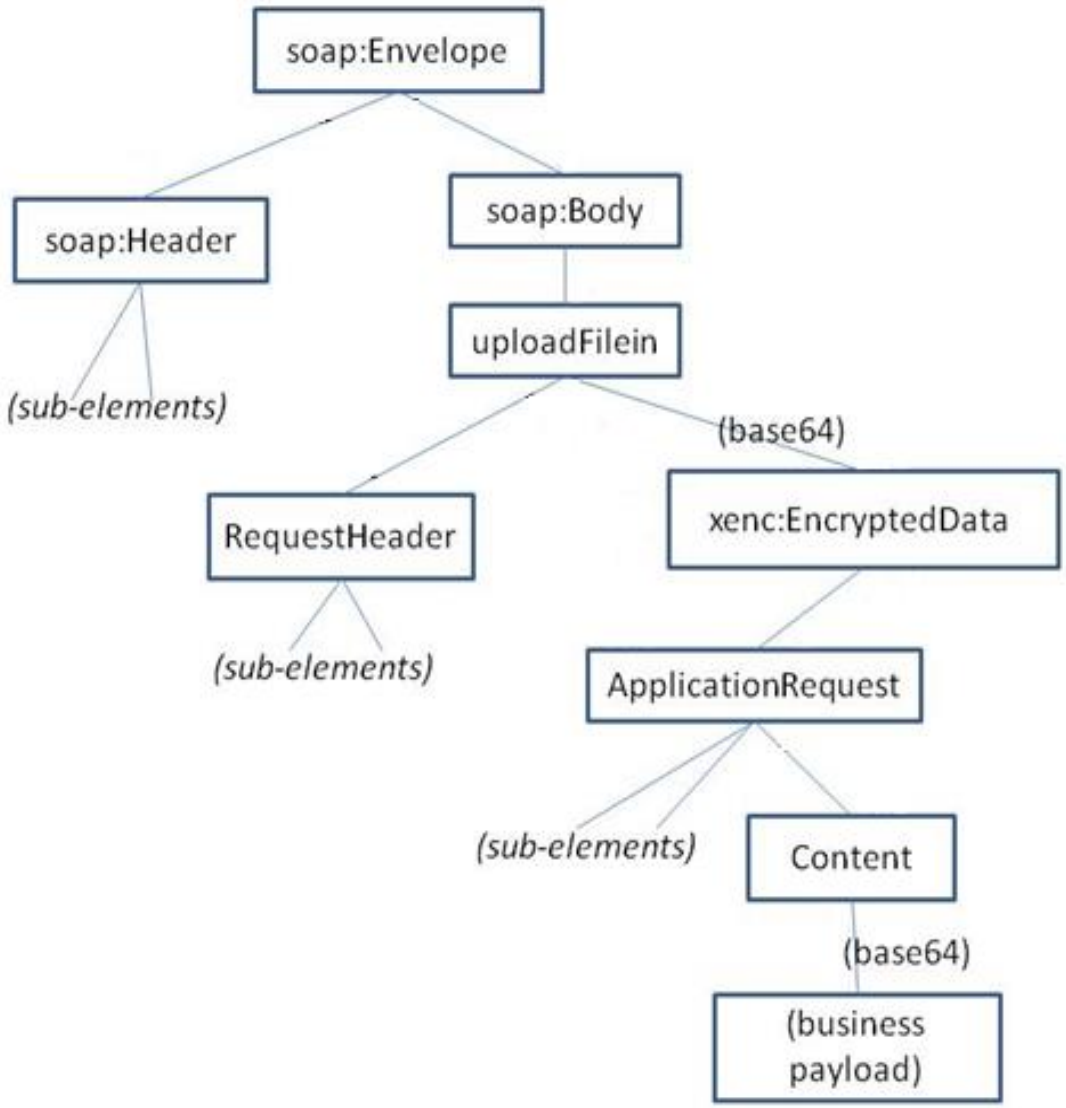
1. The web service call arrives at the server
2. As part of the web service call, the incoming message is checked against the WSDL. This does not include schema checking the ApplicationRequest, due to the base64 encoding.
3. The SOAP header and security information in it is processed, including the transport signature. If everything is not correct, an error message is returned and processing stops.
4. Processing based on RequestHeader can be done.
5. XML is constructed by base64 decoding the content of the ApplicationRequest in the incoming message (in the WSDL, it is defined to be of type xsd:base64Binary). The base64 decoding results in an EncryptedData element.
6. The EncryptedData element is decrypted using XML encryption functionality. This creates an ApplicationRequest element.
7. The ApplicationRequest element can be schema checked now.
8. Further processing of the ApplicationRequest.

The processing of a received ApplicationResponse on the client follows the same pattern. In the same way, the order of processing in the construction of XML prior to a web service call should be as follows:

1. The document for sending is compressed using Gzip
2. The Gzipped file is encoded in base64 so it becomes printable
3. The result is enclosed in a <Content> tag.
4. The so made <Content> tag is placed inside an <ApplicationRequest> tag along with <CustomerId> and other information
5. The Compression is set to true
6. The ApplicationRequest is Digitally signed (business signatures).
7. The ApplicationRequest element is encrypted, producing an EncryptedData element.
8. The EncryptedData element is base64 encoded.
9. A RequestHeader and a soap Body are produced.
10. The base64 data produced in step 8 is inserted in the soap Body in the ApplicationRequest element.
11. The rest of the soap message is constructed (soap Header and soap Envelope)
12. The soap message is digitally signed (transport signature).
13. The Web Service is called.

The construction of an ApplicationResponse on the server follows the same pattern.

The layering of information in the Web Service call is visualized in the following figure:



The figure shows the soap envelope containing the soap Header and soap Body. The soap Body contains an uploadFilein element (the name of this element depends on the operation called, it could also be getUserInfoin, downloadFileListin, downloadFilein, or deleteFilein). This element contains a RequestHeader, and an element containing base64Binary coded data. The base64Binary data can be decoded an EncryptedData element. The EncryptedData element will decrypt into an ApplicationRequest element.

Regarding the Encryption and EncryptionMethod elements

The ApplicationRequest and ApplicationResponse elements contain subelements called *Encryption* (*Encrypted* in ApplicationResponse) and *EncryptionMethod*. These elements can give rise to confusion, since for instance the description of the Encryption elements states:

'If this element is present and the content is the string "true" (case-sensitive) it means that the Content is encrypted or the requested data should be encrypted by the bank'

The first part of the sentence is misleading, since if the Encryption element is visible (i.e. not itself in an encrypted form) then the ApplicationRequest and the Content are no longer encrypted (they may have been in a previous processing step). The only true use of the element is stated in the second part of the sentence: If the element contains "true", the response should be encrypted by the bank. This interpretation also implies that the Encrypted element in ApplicationResponse serves no purpose, since no reply is needed in response to the response.

Similarly, the EncryptionMethod element is only used to communicate the cipher to be used in the response. For this, one EncryptionMethod element is inadequate, since two encryption ciphers are needed: One for symmetric encryption to encrypt the actual data, and one for asymmetric encryption to encrypt the symmetric key. This problem should be solved in a future version of the specification (see the following section). At present it should be up to the individual banks to decide how to handle this. Maybe the same encryption ciphers used in the request should be used in the response, or maybe the same ciphers should always be used.

The specification does not state a default behavior if the Encryption and EncryptionMethod elements are not present in ApplicationRequest.

Regarding the XML Encryption specification

An introduction to the XML Encryption specification is outside the scope of this text. It is recommended to read the specification, which can be found at http://www.w3.org/TR/xmlenc-core/. However, since the specification contains some degrees of freedom as to the XML elements and their content, a brief description of the expected content of an EncryptedData element (which is the root element of encrypted data) will be given here. The encryption used is in two layers:

1. The actual business data is encrypted using symmetric cryptography. The key used to perform this encryption is called the *ephemeral key.* A new ephemeral key is generated every time a message is encrypted. In the example below, the encrypted business data is contained in the EncryptedData/CipherData element. The symmetric cipher is declared in the EncryptedData/EncryptionMethod/@Algorithm attribute.
2. The ephemeral key is encrypted using asymmetric cryptography. The encrypted ephemeral key is contained in the EncryptedData/KeyInfo/EncryptedKey element. The asymmetric cipher is declared in the EncryptedData/KeyInfo/EncryptedKey/EncryptionMethod/@Algorithm attribute. The actual encrypted ephemeral key is contained in the EncryptedData/KeyInfo/EncryptedKey/CipherData element. The certificate used to perform the asymmetric encryption is contained in the EncryptedData/KeyInfo/EncryptedKey/KeyInfo/X509Data/X509Certificate element.

The expected structure of the EncryptedData element can be found in the abbreviated example below.

```
<xenc:EncryptedData xmlns:xenc="http://www.w3.org/2001/04/xmlenc#"
Type="http://www.w3.org/2001/04/xmlenc#Element">
    <xenc:EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#aes256-cbc"/>
    <dsig:KeyInfo xmlns:dsig="http://www.w3.org/2000/09/xmldsig#">
        <xenc:EncryptedKey>
            <xenc:EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5"/>
            <dsig:KeyInfo>
```

```
                    <dsig:X509Data>
                        <dsig:X509Certificate>MIIDyT...UijzrQQ==</dsig:X509Certificate>
                    </dsig:X509Data>
                </dsig:KeyInfo>
                <xenc:CipherData>
                    <xenc:CipherValue>NoO3acd...ggGQWA=</xenc:CipherValue>
                </xenc:CipherData>
            </xenc:EncryptedKey>
        </dsig:KeyInfo>
        <xenc:CipherData>
            <xenc:CipherValue>279oO2AZ6...okVnVDvI+KfG</xenc:CipherValue>
        </xenc:CipherData>
</xenc:EncryptedData>
```

Messages sent to the bank must obey the following rules:

- The EncryptedData/KeyInfo/EncryptedKey/KeyInfo/X509Data/X509Certificate element must be present, and it must contain the base64 encoded certificate used to perform the encryption. This is necessary since at one time the bank may have several valid encryption certificates.
- The actual business data must be encrypted using a symmetric cipher. It is not allowed to use asymmetric encryption to encrypt the business data directly. This is because encryption and decryption using asymmetric ciphers is much more CPU intensive than symmetric ciphers.

Clients should use standard software solutions (libraries) supporting the XML encryption specification rather than implementing it on their own.

Encryption Algorithms supported

For incoming requests, the bank supports the following encryption algorithms:

- Symmetric encryption:
  - 3DES. http://www.w3.org/2001/04/xmlenc#tripledes-cbc
  - AES128. http://www.w3.org/2001/04/xmlenc#aes128-cbc
  - AES192. http://www.w3.org/2001/04/xmlenc#aes192-cbc
  - AES256. http://www.w3.org/2001/04/xmlenc#aes256-cbc
- Asymmetric encryption: RSA-v1.5. http://www.w3.org/2001/04/xmlenc#rsa-1_5

Responses from the bank are encrypted with 3DES and RSA-v1.5.

Our implementation of compression

Regarding compression, it should be applied at the Content element level. The Content element contains base64Binary coded data. Depending on the content of the Compression element, the base64Binary data can be in different formats:

1. If the Compression element contains 'true', the data is compressed. For decompression and decoding, the base64Binary data should be converted into binary data, which should be input to the decompression algorithm. The binary output of the decompression algorithm will be the legacy data or SEPA format XML.
2. If the Compression element contains 'false', the data is not compressed. For decoding, the base64Binary data should be base64 decoded. The binary output of this will be the legacy data or SEPA format XML.

When generating compressed data inside the Content element, the following procedure should be used:

The binary legacy data or the SEPA XML is used as input to the compression algorithm. The resulting binary data is base64 encoded and placed inside the Content element. Notice, that the input to the compression algorithm is the **binary** legacy or SEPA XML data, not a base64 encoded version of the data.

Regarding the compression algorithm, gzip (RFC1952) must be used [5]. The CompressionMethod element should contain the string "gzip".

Regarding signatures

Multiple business signatures

The Financial Messages specification [1] allows for up to three enveloped business signatures in the ApplicationRequest element. However, if more than one business signature is to be used, care has to be taken.

If enveloped signatures based on the standard enveloped signature transform (http://www.w3.org/2000/09/xmldsig#enveloped-signature) are used, only the last signature will be verifiable. This is because the standard enveloped signature transform removes only the signature being verified, and leaves other signatures in the element still in place when the message digest is calculated. This effectively means that the message digest value of the signed element is changed every time a signature is added. Thus, the first signature will not be verifiable after the second signature has been added. If a third signature is added, the second signature will not be verifiable either.

The best solution to this problem probably is to not support multiple business signatures until a new version of the specification [1] and the corresponding schemas [4] has been made.

Supported algorithms

For incoming requests, the bank supports digital signatures based on the following algorithms:

- For message digesting,
  - SHA1 (http://www.w3.org/2000/09/xmldsig#sha1), or
  - SHA256 (http://www.w3.org/2001/04/xmlenc#sha256), or
  - SHA512 (http://www.w3.org/2001/04/xmlenc#sha512) should be used.
- For signing,
  - RSA based on SHA1 (http://www.w3.org/2000/09/xmldsig#rsa-sha1), or
  - RSA based on SHA256 (http://www.w3.org/2001/04/xmldsig-more#rsa-sha256), or

    - RSA based on SHA512 (http://www.w3.org/2001/04/xmldsig-more#rsa-sha512) should be used.
- For canonicalization, exclusive canonicalization without comments (http://www.w3.org/2001/10/xml-exc-c14n#) should be used.

Responses from the bank uses the following algorithms:

- For message digesting, SHA1 (http://www.w3.org/2000/09/xmldsig#sha1),
- For signing, RSA based on SHA1 (http://www.w3.org/2000/09/xmldsig#rsa-sha1),
- For canonicalization, exclusive canonicalization without comments (http://www.w3.org/2001/10/xml-exc-c14n#).

Requirements on the signatures

When reading the XMLDSIG standard, there is a lot of liberty in the way a signature can look. In order to be accepted by Danske Bank, every signature must contain the certificate used to create the signature.

For enveloped style signatures (business signatures), this means that a Signature/KeyInfo/X509Data/X509Certificate element must be found. The element must contain the signing certificate in base64 form.

For the WSSEC signatures (transport signatures), it means that a Security/BinarySecurityToken element must be found. The BinarySecurityToken must contain the signing certificate in base64 form, and it must be referenced from the Signature/KeyInfo/SecurityTokenReference element.

See the Appendix for examples of signatures satisfying these requirements.

Additionally, there is a time requirement on the transport signature. The transport signature contains a timestamp indicating at what time the signature was made. The signature will only be accepted if this timestamp is less than 60 minutes old. The interval in which the signature will be accepted is subject to change.

Future changes to the specification

Work has started to revise the financial web-service specification [1] and the corresponding schemas [4] to solve the problems described in this document. Care will be taken to make the changes backwards compatible whenever possible.

References

1. Security and Message Specification For Financial Messages Using Web Services. Nordea, OP-Pohjola Group, Sampo Bank. Version 1.05.
2. EDI Web Services, Danske Bank, [link]
3. PKI Service Description, Danske Bank, [link]
4. The WSDL and schema files for the financial services: BankCorporateFileService_20080616.wsdl, ApplicationRequest_20080918.xsd, ApplicationResponse_20080918.xsd.
5. RFC1952 - GZIP file format specification version 4.3. https://www.ietf.org/rfc/rfc1952.txt

Appendix A: Example XML and SOAP

This appendix will go through the generation of an example signed and encrypted SOAP message. The XML shown here is delivered in a zip-file along with this document.

Generation of the ApplicationRequest

First a business content and ApplicationRequest element must be generated. This corresponds to step 5 on the list on page 5. An example ApplicationRequest is found below:

```
<bxd:ApplicationRequest xmlns:bxd="http://bxd.fi/xmldata/">
      <bxd:CustomerId>ABC123</bxd:CustomerId>
      <bxd:Command>UploadFile</bxd:Command>
      <bxd:Timestamp>2021-12-17T09:30:47Z</bxd:Timestamp>
      <bxd:Environment>TEST</bxd:Environment>
      <bxd:Encryption>true</bxd:Encryption>
      <bxd:Compression>true</bxd:Compression>
      <bxd:CompressionMethod>gzip</bxd:CompressionMethod>
      <bxd:SoftwareId>CustomerSoftwareId</bxd:SoftwareId>
      <bxd:FileType>pain.001.001.02</bxd:FileType>
      <bxd:Content>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GUXhEUzhi</bxd:Content>
</bxd:ApplicationRequest>
```

Note that the business content and the attributes may not make sense in this example.

Signing the ApplicationRequest (business signature)

A business signature is added to the ApplicationRequest. The signature is of the enveloped type. For this the signing certificate of the customer is used. This corresponds to step 6 on the list on page 5:

```
<bxd:ApplicationRequest xmlns:dpstate="http://danskebank.dk/AGENA/SEPA/dpstate"
xmlns:sig="http://danskebank.dk/AGENA/SEPA/SigningService" xmlns:bxd="http://bxd.fi/xmldata/">
      <bxd:CustomerId>ABC123</bxd:CustomerId>
      <bxd:Command>UploadFile</bxd:Command>
      <bxd:Timestamp>2021-12-17T09:30:47Z</bxd:Timestamp>
      <bxd:Environment>TEST</bxd:Environment>
      <bxd:Encryption>true</bxd:Encryption>
      <bxd:Compression>true</bxd:Compression>
      <bxd:CompressionMethod>gzip</bxd:CompressionMethod>
      <bxd:SoftwareId>CustomerSoftwareId</bxd:SoftwareId>
      <bxd:FileType>pain.001.001.02</bxd:FileType>
      <bxd:Content>UjBsR09EbGhjZ0dTQUxNQUFBUUNBRU1tQ1p0dU1GUXhEUzhi</bxd:Content>
<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/2001/04/xmldsig-more#rsa-sha256"/>
  <Reference URI="">
    <Transforms>
      <Transform Algorithm="http://www.w3.org/2000/09/xmldsig#enveloped-signature"/>
      <Transform Algorithm="http://www.w3.org/2001/10/xml-exc-c14n#"/>
    </Transforms>
    <DigestMethod Algorithm="http://www.w3.org/2001/04/xmlenc#sha256"/>
    <DigestValue>Kg6GoK0HGEXcOiziLjFbg3mw8D6esmwNWbU9qTFRTkM=</DigestValue>
  </Reference>
</SignedInfo>
```

<SignatureValue>HzteEuDTV/kFHMfa3IACietPwxZexBaFtykoav34/+JeyqjshRK5nDPMguBfgDUy+K41dbUiI
lGrB8WKoV1etiQga2JT3SsDj2Os+h7Ov/87SNSQHb8I35BTfiX3ykKlNjIEuNjuc1fwRlWIUszctpVtuOMtrpi+1d
+0ujo9kKHhen+NKv19PR/+DUWnqwDBEffHV7msAkFDSHobmwmt3zj96XBpPahMlg/FtyzLurphxA8ddUSSk
CbEkVhGrHAj30cA+3dC5JXvlwy40sNv4tHUgg1cAaRBwGjHwsKKI/k9D2EfCqthq2juXXk7iX0GXf7GEqfslDF
LBLNvJTEEqw==</SignatureValue><KeyInfo><X509Data><X509Certificate>MIIDIjCCAougAwIBAgIEL4j5xz
ANBgkqhkiG9w0BAQUFADBpMQswCQYDVQQGEwJESzEQMA4GA1UEBxMHRGVubWFyazEaMBgGA1U
EChMRRGFuc2tlIEJhbmsgR3JvdXAxEDAOBgNVBAsTB0FwcGxTSW4xGjAYBgNVBAMUEUZpbm5pc2hfU
0VQQV90ZXN0MB4XDTA5MTAyNjEyMDMzMVoXDTEyMDIwMzEyMDMzMVowaTELMAkGA1UEBhMCRE
sxEDAOBgNVBAcTB0Rlbm1hcmsxGjAYBgNVBAoTEURhbnNrZSBCYW5rIEdyb3VwMRAwDgYDVQQLEwd
BcHBsU0luMRowGAYDVQQDFBFGaW5uaXNoX1NFUEFfdGVzdDCBnzANBgkqhkiG9w0BAQEFAAOBjQA
wgYkCgYEAyKLcdWd6TvZ+AF3zAabivvf+s+QoTnxQ4+DOl8mDBMpo7Ka41i59u79qyHa243HuQgW4eCMi
st+CUfY/Ynu6DgsP/NFduuV2VZNMYdQIKwJMaytQ1zhYufMeiw8YdgGk8qVjZJOmwbCjnDI1+da0CvEeEs1
ZUZtVK9nRDDsnG9cCAwEAAaOB1jCB0zAMBgNVHRMEBTADAQH/MB0GA1UdDgQWBBRu/JyaNnOeCQ
C6jNdNZl/qfLNoYTCBlgYDVR0jBIGOMIGLgBRu/JyaNnOeCQC6jNdNZl/qfLNoYaFtpGswaTELMAkGA1UEB
hMCREsxEDAOBgNVBAcTB0Rlbm1hcmsxGjAYBgNVBAoTEURhbnNrZSBCYW5rIEdyb3VwMRAwDgYDV
QQLEwdBcHBsU0luMRowGAYDVQQDFBFGaW5uaXNoX1NFUEFfdGVzdIIEL4j5xzALBgNVHQ8EBAMCAr
wwDQYJKoZIhvcNAQEFBQADgYEAq6rHlg41XYLMjOLZ33toWKLos3uWJucHK0F6TKAXSNp7Qo34hx04P
0MidOXuj18mYZkU/usVHn/L6rkWSfJretpO0xWTzw50XSm83JUQIYeQyMiU/w7ByJSNlTa8G1i4nKWjZ/kcl2
Ur0oDUTTf/X8mlC24EkDCl9RQjGEYdUvE=</X509Certificate><X509IssuerSerial><X509IssuerName>CN=
Finnish SEPA test, OU=ApplSIn, O=Danske Bank Group, L=Denmark,
C=DK</X509IssuerName><X509SerialNumber>797505991</X509SerialNumber></X509IssuerSerial></X50
9Data></KeyInfo></Signature></bxd:ApplicationRequest>

Encrypting the ApplicationRequest

The signed ApplicationRequest element is encrypted using XML encryption. For this, the encryption certificate of the bank is used. This corresponds to step 7 on the list on page 5:

<xenc:EncryptedData xmlns:xenc="http://www.w3.org/2001/04/xmlenc#"
Type="http://www.w3.org/2001/04/xmlenc#Element">
<xenc:EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#aes256-cbc"/>
<dsig:KeyInfo xmlns:dsig="http://www.w3.org/2000/09/xmldsig#">
<xenc:EncryptedKey>
<xenc:EncryptionMethod Algorithm="http://www.w3.org/2001/04/xmlenc#rsa-1_5"/>
<dsig:KeyInfo>
<dsig:X509Data>

<dsig:X509Certificate>MIIDyTCCArGgAwIBAgIKNDQ0NDQzMDAwMjANBgkqhkiG9w0BAQsFADCBxD
EQMA4GA1UEAxMHREJHUk9PVDELMAkGA1UEBhMCREsxEzARBgNVBAcTCkNvcGVuaGFnZW4xEDA
OBgNVBAgTB0Rlbm1hcmsxGjAYBgNVBAoTEURhbnNrZSBCYW5rIEdyb3VwMRowGAYDVQQLExFEYW5
za2UgQmFuayBHcm91cDEYMBYGA1UEBRMPNjExMjYyMjgxMTMwMDAxMQkwBwYDVQQEEwAxCTAHB
gNVBCoTADEJMAcGA1UEDBMAMQkwBwYDVQQREwAwHhcNMDkxMDMwMTIwMDAwWhcNMTExMDM
wMTIwMDAwWjCBxTERMA8GA1UEAxMIREJHQ1JZUFQxCzAJBgNVBAYTAkRLMRMwEQYDVQQHEwpD
b3BlbmhhZ2VuMRAwDgYDVQQIEwdEZW5tYXJrMRowGAYDVQQKExFEYW5za2UgQmFuayBHcm91cDE
aMBgGA1UECxMRRGFuc2tlIEJhbmsgR3JvdXAxGDAWBgNVBAUTDzYxMTI2MjI4NDQzMDAwMjEJMAcG
A1UEBBMAMQkwBwYDVQQqEwAxCTAHBgNVBAwTADEJMAcGA1UEERMAMIGdMA0GCSqGSIb3DQEB
AQUAA4GLADCBhwKBgQCpae2tNbCmPRni74t4pXpzUwsUTRBeazPpchZHjn+HBpfQAH66kCzOcxLHOrL
71CFYIj6B4WrqXZx4SUldQpKu67vSh5ZsLyyXPZniCo+DtX2zOYGEigzq6hIylR5XKnXkZfJSxo/TgGX3rkLxF
6cbaP6mxN7LcCv9dUj+eRnngQIBA6NAMD4wEQYDVR0OBAoECERCR0NSWVBUMBkGA1UdIwQSMBC
ADsLGxMP29sL29/X39cXEMA4GA1UdDwEB/wQEAwIEMDANBgkqhkiG9w0BAQsFAAOCAQEAD8+BpnM/
K10m5iKO4BTcvGi77oSp0sul5utP6ZFEveuqjlMx4xxh+1SVRSMXQttd49/08BIUOaYrljvP+dJT5J6D+UeFRSj
E6mevjRE1qqIpCsHoCWVE9WkiuF3QLaouD9PH5FPsk53QVdd4Yp+vIKDVYQbpc12A8wAEu8hkngqxN2/E
pd8u/3LQgsTmY6mn5ek2EFNI6o2dQa503DpzjoXGURIFOoAaWB7ZUJhe7nxG1Xjn1OnttreoP6twCTrG8IoL
fGKDkLVQ3G+7vAqXgB+JwFLUoULRaw0eISPgE7nMkz0la0lu+aJlaHRJZq/F9eMkDXFqRSMGHHNUijzrQ
Q==</dsig:X509Certificate>

```
                    </dsig:X509Data>
                </dsig:KeyInfo>
                <xenc:CipherData>

    <xenc:CipherValue>NoO3acdWBuH0nduRMdLZtOhN645erE7JjABu4waNg7GYbEvxrj6m1mdhpj32BZ4
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        <xenc:CipherData>

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This step should be performed by a piece of standard software.

Generation of the SOAP message

The next step is to generate a SOAP message (including the RequestHeader), base64 encode the XML from the previous step and insert it in a the ApplicationRequest element of the SOAP. This corresponds to steps 8 to 11 on the list on page 5:

```
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xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:cor="http://bxd.fi/CorporateFileService"
xmlns:mod="http://model.bxd.fi" xmlns:dpstate="http://danskebank.dk/AGENA/SEPA/dpstate">
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    <soapenv:Body>
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        <mod:Language>EN</mod:Language>
        <mod:UserAgent>CustomerSoftwareId</mod:UserAgent>
        <mod:ReceiverId>DABAFIHH</mod:ReceiverId>
      </mod:RequestHeader>
          <mod:ApplicationRequest>
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</soapenv:Envelope>
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Signing the SOAP message (transport signature)

The last step is to create the transport signature on the SOAP message. The signature is based on a customer signing certificate, and the style of the signature is detached. This corresponds to step 12 on the list on page 5:


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<soapenv:Envelope xmlns:mod="http://model.bxd.fi" xmlns:cor="http://bxd.fi/CorporateFileService"
xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/"
xmlns:sign="http://danskebank.dk/AGENA/SEPA/SigningService">
    <soapenv:Header>
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</soapenv:Envelope>

The XML examples are distributed along with this document.

Appendix B: Web service URL

The URL of the web service is:

https://businessws.danskebank.com/financialservice/edifileservice.asmx

It is not possible to fetch the web service wsdl by appending '?wsdl' to the URL. Instead, the wsdl must be retrieved from the bank homepage.