Digital Signature Service Metadata
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This prose specification is one component of a Work Product that also includes:

- JSON and XML schemas: https://docs.oasis-open.org/dss-x/dss-md/v1.0/csprd01/schema/
- JSON and XML schemas: http://docs.oasis-open.org/dss-x/dss-md/v1.0/cs01/schema/

Related work:
This specification is related to:

- Digital Signature Service Core Protocols, Elements, and Bindings Version 2.0. Edited by Andreas Kuehne and, Stefan Hagen. Latest version: 07 May 2019, Committee Specification 01.
  https://docs.oasis-open.org/dss-x/dss-core/v2.0/dss-core-v2.0.html
  https://docs.oasis-open.org/dss-x/dss-core/v2.0/cs01/dss-core-v2.0-cs01.docx.

Declared XML namespaces:

- http://docs.oasis-open.org/dss-x/ns/info
Abstract:
This document defines JSON and XML structures and discovery mechanisms for metadata related to digital signature services.

Status:
This document was last revised or approved by the OASIS Digital Signature Services eXtended (DSS-X) TC on the above date. The level of approval is also listed above. Check the "Latest version" location noted above for possible later revisions of this document. Any other numbered Versions and other technical work produced by the Technical Committee (TC) are listed at https://www.oasis-open.org/committees/tc_home.php?wg_abbrev=dss-x/#technical.

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Citation format:
When referencing this specification, the following citation format should be used:

[DSS-MD-v1.0]

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1 Introduction

[All text is normative unless otherwise labeled]

1.1 IPR Policy

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1.2 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] and [RFC8174]

1.2.1 Terms and Definitions

For the purposes of this document no specific terms or definitions have been identified as deviating from the usual meaning in the context of XML / JSON schema, digital signatures or transport.

1.2.2 Abbreviated Terms

- JSON — JavaScript Object Notation
- URI — (IETF) Uniform Resource Identifier according to [RFC3986]
- URL — Uniform Resource Locator
- XML — (W3C) Extensible Markup Language
- XSD — (W3C) XML Schema

1.3 Normative References


1.4 Non-Normative References


[CSC-v1.0] Cloud Signature Consortium, “Architectures and protocols for remote signature applications”, Published version 1.0.3.0, 2018


1.5 Typographical Conventions

Keywords defined by this specification use this monospaced font.

Normative source code uses this paragraph style.

Text following the special symbol («) – an opening Guillemet (or French quotation mark) – within this specification identifies automatically testable requirements to aid assertion tools. Every such statement is separated from the following text with the special end symbol (») – a closing Guillemet and has been assigned a reference that follows that end symbol in one of the three patterns:

1. [DSS-section#-local#] if it applies regardless of syntax
2. [JDSS-section#-local#] if it applies only to JSON syntax
3. [XDSS-section#-local#] if it applies only to XML syntax

Some sections of this specification are illustrated with non-normative examples.

Example 1: text describing an example uses this paragraph style

Non-normative examples use this paragraph style.

All examples in this document are non-normative and informative only.

Representation-specific text is indented and marked with vertical lines.

**Representation-Specific Headline**

Normative representation-specific text

All other text is normative unless otherwise labelled e.g. like:

**Non-normative Comment:**

This is a pure informative comment that may be present, because the information conveyed is deemed useful advice or common pitfalls learned from implementer or operator experience and often given including the rationale.

1.6 Motivation and related work (Non-normative)

Based on existing [DSS-v1.0] and emerging [DSS-v2.0] standards for digital signature services as well as the [eIDAS] regulation on electronic identification and trust services, there is a growing ecosystem consisting of providers and consumers of a variety of digital signature related services, which raises the demand for a normalised discovery and provision of service-related metadata.

While there are already standards for the handling of service-related metadata for services for exchanging business documents (see [BDX-SMP-v1.0] and [BDX-SMP-v2.0]) or identity management services (see [SAML-MD], [RFC8414] and [OIDC-MD]), there is currently no comprehensive metadata standard for digital signature services, but only first steps towards filling this gap (see [CSC-v1.0], [TS119432] and [TS119512]).

Against this background, the present document aims at providing a generic and extensible structure (see clauses 2 and 3) and simple discovery mechanism (see clause 4) for digital signature service-related metadata, which is intended to be used in conjunction with [DSS-v2.0] and related profiles and extensions, such as [TS119432], [TS119442] and [TS119512] for example.
2 Overview

As depicted in Figure 1, the main components of the service-related metadata structure specified in the present document comprise Provider, Protocol, Profile, Operation and Policy.

The main component is the Provider element (see clause 3.1.1), which contains general metadata related to the provider of the service(s). As a service provider may support one or more protocols, for signature generation, signature validation or long-term preservation for example, and a provider may support different profiles of the supported protocols, the Provider element may contain one or more Protocol elements (see clause 3.1.2), which in turn may contain one or more Profile elements (see clause 3.1.3), which describe the supported profiles. A Profile element may in turn contain among other elements one or more Operation elements (see clause 3.1.4) and zero or more Policy elements (see 3.1.7), in which the applicable policies are specified or referenced.
3 Data Structure Models

3.1 Data Structure Models defined in this document

The XML elements of this section are defined in the XML namespace 'http://docs.oasis-open.org/dss-x/ns/info/metadata'.

3.1.1 Component Provider

The component Provider is the main element of the metadata structure and contains information about the provider of the related service, digital signature services. The structure of this component has been inspired by the content provided by the info call defined in [CSC-v1.0].

Below follows a list of the sub-components that constitute this component:

- The Name element MUST contain one instance of a string, which contains the commercial name of the service provider. It is RECOMMENDED to limit the size of this string to 255 characters.
- The Logo element MUST contain one instance of a URI, which refers to an image file containing the logo of the service provider. This image file MUST be published online and SHOULD either be in JPEG or PNG format and SHOULD NOT be larger than 256x256 pixels.
- The Region element MUST contain one instance of a string with the [ISO3166-1] Alpha-2 code of the country in which the service provider is established.
- The OPTIONAL SupportedLanguage element, if present, MAY occur zero or more times in order to signal the set of supported languages in line with [RFC5646].
- The OPTIONAL Description element, if present, MAY occur zero or more times containing a sub-component, which provides additional information which describes the service. If present each instance MUST satisfy the requirements specified in [DSS-v2.0] for the InternationalString component, whereas it is RECOMMENDED to limit the size of the value component to 255 characters.
- The OPTIONAL AuthInfo element, if present, MUST satisfy the requirements specified in clause 3.1.10 for the TypedLocator component. This component MUST contain a URI, which points to the location where the metadata document for the authentication and authorization service can be retrieved and MAY in addition contain a Type component, which specifies the type of authorization mechanisms required to access the provided metadata document. The present document defines the following values for the Type component:
  - urn:ietf:rfc:8414 – for services. This URI SHOULD point to OAuth 2.0 metadata according to [RFC8414]
- The Protocol element MUST occur 1 or more times containing a sub-component, which provides information about the supported protocols of the service. Each instance MUST satisfy the requirements specified in this document in section 3.1.2.
- The OPTIONAL Extension element, if present, MAY occur zero or more times containing a sub-component, which extends the semantic of the Provider component. If present each instance MUST satisfy the requirements specified in this document in section 3.1.9.

3.1.1.1 Provider – JSON Syntax

The ProviderType JSON object SHALL implement in JSON syntax the requirements defined in the Provider component.
Properties of the JSON object SHALL implement the sub-components of Provider using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>name</td>
</tr>
<tr>
<td>Logo</td>
<td>logo</td>
</tr>
<tr>
<td>Region</td>
<td>region</td>
</tr>
<tr>
<td>SupportedLanguage</td>
<td>lang</td>
</tr>
<tr>
<td>Description</td>
<td>description</td>
</tr>
<tr>
<td>AuthInfo</td>
<td>authinfo</td>
</tr>
<tr>
<td>Protocol</td>
<td>protocol</td>
</tr>
<tr>
<td>Extension</td>
<td>ext</td>
</tr>
</tbody>
</table>

The ProviderType JSON object is defined in the JSON schema [DSSMD-JSON](http://example.com/DSSMD-JSON) and is provided below as a service to the reader.

```json
"info-md-ProviderType": {
  "type": "object",
  "properties": {
    "name": {
      "type": "string"
    },
    "logo": {
      "type": "string"
    },
    "region": {
      "type": "string"
    },
    "lang": {
      "type": "array",
      "items": {
        "type": "string"
      }
    },
    "description": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/info-md-InternationalStringType"
      }
    },
    "authinfo": {
      "type": "string"
    },
    "protocol": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/info-md-ProtocolType"
      }
    }
  }
}
```
3.1.1.2 Provider – XML Syntax

The XML type ProviderType SHALL implement the requirements defined in the Provider component. The ProviderType XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="ProviderType">
  <xs:sequence>
    <xs:element name="Name" type="xs:string"/>
    <xs:element name="Logo" type="xs:anyURI"/>
    <xs:element name="Region" type="xs:string"/>
    <xs:element name="SupportedLanguage" type="xs:language" maxOccurs="unbounded" minOccurs="0"/>
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="#/definitions/info-md-Extension"/>
    <xs:element name="AuthInfo" type="xs:anyURI" maxOccurs="1" minOccurs="0"/>
    <xs:element name="Protocol" type="#/definitions/info-md-ProtocolType" maxOccurs="unbounded" minOccurs="1"/>
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="#/definitions/info-md-Extension"/>
  </xs:sequence>
</xs:complexType>
```

Each child element of ProviderType XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

3.1.2 Component Protocol

The Protocol component is part of the Provider component specified in clause 3.1.1 and provides information about a digital signature related protocol supported by the service provider.

Below follows a list of the sub-components that constitute this component:
The OPTIONAL Server element, if present, MUST contain one instance of a URI, which SHOULD be the URL of the target host of the service supporting the protocol. For REST-based services this is the URL of Server Object component within [OpenAPI] and for SOAP-based services this is the soap:address within [WSDL].

The OPTIONAL Specification element, if present, MAY occur zero or more times containing a URI, which points to a specification document describing the digital signature related protocol. Examples of digital signature related protocols include the generation [DSS-v1.0, DSS-v2.0, TS119432], validation [TS119442] and preservation [TS119512] of digital signatures.

The OPTIONAL Version element, if present, MUST contain a string, which indicates the version of the protocol specification, if it is not specified within the specification document mentioned above.

The OPTIONAL Description element, if present, MAY occur zero or more times containing a sub-component, which provides additional information with respect to the supported protocol. If present, each instance MUST satisfy the requirements specified in [DSS-v2.0] for the InternationalString component.

The Profile element MUST occur 1 or more times containing a sub-component, which further describes the specific profile of the supported digital signature related protocol. Each instance MUST satisfy the requirements specified in this document in section 3.1.3.

The OPTIONAL Extension element, if present, MAY occur zero or more times containing a sub-component, which extends the semantics of the Protocol component. If present each instance MUST satisfy the requirements specified in this document in section 3.1.9.

### 3.1.2.1 Protocol – JSON Syntax

The ProtocolType JSON object SHALL implement in JSON syntax the requirements defined in the Protocol component.

Properties of the JSON object SHALL implement the sub-components of Protocol using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server</td>
<td>srv</td>
</tr>
<tr>
<td>Specification</td>
<td>spec</td>
</tr>
<tr>
<td>Version</td>
<td>version</td>
</tr>
<tr>
<td>Description</td>
<td>description</td>
</tr>
<tr>
<td>Profile</td>
<td>profile</td>
</tr>
<tr>
<td>Extension</td>
<td>ext</td>
</tr>
</tbody>
</table>

The ProtocolType JSON object is defined in the JSON schema [DSSMD-JSON] and is provided below as a service to the reader.

```json
"info-md-ProtocolType": {
  "type": "object",
  "properties": {
    "srv": {
      "type": "string"
    },
    "spec": {
      "type": "array",
      "items": {
```

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3.1.2.2 Protocol – XML Syntax

The XML type ProtocolType SHALL implement the requirements defined in the Protocol component. The ProtocolType XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="ProtocolType">
  <xs:sequence>
    <xs:element name="Server" type="xs:anyURI" maxOccurs="1" minOccurs="0"/>
    <xs:element name="Specification" type="xs:anyURI" maxOccurs="unbounded" minOccurs="0"/>
    <xs:element name="Version" type="xs:string" maxOccurs="1" minOccurs="0"/>
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="info:md:Description"/>
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="info:md:Extension"/>
  </xs:sequence>
</xs:complexType>
```

Each child element of ProtocolType XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

3.1.3 Component Profile

The Profile component is part of the Protocol component specified in clause 3.1.2 and provides information about the specific profile of the supported digital signature related protocol.

Below follows a list of the sub-components that constitute this component:
The ProfileIdentifier element MUST contain one instance of a URI, which uniquely identifies the profile of the digital signature related protocol.

The OPTIONAL Specification element, if present, MAY occur zero or more times containing a URI, which points to a specification document describing the specific profile of the digital signature related protocol.

The OPTIONAL Description element, if present, MAY occur zero or more times containing a sub-component, which satisfies the requirements specified in [DSS-v2.0] for the InternationalString component and can be used to provide descriptions of the profile in multiple languages.

The Operation element MUST occur 1 or more times containing a sub-component, which describes a specific operation supported by the profile of the digital signature related protocol. For each supported operation there MUST be an Operation component and each instance MUST satisfy the requirements specified in this document in section 3.1.4.

The OPTIONAL Policy element, if present, MAY occur zero or more times containing a sub-component, which specifies the set of policies, which are applicable for the specific profile of the digital signature related protocol. If present each instance MUST satisfy the requirements specified in this document in section 3.1.7.

The OPTIONAL Extension element, if present, MAY occur zero or more times containing a sub-component, which extends the semantics of the Profile component. If present each instance MUST satisfy the requirements specified in this document in section 3.1.9.

### 3.1.3.1 Profile – JSON Syntax

The ProfileType JSON object SHALL implement in JSON syntax the requirements defined in the Profile component.

Properties of the JSON object SHALL implement the sub-components of Profile using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>ProfileIdentifier</td>
<td>prfidpid</td>
</tr>
<tr>
<td>Specification</td>
<td>spec</td>
</tr>
<tr>
<td>Description</td>
<td>description</td>
</tr>
<tr>
<td>Operation</td>
<td>op</td>
</tr>
<tr>
<td>Policy</td>
<td>pol</td>
</tr>
<tr>
<td>Extension</td>
<td>ext</td>
</tr>
</tbody>
</table>

The ProfileType JSON object is defined in the JSON schema [DSSMD-JSON] and is provided below as a service to the reader.

```json
"info" : { "md-ProfileType": { "type": "object", "properties": { "prfidpid": { "type": "string" }, "spec": { "type": "array", "items": { "type": "string" } } } } }
```
3.1.3.2 Profile – XML Syntax

The XML type ProfileType SHALL implement the requirements defined in the Profile component. The ProfileType XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="ProfileType">
  <xs:sequence>
    <xs:element name="ProfileIdentifier" type="xs:anyURI" maxOccurs="unbounded" minOccurs="0"/>
    <xs:element name="Specification" type="xs:anyURI" maxOccurs="unbounded" minOccurs="0" ref="info:md:Description"/>
    <xs:element name="Operation" type="info:md:OperationType" maxOccurs="unbounded" minOccurs="1"/>
    <xs:element name="Policy" type="info:md:PolicyType" maxOccurs="unbounded" minOccurs="0"/>
    <xs:element name="Extension" maxOccurs="unbounded" minOccurs="0" ref="info:md:Extension"/>
  </xs:sequence>
</xs:complexType>
```

Each child element of ProfileType XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

3.1.4 Component Operation

The Operation component is part of the Profile component specified in clause 3.1.3 and provides information about an operation supported by a specific profile of the supported digital signature related protocol.
Below follows a list of the sub-components that constitute this component:

The `OperationIdentifierName` element MUST contain one instance of a `URI string`, which MUST reflect the name of the request to invoke the operation. For REST-based services this corresponds to the `Paths Object` component within [OpenAPI] and the `OperationIdentifierName` element SHOULD contain the relative path the endpoint at which the operation can be invoked, which is appended to the URL of the `Server` component within the `Protocol` element specified in clause 3.1.2. For SOAP-based services the `Name` element corresponds to the `soap:operation` within [WSDL].

The OPTIONAL `Specification` element, if present, MUST contain a URI, which points to a specification document describing the specific operation under consideration.

The OPTIONAL `Description` element, if present, MAY occur zero or more times containing a sub-component, which satisfies the requirements specified in [DSS-v2.0] for the `InternationalString` component and can be used to provide additional information with respect to the specific operation under consideration.

The OPTIONAL `Input` element, if present, MAY occur zero or more times containing a sub-component, which specifies details of a specific input parameter. If present each instance MUST satisfy the requirements specified in this document in section 3.1.5.

The OPTIONAL `Option` element, if present, MAY occur zero or more times containing a sub-component, which specifies details of a specific optional input parameter. If present each instance MUST satisfy the requirements specified in this document in section 3.1.5.

The OPTIONAL `Output` element, if present, MAY occur zero or more times containing a sub-component, which specifies details of a specific output parameter. If present each instance MUST satisfy the requirements specified in this document in section 3.1.5.

The OPTIONAL `Schema` element, if present, MUST contain a URI, which points to the applicable schema document, which defines the detailed syntax of the component implementing the operation under consideration.

The OPTIONAL `Extension` element, if present, MAY occur zero or more times containing a sub-component, which extends the semantics of the `Operation` element. If present each instance MUST satisfy the requirements specified in this document in section 3.1.9.

### 3.1.4.1 Operation – JSON Syntax

The `OperationType` JSON object SHALL implement in JSON syntax the requirements defined in the `Operation` component.

Properties of the JSON object SHALL implement the sub-components of `Operation` using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>name</td>
</tr>
<tr>
<td>Specification</td>
<td>spec</td>
</tr>
<tr>
<td>Description</td>
<td>desc</td>
</tr>
<tr>
<td>Input</td>
<td>in</td>
</tr>
<tr>
<td>Option</td>
<td>opt</td>
</tr>
<tr>
<td>Output</td>
<td>out</td>
</tr>
<tr>
<td>Schema</td>
<td><code>schemaxsd</code></td>
</tr>
</tbody>
</table>
The OperationType JSON object is defined in the JSON schema [DSSMD-JSON] and is provided below as a service to the reader.

```json
"info-md-OperationType": {
  "type": "object",
  "properties": {
    "name": {
      "type": "string"
    },
    "spec": {
      "type": "string"
    },
    "desc": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/dsb-InternationalStringType"
      }
    },
    "in": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/info-md-ParameterType"
      }
    },
    "opt": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/info-md-ParameterType"
      }
    },
    "out": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/info-md-ParameterType"
      }
    },
    "schemaxsd": {
      "type": "string"
    },
    "ext": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/info-md-ExtensionType"
      }
    },
    "required": ["name"]
  }
}
```

### 3.1.4.2 Operation – XML Syntax

The XML type OperationType SHALL implement the requirements defined in the Operation component.
The `OperationType` XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="OperationType">
  <xs:sequence>
    <xs:element name="Name" type="xs:string"/>
    <xs:element name="Specification" type="xs:anyURI" maxOccurs="1" minOccurs="0"/>
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="info:md:Description"/>
    <xs:element name="Input" type="info:md:ParameterType" maxOccurs="unbounded" minOccurs="0"/>
    <xs:element name="Option" type="info:md:ParameterType" maxOccurs="unbounded" minOccurs="0"/>
    <xs:element name="Output" type="info:md:ParameterType" maxOccurs="unbounded" minOccurs="0"/>
    <xs:element name="Schema" type="xs:anyURI" maxOccurs="1" minOccurs="0"/>
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="info:md:Extension"/>
  </xs:sequence>
</xs:complexType>
```

Each child element of `OperationType` XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

### 3.1.5 Component Parameter

The `Parameter` component defines the syntax and semantics of the child components `Input`, `Option` and `Output` of the `Operation` component specified in clause 3.1.4 and allows to provide additional information with respect to specific input and output parameters as well as the available options for an operation, if this is not yet unambiguously specified by the document referenced in the child element `Specification` of the `Operation` according to clause 3.1.4.

Below follows a list of the sub-components that constitute this component:

- **The Name element** MUST contain one instance of a string, which reflects the name of the parameter under consideration.

- **The OPTIONAL Specification element**, if present, MUST contain a URI, which points to a specification document describing additional details with respect to the parameter under consideration.

- **The OPTIONAL Description element**, if present, MAY occur zero or more times containing a sub-component, which satisfies the requirements specified in [DSS-v2.0] for the `InternationalString` component and can be used to provide additional information with respect to the specific (optional) input or output parameter under consideration.

- **The OPTIONAL Format element**, if present, MAY occur zero or more times containing a sub-component, which can be used to specify the format of the (optional) input or output parameter under consideration. If present each instance MUST satisfy the requirements specified in this document in section 3.1.6.

- **The OPTIONAL Schema element**, if present, MUST contain a URI, which points to the applicable schema document, which defines the detailed syntax of the component implementing the specific (optional) input or output parameter under consideration.

- **The OPTIONAL Extension element**, if present, MAY occur zero or more times containing a sub-component, which extends the `semantic` of the `Parameter` component. If present each instance MUST satisfy the requirements specified in this document in section 3.1.9.

### 3.1.5.1 Parameter – JSON Syntax

The `ParameterType` JSON object SHALL implement in JSON syntax the requirements defined in the `Parameter` component.
Properties of the JSON object SHALL implement the sub-components of Parameter using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>name</td>
</tr>
<tr>
<td>Specification</td>
<td>spec</td>
</tr>
<tr>
<td>Description</td>
<td>desc</td>
</tr>
<tr>
<td>Format</td>
<td>form</td>
</tr>
<tr>
<td>Schema</td>
<td>schemaxsd</td>
</tr>
<tr>
<td>Extension</td>
<td>ext</td>
</tr>
</tbody>
</table>

The ParameterType JSON object is defined in the JSON schema [DSSMD-JS0N] and is provided below as a service to the reader.

```json
"infem-ParameterType": {
  "type": "object",
  "properties": {
    "name": {
      "type": "string"
    },
    "spec": {
      "type": "string"
    },
    "desc": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/dsb-InternationalStringType"
      }
    },
    "form": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/infem-FormatType"
      }
    },
    "schemaxsd": {
      "type": "string"
    },
    "ext": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/infem-ExtensionType"
      }
    }
  },
  "required": ["name"]
}
```

### 3.1.5.2 Parameter – XML Syntax

The XML type ParameterType SHALL implement the requirements defined in the Parameter component.
The **ParameterType** XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="ParameterType">
  <xs:sequence>
    <xs:element name="Name" type="xs:string" />
    <xs:element name="Specification" type="xs:anyURI" maxOccurs="1" minOccurs="0" />
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="info:md:Description" />
    <xs:element name="Format" type="info:md:FormatType" maxOccurs="unbounded" minOccurs="0" />
    <xs:element name="Schema" type="xs:anyURI" maxOccurs="1" minOccurs="0" />
    <xs:element maxOccurs="unbounded" minOccurs="0" ref="info:md:Extension" />
  </xs:sequence>
</xs:complexType>
```

Each child element of **ParameterType** XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

### 3.1.6 Component Format

The **Format** component is part of the **Parameter** component specified in clause 3.1.5 and allows to provide additional information with respect to format of the specific input and output parameters or options of an operation, if this is not yet unambiguously specified by the document referenced in the child element **Specification** of the **Operation** according to clause 3.1.4.

Below follows a list of the sub-components that constitute this component:

- **FormatID** element MUST contain one instance of a URI, which identifies the format of the parameter.
- The **Specification** element, if present, MUST contain a URI, which points to a specification document describing additional details with respect to the format under consideration.
- The **Description** element, if present, MAY occur zero or more times containing a sub-component, which satisfies the requirements specified in [DSS-v2.0] for the **InternationalString** component and can be used to provide additional information with respect to the format under consideration.
- The **Parameter** element, if present, MAY occur zero or more times containing a sub-component, which provides more information with respect to a specific parameter under consideration. If present each instance MUST satisfy the requirements specified in this document in section 3.1.5.
- The **Extension** element, if present, MAY occur zero or more times containing a sub-component, which extends the semantic of the **Format** component. If present each instance MUST satisfy the requirements specified in [DSS-v2.0] for the **Any** component.
- The **IsDefault** element, if present, MUST contain one instance of a boolean and indicates whether the format under consideration is the default format. Its default value is 'false'.

The precise semantics what it means that a format is considered to be “the default format” MUST be defined by profiles or extensions of [DSS-v2.0].

### 3.1.6.1 Format – JSON Syntax

The **FormatType** JSON object SHALL implement in JSON syntax the requirements defined in the **Format** component.

Properties of the JSON object SHALL implement the sub-components of **Format** using JSON-specific names mapped as shown in the table below.
<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>FormatID</td>
<td>fid</td>
</tr>
<tr>
<td>Specification</td>
<td>spec</td>
</tr>
<tr>
<td>Description</td>
<td>desc</td>
</tr>
<tr>
<td>Parameter</td>
<td>format</td>
</tr>
<tr>
<td>Extension</td>
<td>ext</td>
</tr>
<tr>
<td>IsDefault</td>
<td>def</td>
</tr>
</tbody>
</table>

The FormatType JSON object is defined in the JSON schema [DSSMD-JSON] and is provided below as a service to the reader.

```
"info-md-FormatType": {
  "type": "object",
  "properties": {
    "fid": {
      "type": "string"
    },
    "spec": {
      "type": "string"
    },
    "desc": {
      "type": "array",
      "items": {
        "$ref": "/definitions/info-md-InternationalStringType"
      }
    },
    "format": {
      "type": "array",
      "items": {
        "$ref": "/definitions/info-md-ParameterType"
      }
    },
    "ext": {
      "type": "array",
      "items": {
        "$ref": "#/definitions/info-md-AnyType"
      }
    },
    "def": {
      "type": "boolean",
      "default": "false"
    }
  },
  "required": ["fid"]
}
```

3.1.6.2 Format – XML Syntax

The XML type FormatType SHALL implement the requirements defined in the Format component. The FormatType XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```
<xs:complexType name="FormatType">
```
Each child element of FormatType XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

### 3.1.7 Component Policy

The Policy component appears within the Profile component specified in clause 3.1.3 and provides information about an applicable policy of the profile of the supported digital signature related protocol. Below follows a list of the sub-components that constitute this component:

- **The OPTIONAL PolicyByRef element**, if present, MUST contain one instance of a sub-component, which provides a reference to a human-readable policy document. This element MUST satisfy the requirements specified in this document in section 3.1.8.
- **The OPTIONAL PolicyByDef element**, if present, MUST contain one instance of a sub-component, which contains a machine-readable policy document. This element MUST satisfy the requirements specified in [DSS-v2.0] for the Any component. The detailed syntax and semantics of the machine-readable policy document MUST be defined by profiles or extensions of [DSS-v2.0] or specifications referenced in such documents.
- **The OPTIONAL EarlierPolicy element**, if present, MAY occur zero or more times containing a URI, which refers to an earlier policy document.
- **The OPTIONAL Extension element**, if present, MAY occur zero or more times containing a sub-component, which extends the semantics of the Policy component. If present each instance MUST satisfy the requirements specified in this document in section 3.1.9.

#### 3.1.7.1 Policy – JSON Syntax

The PolicyType JSON object SHALL implement in JSON syntax the requirements defined in the Policy component.

Properties of the JSON object SHALL implement the sub-components of Policy using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PolicyByRef</td>
<td>peref</td>
</tr>
<tr>
<td>PolicyByDef</td>
<td>pbdef</td>
</tr>
<tr>
<td>EarlierPolicy</td>
<td>ep</td>
</tr>
<tr>
<td>Extension</td>
<td>ext</td>
</tr>
</tbody>
</table>

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The PolicyType JSON object is defined in the JSON schema [DSSMD-JSON] and is provided below as a service to the reader.

```
"info:PolicyType": {
    "type": "object",
    "properties": {
        "type": {
            "type": "string",
            "format": "uri"
        },
        "pbrf": {
            "$ref": "#/definitions/info-PolicyByRefType"
        },
        "pbdef": {
            "$ref": "#/definitions/dsb-AnyType"
        },
        "ep": {
            "type": "array",
            "items": {
                "type": "string"
            }
        },
        "ext": {
            "type": "array",
            "items": {
                "$ref": "#/definitions/info:ExtensionType"
            }
        }
    }
}
```

3.1.7.2 Policy – XML Syntax

The XML type PolicyType SHALL implement the requirements defined in the Policy component. The PolicyType XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```
<xs:complexType name="PolicyType">
  <xs:sequence>
    <xs:choice>
      <xs:element name="PolicyByRef" type="info:PolicyByRefType"/>
      <xs:element name="PolicyByDef" type="dsb:AnyType"/>
    </xs:choice>
    <xs:element name="EarlierPolicy" type="xs:anyURI" maxOccurs="unbounded" minOccurs="0"/>
  </xs:sequence>
  <xs:attribute name="Type" type="xs:anyURI" use="optional"/>
</xs:complexType>
```

Each child element of PolicyType XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.
3.1.8 Component PolicyByRef

The PolicyByRef component appears within the Policy component specified in clause 3.1.7 and provides a reference to a human readable policy document, which is applicable for a profile of the supported digital signature related protocol.

Below follows a list of the sub-components that constitute this component:

- The PolicyID element MUST contain one instance of a URI, which uniquely identifies the policy under consideration.
- The OPTIONAL PolicyLocation element, if present, MUST contain a URI, which SHOULD refer to the location where the policy document can be retrieved. If the PolicyID is already a retrievable URL, the PolicyLocation MAY be omitted.

3.1.8.1 PolicyByRef – JSON Syntax

The PolicyByRefType JSON object SHALL implement in JSON syntax the requirements defined in the PolicyByRef component.

Properties of the JSON object SHALL implement the sub-components of PolicyByRef using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PolicyID</td>
<td>polid</td>
</tr>
<tr>
<td>PolicyLocation</td>
<td>polloc</td>
</tr>
</tbody>
</table>

The PolicyByRefType JSON object is defined in the JSON schema [DSSMD-JSON] and is provided below as a service to the reader.

```
"info\-PolicyByRefType": { "type": "object", "properties": { "polid": { "type": "string" }, "polloc": { "type": "string" } }, "required": ["polid"] }
```

3.1.8.2 PolicyByRef – XML Syntax

The XML type PolicyByRefType SHALL implement the requirements defined in the PolicyByRef component.

The PolicyByRefType XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="PolicyByRefType">
  <xs:sequence>
    <xs:element name="PolicyID" type="xs:anyURI"/>
    <xs:element name="PolicyLocation" type="xs:anyURI" maxOccurs="1" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
```
Each child element of PolicyByRefType XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

### 3.1.9 Component Extension

The Extension component defined in the present document is used in several other components and provides a lightweight possibility for extending the semantics of other components.

Below follows a list of the sub-components that constitute this component:

- **Name** element MUST contain one instance of a string and specifies the name of the extension element.
- **Value** element MUST contain one instance of a string and specifies the value of the extension element.

**NOTE:** In contrast to the Any component defined in [DSS-v2.0], the Extension element defined here only consists of a simple Name and Value pair, which maintains the direct readability by humans, but is less powerful than the Any component, which also allows features transformations for example.

#### 3.1.9.1 Extension – JSON Syntax

The ExtensionType JSON object SHALL implement in JSON syntax the requirements defined in the Extension component.

Properties of the JSON object SHALL implement the sub-components of Extension using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>name</td>
</tr>
<tr>
<td>Value</td>
<td>value</td>
</tr>
</tbody>
</table>

The ExtensionType JSON object is defined in the JSON schema [DSSMD-JSOM] and is provided below as a service to the reader.

```
"info:md-ExtensionType": {
   "type": "object",
   "properties": {
      "name": {
         "type": "string"
      },
      "value": {
         "type": "string"
      }
   },
   "required": ["name", "value"]
}
```

#### 3.1.9.2 Extension – XML Syntax

The XML type ExtensionType SHALL implement the requirements defined in the Extension component.
The `ExtensionType` XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="ExtensionType">
  <xs:sequence>
    <xs:element name="Name" type="xs:string"/>
    <xs:element name="Value" type="xs:string"/>
  </xs:sequence>
</xs:complexType>
```

Each child element of `ExtensionType` XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

### 3.1.10 Component TypedLocator

The `TypedLocator` component defined in the present document is used for the definition of the `AuthInfo` component in clause 3.1.2 and MUST contain a URL, which points to a retrievable document and which MAY in addition contain a URI, which specifies the type of the provided document.

Below follows a list of the sub-components that constitute this component:

- The `value` element MUST contain one instance of a URI, which specifies the location of the document.
- The `Type` element MAY, if present, contain one instance of a URI, which specifies the type of the document.

#### 3.1.10.1 TypedLocator – JSON Syntax

The `TypedLocator` JSON object SHALL implement in JSON syntax the requirements defined in the `TypedLocator` component.

Properties of the JSON object SHALL implement the sub-components of `TypedLocator` using JSON-specific names mapped as shown in the table below.

<table>
<thead>
<tr>
<th>Element</th>
<th>Implementing JSON member name</th>
</tr>
</thead>
<tbody>
<tr>
<td>value</td>
<td>value</td>
</tr>
<tr>
<td>Type</td>
<td>type</td>
</tr>
</tbody>
</table>

The `TypedLocator` JSON object is defined in the JSON schema [DSSMD-JSON] and is provided below as a service to the reader.

```json
"info-TypedLocator": {"type": "object", "properties": { "value": { "type": "string" }, "type": { "type": "string" } }, "required": ["value"] }
```
3.1.10.2 TypedLocator—XML Syntax

The XML type `TypedLocatorType` SHALL implement the requirements defined in the `TypedLocator` component.

The `TypedLocatorType` XML element is defined in XML Schema [DSSMD-XML], and is copied below for information.

```xml
<xs:complexType name="TypedLocatorType">
  <xs:simpleContent>
    <xs:extension base="xs:anyURI">
      <xs:attribute name="Type" type="xs:anyURI" use="optional"/>
    </xs:extension>
  </xs:simpleContent>
</xs:complexType>
```

Each child element of `TypedLocatorType` XML element SHALL implement in XML syntax the sub-component that has a name equal to its local name.

3.2 Element / JSON name lookup tables

The subsequent table allows to find the names of a component's element for a given JSON member name.

<table>
<thead>
<tr>
<th>JSON member name</th>
<th>mapped from element name</th>
</tr>
</thead>
<tbody>
<tr>
<td>authinfo</td>
<td>AuthInfo</td>
</tr>
<tr>
<td>def</td>
<td>IsDefault</td>
</tr>
<tr>
<td>ep</td>
<td>EarlierPolicy</td>
</tr>
<tr>
<td>ext</td>
<td>Extension</td>
</tr>
<tr>
<td>fid</td>
<td>FormatID</td>
</tr>
<tr>
<td>form</td>
<td>Format</td>
</tr>
<tr>
<td>format</td>
<td>Parameter</td>
</tr>
<tr>
<td>ID</td>
<td>Id</td>
</tr>
<tr>
<td>in</td>
<td>Input</td>
</tr>
<tr>
<td>lang</td>
<td>SupportedLanguage</td>
</tr>
<tr>
<td>logo</td>
<td>Logo</td>
</tr>
<tr>
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The subsequent table allows to find the abbreviated JSON member names for a given element name.

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</table>
4 Metadata Discovery

Unless other discovery mechanisms are specified (by profiles or extensions of [DSS-v2.0] for example), it is RECOMMENDED that digital signature service providers make available a JSON or XML document using the appropriate content type (i.e. application/json or application/xml) with the digital signature service metadata at the path formed by concatenating the string /.well-known/dss-info to the “canonical suitable basic information URL” of the service provider, which is intended to provide relevant information about the provided services. (see also “TSP information URI” in clause 5.4.4 of [TS119612]).

The “TSP information URI” according to clause 5.4.4 of [TS119612] MAY be used as “canonical information URL” to provider the metadata for its digital signature related services.
Appendix A. Acknowledgments
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The following individuals have participated in the creation of this specification and are gratefully acknowledged:

Andreas Kuehne, Individual
Detlef Hühnlein, Individual
Ernst Jan van Nigtevecht, Sonnenglanz Consulting
Appendix B. List of Figures

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Figure 1: Overview of main components within the service-related metadata structures .................................... 10
# Appendix C. Revision History

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