

Profile for comprehensive multi-signature verification reports for OASIS Digital Signature Services Version 1.0

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Related work:

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- oasis-dss-core-spec-v1.0-os

and may be combined with other existing profiles, such as

- oasis-dss-profiles-AdES-v1.0-os
- oasis-dss-profiles-german_signature_law-spec-v1.0-os

for example.

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Abstract:

This document defines a protocol and processing profile of the DSS Verifying Protocol specified in Section 4 of **[DSSCore]**, which allows to return individual signature verification reports for each signature in a verification request and include detailed information of the different steps taken during verification.

Status:

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1 Introduction

This document defines a protocol and processing profile of the DSS Verifying Protocol specified in Section 4 of [DSSCore], which allows to support the verification of multiple signatures within some <VerifyRequest> and include detailed information of the different steps taken during verification. The following sections describe how to understand the rest of this document.

1.1 Terminology

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

These keywords are capitalized when used to unambiguously specify requirements over protocol features and behavior that affect the interoperability and security of implementations. When these words are not capitalized, they are meant in their natural-language sense.

This specification uses the following typographical conventions in text: <ns:Element>, Attribute, Datatype, OtherCode.

1.2 Normative References

- | | |
|--------------|--|
| [CAdES] | ETSI, <i>Electronic Signature Formats</i> , Electronic Signatures and Infrastructures (ESI) – Technical Specification, ETSI TS 101 733 V1.7.4, 2008-07, http://www.etsi.org |
| [Core-XSD] | OASIS Standard: <i>DSS Schema</i> , February 2007, http://docs.oasis-open.org/dss/v1.0/oasis-dss-core-schema-v1.0-os.xsd |
| [DSSCore] | OASIS Standard: <i>Digital Signature Service Core Protocols and Elements</i> . OASIS Standard, February 2007, http://docs.oasis-open.org/dss/v1.0/oasis-dss-core-spec-v1.0-os.pdf |
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| [DSSVR-XSD] | OASIS Committee Draft: <i>DSS Verification Report Schema</i> , 19 th July 2009, http://www.oasis-open.org/committees/download.php/33059/VerificationReport-CD1.xsd |
| [DSSVisSig] | OASIS Committee Draft: <i>Visual Signature Profile of the OASIS Digital Signature Services</i> , Committee Draft 01, April 2009, http://docs.oasis-open.org/dss-x/profiles/visualseg/v1.0/cd01/oasis-dssx-1.0-profiles-visualseg-cd1.pdf |
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| [ETSI102231] | ETSI: <i>ETSI TS 102231 Electronic Signatures and Infrastructure (ESI): Provision of harmonized Trust-service status information</i> . Version 2.1.1 of March 2006, via http://www.etsi.org |
| [RFC2119] | S. Bradner: Key words for use in RFCs to Indicate Requirement Levels. IETF RFC 2119, http://www.ietf.org/rfc/rfc2119.txt |

44	[RFC2560]	M. Myers, R. Ankney, A. Malpani, S. Galperin, C. Adams: <i>X.509 Internet Public Key Infrastructure - Online Certificate Status Protocol – OCSP</i> , IETF RFC 2560, http://www.ietf.org/rfc/rfc3161.txt
47	[RFC3161]	C. Adams, P. Cain, D. Pinkas, R. Zuccherato: <i>Internet X.509 Public Key Infrastructure Time-Stamp Protocol (TSP)</i> , IETF RFC 3161, http://www.ietf.org/rfc/rfc3161.txt
50	[RFC3275]	D. Eastlake, J. Reagle, D. Solo: <i>(Extensible Markup Language) XML Signature Syntax and Processing</i> , IETF RFC 3275, http://www.ietf.org/rfc/rfc3275.txt
52	[RFC3281]	S. Farrell, R. Housley: <i>An Internet Attribute Certificate Profile for Authorization</i> , IETF RFC 3281, via http://www.ietf.org/rfc/rfc3281.txt
54	[RFC3852]	R. Housley: <i>Cryptographic Message Syntax (CMS)</i> , IETF RFC 3852, http://www.ietf.org/rfc/rfc3852.txt
56	[RFC4514]	K. Zeilenga, Ed. : <i>Lightweight Directory Access Protocol (LDAP): String Representation of Distinguished Names</i> , IETF RFC 4514, http://www.ietf.org/rfc/rfc4514.txt
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61	[RFC5280]	D. Cooper, S. Santesson, S. Farrell, S. Boeyen, R. Housley, W. Polk: <i>Internet X.509 Public Key Infrastructure, Certificate and Certificate Revocation List (CRL) Profile</i> , IETF RFC 5280, http://www.ietf.org/rfc/rfc5280.txt
64	[SAMLCore1.1]	E. Maler et al.: <i>Assertions and Protocol for the OASIS Security Assertion Markup Language (SAML) V 1.1</i> . OASIS, November 2002. http://www.oasis-open.org/committees/download.php/3406/oasis-sstc-saml-core-1.1.pdf
67	[SAMLCore2.0]	S. Cantor et al.: <i>Assertions and Protocols for the OASIS Security Assertion Markup Language (SAML) V2.0 OASIS Standard</i> , 15 March 2005. http://docs.oasis-open.org/security/saml/v2.0/saml-core-2.0-os.pdf
70	[XAdES]	ETSI: <i>XML Advanced Electronic Signatures (XAdES)</i> , ETSI TS 101 903, Version 1.3.2, March 2006, http://www.etsi.org
72	[XML-ns]	T. Bray, D. Hollander, A. Layman: <i>Namespaces in XML</i> , W3C Recommendation, January 1999, http://www.w3.org/TR/1999/REC-xml-names-19990114
74	[XMLSig]	D. Eastlake et al. <i>XML-Signature Syntax and Processing</i> , W3C Recommendation, June 2008, http://www.w3.org/TR/xmlsig-core/

76 1.3 Namespaces

77 The structures described in this specification are contained in the schema file **[DSSVR-XSD]**. All schema
78 listings in the current document are excerpts from the schema file. In the case of a disagreement between
79 the schema file and this document, the schema file takes precedence.

80 This schema is associated with the following XML namespace:

81 `urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:schema#`

82 If a future version of this specification is needed, it will use a different namespace.

84 Conventional XML namespace prefixes are used in this document:

- 85 • The prefix `vr:` (or no prefix) stands for this profiles namespace **[DSSVR-XSD]**.
- 86 • The prefix `ds:` stands for the W3C XML Signature namespace **[XMLSig]**.
- 87 • The prefix `dss:` stands for the DSS core namespace **[Core-XSD]**.
- 88 • The prefix `saml:` stands for the OASIS SAML Schema namespace **[SAMLCore1.1]**.
- 89 • The prefix `tsl:` stands for the ETSI Trust-service status information namespace **[ETSI102231]**.

- The prefix `xades` : stands for ETSI XML Advanced Electronic Signatures (XAdES) document **[XAdES]**.

Applications MAY use different namespace prefixes, and MAY use whatever namespace defaulting/scoping conventions they desire, as long as they are compliant with the Namespaces in XML specification **[XML-ns]**.

2 Profile Features

2.1 Overview

While the DSS Verifying Protocol specified in Section 4 of **[DSSCore]** allows to verify digital signatures and time stamps, this protocol is fairly limited with respect to the verification of multiple signatures in a single request (cf. Section 4.3.1 of **[DSSCore]**).

In a similar manner it is possible to request and provide processing details (cf. Section 4.5.5 of **[DSSCore]**), but this simple mechanism does not support the verification of multiple signatures in a single request and there are no defined structures yet, which reflect the necessary steps in the verification of a complex signature, like an advanced electronic signature according to the European Directive **[EC/1999/93]** for example.

Therefore the present profile defines how

- individual verification results may be returned, if multiple signatures are part of a `<dss:VerifyRequest>` and
- detailed information gathered in the various steps taken during verification may be included in the response to form a comprehensive verification report.

The requester MAY request the activation of this profile by sending a `<ReturnVerificationReport>` element (cf. Section 3.1) in `<dss:OptionalInputs>`. A responder, which conforms to the present profile SHALL return a `<VerificationReport>` element (cf. Section 3.2) in `<dss:OptionalOutputs>`.

2.2 Scope

This document profiles the DSS Verifying Protocol (cf. **[DSSCore]**, Section 4).

It does *not* profile the DSS Signing Protocol (cf. **[DSSCore]**, Section 3) and does *neither specify nor* constrain

- the type of signature object,
- the transport binding or
- the security binding.

2.3 Relationship To Other Profiles

This profile is based directly on the **[DSSCore]**. This profile is intended to be combined with other profiles freely.

2.4 Profile Identifier

The DSS-client MAY use the following identifier in the `Protocol` attribute of a `VerifyRequest`:

```
urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport
```

The DSS-server MAY use this identifier in the `VerifyResponse`.

3 Verification Reports within DSS Verifying Protocol

3.1 Element <ReturnVerificationReport>

The <ReturnVerificationReport>-element is an optional input for the DSS Verifying Protocol to request an individual report for each signature. It is defined as follows:

```
<element name="ReturnVerificationReport">
  <complexType>
    <sequence>
      <element name="IncludeVerifier" type="boolean"
maxOccurs="1"
              minOccurs="0" default="true" />
      <element name="IncludeCertificateValues" type="boolean"
maxOccurs="1"
              minOccurs="0" default="false" />
      <element name="IncludeRevocationValues" type="boolean"
maxOccurs="1"
              minOccurs="0" default="false" />
      <element name="ExpandBinaryValues" type="boolean"
maxOccurs="1"
              minOccurs="0" default="false" />
      <element name="ReportDetailLevel" type="anyURI"
maxOccurs="1"
              minOccurs="0"
default="urn:oasis:names:tc:dss:1.0:profiles:
              verificationreport:reportdetail:allDetails" />
    </sequence>
  </complexType>
</element>
```

It contains the following elements:

<IncludeVerifier> [Default]

This option specifies, whether the identity of the verifier should be included into the report or not. This is especially useful when (possibly time stamped) reports are archived. It defaults to 'true'.

<IncludeCertificateValues> [Default]

With this option it is possible to include the certificate values, which are used to verify the signature (in binary form or as equivalent XML structure) into the report. This option defaults to 'false'.

<IncludeRevocationValues> [Default]

This option specifies, whether the used revocation values (OCSP responses, CRLs and TSLs) should be included (in binary form or as equivalent XML structure) into the report or not. It defaults to 'false'.

<ExpandBinaryValues> [Default]

If this element is set to true a server which fulfills the conformance level "Convenient" MUST include the content of certificates and revocation information not only as ASN.1-coded binary values into the verification report, but also as equivalent XML structures. This option defaults to 'false'.

<ReportDetailLevel> [Optional]

This option specifies the detail level of the verification report. The following options are defined:

- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:reportdetail:noDetails](#)
For every signature only the final result of the verification is reported.
- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:reportdetail:noPathDetails](#)
Additionally to the final result also the details of the signature verification including the result of the certificate path validation are reported. The details concerning the validation of individual certificates in the path are omitted however.
- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:reportdetail:allDetails](#)
For every signature, the certificate path details and details on the validation of individual certificates in the path are requested. For every signature, the certificate path and each individual certificate the details are reported. If the <ReportDetailLevel>-element is missing, this option is assumed as default.

3.2 Element <VerificationReport>

If the element <ReturnVerificationReport> is provided as optional input in the request, the server MUST include in the response the element <VerificationReport> as optional output:

```
<element name="VerificationReport" type="vr:VerificationReportType" />
```

The **VerificationReportType** is the base structure for verification reports defined by this profile. It is defined as follows:

```
<complexType name="VerificationReportType">
  <sequence>
    <element ref="dss:VerificationTimeInfo" maxOccurs="1"
minOccurs="0" />
    <element name="VerifierIdentity" type="vr:IdentifierType"
maxOccurs="1" minOccurs="0" />
    <element name="IndividualReport" maxOccurs="unbounded"
type="vr:IndividualReportType" minOccurs="0" />
  </sequence>
</complexType>
```

It contains the following elements:

<VerificationTimeInfo> [Optional]

This element MAY contain the verification time, which was used by the server and other relevant time instants.

<VerifierIdentity> [Optional]

This element contains the identity of the verifier, if the report option <IncludeVerifier> was set to 'true'. It is of type **vr:IdentifierType**, which is defined below.

<IndividualReport> [Optional, Unbounded]

For each *independent* signed object (signature, time stamp, certificate, CRL, OCSP-response, evidence record etc.) that has been used in the signature verification process there will be one <IndividualReport>-element in the verification report. The details of this element are specified in the following section.

The **IdentifierType** MAY contain different types of identifiers. It is defined as follows:

```
<complexType name="IdentifierType">
  <sequence>
    <element ref="ds:X509Data" maxOccurs="1" minOccurs="0">
```

```

225     </element>
226     <element name="SAMLv1Identifier" type="saml:NameIdentifierType"
227         maxOccurs="1" minOccurs="0" />
228     <element name="SAMLv2Identifier" type="saml2:NameIDType"
229         maxOccurs="1" minOccurs="0" />
230     <element name="Other" type="dss:AnyType" maxOccurs="1"
231         minOccurs="0" />
232 </sequence>
233 </complexType>

```

It MAY contain the following elements or other identifying information:

<ds:X509Data> [Optional]

This element contains, if present, an X.509-certificate or certificate related information. Please refer to **[RFC3275]** for further details with respect to the **ds:X509Data**-element.

<SAMLv1Identifier> [Optional]

This element contains, if present, an identifier of type **saml:NameIdentifierType** as defined in **[SAMLCore1.1]**.

<SAMLv2Identifier> [Optional]

This element contains, if present, an identifier of type **saml2:NameIDType** as defined in **[SAMLCore2.0]**.

<Other> [Optional]

This element MAY contain, if present, other identifying information.

3.3 Element **<IndividualReport>**

The element **<IndividualReport>** is part of the **<VerificationReport>**-element (see Section 3.2) and is of type **IndividualReportType**, which is defined as follows:

```

253 <complexType name="IndividualReportType">
254     <sequence>
255         <element name="SignedObjectIdentifier"
256             type="vr:SignedObjectIdentifierType"/>
257         <element ref="dss:Result"/>
258         <element name="Details" type="dss:AnyType" maxOccurs="1"
259             minOccurs="0" />
260     </sequence>
261 </complexType>

```

It contains the following elements:

<SignedObjectIdentifier> [Required]

This element identifies the signature or validation data under consideration. The details of the **SignedObjectIdentifierType** are specified below.

<Result> [Required]

The result of the signature verification as defined in section 2.6 of **[DSSCore]**.

<Details> [Optional]

The **<Details>** element MAY contain a detailed report for the signature or validation data under consideration or any other signature-specific optional output defined in Section 4.5 of **[DSSCore]**.

The corresponding elements, which are specified in this document for this purpose are listed in Section 4.2.

The **SignedObjectIdentifierType** is defined as follows:

```
<complexType name="SignedObjectIdentifierType">
  <sequence>
    <element name="DigestAlgAndValue"
      type="XAdES:DigestAlgAndValueType" maxOccurs="1"
minOccurs="0" />
    <element ref="ds:CanonicalizationMethod" maxOccurs="1" minOccurs="0"
/>
    <element name="SignedProperties"
      type="vr:SignedPropertiesType" maxOccurs="1" minOccurs="0" />
    <element ref="ds:SignatureValue" maxOccurs="1" minOccurs="0" />
    <element name="Other" type="dss:AnyType" maxOccurs="1" minOccurs="0"
/>
  </sequence>
  <attribute name="WhichDocument" type="IDREF" use="optional" />
  <attribute name="XPath" type="string" use="optional" />
  <attribute name="Offset" type="integer" use="optional" />
  <attribute name="FieldName" type="string" use="optional" />
</complexType>
```

The set of child elements of the **SignedObjectIdentifierType** SHOULD be chosen to identify the signature or validation data in a given context in an unambiguous manner.

It contains the following attributes and elements:

<DigestAlgAndValue> [Optional]

This element contains, if present, the hash value of the signature or validation data under consideration, where the signed object itself (e.g. the `<ds:Signature>`-element in case of an XML-signature according to [RFC3275], the `SignedData`-structure in case of a CMS-signature according to [RFC3852] or a time stamp according to [RFC3161], the `Certificate`- or `CertificateList`-structure in case of an X.509-certificate or CRL according to [RFC5280] or the `OCSPResponse`-structure in case of an OCSP-response according to [RFC2560] for example) serves as input for the hash-calculation. The structure of the `DigestAlgAndValueType` is defined in [XAdES]. This element SHOULD NOT be used if the unique identification can be guaranteed by other elements.

<ds:CanonicalizationMethod> [Optional]

This element indicates, if present, the canonicalization method to be used before hashing XML-formatted data. Please refer to [RFC3275] for details of this element. This element is only necessary if XML-based structures are subject to hashing.

<SignedProperties> [Optional]

This element contains, if present, any number of signed properties, which may be useful to identify the signature under consideration. This MAY comprise information about the signatory and the signing time for example. The structure of the `SignedPropertiesType` is defined in Section 3.5.4.2. In case of signatures according to [RFC3275] or [RFC3852] this element SHOULD be present.

<ds:SignatureValue> [Optional]

This element specifies, if present, the binary signature value of the signature under consideration. This element SHOULD be present – particularly if the used signature algorithm is randomized and hence this element may serve as unique identifier.

<Other> [Optional]

This element MAY contain other elements, which (help to) identify a signature or related validation data in a unique manner.

324 WhichDocument [Optional]
 325 This attribute MAY specify the document which contains the signature under consideration. Note that
 326 this identifier is only unique with respect to a specific request message (see [DSSCore], Section
 327 2.4.1).
 328 XPath [Optional]
 329 This attribute MAY be used to point to a specific signature within an XML document.
 330 Offset [Optional]
 331 This attribute specifies the first byte of some signature and MAY be used to point to a specific
 332 signature within some binary document.
 333 FieldName [Optional]
 334 This attribute specifies the name of a signature field and MAY be used to point to a specific signature
 335 within some document format, in which there are field names such as PDF for example.

336 3.4 VerificationResultType

337 The **VerificationResultType** defined below is extensively used in the present profile to indicate the
 338 success or failure of individual verification steps.
 339 This type draws from the `dss:Result`-element and the **dss:DetailType** defined in [DSSCore] and is
 340 defined as follows:

```
341 <complexType name="VerificationResultType">
342   <sequence>
343     <element name="ResultMajor" type="anyURI"/>
344     <element name="ResultMinor" type="anyURI" minOccurs="0"/>
345     <element name="ResultMessage" type="dss:InternationalStringType"
346     minOccurs="0"/>
347     <any namespace="##other" processContents="lax" minOccurs="0"
348     maxOccurs="unbounded"/>
349   </sequence>
350 </complexType>
```

351
 352 <ResultMajor> [Required]
 353 This element MUST indicate whether the verification result is valid, invalid or indeterminated using the
 354 URIs defined in [DSSCore]:
 355

- urn:oasis:names:tc:dss:1.0:detail:valid
- urn:oasis:names:tc:dss:1.0:detail:invalid
- urn:oasis:names:tc:dss:1.0:detail:indeterminated

 356
 357
 358 <ResultMinor> [Optional]
 359 In case of an invalid or indeterminated verification step, further details MAY be provided using a specific
 360 URI defined in this document or other profiles.
 361 <ResultMessage> [Optional]
 362 Especially in case of an invalid or indeterminated verification step, further details MAY be provided in
 363 textual form.
 364 Furthermore an element of type **VerificationResultType** MAY contain other elements.

365 3.5 Element <DetailedSignatureReport>

366 The <DetailedSignatureReport>-element MAY appear in the <Details>-element within the
 367 <IndividualReport>-element, which is specified in Section 3.3 above. This element is defined as
 368 follows:

```

369     <element name="DetailedSignatureReport"
370     type="vr:DetailedSignatureReportType" />

```

The **DetailedSignatureReportType** in turn is specified as follows:

```

374 <complexType name="DetailedSignatureReportType">
375   <sequence>
376     <element name="FormatOK" type="vr:VerificationResultType" />
377     <element name="Properties" type="vr:PropertiesType"
378       maxOccurs="1" minOccurs="0" />
379     <element ref="dss:VerifyManifestResults" maxOccurs="1"
380       minOccurs="0" />
381     <element name="SignatureHasVisibleContent" type="boolean"
382       maxOccurs="1" minOccurs="0" />
383     <element name="SignatureOK"
384       type="vr:SignatureValidityType" />
385     <element name="CertificatePathValidity"
386       type="vr:CertificatePathValidityType" />
387   </sequence>
388 </complexType>

```

It contains the following elements:

<FormatOK> [Required]

This element indicates, whether the format of the signature is ok or not. More information on the use of the **VerificationResultType** may be found in Section 3.4.

<Properties> [Optional]

This element contains information gathered during the verification of signed or unsigned properties. The structure of the **PropertiesType** is defined in Section 3.5.4.

<VerifyManifestResults> [Optional]

This element is present, if a manifest verification has been performed. The structure and the semantics of this element is described in Section 4.5.1 of [DSSCore].

<SignatureHasVisibleContent> [Optional]

This element is only present if the FieldName-attribute (cf. Section 3.3) is present and indicates whether the signature under consideration has visual signature content as explained in [DSSVisSig].

<SignatureOK> [Required]

This element contains information about the mathematical validity of the digital signature under consideration. It is of type **SignatureValidityType**, which is specified in Section 3.5.1.

<CertificatePathValidity> [Required]

This element contains the results of the certificate path validation. The **CertificatePathValidityType** is defined in section 3.5.3.

3.5.1 SignatureValidityType

The **SignatureValidityType** is used in the definition of the <DetailedSignatureReport>-element above for example and it is specified as follows:

```

413 <complexType name="SignatureValidityType">
414   <sequence>
415     <element name="SigMathOK" type="vr:VerificationResultType" />

```

```

416         <element name="SignatureAlgorithm"
417         type="vr:AlgorithmValidityType"
418         maxOccurs="1" minOccurs="0"/>
419     </sequence>
420 </complexType>

```

It comprises the following elements:

<SigMathOK> [Required]

Contains information about the mathematical validity of the digital signature under consideration, More information on the use of the **VerificationResultType** may be found in Section 3.4.

<SignatureAlgorithm> [Optional]

This element MAY contain information about the applied signature algorithm. It is of type **AlgorithmValidityType**, which is defined below.

3.5.2 AlgorithmValidityType

The **AlgorithmValidityType** is used in the definition of the **SignatureValidityType** above for example and is specified as follows:

```

434 <complexType name="AlgorithmValidityType">
435     <sequence>
436         <element name="Algorithm" type="anyURI" />
437         <element name="Parameters" type="dss:AnyType" maxOccurs="1"
438         minOccurs="0" />
439         <element name="Suitability" type="vr:VerificationResultType"
440         maxOccurs="1" minOccurs="0"/>
441     </sequence>
442 </complexType>

```

<Algorithm> [Required]

This element contains the URI for the algorithm.

<Parameters> [Optional]

This element MAY contain further parameters for the cryptographic algorithm.

<Suitability> [Optional]

This element MAY contain the information about the suitability of the algorithm under consideration. Note that it MAY depend on the policy of the specific signature and/or the policy under which the DSS server is operated, whether the suitability of the algorithms is verified and what kind of algorithms are considered appropriate under given circumstances and which are not. More information on the use of the **VerificationResultType** may be found in Section 3.4.

3.5.3 CertificatePathValidityType

The <CertificatePathValidity>-element is of type **CertificatePathValidityType** and is used in the definition of

- **DetailedSignatureReportType** (see above),
- **AttributeCertificateValidityType** (see Section 3.5.4.3),
- **CRLValidityType** (see Section 3.5.3.4),
- **OCSPValidityType** (see Section 3.5.3.5) and
- **TimeStampValidityType** (see Section 3.5.4.4).

It is specified as follows:

```
<complexType name="CertificatePathValidityType">
  <sequence>
    <element name="PathValiditySummary"
type="vr:VerificationResultType" />
    <element name="CertificateIdentifier"
type="ds:X509IssuerSerialType" />
    <element name="PathValidityDetail"
type="vr:CertificatePathValidityDetailType"
minOccurs="0" maxOccurs="1"/>
  </sequence>
</complexType>
```

It contains the following elements:

<PathValiditySummary> [Required]

This element is of type **VerificationResultType** (see Section 3.4) and contains a summary of the result of the certificate path validation.

<CertificateIdentifier> [Required]

This element is of type **ds:X509IssuerSerialType** (see Section 4.4.4 of [RFC3275]) and contains a unique reference to the certificate whose path has been checked.

<PathValidityDetail> [Optional]

Contains detailed results of the certificate path validation, if the element <ReportDetailLevel> in the report options (see Section 3.1) was set to <urn:oasis:names:tc:dss:1.0:profiles:verificationreport:reportdetail:allDetails> and the detailed validity information has not been included elsewhere in the verification report.

The structure of **CertificatePathValidityDetailType** is specified as follows:

```
<complexType name="CertificatePathValidityDetailType">
  <sequence>
    <sequence maxOccurs="unbounded" minOccurs="0">
      <element name="CertificateValidity"
type="vr:CertificateValidityType" />
    </sequence>
    <element name="TSLValidity"
type="vr:TrustStatusListValidityType" maxOccurs="1"
minOccurs="0" />
    <element name="TrustAnchor" type="vr:VerificationResultType" />
  </sequence>
</complexType>
```

It contains the following elements:

<CertificateValidity> [Optional, Unbounded]

For every certificate in the certificate path there will be a <CertificateValidity>-element, which provides information about the validity of the specific certificate. The structure of the **CertificateValidityType** is defined below.

<TSLValidity> [Optional]

This element MAY contain information about a Trust-service Status List according to [ETSI102231] and its validity. The **TrustStatusListValidityType** is defined in Section 3.5.3.6.

<TrustAnchor> [Required]

This element indicates how the trusted root certificate, which is used as trust anchor within the verification process, is stored. The following URIs are defined for this purpose:

- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:trustanchor:SSCD](#) – indicates that the trusted root certificate is stored within a secure signature creation device according to [EC/1999/93].
- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:trustanchor:otherCard](#) – indicates that the trusted root certificate is stored within some other hardware token.
- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:trustanchor:certDataBase](#) – indicates that the trusted root certificate is stored within some certificate data base.
- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:trustanchor:other](#) – indicates that the trusted root certificate is stored using other means.

3.5.3.1 CertificateValidityType

The **CertificateValidityType** contains information about the validity of a single certificate and is defined as follows:

```
<complexType name="CertificateValidityType">
  <sequence>
    <element name="CertificateIdentifier" type="ds:X509IssuerSerialType" />
    <element name="Subject" type="string" />
    <element name="ChainingOK" type="vr:VerificationResultType"
      maxOccurs="1" minOccurs="0" />
    <element name="ValidityPeriodOK" type="vr:VerificationResultType" />
    <element name="ExtensionsOK" type="vr:VerificationResultType" />
    <element name="CertificateValue" type="base64Binary"
      maxOccurs="1" minOccurs="0" />
    <element name="CertificateContent"
      type="vr:CertificateContentType" maxOccurs="1" minOccurs="0" />
    <element name="SignatureOK"
      type="vr:SignatureValidityType" />
    <element name="CertificateStatus" type="vr:CertificateStatusType" />
  </sequence>
</complexType>
```

It contains the following elements:

<CertificateIdentifier> [Required]

This element is of type **ds:X509IssuerSerialType** (see [RFC3275], Section 4.4.4) and identifies the certificate under consideration.

<Subject> [Required]

This element contains the subject of the certificate, where the string representation of distinguished names defined in [RFC4514] MUST be used and hence an example of a <Subject>-element may be CN=John Doe,O=Foo Inc.,OU=Sales etc.

<ChainingOK> [Optional]

If present, this element indicates whether the chaining to a previous certificate in the certificate path is ok or not. If the certificate under consideration is the first certificate in the certificate path, this element SHOULD be omitted. More information on the use of the **VerificationResultType** may be found in Section 3.4.

<ValidityPeriodOK> [Required]

This element indicates, whether the reference point in time is within the validity period of the certificate. More information on the use of the **VerificationResultType** may be found in Section 3.4.

<ExtensionsOK> [Required]

This element indicates, whether the certificate extensions are correct. More information on the use of the **VerificationResultType** may be found in Section 3.4.

<CertificateValue> [Optional]

If present, this element contains the certificate in binary form (coded in ASN.1), if the report option <IncludeCertificateValues> is set to 'true' and if the certificate is not already included in the verification report.

<CertificateContent> [Optional]

If present, this element contains detailed information about the content of the certificate, if the report option <ExpandBinaryValues> is set to 'true' and if the certificate content is not already included in the verification report.

<SignatureOK> [Required]

This element indicates, whether the digital signature of the certificate is mathematically correct or not. The **SignatureValidityType** is defined in section 3.5.1.

<CertificateStatus> [Required]

This element contains information about the result of the certificate revocation check. The **CertificateStatusType** is defined in Section 3.5.3.3.

3.5.3.2 CertificateContentType

The **CertificateContentType** is used in **CertificateValidityType** and derived from the TBSCertificate-structure defined in [RFC5280] specified as follows:

```
<complexType name="CertificateContentType">
  <sequence>
    <element name="Version" type="integer" maxOccurs="1"
minOccurs="0" />
    <element name="SerialNumber" type="integer" />
    <element name="SignatureAlgorithm" type="anyURI" />
    <element name="Issuer" type="string" />
    <element name="ValidityPeriod" type="vr:ValidityPeriodType" />
    <element name="Subject" type="string" />
    <element name="Extensions" type="vr:ExtensionsType"
minOccurs="0" />
  </sequence>
</complexType>
```

It contains the following elements:

<Version> [Optional]

This element contains, if present, the version of the certificate structure.

<SerialNumber> [Required]

609 This element MUST contain the serial number of the certificate.

610 <SignatureAlgorithm> [Required]

611 This element MUST contain an identifier of the used signature algorithm. The

612 vr:VerificationResultType is defined in Section 3.4.

613 <Issuer> [Required]

614 This element MUST contain the issuer of the certificate, where different relative distinguished names

615 in a sequence MAY be separated by “:”.

616 <ValidityPeriod> [Required]

617 This element MUST contain the validity period of the certificate. The **ValidityPeriodType** is defined

618 below.

619 <Subject> [Required]

620 This element contains the subject of the certificate, where the string representation of distinguished

621 names defined in **[RFC4514]** MUST be used and hence an example of a <Subject>-element may be

622 CN=John Doe,O=Foo Inc.,OU=Sales etc.

623

624 <Extensions> [Optional]

625 If present, this element contains information about the list of extensions present in the certificate under

626 consideration. The **ExtensionsType** is defined below.

627

628 The **ValidityPeriodType** is specified as follows:

629

```

630 <complexType name="ValidityPeriodType">
631   <sequence>
632     <element name="NotBefore" type="dateTime" />
633     <element name="NotAfter" type="dateTime" />
634   </sequence>
635 </complexType>

```

636

637 It contains the following elements:

638 <NotBefore> [Required]

639 The certificate is not valid before this point in time.

640 <NotAfter> [Required]

641 The certificate is not valid after this point in time.

642

643 The **ExtensionsType** is specified as follows:

644

```

645 <complexType name="ExtensionsType">
646   <sequence minOccurs="0" maxOccurs="unbounded">
647     <element name="Extension" type="vr:ExtensionType" />
648   </sequence>
649 </complexType>

```

650

651 It contains an unbounded number <Extension>-elements of type **ExtensionType**. This type is defined

652 as follows:

653

```

654 <complexType name="ExtensionType">

```

```

655         <sequence>
656             <element name="ExtnId" type="XAdES:ObjectIdentifierType" />
657             <element name="Critical" type="boolean" />
658             <element name="ExtnValue" type="dss:AnyType" maxOccurs="1"
659 minOccurs="0" />
660             <element name="ExtensionOK" type="vr:VerificationResultType"
661 />
662         </sequence>
663     </complexType>

```

It contains the following elements:

<ExtnId> [Required]

This element MUST contain the identifier of the extension as urn:oid: ... in the <Identifier>-element and MAY contain further information in the <Description>- and <DocumentationReferences>-elements. Please refer to **[XAdES]** for more information on the **XAdES:ObjectIdentifierType**.

<Critical> [Required]

This element specifies, whether the extension is critical or not.

<ExtnValue> [Optional]

This element SHOULD contain the value of the extension as an XML-structure, which mirrors the original ASN.1-definition of the extension.

<ExtensionOK> [Required]

This element contains information about the validity of the specific extension within the given context of the certificate.

3.5.3.3 CertificateStatusType

The **CertificateStatusType** is defined as follows:

```

685     <complexType name="CertificateStatusType">
686         <sequence>
687             <element name="CertStatusOK" type="vr:VerificationResultType"
688 />
689             <element name="RevocationInfo" maxOccurs="1"
690 minOccurs="0">
691                 <complexType>
692                     <sequence>
693                         <element name="RevocationDate"
694 type="dateTime" />
695                         <element name="RevocationReason"
696 type="vr:VerificationResultType" />
697                     </sequence>
698                 </complexType>
699             </element>
700             <element name="RevocationEvidence" maxOccurs="1"
701 minOccurs="0">
702                 <complexType>
703                     <choice>
704                         <element name="CRLValidity"
705 type="vr:CRLValidityType" />
706                         <element name="CRLReference"

```

```

type="XAdES:CRLIdentifierType" />
<element name="OCSPValidity"
type="vr:OCSPValidityType" />
<element name="OCSPReference"
type="XAdES:OCSPIdentifierType" />
<element name="Other" type="dss:AnyType"/>
</choice>
</complexType>
</element>
</sequence>
</complexType>

```

It contains the following elements:

<CertStatusOK> [Required]

This element MUST contain the status of the certificate.

<RevocationInfo> [Optional]

If the certificate is revoked this element will contain more information about the revocation. It is defined to be a sequence, which contains the following elements:

- <RevocationDate>
contains the date and time of revocation.
- <RevocationReason>
contains the reason for revocation. Following the definition of CRLReason in **[RFC5280]** there are the following URIs to specify the revocation reason:
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:unspecified>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:keyCompromise>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:cACompromise>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:affiliationChanged>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:superseded>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:cessationOfOperation>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:certificateHold>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:removeFromCRL>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:privilegeWithdrawn>
 - <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:revocationreason:aACompromise>

<RevocationEvidence> [Optional, Choice]

This element contains, if present, the used source of revocation information. This can be one of the following elements:

- <CRLValidity>
This element contains information about the used CRL and its validity. The **CRLValidityType** is defined in Section 3.5.3.4.
- <CRLReference>
This element contains a reference to the CRL in case it is already included elsewhere in the present verification report. The **XAdES:CRLIdentifierType** is defined in **[XAdES]**.
- <OCSPValidity>
This element contains information about the used OCSP response and its validity. The **OCSPValidityType** is defined in Section 3.5.3.5.

- <OCSPReference>
This element contains a reference to the used OCSP response, if it is already included elsewhere in the present verification report. The **XAdES:OCSPIdentifierType** is defined in [XAdES].
- <Other>
This element MAY contain information about alternative sources of revocation information.

3.5.3.4 CRLValidityType

The **CRLValidityType** contains information about a CRL and its validity and is specified as follows:

```
<complexType name="CRLValidityType">
  <sequence>
    <element name="CRLIdentifier" type="XAdES:CRLIdentifierType"
      maxOccurs="1" minOccurs="1" />
    <element name="CRLValue" type="base64Binary"
      maxOccurs="1" minOccurs="0" />
    <element name="CRLContent" type="vr:CRLContentType"
      maxOccurs="1" minOccurs="0" />
    <element name="SignatureOK" type="vr:SignatureValidityType" />
    <element name="CertificatePathValidity"
      type="vr:CertificatePathValidityType" />
  </sequence>
  <attribute name="Id" type="ID" use="optional" />
</complexType>
```

It contains the following attributes and elements:

Id [Optional]

This attribute contains an optional identifier for the element.

<CRLIdentifier> [Required]

This element refers to an X.509v2 CRL according to [RFC5280].

<CRLValue> [Optional]

If present, this element contains the CRL (encoded in ASN.1) if the report option <IncludeRevocationValues> is set to 'true'.

<CRLContent> [Optional]

This element contains, if present, the CRL in form of an equivalent XML structure if the report option <ExpandBinaryValues> is set to 'true'. The **CRLContentType** is defined below.

<SignatureOK> [Required]

This element indicates, whether the digital signature of the CRL is mathematically correct or not. The **SignatureValidityType** is defined in section 3.5.1.

<CertificatePathValidity> [Required]

This element contains the result of the validation of the certificate path of the certificate which has been used to sign the CRL. The **CertificatePathValidityType** is defined at the beginning of Section 3.5.3.

The **CRLContentType** is aligned to [RFC5280] specified as follows:

```
<complexType name="CRLContentType">
  <sequence>
    <element name="Version" minOccurs="0" type="integer" />
    <element name="Signature" type="anyURI" />
  </sequence>
</complexType>
```

```

801         <element name="Issuer" type="string" />
802         <element name="ThisUpdate" type="dateTime" />
803         <element name="NextUpdate" minOccurs="0" type="dateTime" />
804         <element name="RevokedCertificates" minOccurs="0">
805             <complexType>
806                 <sequence minOccurs="0" maxOccurs="unbounded">
807                     <element name="UserCertificate"
808 type="integer" />
809                     <element name="RevocationDate"
810 type="dateTime" />
811                     <element name="CrlEntryExtensions"
812 minOccurs="0"
813                                     type="vr:ExtensionsType" />
814                 </sequence>
815             </complexType>
816         </element>
817         <element name="CrlExtensions" type="vr:ExtensionsType"
818 minOccurs="0" />
819     </sequence>
820 </complexType>

```

It contains the following elements:

<Version> [Optional]

This element contains, if present, the version of the CRL-structure.

<Signature> [Required]

This element contains the algorithm identifier for the algorithm used to sign the CRL.

<Issuer> [Required]

This element contains the issuer of the CRL, where different relative distinguished names in a sequence MAY be separated by “.”.

<ThisUpdate> [Required]

This element contains the issue date of the CRL.

<NextUpdate> [Optional]

This element contains, if present, the date by which the next CRL will be issued.

<RevokedCertificates> [Optional]

The revoked certificates are contained in an unbounded sequence. They are listed by their serial numbers (element <UserCertificate>). Certificates revoked by the CA are uniquely identified by their certificate serial number. The date on which the revocation occurred is contained in the element <RevocationDate>. Additional information MAY be supplied in the element <CrlEntryExtensions>.

<CrlExtensions> [Optional]

If present, this element contains information about the list of extensions present in the CRL under consideration. The **ExtensionType** is defined in Section 3.5.3.2.

3.5.3.5 OCSPValidityType

The **OCSPValidityType** contains information about an OCSP-response and its validity and is specified as follows:

```

847     <complexType name="OCSPValidityType">
848         <sequence>
849             <element name="OCSPIdentifier" type="XAdES:OCSPIdentifierType"
850 />

```



```

851         <element name="OCSPValue" type="base64Binary"
852             maxOccurs="1" minOccurs="0" />
853         <element name="OCSPContent" type="vr:OCSPContentType"
854             maxOccurs="1" minOccurs="0" />
855         <element name="SignatureOK" type="vr:SignatureValidityType" />
856         <element name="CertificatePathValidity"
857             type="vr:CertificatePathValidityType" />
858     </sequence>
859     <attribute name="Id" type="ID" use="optional" />
860 </complexType>

```

It contains the following attributes and elements:

Id [Optional]

This attribute contains an optional identifier for the element.

<OCSPIdentifier> [Required]

This element refers to an OCSP response according to **[RFC2560]**.

<OCSPValue> [Optional]

This element contains the OCSP response (encoded in ASN.1) if the report option **<IncludeRevocationValues>** has been set to 'true'.

<OCSPContent> [Optional]

This element contains the OCSP response in form of an equivalent XML structure if the report option **<ExpandBinaryValues>** has been set to 'true'. The **OCSPContentType** is defined below.

<SignatureOK> [Required]

This element indicates whether the digital signature of the OCSP-response is mathematically correct or not. The **SignatureValidityType** is defined in section 3.5.1.

<CertificatePathValidity> [Required]

This element contains the result of the validation of the certificate path of the certificate which has been used to sign the OCSP-response. The **CertificatePathValidityType** is defined at the beginning of Section 3.5.3.

The **OCSPContentType** is aligned to **[RFC2560]** specified as follows:

```

885 <complexType name="OCSPContentType">
886     <sequence>
887         <element name="Version" type="integer" />
888         <element name="ResponderID" type="string" />
889         <element name="producedAt" type="dateTime" />
890         <element name="Responses">
891             <complexType>
892                 <sequence maxOccurs="unbounded" minOccurs="0">
893                     <element name="SingleResponse"
894 type="vr:SingleResponseType" />
895                 </sequence>
896             </complexType>
897         </element>
898         <element name="ResponseExtensions" type="vr:ExtensionsType"
899             maxOccurs="1" minOccurs="0"/>
900     </sequence>
901 </complexType>

```


It contains the following elements:

<Version> [Required]

This element contains the version of the OCSP-response syntax.

<ResponderID> [Required]

This element contains the name of the OCSP-responder.

<producedAt> [Required]

This element contains the time at which the OCSP-responder produced the response.

<Responses> [Required]

This element contains an unbounded sequence of **<SingleResponse>** entries. The **SingleResponseType** is defined below.

<ResponseExtensions> [Optional]

If present, this element contains information about the list of extensions present in the OCSP-response under consideration. The **ExtensionsType** is defined in Section 3.5.3.2.

The **SingleResponseType** is specified as follows:

```
<complexType name="SingleResponseType">
  <sequence>
    <element name="CertID">
      <complexType>
        <sequence>
          <element name="HashAlgorithm"
type="anyURI" />
          <element name="IssuerNameHash"
type="hexBinary" />
          <element name="IssuerKeyHash"
type="hexBinary" />
          <element name="SerialNumber"
type="integer" />
        </sequence>
      </complexType>
    </element>
    <element name="CertStatus" type="vr:VerificationResultType" />
    <element name="ThisUpdate" type="dateTime" />
    <element name="NextUpdate" type="dateTime" maxOccurs="1"
minOccurs="0" />
    <element name="SingleExtensions" type="vr:ExtensionsType"
maxOccurs="1" minOccurs="0" />
  </sequence>
</complexType>
```

It contains the following elements:

<CertID> [Required]

This element contains a sequence of elements, which uniquely identify the certificate (cf. [RFC2560], Section 4.1.1).

<CertStatus> [Required]

This element contains information about the status of the certificate according to [RFC2560] using the following URI in the **ResultMajor**-element:

- <urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:certstatus:good>

- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:certstatus:revoked](#)
- [urn:oasis:names:tc:dss-x:1.0:profiles:verificationreport:certstatus:unknown](#)

If the certificate is revoked and the revocation reason is present, this information **MUST** be included in the `ResultMinor`-element as a URI defined in Section 3.5.3.4. In a similar fashion the revocation time **MUST** be indicated in the `ResultMessage`-element.

`<ThisUpdate>` [Required]

This element contains the time at which the status being indicated is known to be correct (cf. [RFC2560], Section 2.4).

`<NextUpdate>` [Optional]

This element contains, if present, the time until more recent information about the status of the certificate will be available (cf. [RFC2560], Section 2.4).

`<SingleExtensions>` [Optional]

If present, this element contains information about the list of extensions present in the `SingleResponse`-element. The **ExtensionType** is defined in Section 3.5.3.2.

3.5.3.6 TrustStatusListValidityType

The **TrustStatusListValidityType** is specified as follows:

```
<complexType name="TrustStatusListValidityType">
  <sequence>
    <element ref="tsl:SchemeInformation" />
    <element ref="tsl:TrustServiceProviderList" minOccurs="0" />
    <element name="SignatureOK" type="vr:SignatureValidityType" />
  </sequence>
  <attribute name="TSLTag" type="tsl:TSLTagType" use="required" />
  <attribute name="Id" type="ID" use="optional" />
</complexType>
```

It contains the following attributes and elements:

TSLTag [Required]

This attribute shall facilitate the identification of the TSL as such. It will be a string with a fixed value. Its schema is defined in Section B.1.3.1 of [ETSI102231]

Id [Optional]

This attribute contains an optional identifier for the element.

`<SchemeInformation>` [Required]

This element contains general information about the circumstances how the TSL was issued. For details see Section B.2 of [ETSI102231].

`<TrustServiceProviderList>` [Optional]

This element contains, if present, a list of trustworthy service providers. For details see Section B.2.17 of [ETSI102231].

`<SignatureOK>` [Required]

This element indicates, whether the digital signature of the TSL is mathematically correct or not. The **SignatureValidityType** is defined in section 3.5.1.

3.5.4 PropertiesType

The **PropertiesType** is used in the definition of the <DetailedReport>-element (see Section 3.5) and is specified as follows:

```
<complexType name="PropertiesType">
  <sequence>
    <element name="SignedProperties"
      type="vr:SignedPropertiesType" minOccurs="0" />
    <element name="UnsignedProperties"
      type="vr:UnsignedPropertiesType" minOccurs="0" />
  </sequence>
  <attribute name="Id" type="ID" use="optional" />
</complexType>
```

It contains the following attributes and elements:

Id [Optional]

This attribute contains, if present, an optional identifier for the element.

<SignedProperties> [Optional]

This element contains information gathered during the verification of signed properties. Details of the SignedPropertiesType are specified in Section 3.5.4.1.

<UnsignedProperties> [Optional]

This element contains information gathered during the verification of unsigned properties. Details of the UnsignedPropertiesType are specified in Section 3.5.4.2.

3.5.4.1 Signed Properties

The **SignedPropertiesType** is aligned to [XAdES] structured as follows:

```
<complexType name="SignedPropertiesType">
  <sequence>
    <element name="SignedSignatureProperties"
      type="vr:SignedSignaturePropertiesType" maxOccurs="1"
minOccurs="0" />
    <element name="SignedDataObjectProperties"
      type="vr:SignedDataObjectPropertiesType" minOccurs="0"
/>
    <element name="Other" type="dss:AnyType" maxOccurs="1"
minOccurs="0" />
  </sequence>
  <attribute name="Id" type="ID" use="optional" />
</complexType>
```

It contains the following attributes and elements:

Id [Optional]

This attribute contains an optional identifier for the element.

<SignedSignatureProperties> [Optional]

This element contains information gathered during the verification of signed properties related to the signature itself. The **SignedSignaturePropertiesType** is defined in Section 3.5.4.1.1.

<SignedDataObjectProperties> [Optional]

This element contains information gathered during the verification of signed properties related to the signed data object. The **SignedDataObjectPropertiesType** is defined in Section 3.5.4.1.2.

<Other> [Optional]

This element contains, if present, information about other signed properties.

3.5.4.1.1 SignedSignaturePropertiesType

The **SignedSignaturePropertiesType** is aligned to [RFC3275] defined as follows:

```
<complexType name="SignedSignaturePropertiesType">
  <sequence>
    <element ref="XAdES:SigningTime" maxOccurs="1" minOccurs="0" />
    <element ref="XAdES:SigningCertificate" maxOccurs="1" minOccurs="0" />
    <element ref="XAdES:SignaturePolicyIdentifier" maxOccurs="1" minOccurs="0" />
    <choice maxOccurs="1" minOccurs="0">
      <element ref="XAdES:SignatureProductionPlace" />
      <element name="Location" type="string" />
    </choice>
    <element name="SignerRole" type="vr:SignerRoleType" minOccurs="0" />
  </sequence>
</complexType>
```

It MAY contain the following elements:

<XAdES:SigningTime> [Optional]

This element contains, if present, the signing time (see Section 5.2.1 of [XAdES]).

<XAdES:SigningCertificate> [Optional]

This element contains, if present, a reference to the certificate upon which the signature is based (see Section 5.2.2 of [XAdES]).

<XAdES:SignaturePolicyIdentifier> [Optional]

This element references, if present, the policy under which the signature was produced (see Section 5.2.3 of [XAdES]).

<XAdES:SignatureProductionPlace> [Optional, Choice]

This element contains, if present, information about the place where the signature was generated (see Section 5.2.7 of [XAdES]). This element SHOULD be used in case of a XAdES- or CAdES-based signature.

<Location> [Optional, Choice]

This element contains, if present, information about the place where the signature was generated (see Section 5.2.7 of [XAdES]). This element SHOULD be used in case of a PDF-based signature.

<SignerRole> [Optional]

This element contains, if present, information about the role of the signer (see Section 5.2.8 of [XAdES]).

The **SignerRoleType** is specified as follows:

```
<complexType name="SignerRoleType">
  <sequence>
    <element name="ClaimedRoles" />
  </sequence>
</complexType>
```

```

        type="XAdES:ClaimedRolesListType" minOccurs="0" />
      <element name="CertifiedRoles"
        type="vr:CertifiedRolesListType" minOccurs="0" />
    </sequence>
  </complexType>

```

It MAY contain the following elements:

<ClaimedRoles> [Optional]

This element contains information about the claimed roles of the signer. The information is directly extracted from the signature.

<CertifiedRoles> [Optional]

This element contains information gathered during the verification of attribute certificates.

The **CertifiedRolesListType** is specified as follows:

```

<complexType name="CertifiedRolesListType">
  <sequence>
    <element name="AttributeCertificateValidity"
      type="vr:AttributeCertificateValidityType"
      maxOccurs="unbounded" />
  </sequence>
</complexType>

```

It contains at least one <AttributeCertificateValidity>-element, which contains information about the content and validity of an attribute certificate according to [RFC3281]. The **AttributeCertificateValidityType** is defined in Section 3.5.4.3.

3.5.4.1.2 SignedDataObjectPropertiesType

The **SignedDataObjectPropertiesType** is defined as follows:

```

<complexType name="SignedDataObjectPropertiesType">
  <sequence>
    <element ref="XAdES:DataObjectFormat" maxOccurs="unbounded"
      minOccurs="0" />
    <choice maxOccurs="1" minOccurs="0">
      <element ref="XAdES:CommitmentTypeIndication"
        maxOccurs="unbounded" minOccurs="1"/>
      <element name="Reason" type="string" />
    </choice>
    <element name="AllDataObjectsTimeStamp"
      type="vr:TimeStampValidityType" minOccurs="0"
      maxOccurs="unbounded" />
    <element name="IndividualDataObjectsTimeStamp"
      type="vr:TimeStampValidityType" minOccurs="0"
      maxOccurs="unbounded" />
  </sequence>
  <attribute name="Id" type="ID" use="optional" />
</complexType>

```

It contains the following attributes and elements:

Id [Optional]

1141 This attribute contains an optional identifier for the element.

1142 `<XAdES:DataObjectFormat>` [Optional, Unbounded]

1143 This element contains information about the format of the signed data object (see Section 5.2.5 of [XAdES]). This information is simply extracted from the signature.

1144

1145 `<XAdES:CommitmentTypeIndication>` [Choice, Unbounded]

1146 This element contains, if present, an indication of the type of commitment implied by the signature (see Section 5.2.6 of [XAdES]). This element SHOULD be used in case of a XAdES- or CAdES-based signature.

1147

1148

1149 `<Reason>` [Choice]

1150 This element contains, if present, a description of the reason of the signature generation. This element is only relevant in case of a PDF-based signature identified by a `FieldName`-attribute (cf. Section 3.3).

1151

1152

1153 `<AllDataObjectsTimeStamp>` [Optional, Unbounded]

1154 This element contains, if present, verification results for time stamps covering all data objects (see Section 5.2.6 of [XAdES]). The **TimeStampValidityType** is described in Section 3.5.4.4.

1155

1156 `<IndividualDataObjectsTimeStamp>` [Optional, Unbounded]

1157 This element contains, if present, verification results for time stamps covering only certain data objects (see Section 5.2.10 of [XAdES]). The **TimeStampValidityType** is described in section 3.5.4.4.

1158

1159 3.5.4.2 Unsigned Properties

1160 The **UnsignedPropertiesType** is specified as follows:

```
1161
1162 <complexType name="UnsignedPropertiesType">
1163 <sequence>
1164   <element name="UnsignedSignatureProperties"
1165     type="vr:UnsignedSignaturePropertiesType" minOccurs="0" />
1166   <element ref="XAdES:UnsignedDataObjectProperties"
1167     minOccurs="0" maxOccurs="1" />
1168   <element name="Other" type="dss:AnyType" maxOccurs="1"
1169     minOccurs="0">
1170   </element>
1171 </sequence>
1172 <attribute name="Id" type="ID" use="optional" />
1173 </complexType>
```

1174 It contains the following attributes and elements:

1175 `Id` [Optional]

1176 This attribute contains an optional identifier for the element.

1177 `<UnsignedSignatureProperties>` [Optional]

1178 This element contains information gathered during the verification of the unsigned properties related to the signature itself. The **UnsignedSignaturePropertiesType** is defined below.

1181 `<XAdES:UnsignedDataObjectProperties>` [Optional]

1182 This element contains unsigned properties referring to the signed data objects. These properties are directly extracted from the signature.

1183 `<Other>` [Optional]

1184 This element MAY contain information about other unsigned properties.

1185 The **UnsignedSignaturePropertiesType** is defined as follows:

```

1188
1189     <complexType name="UnsignedSignaturePropertiesType">
1190         <choice maxOccurs="unbounded">
1191             <element name="CounterSignature"
1192 type="vr:SignatureValidityType" />
1193             <element name="SignatureTimeStamp"
1194 type="vr:TimeStampValidityType" />
1195             <element ref="XAdES:CompleteCertificateRefs" />
1196             <element ref="XAdES:CompleteRevocationRefs" />
1197             <element ref="XAdES:AttributeCertificateRefs" />
1198             <element ref="XAdES:AttributeRevocationRefs" />
1199             <element name="SigAndRefsTimeStamp" type="vr:TimeStampValidityType"
1200 />
1201             <element name="RefsOnlyTimeStamp"
1202 type="vr:TimeStampValidityType" />
1203             <element name="CertificateValues"
1204 type="vr:CertificateValuesType" />
1205             <element name="RevocationValues"
1206 type="vr:RevocationValuesType" />
1207             <element name="AttrAuthoritiesCertValues"
1208 type="vr:CertificateValuesType" />
1209             <element name="AttributeRevocationValues"
1210 type="vr:RevocationValuesType" />
1211             <element name="ArchiveTimeStamp"
1212 type="vr:TimeStampValidityType" />
1213         </choice>
1214         <attribute name="Id" type="ID" use="optional" />
1215     </complexType>

```

It contains the following attributes and elements:

Id [Optional]

This attribute contains an optional identifier for the element.

<CounterSignature> [Choice]

This element contains the results of the verification of a counter signature (see Section 7.2.4 of [XAdES]). The **SignatureValidityType** is described in section 3.5.1.

<SignatureTimeStamp> [Choice]

This element contains verification results of a time stamp of the signature (see Section 7.3 of [XAdES]). The **TimeStampValidityType** is described in section 3.5.4.4.

<XAdES:CompleteCertificateRefs> [Choice]

This element contains references to the certificates used during verification of the signature (see Section 7.4.1 of [XAdES]). This information is simply extracted from the signature.

<XAdES:CompleteRevocationRefs> [Choice]

Contains references to the revocation data used for the verification of the signature (see Section 7.4.2 of [XAdES]). This information is simply extracted from the signature.

<XAdES:AttributeCertificateRefs> [Choice]

Contains the references to the full set of attribute authorities certificates that have been used to validate the attribute certificate (see section 7.4.3 of [XAdES]). This information is simply extracted from the signature.

<XAdES:AttributeRevocationRefs> [Choice]

Contains the references to the full set of revocation data that have been used in the validation of the attribute certificate(s) present in the signature (see section 7.4.4 of [XAdES]).

<SigAndRefsTimeStamp> [Choice]

1240 Contains verification results for a time stamp referring to the signature and references on certificates
1241 and revocation data (see section 7.5.1 of [XAdES]). The **TimeStampValidityType** is described in
1242 section 3.5.4.4.

1243 <RefsOnlyTimeStamp> [Choice]

1244 Contains verification results for a time stamp referring only to references on certificates and revocation
1245 data (see section 7.5.2 of [XAdES]). The **TimeStampValidityType** is described in section 3.5.4.4.

1246 <CertificateValues> [Choice]

1247 Contains verification results for the certificates, which were used in the verification of the signature
1248 (see section 7.6.1 of [XAdES]). The **CertificateValuesType** is defined below.

1249 <RevocationValues> [Choice]

1250 Contains verification results of the revocation data used in the verification of the signature (see section
1251 7.6.2 of [XAdES]). The **RevocationValuesType** is defined below.

1252 <AttrAuthoritiesCertValues> [Choice]

1253 Contains verification results of the certificates of Attribute Authorities that have been used to validate
1254 the attribute certificates, which are contained in the signature (see section 7.6.3 of [XAdES]). The
1255 **CertificateValuesType** is defined below.

1256 <AttributeRevocationValues> [Choice]

1257 Contains verification results of the revocation data that have been used to validate the attribute
1258 certificate when present in the signature (see section 7.6.4 of [XAdES]). The **RevocationValuesType**
1259 is defined below.

1260 <ArchiveTimeStamp> [Choice]

1261 Contains verification results for a time stamp covering the complete signature including all attributes
1262 (see section 7.7 of [XAdES]). The **TimeStampValidityType** is described in section 3.5.4.4.

1263

1264 The **CertificateValuesType** is defined as follows:

1265

```
1266 <complexType name="CertificateValuesType">  
1267   <choice minOccurs="0" maxOccurs="unbounded">  
1268     <element name="EncapsulatedX509Certificate"  
1269       type="vr:CertificateValidityType" />  
1270     <element name="OtherCertificate" />  
1271   </choice>  
1272   <attribute name="Id" type="ID" use="optional" />  
1273 </complexType>
```

1274

1275 It defines the following attributes and elements:

1276 Id [Optional]

1277 This attribute contains an optional identifier for the element.

1278 <EncapsulatedX509Certificate> [Optional, Unbounded, Choice]

1279 Contains verification results for an X.509 certificate included in the signature. The
1280 **CertificateValidityType** is defined in Section 3.5.3.1.

1281 <OtherCertificate> [Optional, Unbounded, Choice]

1282 This element contains verification results for other certificates included in the signature. If a certificate
1283 with unknown format is included in the signature, a warning (error code
1284 [urn:oasis:names:tc:dss:1.0:resultminor:certificateFormatNotCorrectWarning](#)) SHOULD be returned.

1285

1286 The **RevocationValuesType** is defined as follows:


```

1288     <complexType name="RevocationValuesType">
1289       <sequence>
1290         <element name="CRLValues" minOccurs="0">
1291           <complexType>
1292             <sequence maxOccurs="unbounded" minOccurs="1">
1293               <element name="VerifiedCRL"
1294 type="vr:CRLValidityType" />
1295             </sequence>
1296           </complexType>
1297         </element>
1298         <element name="OCSPValues" minOccurs="0">
1299           <complexType>
1300             <sequence maxOccurs="unbounded" minOccurs="1">
1301               <element name="VerifiedOCSPResponse"
1302 type="vr:OCSPValidityType" />
1303             </sequence>
1304           </complexType>
1305         </element>
1306         <element name="OtherValues" type="dss:AnyType" minOccurs="0"
1307 />
1308       </sequence>
1309       <attribute name="Id" type="ID" use="optional" />
1310     </complexType>

```

It contains the following attributes and elements:

Id [Optional]

This attribute contains an optional identifier for the element.

<CRLValues> [Optional]

Contains the verification results for all CRLs included in a signature. The **CRLValidityType** is defined in Section 3.5.3.4.

<OCSPValues> [Optional]

Contains the verification results for all OCSP responses included in a signature. The **OCSPValidityType** is defined in Section 3.5.3.5.

<OtherValues> [Optional]

This element MAY contain verification results for other revocation data included in the signature. If other revocation data with unknown format is included in the signature, a warning (error [urn:oasis:names:tc:dss:1.0:resultminor:improperRevocationInformation](#)) SHOULD be returned.

3.5.4.3 AttributeCertificateValidityType

The **AttributeCertificateValidityType** is defined as follows:

```

1329     <complexType name="AttributeCertificateValidityType">
1330       <sequence>
1331         <element name="AttributeCertificateIdentifier"
1332 type="vr:AttrCertIDType" maxOccurs="1" minOccurs="0" />
1333         <element name="AttributeCertificateValue" type="base64Binary"
1334 maxOccurs="1" minOccurs="0" />
1335         <element name="AttributeCertificateContent"
1336 type="vr:AttributeCertificateContentType" maxOccurs="1"
1337 minOccurs="0" />
1338         <element name="SignatureOK" type="vr:SignatureValidityType" />
1339         <element name="CertificatePathValidity"

```

```

1340         type="vr:CertificatePathValidityType" />
1341     </sequence>
1342 </complexType>

```

1343

1344 It contains the following elements:

1345 <AttributeCertificateIdentifier> [Optional]

1346 This element MAY refer to an X.509v3 attribute certificate according to [RFC3281]. The structure of

1347 the **AttrCertIDType** is defined below.

1348 <AttributeCertificateValue> [Optional]

1349 This element MAY contain the certificate in binary form (coded in ASN.1), if the report option

1350 <IncludeCertificateValues> is set to 'true'.

1351 <AttributeCertificateContent> [Optional]

1352 This element MAY contain an XML-based analogue of the content of the certificate, if the report option

1353 <ExpandBinaryValues> is set to 'true'. The structure of the

1354 AttributeCertificateContentType is defined below.

1355 <SignatureOK> [Required]

1356 This element indicates, whether the digital signature is mathematically valid or not. The

1357 **SignatureValidityType** is defined in section 3.5.1.

1358 <CertificatePathValidity> [Required]

1359 This element contains the result of the validation of the certificate path of the certificate which has

1360 been used to sign the attribute certificate. The **CertificatePathValidityType** is defined at the

1361 beginning of Section 3.5.3.

1362

1363 The **AttrCertIDType** is structured as follows:

```

1364
1365 <complexType name="AttrCertIDType">
1366     <sequence>
1367         <element name="Holder" type="vr:EntityType" maxOccurs="1"
1368 minOccurs="0"/>
1369         <element name="Issuer" type="vr:EntityType" />
1370         <element name="SerialNumber" type="integer"/></element>
1371     </sequence>
1372 </complexType>

```

1373

1374 It contains the following elements:

1375 <Holder> [Optional]

1376 This element contains, if present, information about the holder of the certificate. The structure of the

1377 **EntityType** is defined below.

1378 <Issuer> [Required]

1379 This element contains information about the issuer of the attribute certificate. The structure of the

1380 **EntityType** is defined below.

1381 <SerialNumber> [Required]

1382 This element contains the serial number of the attribute certificate, which (together with the information

1383 provided in the <Issuer>-element) uniquely identifies the attribute certificate.

1384

1385 The **EntityType** is aligned to the structure of Holder and V2Form in [RFC3281] and is defined as

1386 follows:

```

1388     <complexType name="EntityType">
1389         <sequence>
1390             <element name="BaseCertificateID"
1391                 type="ds:X509IssuerSerialType" maxOccurs="1"
1392 minOccurs="0"/>
1393             <element name="Name" type="string" maxOccurs="1"
1394 minOccurs="0"/>
1395             <element name="Other" type="dss:AnyType" maxOccurs="1"
1396 minOccurs="0"/>
1397         </sequence>
1398     </complexType>

```

It SHOULD contain sufficient information to identify the entity uniquely and MAY contain the following optional elements:

<BaseCertificateID> [Optional]

This element identifies, if present, the public-key certificate of the entity. The structure of the ds:X509IssuerSerialType is defined in [RFC3275].

<Name> [Optional]

This element contains, if present, the name of the entity.

<Other> [Optional]

This element MAY contain other information, which is used to identify the entity.

The **AttributeCertificateContentType** contains the content of an attribute certificate according to [RFC3281] as XML structure and is structured as follows:

```

1413     <complexType name="AttributeCertificateContentType">
1414         <sequence>
1415             <element name="Version" minOccurs="0" type="integer" />
1416             <element name="Holder" type="vr:EntityType" />
1417             <element name="Issuer" type="vr:EntityType" />
1418             <element name="SignatureAlgorithm" type="anyURI" />
1419             <element name="SerialNumber" type="integer" />
1420             <element name="AttCertValidityPeriod"
1421                 type="vr:ValidityType" />
1422             <element name="Attributes">
1423                 <complexType>
1424                     <sequence minOccurs="0" maxOccurs="unbounded">
1425                         <element name="Attribute"
1426                             type="vr:AttributeType" />
1427                     </sequence>
1428                 </complexType>
1429             </element>
1430             <element name="IssuerUniqueID" type="hexBinary" maxOccurs="1"
1431 minOccurs="0"/>
1432             <element name="Extensions" minOccurs="0"
1433                 type="vr:ExtensionsType" />
1434         </sequence>
1435     </complexType>

```

It contains the following elements:

<Version> [Optional]

This element contains, if present, the version of the attribute certificate.

1440 <Holder> [Required]
 1441 This element contains information about the holder of the certificate. The structure of the **EntityType**
 1442 is defined above.

1443 <Issuer> [Required]
 1444 This element contains the issuer of the attribute certificate. The structure of the **EntityType** is defined
 1445 above.

1446 <SignatureAlgorithm> [Required]
 1447 This element contains an identifier of the used signature algorithm.

1448 <SerialNumber> [Required]
 1449 This element contains the serial number of the attribute certificate.

1450 <AttCertValidityPeriod> [Required]
 1451 This element contains the validity period of the attribute certificate. The **ValidityType** is defined in
 1452 section 3.5.3.2.

1453 <Attributes> [Optional, Unbounded]
 1454 This element contains, if present, a list of attributes. The **AttributeType** is defined below.

1455 <IssuerUniqueID> [Optional]
 1456 This element contains, if present, a unique identifier of the issuer of the attribute certificate.

1457 <Extensions> [Optional]
 1458 If present, this element contains information about the list of extensions present in the attribute
 1459 certificate. The **ExtensionType** is defined in Section 3.5.3.2.

1460
 1461 The **AttributeType** is defined as follows:

```

1463     <complexType name="AttributeType">
1464         <sequence>
1465             <element name="Type" type="anyURI" />
1466             <element name="Value" type="dss:AnyType" maxOccurs="unbounded"
1467 minOccurs="0"/></element>
1468         </sequence>
1469     </complexType>
  
```

1470
 1471 It contains the following elements:

1472 <Type> [Required]
 1473 This element MUST contain an identifier for the type of the attribute in the <Code>-element and MAY
 1474 contain further information.

1475 <Value> [Optional, Unbounded]
 1476 This element MAY contain any number of attribute values.

1478 3.5.4.4 TimeStampValidityType

1479 The **TimeStampValidityType** is structured as follows:

```

1481     <complexType name="TimeStampValidityType">
1482         <sequence>
1483             <element name="FormatOK" type="vr:VerificationResultType" />
1484             <element name="TimeStampContent" type="vr:TstContentType"
  
```

```

1485         maxOccurs="1" minOccurs="0" />
1486         <element name="MessageHashAlgorithm"
1487 type="vr:AlgorithmValidityType"
1488         maxOccurs="1" minOccurs="0" />
1489         <element name="SignatureOK"
1490 type="vr:SignatureValidityType" />
1491         <element name="CertificatePathValidity"
1492 type="vr:CertificatePathValidityType" />
1493     </sequence>
1494     <attribute name="Id" type="ID" use="optional" />
1495 </complexType>

```

It contains the following elements and attributes:

Id [Optional]

This attribute contains an optional identifier for the element.

<FormatOK> [Required]

This element indicates, whether the format of the time stamp is ok or not. More information on the use of the **VerificationResultType** may be found in Section 3.4.

<TimeStampContent> [Optional]

This element contains the content of time stamp in form of an XML structure, if the report option <ExpandBinaryValues> is set to 'true'. The **TstContentType** is specified below.

<MessageHashAlgorithm> [Optional]

This element contains, if present, information about the message hash algorithm and its suitability. The **AlgorithmValidityType** is defined in Section 3.5.2.

<SignatureOK> [Required]

This element indicates, whether the digital signature is mathematically valid or not. The **SignatureValidityType** is defined in Section 3.5.1.

<CertificatePathValidity> [Required]

This element contains the result of the validity check of the certificate. The **CertificatePathValidityType** is defined in Section 3.5.3.

The **TstContentType** complex type is defined as follows:

```

1518 <complexType name="TstContentType">
1519     <sequence>
1520         <element ref="dss:TstInfo" maxOccurs="1" minOccurs="0" />
1521         <element name="Other" type="dss:AnyType" maxOccurs="1"
1522 minOccurs="0" />
1523     </sequence>
1524 </complexType>

```

It contains the following elements:

<dss:TstInfo> [Optional]

This element MAY contain the standard content of a time stamp as defined in Section 5.1.2 of [DSSCore]. Note that there is a straightforward mapping from the TSTInfo-Element according to [RFC3161] to the present structure.

<Other> [Optional]

This element MAY contain other information included in the time stamp.

3.5.5 Element <IndividualTimeStampReport>

The <IndividualTimeStampReport>-element MAY appear in the <Details>-element within the <IndividualReport>-element defined in Section 3.3. This element is defined as follows:

```
<element name="IndividualTimeStampReport" type="vr:TimeStampValidityType" />
```

The **TimeStampValidityType** is defined in Section 3.5.4.4.

3.5.6 Element <IndividualCertificateReport>

The <IndividualCertificateReport>-element MAY appear in the <Details>-element within the <IndividualReport>-element defined in Section 3.3. This element is defined as follows:

```
<element name="IndividualCertificateReport"
  type="vr:CertificateValidityType" />
```

The **CertificateValidityType** is defined in Section 3.5.3.1.

3.5.7 Element <IndividualAttributeCertificateReport>

The <IndividualAttributeCertificateReport>-element MAY appear in the <Details>-element within the <IndividualReport>-element defined in Section 3.3. This element is defined as follows:

```
<element name="IndividualAttributeCertificateReport"
  type="vr:AttributeCertificateValidityType" />
```

The **AttributeCertificateValidityType** is defined in Section 3.5.4.3.

3.5.8 Element <IndividualCRLReport>

The <IndividualCRLReport>-element MAY appear in the <Details>-element within the <IndividualReport>-element defined in Section 3.3. This element is defined as follows:

```
<element name="IndividualCRLReport" type="vr:CRLValidityType" />
```

The **CRLValidityType** is defined in Section 3.5.3.4.

3.5.9 Element <IndividualOCSPReport>

The <IndividualOCSPReport>-element MAY appear in the <Details>-element within the <IndividualReport>-element defined in Section 3.3. This element is defined as follows:

```
<element name="IndividualOCSPReport" type="vr:OCSPValidityType" />
```

The **OCSPValidityType** is defined in Section 3.5.3.5.

3.5.10 Element <EvidenceRecordReport>

The <EvidenceRecordReport>-element MAY appear in the <Details>-element within the <IndividualReport>-element defined in Section 3.3. This element is defined as follows:

```
<element name="EvidenceRecordReport" type="vr:EvidenceRecordValidityType" />
```

The **EvidenceRecordValidityType** is based on the definition of the EvidenceRecord-element in [RFC4998] defined as follows:

```
<complexType name="EvidenceRecordValidityType">
  <sequence>
    <element name="FormatOK" type="vr:VerificationResultType" />
```

```

1569         <element name="Version" type="integer"
1570             maxOccurs="1" minOccurs="0">
1571         </element>
1572         <element name="DigestAlgorithm"
1573             type="vr:AlgorithmValidityType" maxOccurs="unbounded"
1574 minOccurs="0">
1575         </element>
1576         <element name="CryptoInfos" maxOccurs="1" minOccurs="0">
1577             <complexType>
1578                 <sequence>
1579                     <element name="Attribute"
1580                         type="vr:AttributeType"
1581 maxOccurs="unbounded" minOccurs="1">
1582                     </element>
1583                 </sequence>
1584             </complexType>
1585         </element>
1586         <element name="EncryptionInfo" maxOccurs="1" minOccurs="0">
1587             <complexType>
1588                 <sequence>
1589                     <element name="EncryptionInfoType"
1590                         type="vr:AlgorithmValidityType">
1591                     </element>
1592                     <element name="EncryptionInfoValue"
1593                         type="dss:AnyType">
1594                     </element>
1595                 </sequence>
1596             </complexType>
1597         </element>
1598         <element name="ArchiveTimeStampSequence" maxOccurs="1"
1599 minOccurs="1">
1600             <complexType>
1601                 <sequence maxOccurs="unbounded" minOccurs="0">
1602                     <element name="ArchiveTimeStampChain">
1603                         <complexType>
1604                             <sequence maxOccurs="unbounded"
1605 minOccurs="0">
1606                                 <element
1607 name="ArchiveTimeStamp"
1608
1609                             type="vr:ArchiveTimeStampValidityType">
1610                                 </element>
1611                             </sequence>
1612                         </complexType>
1613                     </element>
1614                 </sequence>
1615             </complexType>
1616         </element>
1617     </sequence>
1618     <attribute name="Id" type="ID" use="optional" />
1619 </complexType>

```

It contains the following elements and attributes:

Id [Optional]

This attribute contains an optional identifier for the element.

<FormatOK> [Required]

This element indicates, whether the format of the evidence record according to [RFC4998] is ok or not. More information on the use of the **VerificationResultType** may be found in Section 3.4.

<Version> [Optional]

This element contains, if present, the version of the Evidence Record Syntax.

<DigestAlgorithm> [Optional, unbounded]

This element appears for each hash algorithm used to produce the evidence record and contains information about the hash algorithm and possibly its suitability. The **AlgorithmValidityType** is defined in Section 3.5.2.

<CryptoInfos> [Optional]

This element MAY contain further data useful in the validation of the <ArchiveTimeStampSequence>-element. As explained in [RFC4998] this MAY include possible Trust Anchors, certificates, revocation information, or the information concerning the suitability of cryptographic algorithms.

<EncryptionInfo> [Optional]

This element MAY contain the necessary information to support encrypted content (cf. [RFC4998], Section 6.1).

<ArchiveTimeStampSequence> [Required]

This element is required and MAY contain a sequence of <ArchiveTimeStampChain>-elements (cf. [RFC4998], Section 5), which in turn MAY contain a sequence of <ArchiveTimeStamp>-elements, which are of type **ArchiveTimeStampValidityType** defined below.

The **ArchiveTimeStampValidityType** is based on the definition of the ArchiveTimeStamp-element in [RFC4998] defined as follows:

```
<complexType name="ArchiveTimeStampValidityType">
  <sequence>
    <element name="FormatOK" type="vr:VerificationResultType" />
    <element name="DigestAlgorithm" type="vr:AlgorithmValidityType"
      maxOccurs="1" minOccurs="0" />
    <element name="Attributes" maxOccurs="1" minOccurs="0">
      <complexType>
        <sequence>
          <element name="Attribute" type="vr:AttributeType"
maxOccurs="unbounded" minOccurs="1"/>
        </sequence>
      </complexType>
    </element>
    <element name="ReducedHashTree" maxOccurs="1" minOccurs="0">
      <complexType>
        <sequence maxOccurs="unbounded" minOccurs="1">
          <element name="PartialHashTree">
            <complexType>
              <sequence maxOccurs="unbounded"
minOccurs="1">
                <element name="HashValue"
type="vr:HashValueType">
              </element>
            </sequence>
          </complexType>
        </element>
      </sequence>
    </complexType>
  </element>
  <element name="TimeStamp"
type="vr:TimeStampValidityType" />
</sequence>
<attribute name="Id" type="ID" use="optional" />
</complexType>
```


1683

1684 It contains the following elements and attributes:

1685 **Id** [Optional]

1686 This attribute contains an optional identifier for the element.

1687 **<FormatOK>** [Required]

1688 This element indicates, whether the format of the evidence record according to **[RFC4998]** is ok or

1689 not. More information on the use of the **VerificationResultType** may be found in Section 3.4.

1690 **<DigestAlgorithm>** [Optional]

1691 This element contains, if present, information about the hash algorithm and possibly its suitability. The

1692 **AlgorithmValidityType** is defined in Section 3.5.2.

1693 **<Attributes>** [Optional]

1694 This element contains, if present, information about further attributes related to the archive time

1695 stamp.

1696 **<ReducedHashTree>** [Optional]

1697 This element MAY contain a sequence of **<PartialHashTree>**-elements, which in turn contain a

1698 list of **<HashValue>**-elements of type **HashValueType** defined below.

1699 **<TimeStamp>** [Required]

1700 This element is of type **TimeStampValidityType** (cf. Section 3.5.4.4) and contains information about

1701 the validity of the conventional time stamp, which is included in the present archive time stamp.

1702

1703 The **HashValueType** is used for the **<HashValue>**-element within the **<PartialHashTree>**-element

1704 above and is defined as follows:

```

1705 <complexType name="HashValueType">
1706   <sequence>
1707     <element name="HashValue" type="hexBinary" />
1708   </sequence>
1709   <attribute name="HashedObject" type="IDREF" use="optional" />
1710 </complexType>

```

1711 It contains the following elements and attributes:

1712 **HashedObject** [Optional]

1713 This attribute MAY be used to point to the object, which served as pre-image of the hash value.

1714 **<HashValue>** [Required]

1715 This element contains the hash value produced by applying the hash algorithm specified by the

1716 **<DigestAlgorithm>**- or **<TimeStamp>**-element to the data specified by the **HashedObject**

1717 attribute.

1718

4 Conformance

This profile defines three conformance levels:

- Level 1 - “Basic”,
- Level 2 - “Comprehensive” and
- Level 3 - “Comfortable”.

4.1 Level 1 – “Basic”

The conformance level “Basic” allows to return individual verification results for each signature contained in a `<dss:VerifyRequest>`. For this purpose the `<dss:VerifyResponse>` MUST contain in `<dss:OptionalOutputs>` a `<VerificationReport>`-element, as specified in Section 3.2. The `<VerificationReport>`-element MUST contain an `<IndividualSignatureReport>`-element (see Section 3.3) for each signature or time stamp (i.e. `<dss:SignatureObject>`) contained in the `<VerifyRequest>`-element.

The `<Details>`-element within `<IndividualSignatureReport>` MAY contain other elements, such as the Optional Outputs defined in Section 4.5 of [DSSCore].

4.2 Level 2 – “Comprehensive”

The conformance level “Advanced” comprises all requirements of conformance Level 1 (“Basic”), as explained in Section 4.1. Furthermore the `<Details>`-element within each `<IndividualReport>` MUST contain exactly one object-specific element, which documents the detailed verification results for the signatures or validation data under consideration. While it is REQUIRED in this conformance level that certificate values and revocation values are included into the verification report if requested by the `IncludeCertificateValues-` and `IncludeRevocationValues-`element within the `ReturnVerificationReport`-element (cf. Section 3.1), it is NOT REQUIRED in this conformance level to expand those values and other relevant validation data to XML-structures if requested by the `ExpandBinaryValues`-element.

The object-specific detail elements defined in this specification are given as follows:

- `<DetailedSignatureReport>` (cf. Section 3.5) - is used for the verification of (advanced) electronic signatures.
- `<IndividualTimeStampReport>` (cf. Section 3.5.5) – is used for the verification of individual time stamps according to [RFC3161], which are not included in a signature.
- `<IndividualCertificateReport>` (cf. Section 3.5.6) – is used for the verification of individual certificates according to [RFC5280], which are not included in a signature.
- `<IndividualAttributeCertificateReport>` (cf. Section 3.5.7) - is used for the verification of individual attribute certificates according to [RFC3281], which are not included in a signature.
- `<IndividualCRLReport>` (cf. Section 3.5.8) - is used for the verification of individual CRLs according to [RFC5280], which are not included in a signature.
- `<IndividualOCSPReport>` (cf. Section 3.5.9) - is used for the verification of individual OCSP-responses according to [RFC2560], which are not included in a signature.
- `<EvidenceRecordReport>` (cf. Section 3.5.10) – is used for the verification of evidence records according to [RFC4998].

Other object-specific detail elements MAY be defined in other profiles.

1759 **4.3 Level 3 – “Convenient”**

1760 The conformance Level 3 (“Convenient”) comprises all requirements of the conformance Level 2
1761 (“Comprehensive”), as explained in Section 4.2. Furthermore the binary values of the validation data
1762 MUST be expanded to the corresponding XML-structures, if this is requested by the
1763 `ExpandBinaryValues`-element within the `ReturnVerificationReport`-element (cf. Section 3.1).

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Participants:

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B. Revision History

Revision	Date	Editor	Changes Made
R1	19.07.2009	Detlef Hühnlein	CD1 version on current OASIS template