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Technical Specification

**Electronic Signatures and Infrastructures (ESI);
CAAdES Baseline Profile**

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Electronic Signatures and Infrastructures (ESI).

Introduction

TS 101 733 [1] (CAAdES henceforth) specifies formats for Advanced Electronic Signatures built on CMS [2]. That document defines a number of signed and unsigned optional signature properties, resulting in support for a number of variations in the signature contents and powerful processing requirements.

In order to maximise interoperability in communities applying CAAdES to particular environments it is necessary to identify a common set of options that are appropriate to that environment. Such a selection is commonly called a profile.

The present document profiles the use of TS 101 733 [1] signatures for its use in the context of the "Directive 2006/123/EC [i.1] of the European Parliament and of the Council of 12 December 2006 on services in the internal market" (EU Services Directive henceforth) and any applicable context where qualified signatures are used.

1 Scope

The present document defines the so-called CADES baseline profile which corresponds to the minimum basic requirements in the context of the EU Services Directive, and provides the same basic features with minimal number of options. This is required because there is a clear need to specify the Baseline Profile for AdES signatures used in electronic documents issued by competent authorities to be interchanged across borders in the context of the EU Services Directive.

The present document defines a profile that specifies element and attribute requirements for a CADES signature.

Clause 2 in the present document contains references to the relevant documents and standards.

Clause 3 includes definitions of relevant terms and abbreviations used in the present document.

Clause 4 provides details on the way that the requirements on both signer and verifier will be presented throughout the present document.

Clause 5 specifies the requirements for the short-term electronic signatures, that is, requirements for CADES-BES and CADES-EPES forms.

2 References

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 101 733 (V1.8.3): "Electronic Signatures and Infrastructures (ESI); CMS Advanced Electronic Signatures (CADES)".
- [2] IETF RFC 3852: "Cryptographic Message Syntax (CMS)".
- [3] IETF RFC 2634: "Enhanced Security Services for S/MIME".
- [4] IETF RFC 5035: "Enhanced Security Services (ESS) Update: Adding CertID Algorithm Agility".
- [5] ETSI TS 102 176-1: "Electronic Signatures and Infrastructures (ESI); Algorithms and Parameters for Secure Electronic Signatures; Part 1: Hash functions and asymmetric algorithms".
- [6] ECRYPT II (European Network of Excellence in Cryptology II): "ECRYPT II Yearly Report on Algorithms and Keysizes".

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market.

- [i.2] Commission Decision 2009/767/EC of 16 October 2009 setting out measures facilitating the use of procedures by electronic means through the 'points of single contact' under Directive 2006/123/EC of the European Parliament and of the Council on services in the internal market.

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

generator: any party which creates, or adds attributes to, a signature

NOTE: This may be the signatory or any party which initially verifies or further maintains the signature.

long term signatures: signatures that are expected to be verified beyond the signers' certificate expiration date and, possibly, even after the expiration date of the certificate of the signers' certificate-issuing CA

protocol element: element of the protocol which may be including data elements and / or elements of procedure

service element: element of service that may be provided using one or more protocol elements

NOTE: All alternative protocol elements provide an equivalent service to the users of the protocol.

short term signatures: signatures that are to be verified for a period of time that does not go beyond the signers' certificate expiration date

verifier: entity that validates or verifies an electronic signature

The present document makes use of certain key words to signify requirements. Below follows their definitions:

may: Means that a course of action is permissible within the limits of the present document.

shall: Means that the definition is an absolute requirement of the present document. It has to strictly be followed in order to conform to the present document.

should: Means that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain course of action is preferred but not necessarily required. Implementers **may** know valid reasons in particular circumstances to ignore this recommendation, but the full implications must be understood and carefully weighed before choosing a different course.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in CADES [1] and the following apply:

TSL Trust Status List

4 General requirements

4.1 Algorithm requirements

Generators are referred to applicable national laws regarding algorithms and key lengths.

Generators are also recommended to take into account the latest version of TS 102 176-1 [5] for guidelines purposes and the latest ECRYPT2 D.SPA.13 [6] yearly report for further recommendations, when selecting algorithms and key lengths.

MD5 algorithm **shall not** be used as digest algorithm.

4.2 Compliance requirements

Profiles in the present document define requirements for generator of CADES signatures [1].

The present document defines a profile that specifies which elements/properties **shall** and which **may** be present in a CADES signature.

A verifier **shall** be able to accept a CADES signature containing any elements/properties conformant to CADES [1], but this profile does not specify any processing requirement on such elements/properties present in the signature as it is meant to be used together with a specification describing processing during signature verification.

Requirements are grouped in two different categories, each one having its corresponding identifier. Table 1 defines these categories and their identifiers.

Table 1: Requirement categories

Identifier	Requirement on generator
M	Generator shall include the element in the signature.
O	Generator may include the element in the signature.

Optional elements defined in CADES [1] but not specified in the current document are treated as "O" as above.

Certain service elements **may** be provided by different protocol elements at user's choice. In these cases the semantics of M and O defined in table 1 depend on the requirement for the service element itself. Tables 2 and 3 (each one applies to a different requirement on the service element) define these semantics.

Table 2: Requirements for mandatory service with choices

Requirement Identifier for the Service / Protocol element	Requirement on generator
Service = M	Generator shall provide the service by including one protocol element chosen from the list of choices.
Protocol Choice = O	Generator may use this protocol element for providing the mandatory service elements.

Table 3: Requirements for optional service with choices

Requirement Identifier for the Service / Protocol element	Requirement on generator
Service = O	Generator may provide the service by including one protocol element chosen from the list of choices.
Protocol Choice = O	If the generator decides to provide the service, then it may use this protocol element.

The present document shows new requirements for each service and protocol element in tabular form. Below follows the structure of the table.

Table 4: Requirements for optional service with choices

Service / Protocol element	Reference	Requirement on generator	Notes / Additional requirements
Service:			
Choice 1			
Choice 2			

Column **Service / Protocol element** will identify the service element or protocol element the requirement applies to. Service elements that **may** be implemented by different protocol elements (i.e. users **may** make a choice on several protocol elements) build tables with more than one row.

Column **Reference** will reference the relevant clause of the standard where the element is first defined. The reference is to CADES [1], except where explicitly indicated otherwise.

Column **Requirement on generator** will contain an identifier of the requirement, as defined in table 1, bound to the corresponding protocol element for the generator.

Column **Notes / Additional requirements** will contain numbers referencing notes and/or letters referencing additional requirements. Both notes and additional requirements are listed below the table.

Profiles **may** be affected by applicable regulations; hence implementers **should** check any national regulation that may affect these profiles.

5 Requirements for short-term Electronic Signatures

The current clause specifies compliance requirements for short-term electronic signatures. In consequence it includes requirements for the following forms: CADES-BES and CADES-EPES.

Clause 5.1 provides an overview of the CADES forms profiled in this clause.

Clauses 5.2 and 5.3 profile CADES-BES and CADES-EPES forms respectively.

5.1 Profiled CADES Forms

The present clause provides an overview of the CADES forms profiled in the present clause.

Table 5

Service / Protocol element	CADES [1] Reference	Generator requirement	Additional requirements / notes
Service: signature		M	
CADES-BES	Clause 4.4.1	O	1
CADES-EPES	Clause 4.4.2	O	2

NOTE 1: Attributes leading to CADES-BES signatures are profiled in clause 5.2.

NOTE 2: Attributes leading to CADES-EPES signatures are profiled in clause 5.3.

5.2 Profile of attributes in Basic CADES form (CADES-BES)

5.2.1 Attributes defined in CMS Signature

5.2.1.1 Content type

Table 6

Service / Protocol element	CMS [2] Reference	Generator Requirement	Additional requirements / notes
ContentType	Clause 11.1	M	a

Additional requirements:

- a) The generator **shall** include the ContentType attribute with value id-data.

NOTE: There is an open issue surrounding the indication of the type of the signed document in a CADES signature. Note that a future version of this document may add a requirement regarding the indication of the type of the document, in relation with a future version of the CADES specification.

5.2.1.2 Signing time

Table 7

Service / Protocol element	CMS [2] Reference	Generator requirement	Additional requirements / notes
SigningTime	Clause 11.3	M	a

Additional requirement:

- a) The generator **shall** include the claimed time of signature as content of this element.

5.2.1.3 Placement of the signing certificate

Table 8

Service / Protocol element	CMS [2] Reference	Generator requirement	Additional requirements / notes
SignedData.certificates	Clause 5.1	M	a, b, c

Additional requirements:

- a) The generator **shall** include the signer certificate in the SignedData.certificate field.
- b) In order to facilitate path building, the generator **should** include in the SignedData.certificate field all certificates not available to verifiers that can be used during path building. In the case of signature based on qualified certificates and whose verification is expected to be based on TSLs, (in conformance with Decision 2009/767/EC [i.2]), the generator **should** include all intermediary certificates forming a chain between the signer certificate and a CA present in the TSL which are not available to verifiers.

NOTE 1: A certificate is considered available to the verifier if reliable information about its location is known and allows automated retrieval of the certificate (for instance through an Authority Info Access Extension or equivalent information present in a TSL).

NOTE 2: In the general case, different verifiers can have different trust parameters and can validate the signer certificate through different chains. Therefore, the generator may not know which certificates will be relevant for path building. However, in practice, such certificates can often clearly be identified. In this case, it is advised that the generator include them unless they can be automatically retrieved by verifiers. In the specific case of a signature meant to be validated through TSL, it is advised to include at least the unavailable intermediary certificates up to but not including the CAs present in the TSLs, since the TSL is information that is shared globally by all verifiers.

- c) The requirements a) and b) cannot be satisfied in the case the SignedData.certificate field is used in the computation of a digest included in existing signatures such that the addition of a certificate in this field would invalidate previous signatures (for instance, the case of co-signing a CADES-A signature).

5.2.2 Attributes defined in ESS

5.2.2.1 Signing certificate

Table 9

Service / Protocol element	ESS [3, 4] reference	Generator Requirement	Additional requirements / notes
Service: protection of signing certificate		M	
ESS signing-certificate	ESS [3], Clause 5.4	O	a, b
ESS signing-certificate v2	ESS [4], Clause 4	O	a, b

Additional requirement:

- a) The generator **shall** use either the signing certificate or the signing-certificate v2 attribute, depending on the hash function using, in accordance with ESS [4], clause 2.
- b) The generator **should** migrate to the use of ESS signing-certificate v2 in preference to ESS signing-certificate in line with the guidance regarding limited lifetime for the use of SHA-1 given in clause 9.2 of TS 102 176-1 [5].

5.3 Profile of attributes in Explicit Policy based Electronic Signature CAdES form (CAdES-EPES)

5.3.1 Signature policy identifier

Table 10

Service / Protocol element	CAdES [1] Reference	Generator Requirement	Additional requirements / notes
Signature-policy-identifier	Clause 5.8.1	M	

History

Document history		
V1.1.1	September 2011	Publication