Business Interoperability Specification

OpenPEPPOL AISBL

Pre Award Coordinating Community

ICT - Models

BIS eDocuments guide for pre-award

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1 Introduction

This document describes the cryptographic specifications you need to implement to execute pre-award processes. The cryptographic specifications apply both for the outer corners (corner 1 and 4, e.g. the tendering systems) as for the inner corners (corner 2 and 3, the access points).

All requirements in this document have been designed, tested and approved in the European Large Scale Pilot e-SENS. The document is based on “Signing-and-encrypting-CEN-BII-transactions” by Jon Ølnes (Difi). It explains the usage of the CMS encryption schemes, compliant with IETF RFC 5652 and ENISA SOG-IS standards for recommended crypto schemes and strengths.

1.1 Audience

The audience for this document is organizations wishing to be PEPPOL enabled for exchanging pre-award business documents, and/or their ICT-suppliers. These organizations may be:

- Service providers
- Contracting Authorities
- Economic Operators
- Software Developers

More specifically, it is addressed towards the following roles:

- ICT Architects
- ICT Developers
- Business Experts

For further information on PEPPOL/OpenPEPPOL please see [COMMON BIS].

2 References

[PEPPOL]	http://www.peppol.eu/
[PEPPOL_EIA]	http://www.peppol.eu/peppol_components/peppol-eia/eia
[PEPPOL_Transp]	http://www.peppol.eu/peppol_components/peppol-eia/eia#ict-architecture/transport-infrastructure/models
[COMMON BIS]	To be developed
[CEN_BII2]	http://www.cenbii.eu
[eSENS]	http://wiki.ds.unipi.gr/display/ESENSPILOTS/D5.6-1+-+5.1.1+-+eTendering
[DSI]	https://joinup.ec.europa.eu/news/cef-building-blocks-cros
[UBL]	http://docs.oasis-open.org/ubl/UBL-2.2.html
[Schematron]	http://www.schematron.com
[XSLT]	http://www.w3.org/TR/xslt20/
[EIF]	European Interoperability Framework 2.0, found at: http://ec.europa.eu/isa/library/index_en.htm http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf
[GS1 Keys]	http://www.gs1.org/barcodes/technical/id_keys
[ETSI]	https://portal.etsi.org/webapp/WorkProgram/SimpleSearch/QueryForm.asp
[IETF]	http://trustee.ietf.org/trust-legal-provisions.html
[ENISA SOG-IS]	https://www.enisa.europa.eu/events/sog-is

3 Document history

3.1 Revision history

Version	Date	Author	Organisation	Description
0.1	01-02-2018	Chander Khoenkhoen	PIANOo	First version
0.2	08-03-2018	Kornelis Drijfhout	PIANOo	Addressed review comments difi
1.1	25-06-2018	Kornelis Drijfhout	PIANOo	Addressed review comments from CMB, adding Specifications for ASiC, deleting cryptographic specifications for REM-evidence.

3.2 Contributors

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4 ENISA SOG-IS standards

ENISA specifies cryptographic protocols, underlying algorithms and strengths. Different cryptographic mechanisms, although incomparable at first, are recalculated to so called comparable bit strength values. ENISA mandates a 128 bit comparable bit strength from 2020 on, accepting 112 bits as legacy until then. This 2-pager document works on the 128 bit strength for symmetric and 112 bits for asymmetric keys.

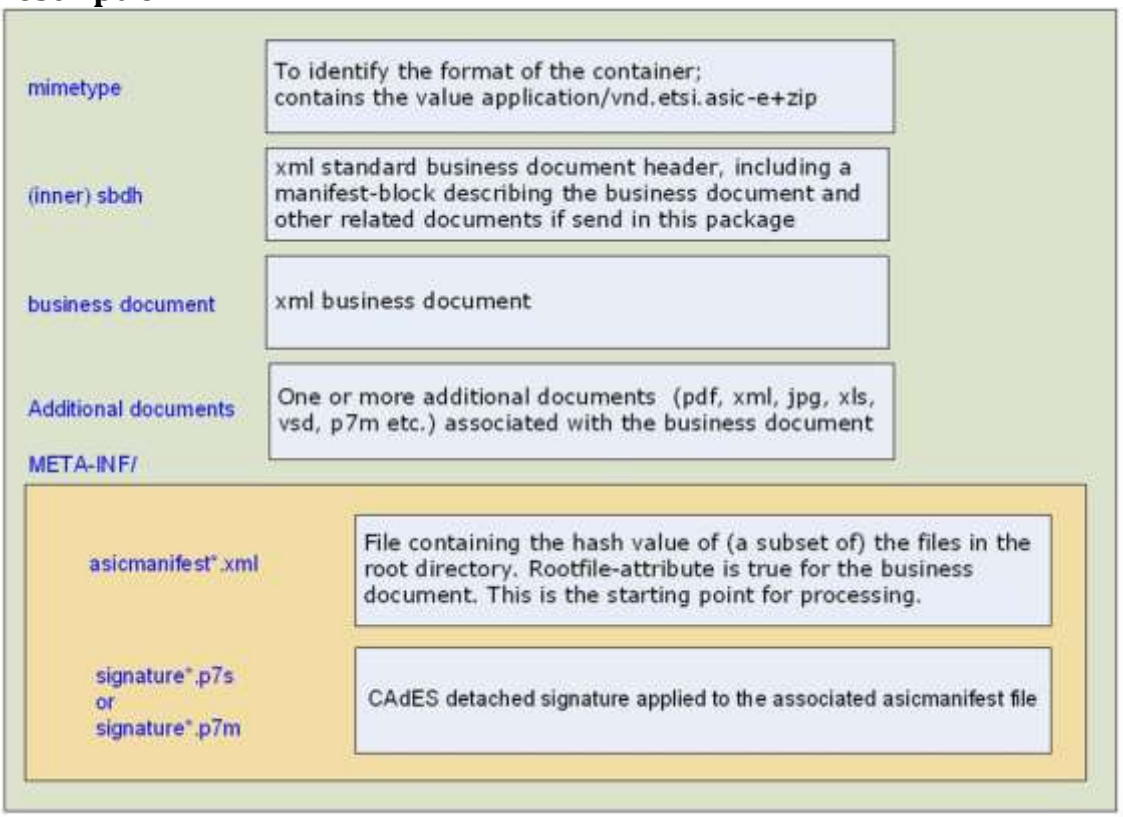
5 ASiC-E container with CAdES signature

5.1 Introduction

There is a need to pack all separate parts of a message together in order to achieve a single payload document for the transport network. This note specifies use of an ASiC-E container (Associated Signature Container Extended) for this purpose. ASiC is based on the zip format.
ASiC-E includes an ASiC manifest that holds metadata, identification of all parts inside the container, and hash values of these parts. Parts in this case are the SBDH, the CEN BII document, and all attachments that are included as separate parts. ASiC requires the manifest to be signed by a detached signature. Since the manifest holds hash values of all other parts, these are implicitly also signed. The signature is placed in the ASiC container as a separate part. This packaging allows security to be applied at message level, preserving security properties across asynchronous message passing with temporal storage at intermediate nodes. Authenticity and integrity are ensured by the ASiC signature, and confidentiality can be achieved by encrypting relevant parts.

The container described in this chapter is based on ETSI TS 102 918 V1.2.1[1].

5.2 Description



Picture 1: Directory structure of an ASiC-E container with CAdES signature

[1] https://portal.etsi.org/webapp/workprogram/Report_WorkItem.asp?WKI_ID=42455

The container includes the following files:

5.2.1 mimetype

- The purpose of this file is to identify the format of the container.
- Fixed name with the value “application/vnd.etsi.asic-e+zip”.

5.2.2 sbdh.xml (SBDH)

- Xml file containing the standard business document header.
- It includes manifest-block for describing the business document and other related documents.
- All files except mimetype (having fixed name and value) and sbdh will be described in the manifest block.

5.2.3 Business documents

- Xml file containing the business document.+

5.2.4 Additional documents

- One or more documents of different types e.g. xml, pdf, jpg, xls, p7m and vsd associated with the business document and that needs to be signed.
- Files which are signed and encrypted has extension p7m.

5.2.5 META-INF/asicmanifest*.xml

- One or more files containing the hash values of all the documents (except mimetype) or the hash values of a subset of the data objects.
- If Rootfile attribute present and set to "true" it specify how to begin processing the container. The rootfile is the business document to be processed e.g. biitrdm082.xml.
- If one or more documents needs to be signed separately than the name should be suffixed by a number starting with 1.

Example: asicmanifest1.xml, asicmanifest2.xml etc.

5.2.6 META-INF/signature*.p7s

- One or more files containing the signature of the asicmanifest*.xml.
- If one or more documents needs to be signed separately than the name should be suffixed by a number starting with 1 e.g. signature1.xml, signature2.xml etc.
- For each asicmanifest*.xml file exactly one associated signature file must be present.

The sub directory META-INF includes an optional file manifest.xml, containing an overview of the files in the main directory of the container (except the mimetype).

5.2.7 Additional rules

For the implementation of the transactions the following additional rules are implied:

- Exactly one asicmanifest.xml and consequently one signature.xml file will be used.
- In asicmanifest.xml the hash value of all the files, except mimetype will be calculated and stored.
- For calculating the hash value sha256 hash algorithm will be used.
- The mimetype, sbdh, business document, asicmanifest and the signature are not encrypted.
- Additional documents can be encrypted[2] depending on the content of the document

[2] For more information on encrypting document see BIS Cryptographic Specifications

- When encryption is required, each document is encrypted separately.

5.3 ASiC signing

Signing values				
Protocol	Algorithm	KeySize	HASH	Reference
CADES B-B detached	DS-RSA; PSS (PKCS#1v2.1)	2048[3]	SHA-256	RFC3447, PKCS1, ISO9796-2]

Certificate for signing	
type	X.509 V3
CN / Identity holding private key	C1, Tendering Service Provider Legal Person
Sign / Seal	Sealing, authenticity and integrity from signature creation time
DATA / Payload	ASiC container; signing encrypted data
Key specs	RSA-2048
Key usage	Signature
extensions	Subject Key Identifier (CMS type 2)
HASH algorithm	SHA-256
PKI	PEPPOL PKI (Pre-award)
Qualified	No
Verifiable / can be validated	YES (PTN PKI)

6 Tender encryption

Protocol	Protocol part	Algorithm		strength	Comp. strength	Encryptor
CMS (Type 2) Enveloped-Data RFC 5652[4]	Data encryption:	AES_CBC[5] ISO10116 7-Padding	Symmetric Block Cipher	128	128	Tendering Service Provider (C1)
	Key encryption	RSA	Asymmetric	2048	112[6]	idem

Certificate for encryption	
type	X.509 V3
CN / Identity holding private key	C4, Sourcing Service Provider / CA
Key specs	RSA-2048
Key usage	Key encipherment
extensions	Subject Key Identifier (CMS type 2)
HASH algorithm	SHA-256
PKI	Self signed allowed if sealed by ASiC signing

[3] ENISA allows RSA 2048 (112 bits comparable bit strength) as legacy until 2020

[4] RFC 5083 (authenticated encryption) is not used. Tender Signing is done on encrypted data (ASiC container) rendering a function equivalent of authenticated encryption as in RFC 5083

[5] In order to provide security in a strong sense, the encryption scheme must either be probabilistic and generate a random initialization vector to bootstrap encryption, or require an additional input, whose value can only be used once with a given key, i.e. a nonce. The specifications of modes of operation describe what is expected (nonce or random IV). Implementations shall follow these specifications, e.g., CBC with a constant or more generally a predictable IV does not follow the CBC specification [SP800-38A] and is not accepted.

[6] ENISA allows RSA 2048 (112 bits comparable bit strength) as legacy until 2020

Qualified	Not Required
Verifiable / can be validated	YES; by means of verifying ASiC signature
Per Tendering Process	Yes