



# Technology Enhanced Learning: Conformance - European Requirements & Testing

<b>Title:</b>	D04 – Phase 1 Community Application Profile - Uni Ko-Ld
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<b>Status:</b>	Final
<b>Distribution:</b>	Public
<b>Summary:</b>	This document describes a candidate profile of the IMS Content Packaging specification which could be used by the German HE community. It harnesses an approach already implemented in the Trial Solution project, documented here as the original DTD and the equivalent XSD.

**REVISION HISTORY**

<b>Version Number</b>	<b>Release Date</b>	<b>Comments</b>
Draft 1	22 March 2004	The first draft of the document. Basic structure are the content currently available.
Draft 1.1	02 April 2004	Changed the heading structure to make this a standalone document. Added references and included URI for base schema.
Draft 1.2	15 April 2004	Information Model with base schema and modifications (in tabular and XML format).
Final Draft	25 May 2004	No further changes due to no comments on last draft.
Final Draft 1.1	30 June 2004	Possible usage of profile added, list of acronyms completed,
Final Draft 1.2	30 July 2004	Included original Trial-Solution DTD and IMS CP XSD files in appendix (before: external files).
Final 1.3	30 July 2004	Formatted for public release.
Final 1.4	30 July 2004	Added Uni Kb-Ld copyright notice

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# 1 INTRODUCTION

## 1.1 Scope & Context

The IST project Trial-Solution (<http://www.trial-solution.de>) developed a technology to add personalization services to existing documents. It developed tools to establish a workflow for slicing existing documents into semantic units, adding metadata and generating on the fly personalized versions.

The profile described here was designed to support offline data exchange between the tools developed for the Trial-Solution reengineering workflow.

Some elements have also been used in online communication processes within the Trial-Solution Reengineering and Delivery Tool.

The *slicing book technology* has been applied within the Project Trial-Solution to 19 books on undergraduate mathematics with altogether 5,000 pages. The books are sliced into approximately 25000 semantic units augmented with metadata information. The personalization service is offered as extra service for the printed books or bought together with the printed book. The sole electronic version of the books, including the personalization service is available too. Most material is copyright protected.

At the University of Koblenz a sliced book is used for the lecture on logics, providing online access to the course students including interactive access to services through the online version of the material.

Outside the Trial-Solution project the company *Slicing Information Technology GmbH* ([www.slicing-infotech.de](http://www.slicing-infotech.de)) has produced content in the appropriate format for a book on plastic technology and for the programs of two large Dutch conferences (Kenniscongress). The company is marketing the technology as a service to publishers, authors and universities, offering the personalized books as add-on to the printed book or as sole electronic books. All books are under copyright protection but parts of some works can be made available for demonstration purposes. The company also offers to export personalized selections of material from sliced books as IMS content packages according to the profile described here.

During the Trial-Solution project the format was described using a DTD, not an XML schema. The schema provided in this document models this DTD. In addition, the encoding of sliced books as IMS content packages contains metadata and references to key phrases. These are encoded in XML according to a specific metadata and thesaurus DTDs developed within the project Trial-Solution. These DTDs have not yet been translated into schemas.

## 1.2 List of Acronyms

**TS** – Trial-Solution (see below).

**TRIAL SOLUTION** (Tools for Reusable, Integrated, Adaptable Learning - Systems/standards for Open Learning Using Tested, Interoperable Objects and Networking)

A project funded by the EU as part of its Information Society Technologies Programme (IST),

which is a major theme of research and technological development within the EU's Fifth RTD Framework Programme.

**IST** – Information Society Technologies European Union research programme (<http://www.cordis.lu/ist/>).

**EU** – European Union (<http://europa.eu.int/>).

**RTD** – Research and Technology Development by the European Union.

**IMS** – IMS Global Learning Consortium (<http://www.imsglobal.org>).

**XML** – Extensible Markup Language (<http://www.w3.org/XML/>).

**SIT** – Slicing Information Technology (<http://www.slicing-infotech.de/>).

**CWI** – Centrum voor Wiskunde en Informatica (<http://www.cwi.nl>).

**DTD** – XML Document Type Declaration (<http://www.w3.org/TR/REC-xml/#dt-doctype>).

## 2 TERMS OF REFERENCE

This application profile is based on IMS Content Packaging specification v1.1.3 public draft (<http://www.imsglobal.org/content/packaging/#version1.1.3>), available at [http://www.imsglobal.org/xsd/imscp\\_v1p1.xsd](http://www.imsglobal.org/xsd/imscp_v1p1.xsd).

## 3 INFORMATION MODEL

### 3.1 Base Schema

The base schema used is the IMS Content Packaging XML schema available at [http://www.imsglobal.org/xsd/imscp\\_v1p1.xsd](http://www.imsglobal.org/xsd/imscp_v1p1.xsd).

For further information on the base schema please refer to the IMS web pages for the Content Packaging Specification at <http://www.imsglobal.org/content/packaging/index.cfm>, especially the Information Model Specification at [http://www.imsglobal.org/content/packaging/cpv1p1p3/imscp\\_infov1p1p3.html](http://www.imsglobal.org/content/packaging/cpv1p1p3/imscp_infov1p1p3.html).

### 3.2 Modifications

The following modifications to the base schema have been made:

- The usage of **submanifests** has been excluded to fix the use of the default organization as the only central structuring method.
- The **file** element has been made mandatory to detect a potential source of errors in the reengineering process.
- The **grp.any** element has been excluded for simplicity.

### 3.3 Modifications in tabular form

The following modification are entered using the MS Word macros provided earlier as intermediate solution until the Koblenz application profiling tool *SchemaProf* is available for all partners.

base schema	<a href="http://www.imsglobal.org/xsd/imscp_v1p1.xsd">http://www.imsglobal.org/xsd/imscp_v1p1.xsd</a>				
modifications	modification	element	manifestType		
		annotation	Nested manifests are de facto not supported by the TS tools		
		cardinality	annotation	No nested manifests	

			subelement	<b>manifest</b>	
			maxOccurs	0	
		cardinality	annotation	No other elements allowed	
			subelement	<b>grp.any</b>	
			maxOccurs	0	
	modification	element	<b>organizationsType</b>		
		cardinality	annotation	No other elements allowed	
			subelement	<b>grp.any</b>	
			maxOccurs	0	
	modification	element	<b>organizationType</b>		
		cardinality	annotation	No other elements allowed	
			subelement	<b>grp.any</b>	
			maxOccurs	0	
	modification	element	<b>itemType</b>		
		cardinality	annotation	No other elements allowed	
			subelement	<b>grp.any</b>	
			maxOccurs	0	
	modification	element	<b>resourcesType</b>		
		cardinality	annotation	No other elements allowed	
			subelement	<b>grp.any</b>	

			maxOccurs	0		
modification	element	<b>resourceType</b>				
		cardinality	annotation	At least one file		
			subelement	<b>file</b>		
			minOccurs	1		
	cardinality	annotation	No other elements allowed			
		subelement	<b>grp.any</b>			
		maxOccurs	0			
	modification	element	<b>dependencyType</b>			
		cardinality	annotation	No other elements allowed		
			subelement	<b>grp.any</b>		
maxOccurs			0			
modification	element	<b>fileType</b>				
	cardinality	annotation	No other elements allowed			
		subelement	<b>grp.any</b>			
		maxOccurs	0			

## 4 BINDING

The Trial-Solution project used a DTD which can be downloaded from the project web site (<http://www.trial-solution.de>).

### 4.1 Modification in XML

The following shows the same modification like section 3.3, but in machine-readable XML format. The XML data is generated by the prototype (build from 15 April 2004) of the Koblenz *SchemaProf* tool. The first official release of *SchemaProf* tool was available at the Pisa meeting (28-30 April 2004).

```
<schema_mod baseSchema="imscp_v1p1.xsd" xmlns="http://iwm.uni-
koblenz.de/xsd/ims_apv1p1"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://iwm.uni-koblenz.de/xsd/ims_apv1p1
ims_apv1p1.xsd">
<modifications>
<modification
  element="/xsd:schema/xsd:complexType[@name='dependencyType']">
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
<modification element="/xsd:schema/xsd:complexType[@name='fileType']">
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
<modification element="/xsd:schema/xsd:complexType[@name='itemType']">
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
<modification
  element="/xsd:schema/xsd:complexType[@name='manifestType']">
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:element[4]">
  <annotation>No nested manifests.</annotation>
</cardinality>
```

```

<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
<modification
  element="/xsd:schema/xsd:complexType[@name='organizationsType']">
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
<modification
  element="/xsd:schema/xsd:complexType[@name='organizationType']">
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
<modification
  element="/xsd:schema/xsd:complexType[@name='resourcesType']">
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
<modification
  element="/xsd:schema/xsd:complexType[@name='resourceType']">
<cardinality maxOccurs="unbounded" minOccurs="1"
  subelement="/xsd:sequence[1]/xsd:element[2]">
  <annotation>At least one file.</annotation>
</cardinality>
<cardinality maxOccurs="0" minOccurs="0"
  subelement="/xsd:sequence[1]/xsd:group[1]">
  <annotation>No other elements allowed.</annotation>
</cardinality>
</modification>
</modifications>
<definitions />
< mappings />
</schema_mod>

```

## **5 POLICY AND PROCESSES**

The profile can be used if proper reference to the Trial-Solution project is given. The profile is used in connection with project specific DTDs describing Metadata and Thesauri.

For more information contact Ingo Dahn ([dahn@uni-koblenz.de](mailto:dahn@uni-koblenz.de)).

## **6 CONFORMANCE TESTING**

No conformance testing procedures have been established.

## 7 TOOLS

The profile is used by the following tools developed within the Trial-Solution project.

- SIT Splitter (slicing documents and producing the initial content package with metadata)
- CWI Key Phrase Assignment Tool
- Trial-Solution Reengineering Tool (for manually revising metadata and content package structure)
- Trial-Solution Delivery Tool (providing personalization services)

Additionally the profile is used in the SIT Reader software (<http://www.slicing-infotech.de>) to import content and to export content as a personalized content package.

## 8 REFERENCES

- Trial-Solution project web site, <http://www.trial-solution.de>.
- IMS Global Learning Consortium: “IMS Content Packaging Specification”.  
<http://www.imsglobal.org/content/packaging/index.cfm>

## 9 APPENDIX A: IMS CONTENT PACKAGING SCHEMA

```

<?xml version="1.0" encoding="UTF-8" ?>
- <!-- Generated by Turbo XML 2.3.1.100. Conforms to w3c http://www.w3.org/2001/XMLSchema -->
- <xsd:schema xmlns="http://www.imsglobal.org/xsd/ims_cp_v1p1"
  targetNamespace="http://www.imsglobal.org/xsd/ims_cp_v1p1"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema" version="IMS CP 1.1.3" elementFormDefault="unqualified">
  <xsd:import namespace="http://www.w3.org/XML/1998/namespace"
    schemaLocation="http://www.w3.org/2001/03/xml.xsd" />
- <xsd:annotation>
  <xsd:documentation xml:lang="en">DRAFT XSD for IMS Content Packaging version 1.1 DRAFT</xsd:documentation>
  <xsd:documentation>Copyright (c) 2001 IMS GLC, Inc.</xsd:documentation>
  <xsd:documentation>2000-04-21, Adjustments by T.D. Wason from CP 1.0.</xsd:documentation>
  <xsd:documentation>2001-02-22, T.D.Wason: Modify for 2000-10-24 XML-Schema version.</xsd:documentation>
  <xsd:documentation>Modified to support extension.</xsd:documentation>
  <xsd:documentation>2001-03-12, T.D.Wason: Change filename, target and meta-data namespaces</xsd:documentation>
  <xsd:documentation>and meta-data filename.</xsd:documentation>
  <xsd:documentation>Add meta-data to itemType, fileType and organizationType.</xsd:documentation>
  <xsd:documentation>Do not define namespaces for xml in XML instances generated from this xsd.</xsd:documentation>
  <xsd:documentation>Imports IMS meta-data xsd, lower case element names.</xsd:documentation>
  <xsd:documentation>This XSD provides a reference to the IMS meta-data root element as
    imsmd:record</xsd:documentation>
  <xsd:documentation>If the IMS meta-data is to be used in the XML instance then the instance</xsd:documentation>
  <xsd:documentation>must define an IMS meta-data prefix with a namespace.</xsd:documentation>
  <xsd:documentation>The meta-data targetNamespace should be used.</xsd:documentation>
  <xsd:documentation>2001-03-20, Thor Anderson: Remove manifestref, change resourceref back to</xsd:documentation>
  <xsd:documentation>identifierref, change manifest back to contained by manifest.</xsd:documentation>
  <xsd:documentation>--Tom Wason: manifest may contain _none_ or more manifests.</xsd:documentation>
  <xsd:documentation>2001-04-13 Tom Wason: corrected attribute name structure. Was misnamed
    type.</xsd:documentation>
  <xsd:documentation>2001-05-14 Schawn Thropp: Made all complexType extensible with the
    group.any</xsd:documentation>
  <xsd:documentation>Added the anyAttribute to all complexTypes.</xsd:documentation>
  <xsd:documentation>Changed the href attribute on the fileType and resourceType to xsd:string</xsd:documentation>
  <xsd:documentation>Changed the maxLength of the href, identifierref, parameters, structure</xsd:documentation>
  <xsd:documentation>attributes to match the Information model.</xsd:documentation>
  <xsd:documentation>2001-07-25 Schawn Thropp: Changed the namespace for the Schema of Schemas
    to</xsd:documentation>
  <xsd:documentation>the 5/2/2001 W3C XML Schema Recommendation.</xsd:documentation>
  <xsd:documentation>attributeGroup attr.imsmd deleted, was not used anywhere.</xsd:documentation>
  <xsd:documentation>Any attribute declarations that have use = "default"</xsd:documentation>
  <xsd:documentation>changed to use="optional" - attr.structure.req.</xsd:documentation>
  <xsd:documentation>Any attribute declarations that have value="somevalue" changed to</xsd:documentation>
  <xsd:documentation>default="somevalue" - attr.structure.req (hierarchical).</xsd:documentation>
  <xsd:documentation>Removed references to IMS MD Version 1.1.</xsd:documentation>
  <xsd:documentation>Modified attribute group "attr.resourcetype.req" to change use from optional</xsd:documentation>
  <xsd:documentation>to required to match the information model. As a result the default value</xsd:documentation>
  <xsd:documentation>also needed to be removed</xsd:documentation>
  <xsd:documentation>Name change for XSD. Changed to match version of CP Spec</xsd:documentation>
  <xsd:documentation>2001-11-04 Chris Moffatt:</xsd:documentation>
  <xsd:documentation>1. Refer to the xml namespace using the "x" abbreviation instead of "xml".</xsd:documentation>
  <xsd:documentation>This change enables the schema to work with commercial XML Tools</xsd:documentation>
  <xsd:documentation>2. Revert to original IMS CP version 1.1 namespace.</xsd:documentation>
  <xsd:documentation>i.e. "http://www.imsglobal.org/xsd/ims_cp_v1p1"</xsd:documentation>
  <xsd:documentation>This change done to support the decision to only change the XML namespace
    with</xsd:documentation>
  <xsd:documentation>major revisions of the specification i.e. where the information model or
    binding</xsd:documentation>
  <xsd:documentation>changes (as opposed to addressing bugs or omissions). A stable namespace is</xsd:documentation>
  <xsd:documentation>necessary to the increasing number of implementors.</xsd:documentation>
  <xsd:documentation>3. Changed name of schema file to "ims_cp_v1p1p3.xsd" and</xsd:documentation>
  <xsd:documentation>version attribute to "IMS CP 1.1.3" to reflect minor version change</xsd:documentation>
  <xsd:documentation>Inclusions and Imports</xsd:documentation>
  <xsd:documentation>Attribute Declarations</xsd:documentation>
  <xsd:documentation>element groups</xsd:documentation>
  <xsd:documentation />
  <xsd:documentation>2003-03-21 Schawn Thropp</xsd:documentation>
  <xsd:documentation>The following updates were made to the Version 1.1.3 "Public Draft" version:</xsd:documentation>
  <xsd:documentation>1. Updated name of schema file (ims_cp_v1p1.xsd) to match to IMS naming
    guidance</xsd:documentation>
  <xsd:documentation>2. Updated the import statement to reference the xml.xsd found at</xsd:documentation>
  <xsd:documentation>"http://www.w3.org/2001/03/xml.xsd". This is the current W3C schema</xsd:documentation>

```

```

<xsd:documentation>recommended by the W3C to reference.</xsd:documentation>
<xsd:documentation>3. Removed all maxLength's facets. The maxLength facets was an incorrect
  binding</xsd:documentation>
<xsd:documentation>implementation. These lengths were supposed, according to the information</xsd:documentation>
<xsd:documentation>model, to be treated as smallest permitted maximums.</xsd:documentation>
<xsd:documentation>4. Added the variations content model to support the addition in the
  information</xsd:documentation>
<xsd:documentation>model.</xsd:documentation>
  </xsd:annotation>
- <xsd:attributeGroup name="attr.base">
  <xsd:attribute ref="xml:base" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.default">
  <xsd:attribute name="default" type="xsd:IDREF" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.href">
  <xsd:attribute name="href" type="xsd:anyURI" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.href.req">
  <xsd:attribute name="href" use="required" type="xsd:anyURI" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.identifier.req">
  <xsd:attribute name="identifier" use="required" type="xsd:ID" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.identifier">
  <xsd:attribute name="identifier" type="xsd:ID" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.isvisible">
  <xsd:attribute name="isvisible" type="xsd:boolean" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.parameters">
  <xsd:attribute name="parameters" type="xsd:string" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.identifierref">
  <xsd:attribute name="identifierref" type="xsd:string" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.identifierref.req">
  <xsd:attribute name="identifierref" use="required" type="xsd:string" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.resourcetype.req">
  <xsd:attribute name="type" use="required" type="xsd:string" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.structure.req">
  <xsd:attribute name="structure" default="hierarchical" type="xsd:string" />
  </xsd:attributeGroup>
- <xsd:attributeGroup name="attr.version">
  <xsd:attribute name="version" type="xsd:string" />
  </xsd:attributeGroup>
- <xsd:group name="grp.any">
- <xsd:annotation>
  <xsd:documentation>Any namespaced element from any namespace may be included within an "any" element. The
    namespace for the imported element must be defined in the instance, and the schema must be
    imported.</xsd:documentation>
  </xsd:annotation>
- <xsd:sequence>
  <xsd:any namespace="##other" processContents="strict" minOccurs="0" maxOccurs="unbounded" />
  </xsd:sequence>
  </xsd:group>
- <!-- Copyright (2) 2003 IMS Global Learning Consortium, Inc. -->
- <!-- ***** -->
- <!-- ** Change History ** -->
- <!-- ***** -->
- <!-- ***** -->
- <!-- ** Attribute Declarations ** -->
- <!-- ***** -->
- <!-- ***** -->
- <!-- ** Element Declarations ** -->
- <!-- ***** -->
<xsd:element name="dependency" type="dependencyType" />
<xsd:element name="file" type="fileType" />
<xsd:element name="item" type="itemType" />
<xsd:element name="manifest" type="manifestType" />
<xsd:element name="metadata" type="metadataType" />
<xsd:element name="organization" type="organizationType" />
<xsd:element name="organizations" type="organizationsType" />
<xsd:element name="resource" type="resourceType" />
<xsd:element name="resources" type="resourcesType" />

```

```

<xsd:element name="schema" type="schemaType" />
<xsd:element name="schemaversion" type="schemaversionType" />
<xsd:element name="title" type="titleType" />
<xsd:element name="variation" type="variationType" />
- <!-- ***** -->
- <!-- ** Complex Types ** -->
- <!-- ***** -->
- <!-- ***** -->
- <!-- ** dependency ** -->
- <!-- ***** -->
= <xsd:complexType name="dependencyType">
= <xsd:sequence>
<xsd:group ref="grp.any" />
</xsd:sequence>
<xsd:attributeGroup ref="attr.identifier.req" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** file ** -->
- <!-- ***** -->
= <xsd:complexType name="fileType">
= <xsd:sequence>
<xsd:element ref="metadata" minOccurs="0" />
<xsd:group ref="grp.any" />
</xsd:sequence>
<xsd:attributeGroup ref="attr.href.req" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** item ** -->
- <!-- ***** -->
= <xsd:complexType name="itemType">
= <xsd:sequence>
<xsd:element ref="title" minOccurs="0" />
<xsd:element ref="item" minOccurs="0" maxOccurs="unbounded" />
<xsd:element ref="metadata" minOccurs="0" />
<xsd:group ref="grp.any" />
</xsd:sequence>
<xsd:attributeGroup ref="attr.identifier.req" />
<xsd:attributeGroup ref="attr.identifier.ref" />
<xsd:attributeGroup ref="attr.isvisible" />
<xsd:attributeGroup ref="attr.parameters" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** manifest ** -->
- <!-- ***** -->
= <xsd:complexType name="manifestType">
= <xsd:sequence>
<xsd:element ref="metadata" minOccurs="0" />
<xsd:element ref="organizations" />
<xsd:element ref="resources" />
<xsd:element ref="manifest" minOccurs="0" maxOccurs="unbounded" />
<xsd:group ref="grp.any" />
</xsd:sequence>
<xsd:attributeGroup ref="attr.identifier.req" />
<xsd:attributeGroup ref="attr.version" />
<xsd:attribute ref="xml:base" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** metadata ** -->
- <!-- ***** -->
= <xsd:complexType name="metadataType">
= <xsd:sequence>
<xsd:element ref="schema" minOccurs="0" />
<xsd:element ref="schemaversion" minOccurs="0" />
<xsd:group ref="grp.any" />
</xsd:sequence>
</xsd:complexType>
- <!-- ***** -->
- <!-- ** organizations ** -->
- <!-- ***** -->
= <xsd:complexType name="organizationsType">
= <xsd:sequence>
<xsd:element ref="organization" minOccurs="0" maxOccurs="unbounded" />
<xsd:group ref="grp.any" />

```

```

</xsd:sequence>
<xsd:attributeGroup ref="attr.default" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** organization ** -->
- <!-- ***** -->
= <xsd:complexType name="organizationType">
= <xsd:sequence>
<xsd:element ref="title" minOccurs="0" />
<xsd:element ref="item" minOccurs="0" maxOccurs="unbounded" />
<xsd:element ref="metadata" minOccurs="0" />
<xsd:group ref="grp.any" />
</xsd:sequence>
<xsd:attributeGroup ref="attr.identifier.req" />
<xsd:attributeGroup ref="attr.structure.req" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** resources ** -->
- <!-- ***** -->
= <xsd:complexType name="resourcesType">
= <xsd:sequence>
<xsd:element ref="resource" minOccurs="0" maxOccurs="unbounded" />
<xsd:group ref="grp.any" />
</xsd:sequence>
<xsd:attributeGroup ref="attr.base" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** resource ** -->
- <!-- ***** -->
= <xsd:complexType name="resourceType">
= <xsd:sequence>
<xsd:element ref="metadata" minOccurs="0" />
<xsd:element ref="file" minOccurs="0" maxOccurs="unbounded" />
<xsd:element ref="dependency" minOccurs="0" maxOccurs="unbounded" />
<xsd:element ref="variation" minOccurs="0" maxOccurs="unbounded" />
<xsd:group ref="grp.any" />
</xsd:sequence>
<xsd:attributeGroup ref="attr.identifier.req" />
<xsd:attributeGroup ref="attr.resourcetype.req" />
<xsd:attributeGroup ref="attr.base" />
<xsd:attributeGroup ref="attr.href" />
<xsd:anyAttribute namespace="##other" processContents="strict" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** variation ** -->
- <!-- ***** -->
= <xsd:complexType name="variationType">
= <xsd:sequence>
<xsd:element ref="metadata" />
<xsd:element ref="file" minOccurs="0" maxOccurs="unbounded" />
<xsd:element ref="dependency" minOccurs="0" maxOccurs="unbounded" />
<xsd:element ref="variation" minOccurs="0" maxOccurs="unbounded" />
</xsd:sequence>
<xsd:attribute ref="xml:base" />
<xsd:attributeGroup ref="attr.resourcetype.req" />
<xsd:attributeGroup ref="attr.identifier.req" />
<xsd:attributeGroup ref="attr.href" />
</xsd:complexType>
- <!-- ***** -->
- <!-- ** Simple Types ** -->
- <!-- ***** -->
= <xsd:simpleType name="schemaType">
<xsd:restriction base="xsd:string" />
</xsd:simpleType>
= <xsd:simpleType name="schemaversionType">
<xsd:restriction base="xsd:string" />
</xsd:simpleType>
= <xsd:simpleType name="titleType">
<xsd:restriction base="xsd:string" />
</xsd:simpleType>
</xsd:schema>

```

## 10 APPENDIX B: TRIAL-SOLUTION DTD

```

<!ELEMENT record      ((sourcereference, master?, navtitle, types, start+, main+, end+,
relation*, keyphs?)|(navtitle, logical_id))>

<!ELEMENT sourcereference (#PCDATA)>

<!ELEMENT master (contribute*, ts_title?, language*, classification*, rights?)>

<!-- The definition of the subelements of the master element coincides with their definition
in the IMS Metadata Specification with the restriction that extensions are not allowed, except
for the rights element
title has been renamed to ts_title to easily avoid clashes with title element from IMS Content
Packaging specification -->
<!ELEMENT CONTRIBUTE (role?, centity*, date?)>
<!-- Type of contribution defined by Role -->

<!ELEMENT role (langstring?)>

<!-- langstring: A string in a particular language -->
<!ELEMENT langstring (#PCDATA)>
<!ATTLIST langstring lang CDATA #IMPLIED>

<!ELEMENT centity (vcard?)>

<!ELEMENT vcard      (#PCDATA)>
<!-- STRING per vCard specification -->

<!ELEMENT date (datetime?, description?)>

<!ELEMENT datetime (#PCDATA)>
<!-- Per W3C, e.g., 1999-08-07 -->

<!ELEMENT description (langstring*)>

<!ELEMENT ts_title (langstring*)>

<!ELEMENT language (#PCDATA)>
<!-- Human Language -->

<!ELEMENT classification (purpose?, taxonpath*, description?, KEYWORDS*)>
<!-- classification is a category element -->
<!-- Description or cataloging of a characteristic. -->

<!ELEMENT purpose (langstring?)>

<!ELEMENT taxonpath (source?, taxon*)>
<!-- A taxonomic path in a specific classification. There may be different paths, in the same
or different classifications, that describe the same characteristic. -->

<!ELEMENT KEYWORDS (langstring*)>

<!ELEMENT source (#PCDATA)>

<!ELEMENT taxon (id?, entry?)>
<!-- Ordered list -->

<!ELEMENT id      (#PCDATA)>
<!-- Alphanumeric identifier -->

<!ELEMENT entry (langstring*)>

<!ELEMENT rights (cost?, copyrightandotherrestrictions?, description?, extension?)>
<!-- rights is a category element -->
<!-- Conditions of use of the resource. -->

<!ELEMENT cost (langstring*)>
<!-- Boolean, yes|no -->

<!ELEMENT copyrightandotherrestrictions (langstring*)>
<!-- Boolean, yes|no -->

```

```

<!-- The following elements extend the IMS Specification of rights -->

<!ELEMENT extension    (rightsowned*)>

<!ELEMENT rightsowned (typeofright?, underwhatlaw*, rightowner*)>

<!ELEMENT typeofright (#PCDATA)>
<!-- Rights that are owned -->

<!ELEMENT underwhatlaw (#PCDATA)>
<!-- Laws of which country govern these rights -->

<!ELEMENT rightowner  (#PCDATA)>
<!-- Who owns the right -->

<!ELEMENT navtitle    (#PCDATA)>
<!ATTLIST navtitle    isvisible    CDATA    #IMPLIED>

<!ELEMENT logical_id  (#PCDATA)>

<!ELEMENT types        (type+)>
<!ELEMENT type         (#PCDATA)>

<!ELEMENT start        EMPTY>
<!ATTLIST start        href         CDATA    #IMPLIED
                                type    (
                                    latex |
                                    latex_ps |
                                    latex_pdf |
                                    latex_ps_slide |
                                    latex_pdf_slide |
                                    html |
                                    all
                                ) "all"
>

<!ELEMENT main         EMPTY>
<!ATTLIST main         href         CDATA    #IMPLIED
                                type    (
                                    latex |
                                    latex_ps |
                                    latex_pdf |
                                    latex_ps_slide |
                                    latex_pdf_slide |
                                    html |
                                    all
                                ) "all"
>

<!ELEMENT end          EMPTY>
<!ATTLIST end          href         CDATA    #IMPLIED
                                type    (
                                    latex |
                                    latex_ps |
                                    latex_pdf |
                                    latex_ps_slide |
                                    latex_pdf_slide |
                                    html |
                                    all
                                ) "all"
>

<!ELEMENT relation     ((target | external)*>
<!ATTLIST relation     kind         (References |
                                    Requires |
                                    IsSubsumedBy |
                                    Before |
                                    NotWith |
                                    IsAugmentedBy |
                                    IsExplainedBy |
                                    IsKnownBlocker |
                                    CorrespondsTo
                                    ) #REQUIRED
>

<!ELEMENT target       EMPTY>

```

```
<!ATTLIST target      href      CDATA      #REQUIRED
                    author    CDATA      #IMPLIED
                    status (assigned | inherited | proposed) "assigned"
                    inherits (none | up | down | updown) "none"
>

<!ELEMENT external    (#PCDATA)>
<!ATTLIST      external      href      CDATA      #REQUIRED
                    author    CDATA      #IMPLIED
                    status (assigned | inherited | proposed) "assigned"
                    inherits (none | up | down | updown) "none"
>
<!ELEMENT keyphs      (keyph)*>

<!ELEMENT keyph        (evidence?)>
<!ATTLIST keyph        href      CDATA      #REQUIRED
                    author    CDATA      #IMPLIED
                    status (assigned | inherited | proposed) "assigned"
                    inherits (none | up | down | updown) "none"
>
<!ELEMENT evidence     (evstrg)*>
<!ATTLIST evidence     perc      CDATA      #REQUIRED>
<!ELEMENT evstrg       (#PCDATA)>
<!ATTLIST evstrg       weight    CDATA      #IMPLIED>
```