



**Electronic Signatures and Infrastructures (ESI);
CADES digital signatures;
Part 1: Building blocks and CADES baseline signatures**

Reference

RTS/ESI-0019122-1-TS

Keywords

ASN.1, CAdES, electronic signature, profile,
security

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:
<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at
<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:
<https://portal.etsi.org/People/CommitteeSupportStaff.aspx>

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.
The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2015.
All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members.
3GPP™ and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.
GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Contents

Intellectual Property Rights	5
Foreword.....	5
Modal verbs terminology.....	5
Introduction	5
1 Scope	6
2 References	6
2.1 Normative references	6
2.2 Informative references.....	7
3 Definitions and abbreviations.....	8
3.1 Definitions.....	8
3.2 Abbreviations	9
4 General syntax.....	9
4.1 General requirements	9
4.2 The data content type.....	9
4.3 The signed-data content type.....	9
4.4 The SignedData type.....	9
4.5 The EncapsulatedContentInfo type.....	10
4.6 The SignerInfo type.....	10
4.7 ASN.1 Encoding.....	10
4.7.1 DER.....	10
4.7.2 BER	10
4.8 Other standard data structures	10
4.8.1 Time-stamp token format.....	10
4.8.2 Additional types.....	10
4.9 Attributes.....	11
5 Attribute semantics and syntax.....	11
5.1 CMS defined basic signed attributes	11
5.1.1 The content-type attribute	11
5.1.2 The message-digest attribute	11
5.2 Basic attributes for CADES signatures	12
5.2.1 The signing-time attribute	12
5.2.2 Signing certificate reference attributes	12
5.2.2.1 General requirements	12
5.2.2.2 ESS signing-certificate attribute	12
5.2.2.3 ESS signing-certificate-v2 attribute.....	13
5.2.3 The commitment-type-indication attribute.....	13
5.2.4 Attributes for identifying the signed data type.....	14
5.2.4.1 The content-hints attribute	14
5.2.4.2 The mime-type attribute.....	14
5.2.5 The signer-location attribute.....	15
5.2.6 Incorporating attributes of the signer	15
5.2.6.1 The signer-attributes-v2 attribute	15
5.2.6.2 claimed-SAML-assertion	17
5.2.7 The countersignature attribute.....	17
5.2.8 The content-time-stamp attribute.....	18
5.2.9 The signature-policy-identifier attribute and the SigPolicyQualifierInfo type.....	18
5.2.9.1 The signature-policy-identifier attribute.....	18
5.2.9.2 The SigPolicyQualifierInfo type	19
5.2.10 The signature-policy-store attribute	21
5.2.11 The content-reference attribute	21
5.2.12 The content-identifier attribute.....	22
5.3 The signature-time-stamp attribute.....	22

5.4	Attributes for validation data values.....	23
5.4.1	Introduction.....	23
5.4.2	OCSP responses.....	23
5.4.2.1	OCSP response types.....	23
5.4.2.2	OCSP responses within RevocationInfoChoices.....	23
5.4.3	CRLs.....	23
5.5	Archive validation data.....	23
5.5.1	Introduction.....	23
5.5.2	The <code>ats-hash-index-v2</code> attribute.....	23
5.5.3	The <code>archive-time-stamp-v3</code> attribute.....	25
6	CADES baseline signatures.....	27
6.1	Signature levels.....	27
6.2	General requirements.....	28
6.2.1	Algorithm requirements.....	28
6.2.2	Notation for requirements.....	28
6.3	Requirements on components and services.....	30
6.4	Legacy CADES baseline signatures.....	33
Annex A (normative): Additional Attributes Specification.....		34
A.1	Attributes for validation data.....	34
A.1.1	Certificates validation data.....	34
A.1.1.1	The <code>complete-certificate-references</code> attribute.....	34
A.1.1.2	The <code>certificate-values</code> attribute.....	35
A.1.2	Revocation validation data.....	35
A.1.2.1	The <code>complete-revocation-references</code> attribute.....	35
A.1.2.2	The <code>revocation-values</code> attribute.....	37
A.1.3	The <code>attribute-certificate-references</code> attribute.....	38
A.1.4	The <code>attribute-revocation-references</code> attribute.....	39
A.1.5	Time-stamps on references to validation data.....	40
A.1.5.1	The <code>time-stamped-certs-crls-references</code> attribute.....	40
A.1.5.2	The <code>CADES-C-timestamp</code> attribute.....	40
A.2	Deprecated attributes.....	41
A.2.1	Usage of deprecated attributes.....	41
A.2.2	The <code>other-signing-certificate</code> attribute.....	41
A.2.3	The <code>signer-attributes</code> attribute.....	41
A.2.4	The <code>archive-time-stamp</code> attribute.....	41
A.2.5	The <code>long-term-validation</code> attribute.....	41
A.2.6	The <code>ats-hash-index</code> attribute.....	42
Annex B (informative): Signature Format Definitions Using X.208 ASN.1 Syntax.....		43
Annex C (normative): Signature Format Definitions Using X.680 ASN.1 Syntax.....		49
Annex D (informative): Example Structured Contents and MIME.....		56
D.1	Use of MIME to Encode Data.....	56
D.1.1	MIME Structure.....	56
D.1.2	Header Information.....	56
D.1.3	Content Encoding.....	57
D.1.4	Multi-Part Content.....	57
D.2	S/MIME.....	58
D.2.1	Using S/MIME.....	58
D.2.2	Using <code>application/pkcs7-mime</code>	58
D.2.3	Using <code>multipart/signed</code> and <code>application/pkcs7-signature</code>	59
D.3	Use of MIME in the signature.....	59
Annex E (informative): Change history.....		61
History.....		62

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: "*Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards*", which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

The present document is part 1 of a multi-part deliverable covering CAAdES digital signatures as identified below:

Part 1: "Building blocks and CAAdES baseline signatures";

Part 2: "Extended CAAdES signatures".

The present document partly contains an evolved specification of the ETSI TS 101 733 [1] and ETSI TS 103 173 [i.1].

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Introduction

Electronic commerce has emerged as a frequent way of doing business between companies across local, wide area and global networks. Trust in this way of doing business is essential for the success and continued development of electronic commerce. It is therefore important that companies using this electronic means of doing business have suitable security controls and mechanisms in place to protect their transactions and to ensure trust and confidence with their business partners. In this respect digital signatures are an important security component that can be used to protect information and provide trust in electronic business.

The present document is intended to cover digital signatures supported by PKI and public key certificates, and aims to meet the general requirements of the international community to provide trust and confidence in electronic transactions, including, amongst other, applicable requirements from Regulation (EU) No 910/2014 [i.13].

The present document can be used for any transaction between an individual and a company, between two companies, between an individual and a governmental body, etc. The present document is independent of any environment. It can be applied to any environment e.g. smart cards, GSM SIM cards, special programs for electronic signatures, etc.

The present document is part of a rationalized framework of standards (see ETSI TR 119 000 [i.2]). See ETSI TR 119 100 [i.4] for getting guidance on how to use the present document within the aforementioned framework.

1 Scope

The present document specifies CAAdES digital signatures. CAAdES signatures are built on CMS signatures [7], by incorporation of signed and unsigned attributes, which fulfil certain common requirements (such as the long term validity of digital signatures, for instance) in a number of use cases.

The present document specifies the ASN.1 definitions for the aforementioned attributes as well as their usage when incorporating them to CAAdES signatures.

The present document specifies formats for CAAdES baseline signatures, which provide 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 digital signatures used in electronic documents.

The present document defines four levels of CAAdES baseline signatures addressing incremental requirements to maintain the validity of the signatures over the long term, in a way that a certain level always addresses all the requirements addressed at levels that are below it. Each level requires the presence of certain CAAdES attributes, suitably profiled for reducing the optionality as much as possible.

Procedures for creation and validation of CAAdES digital signatures are out of scope and specified in ETSI TS 119 102-1 [i.5].

The present document aims at supporting digital signatures in different regulatory frameworks.

NOTE: Specifically, but not exclusively, CAAdES digital signatures specified in the present document aim at supporting electronic signatures, advanced electronic signatures, qualified electronic signatures, electronic seals, advanced electronic seals, and qualified electronic seals as per Regulation (EU) No 910/2014 [i.13].

2 References

2.1 Normative 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.

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

- [1] ETSI TS 101 733 (V2.2.1): "Electronic Signatures and Infrastructures (ESI); CMS Advanced Electronic Signatures (CAAdES)".
- [2] IETF RFC 2045 (1996): "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies".
- [3] IETF RFC 2634 (1999): "Enhanced Security Services for S/MIME".
- [4] IETF RFC 3161 (2001): "Internet X.509 Public Key Infrastructure Time-Stamp Protocol (TSP)".
- [5] IETF RFC 5035 (2007): "Enhanced Security Services (ESS) Update: Adding CertID Algorithm Agility".
- [6] IETF RFC 5280 (2008): "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile".

NOTE: Obsoletes IETF RFC 3280.