



Electronic Signatures and Infrastructures (ESI); PDF Advanced Electronic Signature Profiles; Part 4: PAdES Long Term - PAdES-LTV Profile

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Contents

| | |
|--|-----------|
| Intellectual Property Rights | 4 |
| Foreword..... | 5 |
| Introduction | 5 |
| 1 Scope | 6 |
| 2 References..... | 6 |
| 2.1 Normative references | 6 |
| 2.2 Informative references..... | 7 |
| 3 Definitions, symbols and abbreviations | 8 |
| 3.1 Definitions..... | 8 |
| 3.2 Abbreviations | 8 |
| 4 Profile for PAdES-LTV..... | 10 |
| 4.1 Overview | 10 |
| 4.2 General Requirements | 11 |
| 4.3 Validation Process..... | 12 |
| 4.4 Extensions Dictionary | 12 |
| Annex A (normative): ISO 32000-1 LTV Extensions..... | 13 |
| A.1 Document Security Store..... | 13 |
| A.2 Document Time-stamp..... | 17 |
| Annex B (informative): Matching of PAdES-LTV-profiles to CADES..... | 19 |
| Annex C (informative): Change History | 21 |

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Foreword

This European Standard (EN) has been produced by ETSI Technical Committee Electronic Signatures and Infrastructures (ESI).

| 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 |

The present document is part 4 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.1].

The present document was previously published as ETSI TS 102 778-4 [i.X].

Introduction

Electronic documents are a major part of a modern companies business. Trust in this way of doing business is essential for the success and continued development of electronic business. It is, therefore, important that companies using electronic documents have suitable security controls and mechanisms in place to protect their documents and to ensure trust and confidence with their business practices. In this respect the electronic signature is an important security component that can be used to protect information and provide trust in electronic business.

The present document is intended to cover electronic signatures for electronic documents. This includes evidence as to its validity even if the signer or verifying party later attempts to deny (i.e. repudiates; see ISO/IEC 10181-4 [i.1]) the validity of the signature.

Thus, the present document can be used for any document encoded in a portable document format produced by an individual and a company, and exchanged between 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 European Directive on a community framework for Electronic Signatures defines an electronic signature as: "Data in electronic form which is attached to or logically associated with other electronic data and which serves as a method of authentication".

The formats defined in the present document, are able to support advanced electronic signatures as defined in the Directive.

ISO 32000-1 [1] specifies a digital form for representing documents called the Portable Document Format (PDF) that enables users to exchange and view electronic documents easily and reliably, independent of the environment in which they were created or the environment in which they are viewed or printed.

Clause 12.8 of ISO 32000-1 [1] identifies the ways in which an electronic signature may be used to authenticate the identity of a user and the accuracy of the document's content. These electronic signatures are based on the same CMS [10] technology and techniques on which EN 319 122 [3] (CAAdES) is based too, but with some restrictions. This profile specifies electronic signatures in PDF to provide Advanced Electronic Signature with long term validation equivalent to the, CAAdES-X-Long and CAAdES-A forms.

1 Scope

The present document profiles the electronic signature formats found in ISO 32000-1 [1] to support Long Term Validation (LTV) of PDF Signatures. This profile does not repeat the base requirements of the referenced standards, but instead aims to disambiguate between the techniques used in the different referenced standards.

The present document specifies how to include validation information in a PDF Document and to further protect the document using time-stamps so that it is possible to subsequently verify a PDF Signature long after it was signed. This profile may be used to support long term validation of:

- a) PDF Signatures to profiles specified in EN 319 142-2 [i.4]; or
- b) PDF Signatures to profiles specified in EN 319 142-3 [i.5]; or
- c) PDF Signatures to profiles specified in EN 319 142-5 [i.6].

The present document specifies a profile to support the equivalent functionality to the signature forms CAAdES-X Long and CAAdES-A as specified in EN 319 122 [2] in a single profile PAdES-LTV (see annex B for further information on matching this profile to CAAdES signature forms).

The same LTV mechanism specified in this profile is used to support the equivalent to all the signature forms XAdES-XL and XAdES-A as specified in EN 319 132 [3], by upgrading XAdES signatures aligned with the profile defined in clause 5.2 of EN 319 142-5 [i.6] (see annex A of EN 319 142-5 [i.6] for further information on matching this profile to XAdES signature forms).

The present document also specifies extensions to ISO 32000-1 [1] to provide features required to support LTV (see annex A).

NOTE: It is planned to submit these extensions to ISO as a proposal for a revision to ISO 32000-1 [1]. If accepted, future versions of this profile may reference any future ISO standard instead of the extensions specified in annex A.

This profile is applicable to any party relying on a signature over a long period (e.g. longer than the lifetime of the signing certificate). It may be applied by a party receiving and verifying the document or the signing party who should also verify the document when applying LTV.

The present document is part of a series of profiles for advanced electronic signature formats applied to PDF documents. General information on the series of profiles is specified in EN 319 142-1 [i.3].

The requirements specified in the present document take precedence over those specified in ISO 32000-1 [1].

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] ISO 32000-1: "Document management - Portable document format - Part 1: PDF 1.7".

NOTE: Available at http://www.adobe.com/devnet/acrobat/pdfs/PDF32000_2008.pdf.

- [2] EN 319 122: "Electronic Signatures and Infrastructures (ESI); CMS Advanced Electronic Signatures (CAAdES)".
- [3] EN 319 132: "XML Advanced Electronic Signatures (XAdES)".
- [4] IETF RFC 2315: "PKCS #7: Cryptographic Message Syntax Version 1.5".
- [5] IETF RFC 5652 (2009): "Cryptographic Message Syntax (CMS)".
- [6] IETF RFC 3161: "Internet X.509 Public Key Infrastructure Time-Stamp Protocol (TSP)".
- [7] IETF RFC 5280: "Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile".
- [8] IETF RFC 6960: "X.509 Internet Public Key Infrastructure Online Certificate Status Protocol - OCSP".
- [9] W3C Recommendation (18 July 2002): "Exclusive XML Canonicalization Version 1.0".

NOTE: Available at <http://www.w3.org/TR/xml-exc-c14n/#>

- [10] EN 319 102: "Electronic Signature and Infrastructures (ESI); Procedures for Signature Creation and Validation".

NOTE: The ENs mentioned in [2], [3], 10 are published in the context of the work in Mandate M460. They might not yet be published at the time of publication of the present document.

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] ISO/IEC 10181-4: "Information technology - Open Systems Interconnection - Security frameworks for open systems: Non-repudiation framework".
- [i.2] Adobe XFA: "XML Forms Architecture (XFA) Specification" version 2.5, (June 2007), Adobe Systems Incorporated".
- [i.3] EN 319 142-1: "Electronic Signatures and Infrastructures (ESI); PDF Advanced Electronic Signature Profiles; Part 1: PAdES Overview - a framework document for PAdES".
- [i.4] EN 319 142-2: "Electronic Signatures and Infrastructures (ESI); PDF Advanced Electronic Signature Profiles; Part 2: PAdES Basic - Profile based on ISO 32000-1".
- [i.5] EN 319 142-3: "Electronic Signatures and Infrastructures (ESI); PDF Advanced Electronic Signature Profiles; Part 3: PAdES Enhanced - PAdES-BES and PAdES-EPES Profiles.
- [i.6] EN 319 142-5: "Electronic Signatures and Infrastructures (ESI); PDF Advanced Electronic Signature Profiles; Part 5: PAdES for XML Content - Profiles for XAdES signatures".
- [i.7] ISO 32000-2: "Document management - Portable document format - Part 2: PDF 2.0". Standard under development".
- [i.8] ETSI Directives.

NOTE: The ENs mentioned in [i.3], [i.4], [i.5], [i.6] are published in the context of the work in Mandate M460. They might not yet be published at the time of publication of the present document.

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in [1], [2], [3] and the following apply:

conforming signature handler: in the context of this profile, software application, or part of a software application, that knows how to perform digital signature operations (e.g. signing and/or verifying) in conformance with ISO 32000-1 [1] and the requirements of the appropriate profile

conforming reader: in the context of this profile, software application, or part of a software application, that knows how to perform validation digital signature operations in conformance with ISO 32000-1 [1] and the requirements of the appropriate profile

Document Security Store (DSS): information appended to a PDF document relating to its security including Validation-Related Information (VRI) and indirect references to the values of validation data for all signatures

document time-stamp: time-stamp applied to a document along with any document security-related information applied to that document

PDF signature: DER-encoded binary data object based on the PKCS #7 [4] or the CMS (RFC5652 [5]) or related syntax containing a electronic signature and other information necessary to verify the electronic signature such as the signer's certificate along with any supplied revocation information placed within a PDF document structure as specified in ISO 32000-1 [1], clause 12.8

signature dictionary: PDF data structure, of type dictionary, as described in ISO 32000-1 [1], clause 12.8.1, table 252 that contains all the of information about the Digital Signature

signer: entity that creates an electronic signature

validation data: data that may be used by a verifier of electronic signatures to determine that the signature is valid (e.g. certificates, CRLs, OCSP responses)

Validation Related Information (VRI): indirect references to validation data used to validate a specific signature

verifier: entity that validates an electronic signature

The present document makes use of certain keywords defined in ETSI Drafting Rules [i.8] to signify requirements.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in [1], [2], [3] and the following apply:

| | |
|-------|-----------------------------------|
| BER | Basic Encoding Rules |
| BES | Basic Electronic Signature |
| CA | Certification Authority |
| CAdES | CMS Advanced Electronic Signature |
| CMS | Cryptographic Message Syntax |

NOTE: As specified in RFC 5652 [5].

| | |
|-----------|---|
| CRL | Certificate Revocation List |
| DSS | Document Security Store |
| EPES | Explicit Policy-based Electronic Signature |
| GSM | Global System for Mobile Telecommunications |
| LTV | Long Term Validation |
| OCSP | Online Certificate Status Protocol |
| PAdES | PDF Advanced Electronic Signature |
| PAdES-LTV | PAdES Long Term Validation |
| PDF | Portable Document Format |
| SIM | Subscriber Identity Module |

| | |
|-------|------------------------------------|
| VRI | Validation Related Information |
| XADES | XML Advanced Electronic Signatures |
| XFA | XML Forms Architecture |

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4 Profile for PAdES-LTV

4.1 Overview

Validation of an electronic signature requires data to validate the signature such as CA certificates, Certificate Revocation List (CRLs) or Certificate status information (OCSP) commonly provided by an online service (referred to in the present document as validation data). If the document is stored and the signatures are to be verifiable long after first created, in particular after the signing certificate has expired, the original validation data may no longer be available or there may be uncertainty as to what validation data was used when the document was first verified.

Also, the cryptographic protection afforded by the signature may not be guaranteed after the certificate has expired.

This profile uses an extension to ISO 32000-1 [1] called Document Security Store (DSS) to carry such validation data as necessary to validate a signature, optionally with Validation Related Information (VRI) which relates the validation data to a specific signature (see clause A.1). The structure of DSS and VRI is illustrated in figure 1.

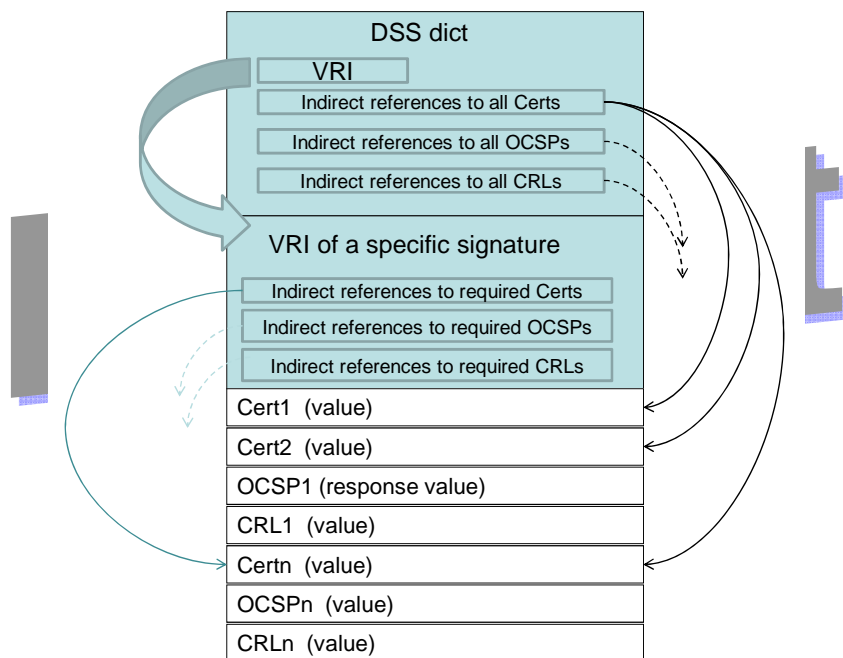


Figure 1: Illustration of DSS and VRI Structures

This profile also uses another extension to ISO 32000-1 [1] called Document Time-stamp (see clause A.2) to extend the life-time of protection to the document.

The structure of a PDF document to which LTV is applied is illustrated in figure 2.

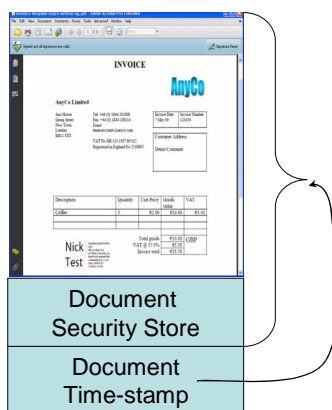


Figure 2: Illustration of PDF Document with LTV

The life-time of the protection can be further extended beyond the life-time of the last document Time-stamp applied by adding further DSS information to validate the previous last document Time-stamp along with a new document Time-stamp. This is illustrated in figure 3.

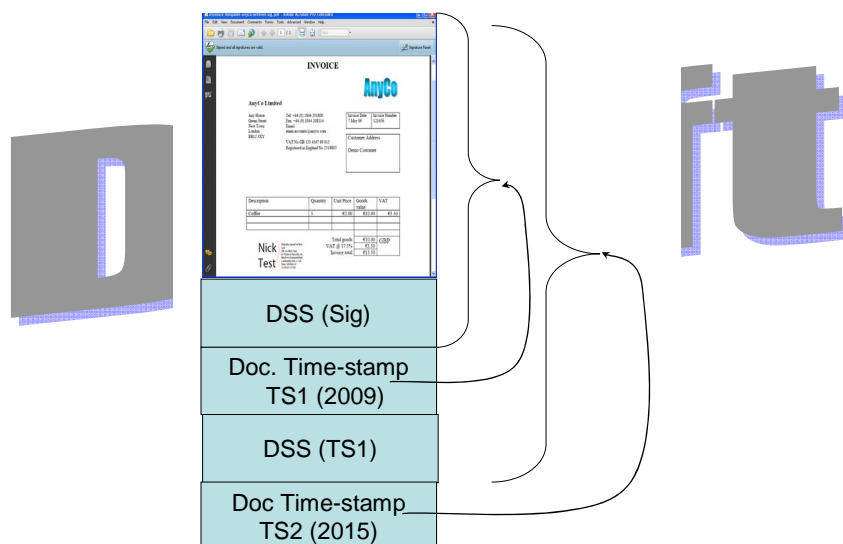


Figure 3: Illustration of PDF Document with repeated LTV

This profile is based on extensions to the PDF document structure described in ISO 32000-1 [1] as specified in annex A which describes how to use the **DSS dictionary** and **VRI dictionaries** to incorporate information for the purposes of performing long-term signature validation.

4.2 General Requirements

Conforming signature handlers creating and/or verifying PDF documents with PAdES-LTV shall support PDF documents with:

- a) Document security store information as specified in clause A.1.
- b) Document time-stamps as specified in clause A.2.

It is recommended that signed PDF documents, conforming to this profile, contain DSS followed by a document Time-stamp.

This profile supports validation data carried by value within the DSS.

NOTE: Use of validation data in DSS referencing external sources is not supported by the current profile.

Systems supporting this profile shall support creation and/or validation of signatures with one or more DSS entries and document Time-stamps.

4.3 Validation Process

It is recommended that the validation process be as specified in EN 319 102 [10]

4.4 Extensions Dictionary

The extensions dictionary (see ISO 32000-1 [1] clause 7.12) should include an entry:

```
<</ESIC
  <</BaseVersion /1.7
    /ExtensionLevel 1
  >>
>>
```

to identify that a PDF document includes extensions as identified in the current document.

NOTE: Use of DSS as specified in Annex A.1 may also be identified by:

```
<</ADBE
  <</BaseVersion /1.7
    /ExtensionLevel 5
  >>
```

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Annex A (normative): ISO 32000-1 LTV Extensions

A.1 Document Security Store

Background

The long-term validation of an electronic signature is a well recognized problem. The problem stems from the fact that the signature may not be successfully verified when its collateral (validation data) components may have expired, e.g. signing certificates, time-stamps, CRLs and. To facilitate long term signature validation (LTV), PDF supports the inclusion of various types of validation data into the signed document. This enables the validation process of a conforming signature handler to re-verify the signature as occurred when the signature was first created or some short time thereafter.

In order to know and trust the signing time, the signature should include an authoritative time-stamp. A time-stamp is itself signed, and so it is possible for the time-stamp's own validation data also to eventually expire. As with signatures, DSS may also include signature validation data relating to the signature time-stamp (or later document time-stamps).

Another problem is that at the time of signing not all of the validation-related components may not be available for various reasons including the inability to connect to remote servers that provide them (e.g. the user is offline) or the inability of the signer to bear the financial or time costs associated with obtaining these components. Also, in many workflows it is the recipient of a signed PDF document who is interested in a long term validation of the signatures and not the signer of the document.

In order to address these problems, this validation-related information needs to be dissociated from the signature itself providing the ability to add validation-related information to an existing signed PDF document at some time after a signature has been created. Therefore, a new separate "security store" (a repository of all security-related information) is defined in the PDF in which to place the components within the document.

NOTE: An additional benefit of separating out the components is that those components which are common to several signatures (e.g. certificates and revocation lists) can be stored in this repository once and referenced from all places where they are needed. This will greatly reduce the size of a PDF document that contains several signatures.

"The relevant validation data for each signature may be identified from the security store (see VRI below) for optimization or to remove ambiguity of the validation data used to validate a specific signature."

Catalog

| Added to ISO 32000-1 [1] Table 28 "Entries in catalogue dictionary" | | |
|---|------------|--|
| KEY | TYPE | VALUE |
| DSS | dictionary | (Optional) Document-wide security-related information. |

DSS Dictionary

The Document Security Store (DSS), when present, shall be a dictionary that shall have the value "DSS" as key in the document catalog dictionary. This dictionary is used to provide a single place where all of the validation-related information for some or all signatures in the document should be placed.

The **DSS** dictionary, if present, shall contain validation-related information only for document signatures represented in PKCS#7 and CMS (and its derivatives) format or for XAdES signatures of forms signing dynamic XFA [i.2]. This dictionary may contain.

- An array of all certificates used for the signatures, including time stamp signatures, that occur in the document, It shall also hold all the auxiliary certificates required to validate the certificates participating in certificate chain validations.

- An array of all Certificate Revocation Lists (CRL) (see RFC 2459) used for some of the signatures.
- An array of all Certificate Status Protocol (OCSP) responses (see RFC 2560) used for some of the signatures.
- A VRI key whose value shall be a dictionary containing one VRI dictionary (validation-related information) for each signature represented in PKCS#7, CMS or XAdES format.

Any VRI dictionaries, if present, shall be located in document incremental update sections. If the signature dictionary to which a VRI dictionary applies is itself in an incremental update section (see clause 7.5.6 of ISO 32000-1 [1]), the VRI update shall be done later than the signature update.

| Entries in a DSS Dictionary | | |
|---|------------|--|
| KEY | TYPE | VALUE |
| Type | Name | (Optional) If present shall be DSS for a document security store dictionary. |
| VRI | Dictionary | (Optional) This dictionary contains Signature VRI dictionaries in the document. The key of each entry in this dictionary is the base-16-encoded (uppercase) SHA1 digest of the signature to which it applies and the value is the Signature VRI dictionary which contains the validation-related information for that signature. See notes 1 and 2. |
| Certs | Array | (Optional) An array of streams, each containing one BER-encoded X.509 certificate (see RFC 5280 [7]). This array contains certificates that may be used in the validation of any signatures in the document. |
| OCSPs | Array | (Optional) An array of streams, each containing a BER-encoded Online Certificate Status Protocol (OCSP) response (see RFC 6960 [8]). This array contains OCSPs that may be used in the validation of any signatures in the document. |
| CRLs | Array | (Optional) An array of streams, each containing a BER-encoded Certificate Revocation List (CRL) (see RFC 5280 [7]). This array contains CRLs that may be used in the validation of any signatures in the document. |
| <p>NOTE 1: For a document signature the bytes that are hashed are those of the signature's DER-encoded binary data object (base-16 decoded byte string) from the Contents entry in the associated signature dictionary (e.g. PKCS#7 or CMS objects). For the signatures of the CRL and OCSP response, it is the respective signature object represented as a BER-encoded OCTET STRING encoded with primitive encoding. For a time-stamp's signature it is the bytes of the time-stamp itself since the time-stamp token is a signed data object.</p> <p>NOTE 2: When computing the digest of a XAdES signature found in dynamic XFA [i.2], the contents of the ds:Signature is canonicalized using exclusive canonicalization (http://www.w3.org/2001/10/xml-exc-c14n#) as specified in [9] and then hashed.</p> | | |

Signature VRI Dictionary

The signature VRI dictionary shall contain validation-related information (VRI) for a specific signature in the document to which the validation information applies. This validation data shall be that used by the party adding the DSS to successfully verify the given signature or validation data known to be appropriate to another party later relying on the signature. The information consists of the validation time (indicated either by a date object, or a secure time represented by a time-stamp, or implied by Document time-stamp applied to the PDF document immediately after the DSS) and revocation information (which can be either a CRL or an OCSP).

Any values in the **Cert**, **CRL** and **OCSP** arrays of a **Signature VRI** dictionary shall also be present in the **DSS** dictionary applicable to the signature for which this **Signature VRI** dictionary is associated. If this signature (e.g. PKCS#7 or CMS object) does have any associated Certs, CRLs or OCSPs, then the corresponding key shall not be present in the VRI dictionary.

A **Signature VRI** dictionary shall not be used to record the information used in an unsuccessful validation attempt.

| Entries in a Signature VRI Dictionary | | |
|---|--------|---|
| KEY | TYPE | VALUE |
| Type | Name | <i>(Optional)</i> If present, shall be VRI for a validation-related information dictionary |
| Cert | Array | <i>(Optional, if present shall not be an empty array)</i> An array of streams, each containing one BER-encoded X.509 certificate (see RFC 5280 [7]). This array should contain all certificates that were used in the validation of this signature. |
| CRL | Array | <i>(Optional, if present shall not be an empty array)</i> An array of streams that are all CRLs used to determine the validity of the certificates in the chains related to this signature. Each stream shall reference a CRL that is an entry in the CRLs array in the DSS dictionary |
| OCSP | Array | <i>(Optional, if present shall not be an empty array)</i> An array of streams that are all OCSPs used to determine the validity of the certificates in the chains related to this signature. Each stream shall reference an OCSP that is an entry in the OCSPs array in the DSS dictionary. |
| TU | Date | <i>(Optional)</i> The date/time at which this signature VRI dictionary was created. The conforming reader may ignore this entry and use a different time for the signature validation. This entry shall be absent when the TS entry is present. Date shall be a date string as defined in ISO 32000-1 [1], clause 7.9.4. (See note 1). |
| TS | Stream | <i>(Optional)</i> A stream containing the DER-encoded Time-stamp (see RFC 3161 [6]) which represents the secure time at which this signature VRI dictionary was created. This entry shall be absent when a TU entry is present. (See notes 2 and 3). |
| NOTE 1: The use of the TU key is not recommended by this profile and is only provided for informational purposes by other implementations. As such, this value should be ignored by this profile. | | |
| NOTE 2: For PKCS#7 signatures the datum that is hashed and included in the time-stamp's messageImprint field (see RFC 3161 [6]) is the encryptedDigest field in the signature's PKCS#7 object (see RFC 2315 [4]). | | |
| NOTE 3: The use of the TS key is not recommended by this profile and is only provided for informational purposes by other implementations. As such, this value should be ignored by this profile. | | |
| NOTE 4: The VRI dictionary is optional, since all necessary data to validate the signature may be available from other sources like the DSS dictionary itself. The VRI dictionary offers possibilities for optimization of the validation process, since it relates the data to one specific signature. | | |
| NOTE 5: Exactly one of the following methods to provide a time stamp for a VRI shall be used: the TU entry, the TS entry or a subsequent document timestamp. | | |
| NOTE 6: The value of TS may be used as a proof of existence for the signature value itself. | | |

DocMDP restrictions (see ISO 32000-1 [1] clause 12.8.2.2) shall not apply to incremental updates to a PDF document containing a DSS dictionary and associated VRI, Certs, CRLs and OCSPs.

NOTE: ISO 32000-1 [1], 12.8.2.2, discusses the **DocMDP** (Modification, Detection and Prevention) feature whereby a set of permissions can be associated with a PDF in conjunction with a certification signature. The permissions of **DocMDP** are present in the **P** key of the **DocMDP** transform parameters dictionary, as an integer in the range 1 through 3. Values of 2 and 3 allow for additional signatures to be included after the certification but a value of 1 does not allow any change but should allow Document Time-stamps. This provision will need to be changed from that in ISO 32000-1 [1], to allow for the inclusion of LTV, including DSS and Document Time-stamps.

Example DSS dictionary (and associated objects)

```

100 0 obj
<<
/Type /Catalog
/DSS 101 0 R
%other stuff here...
>>
endobj

101 0 obj
<<
/VRI 102 0 R
/OCSPs [103 0 R]
/CRLs [104 0 R]
/Certs [105 0 R 106 0 R]
>>
endobj

```

```

102 0 obj
<<
  /4B783B9A6D0D69E4E881BFDF080835E896735416 << /OCSP [103 0 R] /CRL [104 0 R] >>
>>
endobj

```

```

103 0 obj
<<
  /Length 3085 %whatever the length of the stream is
>>
stream
%OCSP data goes here...
endstream

```

```

104 0 obj
<<
  /Length 909 %whatever the length of the stream is
>>
stream
%CRL data goes here...
endstream

```

```

105 0 obj
<<
  /Length 1042 %whatever the length of the stream is
>>
stream
%Certificate data goes here...
endstream

```

```

106 0 obj
<<
  /Length 960 %whatever the length of the stream is
>>
stream
%Certificate data goes here...
endstream

```



Example with Two Signatures

```

101 0 obj
<<
  /VRI 102 0 R
  /OCSPs [103 0 R 107 0 R]
  /CRLs [104 0 R]
  /Certs [105 0 R 106 0 R]
>>
endobj
102 0 obj
<<
  /4B783B9A6D0D69E4E881BFDF080835E896735416 << /OCSP [103 0 R] /CRL [104 0
R] >>
  /123456789ABCDEF987654321FEDCBA1234567890 << /OCSP [107 0 R] >>
>>
107 0 obj
<<
  /Length 5012 %whatever the length of the stream is
>>
stream
%OCSP data goes here...
endstream

```

Usage of the DSS VRI in the Process of Signature Validation

In the process of a signature validation a conforming reader may have available multiple sources of validation-related information (VRI) components including those embedded in the signature itself, a local repository of such components, and those retrieved from on-line sources. In the presence of a **DSS** entry in a PDF's **Catalog** the preferred order of the search for VRI components that can be used to validate a signature from the verifier's trust anchors by the conforming reader should be as follows:

- 1) VRI component in DSS.
- 2) VRI component embedded in the signature (e.g. OCSP data see part 2 [i.4], clause 4.4).

- 3) VRI component from the local repository.
- 4) VRI component retrieved from an on-line source.

A.2 Document Time-stamp

A **Document Time-stamp** dictionary is a standard **Signature** dictionary (see ISO 32000-1 [1], 12.8.1) but with the following changes.

| Modifications to table 252 for a Document Time-stamp Dictionary | | |
|---|-------------|--|
| KEY | TYPE | VALUE |
| Type | Name | <i>(Optional)</i> If present, shall be DocTimeStamp . |
| SubFilter | Name | <i>(Required)</i> The value of SubFilter identifies the format of the data contained in the stream. A conforming reader may use any conforming signature handler that supports the specified format. When the value of Type is <i>DocTimestamp</i> , the value of SubFilter shall be <i>ETSI.RFC3161</i> . Other values may be defined by developers, and when used, shall be prefixed with the registered developer identification as described in ISO 32000-1 [1], annex E. |
| Contents | Byte string | <i>(Required)</i> The value shall be a hexadecimal string (see clause 7.3.4.3, "Hexadecimal Strings" in ISO 32000-1 [1]) representing the value of the byte range digest. When the value of SubFilter is <i>ETSI.RFC3161</i> , Contents shall be the TimeStampToken as specified in RFC 3161 [6]. The value of the messageImprint field within the TimeStampToken shall be a hash of the bytes of the document indicated by the ByteRange. Space for the Contents value is required to be allocated before the message digest is computed (see clause 7.3.4, "String Objects" in ISO 32000-1 [1]). |
| V | Integer | <i>(Optional)</i> The version of the signature dictionary format. For Document Time-stamp dictionaries the value, if present, shall be 0. Default value: 0. |

In addition, the following keys shall not be present in a **Document Time-stamp** dictionary: **Cert**, **Reference**, **Changes**, **R**, **Prop_AuthTime**, and **Prop_AuthType**.

The following keys should not be present in a Document Time-stamp dictionary: **Name**, **M**, **Location**, **Reason**, and **ContactInfo**. Since this information may already be present inside of the timestamp token contained in **Contents**, a conforming reader should ignore these keys.

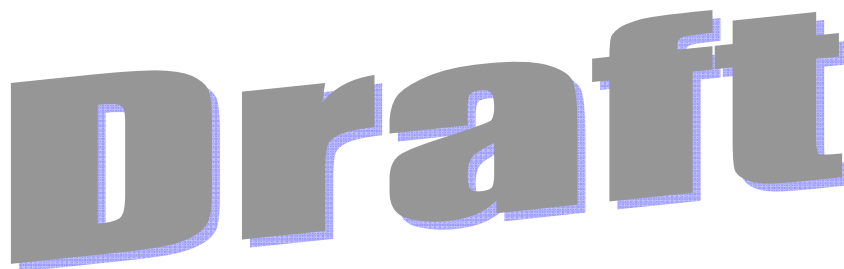
When a PDF already contains a PAdES signature, there is the likely scenario that future updates to that signature and its revocation information may need to take place. This process is done using the same LTV methodology already described.

When evaluating the DocMDP restrictions (see ISO 32000-1 [1], clause 12.8.2.2) the presence of a Document Time-stamp dictionary item shall be ignored.

NOTE: ISO 32000-1 [1], 12.8.2.2, discusses the **DocMDP** (Modification, Detection and Prevention) feature whereby a set of permissions can be associated with a PDF in conjunction with a certification signature. The permissions of **DocMDP** are present in the **P** key of the DocMDP transform parameters dictionary, as an integer in the range 1 through 3. Values of 2 and 3 allow for additional signatures to be included after the certification but a value of 1 does not currently allow any change but should allow Document Time-stamps. This provision will need to be changed in ISO 32000-2 [i.7], to allow for the inclusion of LTV, including DSS and Document Time-stamps.

Example Document Time-stamp

```
1 0 obj
<<
/Type /Catalog
/Pages 2 0 R
/AcroForm 5 0 R
>>
endobj
2 0 obj
<<
/Kids [ 3 0 R ]
/Count 1
/Type /Pages
>>
endobj
3 0 obj
<<
/Type /Page
/Parent 2 0 R
/MediaBox [ 0 0 612 792 ]
/Annots 4 0 R
% other keys goes here...
>>
endobj
4 0 obj
<<
/Type /Annot /Subtype /Widget
/Rect [ 0 0 0 0 ]
/F 4 /P 3 0 R
/FT /Sig /T (Sig)
/V 6 0 R
>>
endobj
5 0 obj
<<
/Fields [ 4 0 R ]
/SigFlags 3
>>
endobj
6 0 obj
<<
/Type /DocTimeStamp
/Filter /Adobe.PPKLite
/SubFilter /ETSI.RFC3161
/Contents <00000> % values go here inside of <>
/ByteRange [ 0 0 0 0 ] % values go here inside of []
>>
Endobj
```



Annex B (informative): Matching of PAdES-LTV-profiles to CAdES

This informative annex provides a match between the different CAdES forms and the combinations of PDF objects included within VRI dictionaries and Document Timestamp PDF objects.

| Entry | Profile | Functional equivalence to CAdES form | Built on | Adding |
|-------|--------------------------------------|--------------------------------------|--|---|
| 1 | Not currently supported (see note 1) | CAdES-C | | |
| 2 | Not currently supported (see note 1) | CAdES-X | | |
| 3 | PAdES-LTV (see note 2) | CAdES-X-Long Type 1 or Type 2 | PAdES-BES or PAdES-EPES, either with signature time-stamps recommended (functionally equivalent to CAdES-T, CAdES-BES or CAdES-EPES) | A DSS containing indirect references to the values of the certificates and cert status data (CRLs or OCSP responses) as specified in clause A.1. Optionally VRI dictionary containing indirect references to the values of the certificates and cert status data (CRLs or OCSP responses) that were used for verifying a particular signature as specified in clause A.1. The certificates and cert status data (CRLs or OCSP responses) referencing by DSS and VRI as specified in clause A.1. A document Time-stamp as specified in clause A.2. |
| 4 | PAdES-LTV (see note 3) | CAdES-A | PAdES-LTV Signature identified in row 3 (functionally equivalent to CAdES-X-Long Type 1 or Type 2) | In the DSS: set of indirect references to the values of certificates and certificate status data (CRLs or OCSP responses) including those that were used for verifying the previous document Time-stamp as specified in clause A.1. Optionally VRI dictionary containing indirect references to the values of the certificates and cert status data (CRLs or OCSP responses)) including those that were used for verifying a particular signature as specified in clause A.1. The certificates and cert status data (CRLs or OCSP responses) referencing by DSS as specified in clause A.1. A document Time-stamp as specified in clause A.2. |

| Entry | Profile | Functional equivalence to CADES form | Built on | Adding |
|--|---------|--------------------------------------|----------|--------|
| <p>NOTE 1: The reason for not dealing references, as defined in CADES-C and CADES-X for certificates and revocation data, is that they can be difficult to handle reliably for all cases. There may be situations where referenced data are not available and this may result in being locked-up while waiting for resolution of references.</p> <p>NOTE 2: CADES-X-Long Type 1 or Type 2 contains references to certificates, certificates status and time-stamp on the references (Type 2) or on the references and the signature (Type 1). The present profile provides functional equivalence in the sense that the form detailed in row 3 contains certificates and certificate status values as recollected during the verification process, and a <i>document</i> Time-stamp that also Time-stamps these values. In summary, this form allows to ascertain one time when the verifier had gained access to the validation data (as does CADES-X) and includes the validation data within the signature (as does CADES-X-Long).</p> <p>NOTE 3: The process for upgrading the signature with successive document time-stamps and their corresponding validation data (certificates and certificate status) is equivalent to the process for upgrading a CADES-A signature by adding successive archive-time-stamps.</p> | | | | |

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Annex C (informative): Change History

| date | Version | Information about changes |
|----------------|---------|--|
| July 2009 | v1.1.1 | Publication as TS 102 778 |
| December 2009 | v1.1.2 | Publication as TS 102 778 |
| April 2013 | v1.1.2 | Draft forwarded by editHelp! for revision purposes |
| May 2013 | v0.0.0 | Draft version of EN inside ETSI STF458 |
| September 2013 | v0.0.1 | Incomplete Draft for Review at ESI#40 |
| November 2013 | V0.0.2 | Draft for Review in ESI#41 |
| November 2013 | V.0.0.3 | Stable draft for public comment |

Latest changes made on 2013-11-07

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