



**Electronic Signatures and Infrastructures (ESI);
CMS Advanced Electronic Signatures (CAAdES);
Part 2: Baseline Profile**

STABLE DRAFT FOR PUBLIC REVIEW UNTIL 15 JANUARY 2014

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Foreword

This draft European Standard (EN) has been produced by ETSI Technical Committee Electronic Signatures and Infrastructures (ESI) and is now submitted for the combined Public Enquiry and Vote phase of the ETSI standards EN Approval Procedure.

The present document is part 2 of a multi-part deliverable covering the CMS Advanced Electronic Signatures (CAAdES). Full details of the entire series can be found in part 1 [1].

The present document was previously published as TS 103 173 [i.3].

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Introduction

Part 1 of the current multipart document, EN 319 122-1 [1] (CAAdES henceforth) specifies formats for Advanced Electronic Signatures built on CMS [5]. It defines a number of signed and unsigned optional signature attributes, resulting in support for a number of variations in the signature contents and powerful processing requirements.

In order to maximize 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 EN 319 122-1 [1] signatures contexts where AdES signatures are used and in particular its use in the context of the "Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market" [i.5] (EU Services Directive henceforth).

1 Scope

The present document defines a baseline profile for CAdES that provides the basic features necessary for a wide range of business and governmental use cases for electronic procedures and communications to be applicable to a wide range of communities when there is a clear need for interoperability of AdES signatures used in electronic documents to be interchanged across borders. In particular it takes into account eSignature needs in the context of the EU Services Directive [i.7].

The present document defines four different conformance levels addressing incremental requirements to maintain the validity of the signatures over the long term, in a way that all the requirements addressed at a certain level are always addressed also by the levels above. Each level requires the presence of certain CAdES attributes, suitably profiled for reducing the optionality as much as possible and referring to the forms that are specified in CAdES [1].

Clause 4 identifies the four conformance levels and shows how these levels might encompass the life cycle of the electronic signatures.

Clause 5 provides details on the way that the requirements will be specified throughout the present document.

Clause 6 profiles short-term related CAdES attributes.

Clause 7 profiles a CAdES signature for which a Trust Service Provider has generated a trusted token (time-mark or time-stamp token) proving that the signature itself actually existed at a certain date and time.

Clause 8 profiles long-term related CAdES attributes tackling the long term availability of the signature validation material.

Clause 9 profiles long-term related CAdES attributes tackling the long term availability and integrity of the signature validation material.

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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 EN 319 122-1: "Electronic Signatures and Infrastructures (ESI); CMS Advanced Electronic Signatures (CAAdES); Part 1: Core Specification".

[2] ETSI TS 119 312: "Electronic Signatures and Infrastructures (ESI); Cryptographic Suites for Secure Electronic Signatures".

[3] IETF RFC 2634: "Enhanced Security Services for S/MIME".

NOTE: Available at <http://tools.ietf.org/rfcmarkup/2634>.

[4] IETF RFC 5035: "Enhanced Security Services (ESS) Update: Adding CertID Algorithm Agility".

NOTE: Available at <http://tools.ietf.org/rfcmarkup/5035>.

[5] IETF RFC 5652: "Cryptographic Message Syntax (CMS)".

NOTE 1: Obsoletes RFC 3852

NOTE 2: Available at <http://tools.ietf.org/rfcmarkup/5652>.

[6] ECRYPT II (European Network of Excellence in Cryptology II): "ECRYPT II Yearly Report on Algorithms and Keysizes".

NOTE: The document [1], [2] are published in the context of the work in Mandate M460. They might not yet be published.

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] ETSI TS 101 533-1: "Electronic Signatures and Infrastructures (ESI); Data Preservation Systems Security; Part 1: Requirements for Implementation and Management".

[i.2] ETSI TS 102 640-1: "Electronic Signatures and Infrastructures (ESI); Registered Electronic Mail (REM); Part 1: Architecture".

[i.3] ETSI TS 103 173: "Electronic Signatures and Infrastructures (ESI); CAAdES Baseline Profile"

[i.4] ETSI TR 119 001: "Electronic Signatures and Infrastructures (ESI); Definitions and abbreviations"

[i.5] Directive 2006/123/EC of the European Parliament and of the Council of 12 December 2006 on services in the internal market.

- [i.6] Commission Decision 2009/767/EC of 16 October 2009 amended by CD 2010/425/EU of 28 July 2010 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.

NOTE: Contained in the ETSI Directives: <http://portal.etsi.org/Directives/home.asp>.

- [i.7] Commission Decision 2011/130/EU of 25 February 2011; establishing minimum requirements for the cross-border processing of documents signed electronically by competent authorities under Directive 2006/123/EC of the European Parliament and of the Council on services in the internal market (notified under document C(2011) 1081).

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3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 119 001 [i.4] and EN 319 122-1 [1] and the following 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.

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.

trust service: electronic service which enhances trust and confidence in electronic transactions

trust service provider: entity which provides one or more electronic Trust Services

verifier: entity that validates or verifies an electronic signature

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 119 001 [i.4] and the following apply:

LTA	Long Term Archive
TSL	Trust Status List

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4 Conformance Levels

The present document defines four conformance levels as indicated below.

Applications managing signatures conformant to requirements specified in clause 6 may claim **B-Level** (basic Level) conformance.

Applications managing signatures conformant to B-Level and also conformant to requirements specified in clause 7 may claim **T-Level** (Trusted time for signature existence) conformance.

Applications managing signatures conformant to T-Level and also conformant to requirements specified in clause 8 of the present document may claim **LT-Level** (Long Term level) conformance.

Applications managing signatures conformant to LT-Level and also conformant to requirements specified in clause 9 of the present document may claim **LTA-Level** (Long Term with Archive time-stamps) conformance.

These conformance levels are defined for encompassing the life cycle of electronic signature, namely:

- a) B-Level profiles incorporation of signed and some unsigned properties when the signature is actually generated.

NOTE 1: It is considered that this level is sufficient to conform to the Commission Decision 2011/130/EU of 25 February 2011 [i.7].

- b) T-Level profiles the generation and inclusion, for an existing signature, of a trusted token proving that the signature itself actually existed at a certain date and time.
- c) LT-Level profiles the incorporation of all the material required for validating the signature in the signature document. This level is understood to tackle the long term availability of the validation material.
- d) LTA-Level profiles the incorporation of time-stamp tokens that allow validation of the signature long time after its generation. This level is understood to tackle the long term availability and integrity of the validation material.

NOTE 2: The levels b) to d) are appropriate where the technical validity of signature needs to be preserved for a period of time after signature creation where certificate expiration, revocation and/or algorithm obsolescence is of concern. The specific level applicable depends on the context and use case.

All conformance levels up to LTA uses attributes defined in CADES [1].

When signed data is exchanged between parties the sender **should** use at least signatures conforming to a level that allows the relying parties to trust the signature at the time the exchange takes place.

NOTE 3: Archiving or preservation of electronic signatures over long term requires in general conformance to LTA level. The use of LTA-level is considered an appropriate preservation and transmission technique for signed data. Conformance to lower level is sufficient when combined with appropriate additional protection techniques such as use of systems compliant to TS 101 533-1 [i.1].

NOTE 4: The assessment of the effectiveness of other preservation and transmission techniques for signed data is out of the scope of the present document. The reader is advised to consider legal instruments in force and related standards such as TS 101 533-1 [i.1] or TS 102 640-1 [i.2] to evaluate their appropriateness.

5 General requirements

5.1 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 119 312 [2] for guideline 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.

5.2 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 signature containing any elements/properties conformant to CADES [1], but the present document 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 validation.

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 present 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	Additional requirements/notes
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.

6 Requirements for B-Level Conformance

This clause defines requirements that CADES signatures claiming conformance to the B-Level have to fulfil.

This clause actually profiles CADES-BES (when the `signature-policy-id` attribute is not present) and CADES-EPEs (when the `signature-policy-id` attribute is present) signatures.

In consequence, the following CADES attributes are addressed directly in this clause: `content-type`, `signing-time` and `signing-certificate`, `signer-attributes-v2`. Further `message-digest`, `signature-policy-identifier`, `counter-signature`, `content-reference`, `content-identifier`, `content-hints`, `commitment-type-indication`, `signer-location`, `content-time-stamp`, `mime-type`, `signature-policy-store` are inherently addressed.

Clause 6.1 profiles attributes defined in CMS [5], namely: `content-type` and `signing-certificate`.

Clause 6.2 profiles attributes defined in ESS [4], namely: `signing-certificate`.

No further requirements are defined by the present document for the rest of the attributes specified by CADES [1]. In the case an optional unsigned attribute is incorporated in the signature, DER encoding **shall** be used for this attribute, whilst preserving the encoding of any other attribute field.

6.1 Attributes defined in CMS Signature

6.1.1 Content type

Table 5

Service/Protocol element	CMS [5] Reference	Generator Requirement	Additional requirements/notes
<code>ContentType</code>	Clause 11.1	M	a

Additional requirement:

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

6.1.2 Signing time

Table 6

Service/Protocol element	CMS [5] Reference	Generator requirement	Additional requirements/notes
SigningTime	Clause 11.3	M	a

Additional requirement:

- a) The generator shall include the claimed UTC time expressed as in [5], clause 11.3 when the signature was generated as content of this element.

6.1.3 Placement of the signing certificate

Table 7

Service/Protocol element	CMS [5] 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 particular on Trusted Lists as defined in CD 2009/767/EC amended by CD 2010/425/EU [i.6]), 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.

6.1.4 Attributes of the signer

Table 8

Service/Protocol element	CAES [1] Reference	Generator requirement	Additional requirements/notes
signer-attributes-v2	Clause Erreur ! Source du renvoi introuvable.	O	a, b

Additional requirements:

- a) Signatures generated after the date of publication of the present document shall use `signer-attributes-v2` to specify the attributes or roles of the signer.

- b) Legacy signatures generated before the date of publication of this European norm, which include signer-attributes, shall be considered conformant to the present specification.

6.2 Attributes defined in ESS

6.2.1 Signing certificate

Table 9

Service/Protocol element	ESS [3] and [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 TS 119 312 [2].

7 Requirements for T-Level Conformance

This clause defines those requirements that CADES signatures conformant to B-Level, have to fulfil for also being conformant to T-Level. In consequence, CADES signatures claiming conformance to the T-Level of the present document **shall** be built on signatures conformant to the B-Level.

A CADES signature conformant to T-Level **shall** be a signature conformant to B-Level for which a Trust Service Provider has generated a trusted token (time-mark or time-stamp token) proving that the signature itself actually existed at a certain date and time.

NOTE: CADES signatures conformant to T-Level of the present document are, in consequence, CADES-T signatures suitably profiled as per the requirements defined in this clause.

Table 9 further profiles the provision of the trusted token that proves existence of the signature at a certain date and time.

Table 10

Service/Protocol element	CADES [1] Reference	Generator Requirement	Additional requirements/notes
Service: trusted time for existence of the signature		M	
Signature-time-stamp attribute	Clause 6.3.1	O	a, b, c
Time mark	Clause 4.1.3.1	O	d

Additional requirements

- a) The present document recommends usage of time-stamps as attestation of the time for existence of the signature instead of time-marks.

- b) A CADES-T claiming conformance to the present document **may** contain several `signature-time-stamp` attributes.
- c) The generator **shall** use DER encoding for any `signature-time-stamp` attribute, whilst preserving the encoding of any other attribute field.
- d) If a time-mark is used, then no additional attribute is incorporated into the signature. It is the responsibility of the TSP generating the time-mark to provide the needed trust on the signature time.

8 Requirements for LT-Level Conformance

This clause defines those requirements that CADES signatures conformant to T-Level, have to fulfil to also be conformant to LT-Level. In consequence, CADES signatures claiming conformance to the LT-Level of the present profile shall be built on signatures conformant to the T-Level.

CADES signatures conformant to LT-Level **shall** not incorporate any of the following unsigned attributes:

`complete-certificate-references`, `complete-revocation-references`, `attribute-certificate-references`, `attribute-revocation-references`, `CADES-C-time-stamp`, `time-stamped-certs-crls-references`, `certificate-values`, `revocation-values`, `archive-time-stamp` OID { iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs-9(9) smime(16) id-aa(2) 27 }, `archive-time-stamp` OID { iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1) pkcs-9(9) smime(16) id-aa(2) 48}, and `long-term-validation`.

NOTE: By doing so, this profile eliminates a high degree of optionality.

CADES signatures conformant to LT-Level shall be built by incorporation to CADES-T signatures conformant to the T-Level, of values of certificates and values of certificate status used to validate the signature. Clauses 8.1 and 8.2 profile the incorporation of these values.

8.1 Certificate values

Table 11

Service/Protocol element	CADES [1] Reference	Generator Requirement	Additional requirements/notes
Service: certificate values in long-term-validation	Clause 6.5	M	
<code>SignedData.certificates</code>	Clause 6.5.2	M	a, b

Additional requirements:

- a) The generator shall include the full set of certificates, including the trust anchors when they are available in the form of certificates that have been used to validate the signature. This set includes certificates required for validating the signing certificate, for validating any attribute certificate present in the signature, for validating revocation information (i.e. OCSP response and CRL) if certificates are not already included, and for validating any time-stamp token's signing certificate (i.e. a TSA certificate) already incorporated to the signature.
- b) The present document recommends avoiding duplication of certificate values within the signature.

8.2 Revocation values

Table 12

Service/Protocol element	CADES [1] Reference	Generator Requirement	Additional requirements/notes
Service:revocation values in long-term-validation	Clause 6.4	M	a, b
SignedData.crls.crl	Clause 6.5.2	O	c
SignedData.crls.other	Clause 6.5.2	O	d

Additional requirements:

- The generator shall include the full set of revocation data (CRL or OCSP responses) that have been used in the validation of the signature. This set includes all certificate status information required for validating the signing certificate, for validating any attribute certificate present in the signature, for validating revocation information (i.e. OCSP response and CRL) if they are not already included and for validating any time-stamp token's signing certificate (i.e. a TSA certificate) already incorporated to the signature.
- The present document recommends avoiding duplication of revocation values within the signature.
- Applications shall include CRL values within SignedData.crls.crl.
- Applications shall include OCSP response values within SignedData.crls.other.

9 Requirements for LTA-Level Conformance

This clause defines those requirements that CADES signatures conformant to LT-Level, have to fulfil to also be conformant to LTA-Level. In consequence, CADES signatures claiming conformance to the LTA-Level of the present profile **shall** be built on signatures conformant to the LT-Level.

When a long-term-validation attribute is not present, CADES signatures conformant to LTA-Level **shall** be a signature conformant to the LT-Level to which one or more archive-time-stamp-v3 attributes (each one including one ats-hash-index unsigned attribute as specified in [1]) have been incorporated.

When a long-term-validation attribute is already present, CADES signatures conformant to LTA-Level **shall** be a signature conformant to the LT-Level to which one or more long-term-validation attributes have been incorporated.

NOTE 1: The present document uses CADES [1], which defines the new attribute archive-time-stamp-v3 intended to replace the archive-time-stamp and long-term-validation unsigned attributes.

NOTE 2: CADES signatures conformant to LTA-Level of the present document are, in consequence, CADES-A signatures suitably profiled as per the requirements defined in this clause.

NOTE 3: As stated in CADES [1], CADES-A form may help to validate the signature beyond any event that may limit its validity.

NOTE 4: a long-term-validation attribute is already present when the CADES signature was first created as conformant to TS 101 733 v2.1.1 or to the LTA-Level as defined in TS 103 173 v2.1.1.

Table 13

Service/Protocol element	CADES [1] Reference	Generator requirement	Additional requirements/notes
Service: add archive time-stamp	Clause 6.5	M	
archive-time-stamp-v3	Clause 6.5.2	M	a, b, note 4

Additional requirements:

- a) Signatures conformant to LTA-level **may** have more than one `archive-time-stamp-v3` attribute each one containing one `ats-hash-index` unsigned attribute as specified in [1].
- b) Before generating and incorporating an `archive-time-stamp-v3` attribute, applications claiming conformance to this profile, **shall** include all the validation material, which are not already in the signature, required for verifying the signature. This validation material includes all the certificates and all certificate status information (like CRLs or OCSP responses) required for:
 - validating the signing certificate (including validating a revocation values when signed by a separate certification authority);
 - validating any attribute certificate present in the signature;
 - and validating any time-stamp token's signing certificate (i.e. a TSA certificate) already incorporated in the signature (including, of course, any previous `archive-time-stamp-v3`).

This validation material **shall** be incorporated within `SignedData.certificates` and `SignedData.crls`. See clauses 8.1 and 8.2 for details of incorporation.

NOTE 4: The specific rules for encoding this attribute are specified in CADES [1], clause 6.5.2.

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Annex A (informative): Change History

date	Version	Information about changes
November 2013	v0.0.3	Update of references and added clarification concerning LTA signatures containing already a long-term-validation attribute, adding a section on the signer attributes.

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History

Document history		
V0.0.3	November 2013	Stable draft for public review

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