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Information technology — Document Schema Definition Languages (DSDL) —

Part 8: Document Semantics Renaming Language (DSRL)

Technologies de l'information — Langages de définition de schéma de documents (DSDL) —

Partie 8: Langage pour renommer une sémantique de documents (DSRL)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

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The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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ISO/IEC 19757-8 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 34, *Document description and processing languages*.

ISO/IEC 19757 consists of the following parts, under the general title *Information technology — Document Schema Definition Languages (DSDL)*:

— *Part 1: Overview*

— *Part 2: Regular-grammar-based validation — RELAX NG*

— *Part 3: Rule-based validation — Schematron*

— *Part 4: Namespace-based Validation Dispatching Language (NVDL)*

— *Part 7: Character Repertoire Description Language (CRDL)*

— *Part 8: Document Semantics Renaming Language (DSRL)*

— *Part 9: Namespace and datatype declaration in Document Type Definitions (DTDs)*

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Introduction

ISO/IEC 19757 defines a set of Document Schema Definition Languages (DSDL) that can be used to specify one or more validation processes performed against Extensible Markup Language (XML) or Standard Generalized Markup Language (SGML) documents. (XML is an application profile of SGML, ISO 8879:1986.)

A document model is an expression of the constraints to be placed on the structure and content of documents to be validated with the model. A number of technologies have been developed through various formal and informal consortia since the development of Document Type Definitions (DTDs) as part of ISO 8879, notably by the World Wide Web Consortium (W3C) and the Organization for the Advancement of Structured Information Standards (OASIS). A number of validation technologies are standardized in DSDL to complement those already available as standards or from industry.

To validate that a structured document conforms to specified constraints in structure and content relieves the potentially many applications acting on the document from having to duplicate the task of confirming that such requirements have been met. Historically, such tasks and expressions have been developed and utilized in isolation, without consideration for how the features and functionality available in other technologies might enhance validation objectives.

The primary objective of ISO/IEC 19757 is to bring together different validation-related tasks and expressions to form a single extensible framework that allows technologies to work in series or in parallel to produce a single or a set of validation results. The extensibility of DSDL accommodates validation technologies not yet designed or specified.

In the past, different design and use criteria have led users to choose different validation technologies for different portions of their information. Bringing together information within a single XML document sometimes prevents existing document models from being used to validate sections of data. By providing an integrated suite of constraint description languages that can be applied to different subsets of a single XML document, ISO/IEC 19757 allows different validation technologies to be integrated under a well-defined validation policy.

ISO/IEC 19757 integrates constraint description technologies into a suite that

— provides user control of names, order and repeatability of information objects (elements),

— allows users to identify restrictions on the co-concurrence of elements and/or element contents,

— allows specific subsets of structured documents to be validated,

— allows restrictions to be placed on the contents of specific elements, including restrictions based on the content of other elements in the same document,

— allows the character set that can be used within specific elements to be managed, based on the application of the ISO/IEC 10646 Universal Multiple-Octet Coded Character Set (UCS),

— allows default values to be assigned to element content and attribute values,

— allows SGML to be used to declare document structure constraints that extend DTDs to include functions such as namespace-controlled validation and datatypes.

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Information technology — Document Schema Definition Languages (DSDL) —

Part 8:
Document Semantics Renaming Language (DSRL)

1 Scope

This part of ISO/IEC 19757 specifies a mechanism that allows users to assign locally meaningful names to XML elements, attributes, entities and processing instructions, without having to completely rewrite the DTD or schema against which they are to be validated. In addition, this part of ISO/IEC 19757 provides an XML-based format for declaring the replacement text for entity references and provides a mechanism that allows users to define default values for both element content and attribute values.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE Each of the following documents that is not an International Standard has a unique identifier that is used to cite the document in the text. The unique identifier consists of the part of the reference up to the first comma.

IRI, IETF RFC 3987, *Internationalized Resource Identifiers (IRIs)*, Internet Standards Track Specification, January 2005, http://www.ietf.org/rfc/rfc3987.txt

ISO/IEC 19757-2:2003, *Information technology — Document Schema Definition Language (DSDL) — Part 2: Regular-grammar-based validation — RELAX NG*

ISO/IEC 19757-2:2003/Amd.1:2006, *Information technology — Document Schema Definition Language (DSDL) — Part 2: Regular-grammar-based validation — RELAX NG — Amendment 1: Compact Syntax*

ISO/IEC 19757-3:2006, *Information technology — Document Schema Definition Languages (DSDL) — Part 3: Rule-based validation — Schematron*

ISO 8879:1986, *Information processing — Text and office systems — Standard Generalized Markup Language (SGML)*

XML, *Extensible Markup Language (XML) 1.0 (Fourth Edition)*, W3C Recommendation, 16 August 2006, http://www.w3.org/TR/2006/REC-xml-20060816

XML-Infoset, *XML Information Set (Second Edition)*, W3C Recommendation, 4 February 2004, http://www.w3.org/TR/2004/REC-xml-infoset-20040204

XML-Names, *Namespaces in XML 1.0 (Second Edition)*, W3C Recommendation, 16 August 2006, http://www.w3.org/TR/2006/REC-xml-names-20060816

XML Schema, *XML Schema Part 1: Structures Second Edition*, W3C Recommendation, 28 October 2004, http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/

XSD, *XML Schema Part 2: Datatypes Second Edition*, W3C Recommendation, 28 October 2004, http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/

XSLT 2.0, *XSL Transformations (XSLT) Version 2.0*, W3C Recommendation, 23 January 2007, http://www.w3.org/TR/2007/REC-xslt20-20070123/

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19757-2, ISO/IEC 19757-3 and the following apply.

3.1
DSRL map
set of rules that is used to map a document instance to a document model defined by one or more schemas

3.2
entity
ISO 8879:1986 general entity that can be referenced using an XML entity reference

3.3
entity node
node in a Document Object Model that identifies an entity and, where appropriate, contains details of its replacement text

3.4
IRI
Internationalized Resource Identifiers as defined in IETF RFC 3987

3.5
SGML
Standard Generalized Markup Language defined in ISO 8879:1986

4 The role of the Document Semantics Renaming Language

The Document Semantics Renaming Language (DSRL) provides a mechanism for declaring how an application can map locally meaningful element, attribute, entity and processing instruction names to the names assigned to equivalent XML elements, attributes, entities and processing instructions within a document model without having to completely rewrite the DTD or schema to which they are required to conform.

In addition, DSRL provides an XML-based format for declaring the replacement text for entity references and provides a mechanism that allows users to define default values for both element content and attribute values. To allow for schemas that do not support the use of attributes, DSRL also allows users to convert attribute values to element content.

4.1 Namespace

Elements and attributes that conform to this Part of DSDL shall have an XML namespace definition (as defined in XML-Names) whose associated resource identifier (IRI) is:

```
http://purl.oclc.org/dsdl/dsrl
```

In this Part the prefix `dsrl:` is used to identify points at which this IRI defines the namespace.

NOTE: In most applications of DSRL this namespace prefix will not be required as the IRI can be assigned as the default XML namespace.

Other namespaces required to group elements and attributes into processable units can be assigned as required for validation.

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5 DSRL maps

The outermost element of a DSRL map has the following structure:

```
<dsrl:maps xmlns:dsrl="http://purl.oclc.org/dsdl/dsrl">
  ...
</dsrl:maps>
```

Two optional attributes can be associated with this element:

— `targetNamespace` may be used to record the IRI assigned as the target namespace for the validating schema;

— `targetSchemaLocation` may be used to record the IRI assigned to the schema to be used to validate the mapped document instances.

The `targetNamespace` attribute is required when the schema identified by the `targetSchemaLocation` attribute has a target namespace.

NOTE: The `targetSchemaLocation` attribute can be used to provide a specific location for the schema to be used for the validation of the result document. If there is no requirement to validate both the optional attributes can be omitted. If a null value is present for `targetSchemaLocation` the DTD to be used to validate it is presumed to be part of the document. If a namespace is declared but no schema location is stated the namespace is mapped against an empty string.

The formal declaration for this element, defined using the RELAX NG Compact Syntax, is:

```
namespace xsd="http://www.w3.org/2001/XMLSchema-datatypes"
namespace dsrl="http://purl.oclc.org/dsdl/dsrl"

maps = element dsrl:maps
       {target-namespace?, schema-location?,
        (element-map | attribute-map | map-pi-target )+,
        entity-name-map?, define-entity*
       }

target-namespace = attribute targetNamespace {xsd:anyURI}
schema-location = attribute targetSchemaLocation {xsd:anyURI}
```

NOTE: Support for the optional `entity-name-map` component is a conformance issue (see Clause 8).

6 Mapping user-defined names to schema-defined names

6.1 Reassigning element and attribute names

The `dsrl:element-map` element is used to record replacements that apply to element names and to their associated attributes. The model for this element is:

```
element-map = element dsrl:element-map (parent?, (name | name-map),
                                        attribute-map*, default-content?)

parent = element dsrl:parent { text }
name = element dsrl:name { added-attribute*, xsd:QName }
added-attribute = attribute additional { xsd:boolean }
name-map = { (from, to) }
from = element dsrl:from { text }
to = element dsrl:to { text }
```

The contents of a `dsrl:element-map` element consists of a sequence of elements that define which name in a document instance is to be matched to which element in the validation schema, and which attributes of the element are to be mapped. Optionally default content can also be defined for the element.

The name of the element to be mapped is recorded in the content of the `dsrl:from` element. This content shall be a valid XML name, which can include a prefix that identifies the appropriate namespace. If the content is a prefixed

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name, it is recommended that the prefix used be declared in a namespace declaration that is declared as an attribute of the `dsrl:from` element.

NOTE: If the namespace is declared within the definition of the `dsrl:from` element you can be certain that the association of the name with the referenced IRI is correctly recorded. This makes it easier to reuse the definition safely, and can make processing easier.

If the named element needs to be replaced in different ways in different contexts the optional `dsrl:parent` element can be used to record XML Stylesheet Langauge Transformation (XSLT) patterns that distinguish between the different contexts in which replacement of the name is to be applied. No two `dsrl:element-map` elements shall have identical contents for both their `dsrl:parent` element and their `dsrl:from` element. If two or more maps with different contents match the same result path the last of matches shall be applied.

NOTE: This precedence rule allows the XSLT error recovery rule for matching paths using the last template defined to be applied when processing DSRL using XSLT.

The name to be applied to the mapped element when it is validated is recorded as the content of the `dsrl:to` element. This content shall be a valid XML name, which can include a prefix that identifies the appropriate namespace. If the content is a prefixed name, it is recommended that the prefix used be declared in a namespace declaration that is declared as an attribute of the `dsrl:to` element.

If the element name is to stay the same, but one or more attributes of the element is to have its name or values mapped, the `dsrl:name` element can be used in place of the `dsrl:from` and `dsrl:to` pair. The content of a `dsrl:name` element shall be a valid XML name, which can include a prefix that identifies the appropriate namespace.

Names can be qualified providing the relevant namespace prefixes have been declared within the map. They cannot contain spaces, or any other character that is not a valid name character as defined in the W3C XML specification.

The contents of the `dsrl:parent` element shall form a valid XSLT pattern that identifies a permitted parent for the element to be renamed.

NOTE: A typical example of a DSRL element name map for which no attribute mapping is required would be:

```
<dsrl:element-map>
  <dsrl:from>adresse</dsrl:from>
  <dsrl:to>address</dsrl:to>
</dsrl:element-map>
```

If namespaces are used for the source or result element they should be declared as part of the definition, giving the declaration the form:

```
<dsrl:element-map>
  <dsrl:from xmlns:old="http://www.example.org/namespaces/a">old:name</dsrl:from>
  <dsrl:to xmlns:new="http://www.example.org/namespaces/b">new:name</dsrl:to>
</dsrl:element-map>
```

The `dsrl:attribute-map` element is used within `dsrl:element-map` elements to record replacements that apply to attribute names and values. The model for this element is:

```
attribute-map = element dsrl:attribute-map {(name | attribute-name-map),
                                            values-map?, default-value?}
attribute-name-map = (from, (to|to-element))
to-element = element dsrl:to-element { text }
```

Each `dsrl:attribute-map` replaces a single attribute. The name of the attribute to be mapped is recorded as the content of the `dsrl:from` element. No two `dsrl:attribute-map` elements within a given `dsrl:element-map` shall have the same value for their `dsrl:from` element.

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If the attribute is to be directly mapped to an attribute in the result document, the name to be applied to the mapped attribute when it is validated is recorded as the contents of the immediately following `dsrl:to` element. If the `dsrl:to` element is empty the attribute named in the `dsrl:from` element is to be removed prior to validation.

If the attribute is to be mapped to an element in the result document that is to precede any existing contents of the element containing the mapped attribute, the name to be applied to the mapped element when it is validated is recorded as the contents of the immediately following `dsrl:to-element` element. It is an error if both a `dsrl:to` and `dsrl:to-element` occur in the same attribute map.

If the values of an attribute are to be mapped without the name of the attribute changing a `dsrl:name` element can be used in place of the `dsrl:from` and `dsrl:to` pair.

If an attribute that is not in the source document is required to be present for document instances to be validated against a target schema the `dsrl:name` element shall be assigned an `additional="true"` boolean attribute.

NOTE: If the `additional="true"` is present a default value shall be assigned to the attribute using the mechanisms specified in 6.3.

If the attribute map is defined as child of a `dsrl:maps` element, rather than a `dsrl:element-map` element, the attribute map will be applied to all elements that have an attribute of that name for which a specific mapping has not been declared.

Attribute names can be qualified providing the relevant namespace prefixes have been declared within the map. They cannot contain spaces, or any other character that is not a valid name character as defined in the W3C XML specification.

NOTE: A typical example of a DSRL attribute name map which could be nested with the `dsrl:element-map` example shown above is:

```
<dsrl:attribute-map>
  <dsrl:from>sorte</dsrl:from>
  <dsrl:to>type</dsrl:to>
</dsrl:attribute-map>
```

6.2 Mapping attribute values

A mapping can be declared between attribute values in a source document and attribute values in a target schema. The model for the `dsrl:values-map` element that is nested within the appropriate `dsrl:attribute-map` element is:

```
values-map = element dsrl:values-map {name-map+}
```

The value to be mapped is recorded as the content of a `dsrl:from` element. No two `dsrl:from` elements within the same `dsrl:values-map` element can have identical content. If two or more `dsrl:from` elements with different contents refer to the same result path the last of matches shall be applied.

NOTE: This allows the default XSLT rules for matching paths using the last template to be defined to be applied when processing DSRL using XSLT.

The value to be assigned to the mapped attribute when it is validated is recorded as the contents of the associated `dsrl:to` element.

NOTE: A typical example of a DSRL attribute values map is:

```
<dsrl:values-map>
  <dsrl:from>maison</dsrl:from><dsrl:to>home</dsrl:to>
  <dsrl:from>bureau</dsrl:from><dsrl:to>office</dsrl:to>
</dsrl:values-map>
```

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6.3 Default attribute values

A `dsrl:default-value` element can be used to define a default value for an attribute at the end of an attribute map. The model for this element is:

```
default-value = element dsrl:default-value {text}
```

The default value to be assigned is recorded as the contents of the `dsrl:default-value` element. Any value assigned to the named attribute within the document instance will be used during validation of the document, but if the attribute is not present the default value will be applied.

If an attribute has been declared to be an additional attribute by the addition of an `additional="true"` attribute to a `dsrl:name` element the attribute map shall contain a `dsrl:default-value` element.

NOTE: A typical example of a DSRL default attribute value definition, as introduced as the last element in an `dsrl:attribute-map` element, is:

```
<dsrl:name additional="true">code-source</dsrl:name>
<dsrl:default-value>iso3166</dsrl:default-value>
```

6.4 Mapping element content

A mapping can be declared between a text string in a source element whose only content is text and replacement values to be applied when validating the document against the target schema. The model for the `dsrl:values-map` element that is nested within the appropriate `dsrl:element-map` element is:

```
values-map = element dsrl:values-map {name-map+}
```

The element content to be mapped is recorded as the content of a `dsrl:from` element. No two `dsrl:from` elements within the same `dsrl:values-map` element shall have the same contents.

The value to be assigned as the replacement text when the element is validated is recorded as the contents of the associated `dsrl:to` element.

NOTE: A typical example of a DSRL element values map is:

```
<dsrl:values-map>
  <dsrl:from>BSI</dsrl:from><dsrl:to>ANSI</dsrl:to>
  <dsrl:from>ISO</dsrl:from><dsrl:to>ISO/IEC</dsrl:to>
</dsrl:values-map>
```

6.5 Default content

A `dsrl:default-content` element can used to define a default value for an element defined in a schema. The model for this element is:

```
default-content = element dsrl:default-content {after, any-content}
after = attribute after {text}
any-content = (mixed {any-element*})
any-element = element * {any-attribute, any-content}
any-attribute = (attribute * {text})*
```

The default content for the element is recorded as the content of the `dsrl:default-content` element. Any contents assigned to the element within the document instance will be used during validation of the document, but if the element is empty, or not present, the default content will be applied during validation.

The `after` attribute of the `dsrl:default-content` element records the name of the target element after which the content has to be inserted if not found in the source instance. The element the default content is to be placed after shall be declared within the same DSRL map, even if it is not altered in any way. To ensure that the `after`

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attribute can be applied in the appropriate context the containing `dsrl:element-map` element shall start with a `dsrl:parent` statement that contains the name of the element within which the element identified by the `after` attribute occurs.

NOTE: A typical example of a DSRL default content definition is:

```
<dsrl:default-content after="rue">Downtown</dsrl:default-content>
```

NOTE: A typical example of a DSRL element map with mapped attribute values and a default attribute value, might be:

```
<dsrl:element-map>
  <dsrl:parent>adresse</dsrl:parent>
  <dsrl:from>ville</dsrl:from>
  <dsrl:to>locality</dsrl:to>
  <dsrl:attribute-map>
      <dsrl:name>required</dsrl:name>
      <dsrl:default-value>true</dsrl:default-value>
   </dsrl:attribute-map>
   <dsrl:attribute-map>
        <dsrl:name>imported</dsrl:name>
        <dsrl:default-value>false</dsrl:default-value>
     </dsrl:attribute-map>
  <dsrl:default-content after="rue">Downtown</dsrl:default-content>
</dsrl:element-map>
```

6.6 Renaming processing instruction targets

Where the names and properties of processing instructions have not been defined in terms understandable to user-communities, users of ISO/IEC 19757-2 can create a mapping rule that associates alternative processing instruction names used in document instances with the name of the processing instruction target to be used during validation using a `dsrl:map-pi-target` element. The model for this element is:

```
map-pi-target = element dsrl:map-pi-target {name-map+}
```

The processing instruction name to be mapped is recorded as the content of a `dsrl:from` element. No two `dsrl:map-pi-target` elements shall have the same contents in their `dsrl:from` element.

The name to be assigned to the mapped processing instruction when it is validated is recorded as the contents of the associated `dsrl:to` element. A processing instruction name shall not be prefixed.

If two or more `dsrl:map-pi-target` elements occur within a DSRL map their contents shall be concatenated to form a single mapping of processing instruction targets.

NOTE: A possible example of a DSRL processing instruction name map is:

```
<dsrl:map-pi-target>
 <dsrl:from>MyPIname</dsrl:from><dsrl:to>PItarget</dsrl:to>
 <dsrl:from>AlternativePIname</dsrl:from><dsrl:to>PItarget</dsrl:to>
</dsrl:map-pi-target>
```

6.7 Mapping entity references

Neither ISO/IEC 19757-2, the RELAX NG regular-grammar-based validation language, nor W3C XML schemas provide a mechanism for defining XML entities that can be referenced within document instances. Only SGML DTDs can be used to specify general entities other than the five specified as default entities within the W3C XML specification (`&`, `<`, `>`, `'` and `"`).

NOTE: An alternative mechanism for defining general entities is provided within Clause 7 of this standard.

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Often the names assigned to entity references, including the default ones defined for XML, are difficult for users to understand or remember, especially when they are specified using a language which is not the native language of a particular user community. The facilities in this clause allow locally-significant names to be mapped to those used to define entities in a declared or predefined entity set.

NOTE Mapping of entity names can only take place using models, such as the W3C Document Object Model, which retain information about where entities were referenced and the text that replaced them. For other processing models, such as those based on the W3C XML Information Set, the renaming of entities may only be possible using a preprocess stage such as that described in Annex B, because entity references are lost prior to creation of the information set.

The optional `dsrl:entity-name-map` element can be used, by those processors which have access to entity reference nodes, to identify reusable mappings between names used in entity definitions and those used in entity references. The model for this element is:

```
entity-name-map = element dsrl:entity-name-map {name-map+}
```

The entity name to be mapped is recorded as the content of a `dsrl:from` element. No two `dsrl:from` elements within a `dsrl:entity-name-map` element shall have the same contents.

The name to be assigned to the mapped entity when it is validated is recorded as the contents of the immediately following `dsrl:to` element. An entity name shall not be prefixed.

NOTE A typical example of a DSRL entity name map is:

```
<dsrl:entity-name-map>
 <dsrl:from>and</dsrl:from><dsrl:to>amp</dsrl:to>
 <dsrl:from>open-tag</dsrl:from><dsrl:to>lt</dsrl:to>
 <dsrl:from>close-tag</dsrl:from><dsrl:to>gt</dsrl:to>
 <dsrl:from>e</dsrl:from><dsrl:to>eacute</dsrl:to>
</dsrl:entity-name-map>
```

7 Declaring entities

An XML entity declaration consists of an entity name and replacement text that is to be used in the document at points indicated by a reference to the entity name.

NOTE The redefinition of entities can only take place using models, such as the W3C Document Object Model, which allow entity references and their replacement text to be recorded as processing nodes. For other processing models, such as those based on the W3C XML Information Set, references to entities declared in a DSRL map can be processed by converting them to an XML document type definition (`doctypedecl`) to be assigned to the document instance to be processed.

The optional `dsrl:define-entity` element provides a simple XML-based mechanism for defining replacement text that can be referenced using entity references. It is required wherever the result document includes entity references that need to be resolved using entity declarations that are part of the prolog of the document instance. The model for this element is:

```
define-entity = element dsrl:define-entity {from, replacement-text}
define replacement-text = element dsrl:replacement-text  {any-content}
```

The name of the entity to be defined is recorded as the content of a `dsrl:from` element. An entity name shall not be prefixed. No two `dsrl:from` elements within `dsrl:define-entity` elements within a DSRL map shall have the same contents.

The replacement text for any references made to the named entity is recorded as the contents of the immediately following `dsrl:replacement-text` element. If the replacement text contains markup it shall be defined as a CDATA marked section. The replacement text shall be well-formed XML. The replacement text shall not include entity references to entities other than the five pre-defined attributes recognized by XML, but can contain character references.

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NOTE: A typical example of a DSRL entity definition is:

```
<dsrl:define-entity>
  <dsrl:from>e</dsrl:from><dsrl:replacement-text>&#233;</dsrl:replacement-text>
  <dsrl:from>ISO</dsrl:from>
  <dsrl:replacement-text>
    International Organization for Standardization
  </dsrl:replacement-text>
</dsrl:define-entity>
<dsrl:define-entity>
  <dsrl:from>XML</dsrl:from>
  <dsrl:replacement-text>
    <![CDATA[the W3C Extensible Markup Language (<acronym>XML</acronym>)]]>
  </dsrl:replacement-text>
</dsrl:define-entity>
```

8 Conformance

Applications shall choose to conform to one of the two conformance levels provided by ISO/IEC 19757-8:

1. Entity-mapping conformance

2. Entity-definition conformance

Applications that support entity-mapping conformance shall support all features of ISO/IEC 19757-8. In particular, they shall be able to identify the points at which entity references occurred in the source document and be able to apply the mapping rules defined in an `dsrl:entity-name-map` to create a result document that contains renamed entity references rather than the replacement text for the entity referenced in the source document.

Applications that do not support entity-mapping conformance shall support entity-definition conformance. This means that as well as being able to support all the compulsory components of a `dsrl:maps` element they shall also support the optional `dsrl:define-entity` methodology for defining entity declarations to be used in the result document of a DSRL map.

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Annex A
(normative)

Validation of declarative document architectures

The normative schemas defined in this annex provide formal definitions for the elements and attributes used to define DSRL maps.

A.1 RELAX NG XML Schema for Validating DSRL

The following ISO/IEC 19757-2, RELAX NG, schema can be used to validate DSRL maps:

```
<?xml version="1.0" encoding="UTF-8"?>
<grammar xmlns:dsrl="http://purl.oclc.org/dsdl/dsrl"
  xmlns="http://relaxng.org/ns/structure/1.0"
  datatypeLibrary="http://www.w3.org/2001/XMLSchema-datatypes">
  <start>
    <ref name="maps"/>
  </start>
  <define name="maps">
    <element name="dsrl:maps">
      <optional>
        <ref name="target-namespace"/>
      </optional>
      <optional>
        <ref name="schema-location"/>
      </optional>
      <oneOrMore>
        <choice>
          <ref name="element-map"/>
          <ref name="attribute-map"/>
          <ref name="map-pi-target"/>
        </choice>
      </oneOrMore>
      <optional>
        <ref name="entity-name-map"/>
      </optional>
      <zeroOrMore>
        <ref name="define-entity"/>
      </zeroOrMore>
    </element>
  </define>
  <define name="target-namespace">
    <attribute name="targetNamespace">
      <data type="anyURI"/>
    </attribute>
  </define>
  <define name="schema-location">
    <attribute name="targetSchemaLocation">
      <data type="anyURI"/>
    </attribute>
  </define>
  <define name="element-map">
    <element name="dsrl:element-map">
      <optional>
        <ref name="parent"/>
```


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```
    </optional>
    <choice>
      <ref name="name"/>
      <ref name="name-map"/>
    </choice>
    <zeroOrMore>
      <ref name="attribute-map"/>
    </zeroOrMore>
    <optional>
      <ref name="values-map"/>
    </optional>
    <optional>
      <ref name="default-content"/>
    </optional>
  </element>
</define>
<define name="parent">
  <element name="dsrl:parent">
    <text/>
  </element>
</define>
<define name="name">
  <element name="dsrl:name">
  <zeroOrMore>
    <attribute name="additional">
     <data type="boolean"/>
    </attribute>
  </zeroOrMore>
    <text/>
  </element>
</define>
<define name="name-map">
  <ref name="from"/>
  <ref name="to"/>
</define>
<define name="attribute-name-map">
  <ref name="from"/>
  <choice>
    <ref name="to"/>
    <ref name="to-element"/>
  </choice>
</define>
<define name="from">
  <element name="dsrl:from">
    <text/>
  </element>
</define>
<define name="to">
  <element name="dsrl:to">
    <text/>
  </element>
</define>
<define name="to-element">
  <element name="dsrl:to-element">
    <text/>
  </element>
</define>
<define name="attribute-map">
  <element name="dsrl:attribute-map">
    <choice>
```

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```
      <ref name="name"/>
      <ref name="attribute-name-map"/>
    </choice>
    <optional>
      <ref name="values-map"/>
    </optional>
    <optional>
      <ref name="default-value"/>
    </optional>
  </element>
</define>
<define name="values-map">
  <element name="dsrl:values-map">
    <oneOrMore>
      <ref name="name-map"/>
    </oneOrMore>
  </element>
</define>
<define name="default-value">
  <element name="dsrl:default-value">
    <optional>
      <ref name="force-default"/>
    </optional>
    <text/>
  </element>
</define>
<define name="force-default">
  <attribute name="force-default">
    <data type="boolean"/>
  </attribute>
</define>
<define name="map-pi-target">
  <element name="dsrl:map-pi-target">
    <oneOrMore>
      <ref name="name-map"/>
    </oneOrMore>
  </element>
</define>
<define name="entity-name-map">
  <element name="dsrl:entity-name-map">
    <oneOrMore>
      <ref name="name-map"/>
    </oneOrMore>
  </element>
</define>
<define name="define-entity">
  <element name="dsrl:define-entity">
    <ref name="from"/>
    <ref name="replacement-text"/>
  </element>
</define>
<define name="replacement-text">
  <element name="dsrl:replacement-text">
    <ref name="any-content"/>
  </element>
</define>
<define name="any-content">
  <mixed>
    <zeroOrMore>
      <ref name="any-element"/>
```


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```
      </zeroOrMore>
    </mixed>
  </define>
  <define name="any-element">
    <element>
      <anyName/>
      <ref name="any-attribute"/>
      <ref name="any-content"/>
    </element>
  </define>
  <define name="any-attribute">
    <zeroOrMore>
      <attribute>
        <anyName/>
      </attribute>
    </zeroOrMore>
  </define>
  <define name="default-content">
    <element name="dsrl:default-content">
      <optional>
        <ref name="force-default"/>
      </optional>
      <ref name="after"/>
      <ref name="any-content"/>
    </element>
  </define>
  <define name="after">
    <attribute name="after"/>
  </define>
</grammar>
```

Figure A.1 illustrates the contents of this schema.

--`,,```,,,,````-`-`,,`,,`,`,,`---
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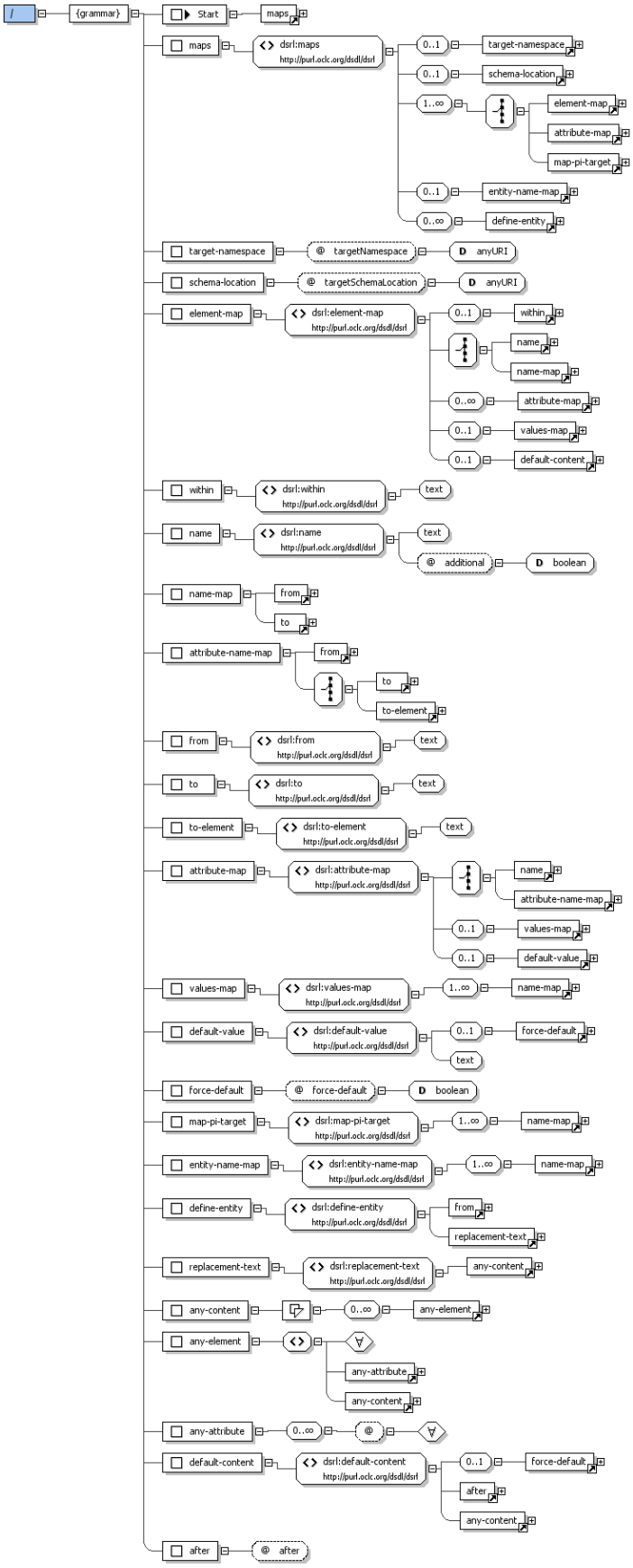

Figure A.1 — Diagrammatic representation of schema for DSRL

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A.2 RELAX NG Compact Schema for Validating DSRL maps

When names maps are stored externally the following RELAX NG compact syntax schema can be used to validate the map:

```
namespace rng = "http://relaxng.org/ns/structure/1.0"
datatypes xsd  = "http://www.w3.org/2001/XMLSchema-datatypes"
namespace dsrl = "http://purl.oclc.org/dsdl/dsrl"

start = maps
maps =  element dsrl:maps
               {target-namespace?, schema-location?,
                (element-map | attribute-map | map-pi-target )+,
                entity-name-map?, define-entity*
               }

target-namespace = attribute targetNamespace {xsd:anyURI}
schema-location = attribute targetSchemaLocation {xsd:anyURI}

element-map = element dsrl:element-map {(parent?, (name | name-map),
                                         attribute-map*, values-map?, default-content?)}

parent = element dsrl:parent { text }
name = element dsrl:name { added-attribute*, xsd:QName }
added-attribute = attribute additional {xsd:boolean}
name-map = (from, to)
attribute-name-map = (from, (to|to-element))
from = element dsrl:from { text }
to = element dsrl:to { text }
to-element = element dsrl:to-element { text }

attribute-map = element dsrl:attribute-map {(name | attribute-name-map),
                                            values-map?, default-value?}
values-map = element dsrl:values-map {name-map+}
default-value= element dsrl:default-value {force-default?, text }
force-default = attribute force-default {xsd:boolean}

map-pi-target = element dsrl:map-pi-target {name-map+}

entity-name-map = element dsrl:entity-name-map {name-map+}

define-entity = element dsrl:define-entity {from, replacement-text}

replacement-text = element dsrl:replacement-text  {any-content}

any-content = (mixed {any-element*})
any-element = element * {any-attribute, any-content}
any-attribute = (attribute * {text})*

default-content = element dsrl:default-content {force-default?, after, any-content}
after = attribute after {text}
```

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A.3 Schematron Rules for Validating DSRL

The following ISO/IEC 19757-3 rules can be used to validate that `dsrl:default-content` elements have been defined validly:

```
<sch:schema xmlns:sch="http://purl.oclc.org/dsdl/schematron"
xml:lang="en">
<sch:title>Schema for Additional Constraints for ISO/IEC 19757-8: DSRL</sch:title>
<sch:ns prefix="dsrl" uri="http://purl.oclc.org/dsdl/dsrl" />
<sch:p>This schema supplies some constraints in addition to those given
  in the ISO/IEC 19757-8 (Document Semantics Renaming Language) schema.
</sch:p>
<sch:pattern>
<sch:rule context="dsrl:element-map/dsrl:default-content/@after">
<sch:assert  test=".=../../dsrl:from or .=../../dsrl:name">
  The contents of the after element shall match the name of an
  element included in the same map.
</sch:assert>
</sch:rule>
<sch:rule context="dsrl:element-map/dsrl:default-content">
<sch:assert test="../dsrl:parent">
  Whenever default content is assigned to an element a dsrl:parent
  declaration shall occur at the same level in the element map.
</sch:assert>
</sch:rule>
</sch:pattern>
</sch:schema>
```


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Annex B
(informative)

Using DSRL to Transform Document Instances

The examples in this standard have been taken from the following DSRL map, which has been designed to test the full range of options provided by DSRL:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml-stylesheet type="text/xsl" href="TransformDSRLmaps.xsl"?>
<dsrl:maps xmlns:dsrl="http://purl.oclc.org/dsdl/dsrl" xmlns=""
  targetNamespace="http://csw.co.uk/addresses"
  targetSchemaLocation="EuropeanAddress.xsd">

  <!--Mapping of element and attribute names and attribute values-->
  <dsrl:element-map>
    <dsrl:from>doc</dsrl:from>
    <dsrl:to>document</dsrl:to>
  </dsrl:element-map>

  <dsrl:element-map>
    <dsrl:from>adresse</dsrl:from>
    <dsrl:to>address</dsrl:to>
    <dsrl:attribute-map>
      <dsrl:from>sorte</dsrl:from>
      <dsrl:to>type</dsrl:to>
      <dsrl:values-map>
        <dsrl:from>maison</dsrl:from>
        <dsrl:to>home</dsrl:to>
        <dsrl:from>bureau</dsrl:from>
        <dsrl:to>office</dsrl:to>
      </dsrl:values-map>
    </dsrl:attribute-map>
  </dsrl:element-map>

  <dsrl:element-map>
    <dsrl:from xmlns:a="http://mycompany.com/namespaces/a">a:numero</dsrl:from>
    <dsrl:to xmlns:b="http://mycompany.com/namespaces/b">b:building-identifier</dsrl:to>
  </dsrl:element-map>
  <dsrl:element-map>
    <dsrl:from>rue</dsrl:from>
    <dsrl:to>road</dsrl:to>
    <dsrl:attribute-map>
      <dsrl:from>location</dsrl:from>
      <dsrl:to></dsrl:to>
    </dsrl:attribute-map>
  </dsrl:element-map>

  <dsrl:element-map>
    <dsrl:parent>adresse</dsrl:parent>
    <dsrl:from>ville</dsrl:from>
    <dsrl:to>locality</dsrl:to>
    <dsrl:attribute-map>
      <dsrl:from>requis</dsrl:from>
      <dsrl:to>required</dsrl:to>
      <dsrl:values-map>
```

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```
        <dsrl:from>vrai</dsrl:from>
        <dsrl:to>true</dsrl:to>
        <dsrl:from>faux</dsrl:from>
        <dsrl:to>false</dsrl:to>
      </dsrl:values-map>
      <dsrl:default-value>false</dsrl:default-value>
    </dsrl:attribute-map>
    <dsrl:attribute-map>
      <dsrl:name>imported</dsrl:name>
      <dsrl:default-value>no</dsrl:default-value>
    </dsrl:attribute-map>
    <dsrl:default-content after="road">Downtown</dsrl:default-content>
  </dsrl:element-map>

  <dsrl:element-map>
    <dsrl:parent>adresse</dsrl:parent>
    <dsrl:from>cité</dsrl:from>
    <dsrl:to>postal-town</dsrl:to>
    <dsrl:default-content after="locality">Bordeaux</dsrl:default-content>
  </dsrl:element-map>

  <dsrl:element-map>
    <dsrl:from>département</dsrl:from>
    <dsrl:to>county</dsrl:to>
  </dsrl:element-map>

  <dsrl:element-map>
    <dsrl:from>code-postal</dsrl:from>
    <dsrl:to>postcode</dsrl:to>
  </dsrl:element-map>

  <dsrl:element-map>
    <dsrl:from>pays</dsrl:from>
    <dsrl:to>country</dsrl:to>
    <dsrl:attribute-map>
      <dsrl:name>code-system</dsrl:name>
      <dsrl:default-value>iso3166</dsrl:default-value>
    </dsrl:attribute-map>
    <dsrl:attribute-map>
      <dsrl:name>ISO-code</dsrl:name>
      <dsrl:default-value>FR</dsrl:default-value>
    </dsrl:attribute-map>
  </dsrl:element-map>

 <dsrl:attribute-map>
   <dsrl:from>numero</dsrl:from>
   <dsrl:to-element>district-code</dsrl:to-element>
 </dsrl:attribute-map>

  <dsrl:map-pi-target>
    <dsrl:from>PInameAsInput</dsrl:from>
    <dsrl:to>PIname</dsrl:to>
    <dsrl:from>AlternativePIname</dsrl:from>
    <dsrl:to>PIname</dsrl:to>
    <dsrl:from>MyPI</dsrl:from>
    <dsrl:to>ProcessThis</dsrl:to>
  </dsrl:map-pi-target>

  <dsrl:entity-name-map>
    <dsrl:from>et</dsrl:from>
```


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```
    <dsrl:to>amp</dsrl:to>
    <dsrl:from>and</dsrl:from>
    <dsrl:to>amp</dsrl:to>
    <dsrl:from>open-tag</dsrl:from>
    <dsrl:to>lt</dsrl:to>
    <dsrl:from>close-tag</dsrl:from>
    <dsrl:to>gt</dsrl:to>
  </dsrl:entity-name-map>

  <dsrl:define-entity>
    <dsrl:from>oc</dsrl:from>
    <dsrl:replacement-text>&#244;</dsrl:replacement-text>
  </dsrl:define-entity>
  <dsrl:define-entity>
    <dsrl:from>xml</dsrl:from>
    <dsrl:replacement-text><![CDATA[Extensible Markup Language
    (<acronym>XML</acronym>) ]]></dsrl:replacement-text>
  </dsrl:define-entity>
</dsrl:maps>
```

NOTE: This map contains some conversions, such as those for processing instructions, whose only real purpose is to illustrate the application of each of the features of DSRL. In practice maps will not normally include all of the DSRL constructs, as this example does.

DSRL rules that are defined in this mapping file can be converted into a set of XSLT transformation rules that can be used to convert a document instance into a form that can be validated against the relevant validation schema by use of an XSLT 2.0 transform that provides a W3C Document Object Model interface. A tutorial explaining this process, together with the XSLT code required, is available online at http://www.dsdl.org.

The processing model used within the example application can be summarized as:

1. Parse the DSRL map to see if it contains any of the optional `dsrl:entity-name-map` or `dsrl:define-entity` element. If it does:

   — generate an XML Document Type Definition containing the revised definitions of the entities to be mapped

   — add a reference to the revised definition of the entities to the document instance to be processed.

2. Generate an XSLT transformation that changes the names and, where appropriate, namespace prefixes, assigned to elements, attributes, entities or processing instructions. This transformation shall include templates that:

   — map any attribute or element content that is declared in a value map

   — assign default content to any missing attributes or elements

   — convert attribute values to element content where this has been requested

   — serialize the amended information set as an XML document.

3. Parse the transformed document against the target schema/DTD.

NOTE: XML does not mandate that a non-validating XML processor read and process entity declarations made in the external subset or declared in external parameter entities. This means that parsed entities declared in the external subset need not be expanded by some classes of applications, and that the replacement value of the entity may not be available. When the replacement value is available, the corresponding entity node's child list within the Document Object Model stream represents the structure of that replacement text. Otherwise, the child list is empty.

This processing model in no way constrains how a particular application shall implement DSRL.

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Bibliography

[1] *Document Object Model (DOM) Level 3 Core Specification*, W3C Recommendation, 7 April 2004, http://www.w3.org/TR/2004/REC-DOM-Level-3-Core-20040407

[2] *XML Path Language (XPath) Version 1.0*, W3C Recommendation, 16 November 1999, http://www.w3.org/TR/1999/REC-xpath-19991116

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