# Documentation in the Production Framework of DDI Lifecycle (MD)

Structure and Flow

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## Overview

A single-source paradigm is followed for the documentation of DDI Lifecycle (MD). The chosen format is DocBook. The class and Functional View documentation is entered in the Drupal system and high-level and contextual information will be entered either in the Drupal system or maintained separately in a for instance in DocBook. Both documentation branches can be merged into one downstream if required. It is envisaged that the DocBook format is used as single source for further representations downstream in the production flow. Planned representations are PDF, browsable HTML pages (as a package available to download and over HTTP) , pure text in XMI, embedded HTML documentation in binding formats like OWL/RDF and XML Schema. The binding formats will also be available as a collection of browsable HTML pages.

High-Level Documentation

DocBook

XMI

with Plain Text

Class / Functional View Definition

in Drupal

XML Schema

OWL/RDF

Browsable HTML

for XML Schema

Browsable HTML

for OWL/RDF

End Products

Editing

Intermediate Products

Browsable HTML

PDF

Class Comments

in UML Tools

XML Schema

with embedded HTML

OWL/RDF Schema with

embedded HTML

Webhelp Mobile

## High-Level Documentation

The high-level documentation is output in Docbook.

## Class and Functional View Documentation

The documentation for each class and Funational View is exported by Drupal in DocBook format. A couple of HTML tags are allowed in Drupal.

**Action item:**

1. The “in Drupal” allowed HTML elements should be reviewed if these are sufficient. The list of elements should be a subset of the elements which are allowed in XSDDoc.
2. A reference section should be invented in Drupal for references to i.e. glossary entries and background material.
3. Investigate potential layouts for representing Functional Views that are more user intuitive

## Single-Source Publishing Format

### DocBook

DocBook[[1]](#footnote-1) follows the idea of a book with sequential chapters and sections.

The latest version 5.0 is used.

The high-level documentation, the class and Funcational View documentation can be merged in one single DocBook file. This can be suitable for the generation of end products with XSL Stylesheets[[2]](#footnote-2).

**Action items:**

1. The used DocBook elements should be reviews if they are appropriate.
2. Suggested changes: The documentation of a UML package should be in the DocBook element “part” (part of a book), of a class should be in “chapter”. All sections of a class should be in “section” (is already the case).
3. The file doesn’t seem to be valid. Validation should be done with Oxygen or other tools.
4. All desired output formats generated by the DocBook XSL Stylesheets should be tested with a chosen DocBook file.

**Darwin Information Typing Architecture (DITA)**

DITA[[3]](#footnote-3) is another format for single-source publishing. It stresses the development of independent units of documentation, often called topics, rather than a single narrative (like DocBook). General topic types are task, concept, and reference. A map is a container for topics organizing them in sequence. Multiple maps can organize the topics for different needs.

The topic map approach seems to be closer to the idea of the class library and the functional views. A class could be described in an independent topic like a concept or reference. A functional view can be represented in a map referencing independent topics (here classes).

DITA has an own set of tools, the DITA Open Toolkit[[4]](#footnote-4), to generate the target formats like HTML and PDF.

**Action item:**

1. Evaluation of DITA versus DocBook.

## PDF

PDF files are generated on the basis of DocBook files with the DocBook XSL Stylesheets.

The contents show currently all section levels (similar in the browsable HTML pages). The levels below the class section should be suppressed.

**Action item:**

1. The configuration of the DocBook XSL Stylesheets should be explored if they can be adjusted for suppressing lower section levels. Candidates are: generate.toc[[5]](#footnote-5) (chapter nop), toc.section.depth (0), and chunk.section.depth[[6]](#footnote-6) (0).

## Additional Formats with Other XSL Stylesheets

Additional formats make sense which can be generated by other XSL Stylesheets. Candidates are: Web-based Help[[7]](#footnote-7) (collection of browsable HTML pages with search) and Webhelp Mobile[[8]](#footnote-8) (for mobile devices).

## XMI

The model is exported from Drupal in XMI format. Documentation in plain text embedded in XMI can make sense. The UML type “Comment” can be used for this purpose. UML tools can import XMI with comments. It is dependent from the tool if the comments are accessible in the user interface of the tool.

### Plain Text

A specific layout is suggested for plain text representations of class documentation. An example is shown in the appendix section on Plain Text Layout.

Another option to get plain text of the documentation is to use text browsers with HTML files as basis. The tool Elinks[[9]](#footnote-9) can generate plain text even for tables. The only issue is that there seem to be many empty lines.

## Bindings

### XML Schema

The XML Schema binding is generated on the basis of the XMI representation of the model. XHTML documentation can be added inside the XSD element “documentation”. The XSD element “documentation” requires then the namespace of XHTML.

<xs:documentation xmlns="http://www.w3.org/1999/xhtml">

The plain XML Schema can be merged with the class documentation.

The tool XSDDoc[[10]](#footnote-10) is used to generate the browsable XML Schema documentation on the basis of the XML Schema files. Only a subset[[11]](#footnote-11) of XHTML is accepted by this tool.

A version of the XML Schema with embedded plain text documentation might make sense for people looking only into the XML Schema files.

**Action items:**

1. An XSLT should be written for merging the documentation into the XML Schema. The merge can be done by the unique class name. DocBook elements should be transformed into the related XHTML elements, see section Mapping Table XHTML/DocBook in the appendix.
2. It should be explored if the XSLT for the transformation from XMI to XML Schema can be used to embed plain text documentation.

### OWL/RDF

The OWL/RDF binding is generated on the basis of the XMI representation of the model. XHTML documentation can be added inside the ontology with appropriate elements. Following elements are available: rdfs:comment, rdf:HTML, and rdf:XMLLiteral.

Example:

<rdfs:comment rdf:parseType="Literal" xmlns="http://www.w3.org/1999/xhtml">

 <h1>Test rdfs:comment xx title</h1>

</rdfs:comment>

<rdf:HTML>

 <h1>Test rdf:HTML xx title</h1>

</rdf:HTML>

<rdf:XMLLiteral>

 <h1>Test rdf:XMLLiteral xx title</h1>

</rdf:XMLLiteral>

One background could be that rdf:HTML and rdf:XMLLiteral are still non-normative[[12]](#footnote-12).

rdfs:comment with a XHTML namespace should work, but only the plugin OWLDoc[[13]](#footnote-13) of Protégé does something with it (the other test tools LODE[[14]](#footnote-14) and Parrot[[15]](#footnote-15) ignore embedded HTML documentation). But it just escapes the embedded HTML tags, which is not desired. Nevertheless OWLDoc could be an option, because it is an open source program[[16]](#footnote-16) which can probably be adjusted (possibly as standalone tool without Protégé). Only the escaping[[17]](#footnote-17) of XHTML elements needs to be suppressed.

**Action items:**

1. A XSLT should be written for merging the documentation into the ontology (similar to XML Schema). The merge can be done by the unique class name. DocBook elements should be transformed into the related XHTML elements, see section Mapping Table XHTML/DocBook in the appendix.
2. It should be explored if the XSLT for the transformation from XMI to XML Schema can be used to embed plain text documentation.
3. OWLDoc should be further explored if changes in the program code are not much work.
4. Parrot could be explored. It is open source as well. But Parrot has no left-hand navigation column.
5. The Semantic Web email lists should be asked if there is any tool known which allows embedded XHTML.

## Appendix

### Plain Text Layout

The example for class “Agent” shows the layout of the suggested plain text documentation.

Agent

 - Extends

 This object extends AnnotatedIdentifiable.

 - Abstract

 This class is abstract.

 - Definition

 An actor that performs a role in relation to a process.

 - Properties

 - agentId

 Datatype: AgentId

 Cardinality: 0..n

 An identifier within a specified system for specifying an agent.

 - description

 Datatype: StructuredString

 Cardinality: 0..1

 Multilingual description allowing for internal formatting using XHTML tags.

###

### Mapping Table XHTML/DocBook

| **HTML Element** | **XHTML 1.1 used in DDI 3.2[[18]](#footnote-18)** | **Drupal** | **HTML Elements allowed in XSDDoc** | **Recommended XHTML Elements for DDI Lifecycle (MD)** | **DocBook 5.0 Equivalent Elements[[19]](#footnote-19)**This column is not completed yet. |
| --- | --- | --- | --- | --- | --- |
| **a** | **x** | **x** | **x** | **x** | **link** |
| **a/@href** | **x** | **x** | **x** | **x** | **link/@linkend** |
| **a/@id** | **x** | **x** | **x** | **x** | **@xml:id (at section etc.)** |
| abbr | x |  |  |  |  |
| acronym | x |  |  |  |  |
| address | x |  |  |  |  |
| **b** | **x** |  | **x** | **x** |  |
| bdo | x |  |  |  |  |
| big | x |  |  |  |  |
| blockquote | x | x | x | x |  |
| br | x |  | x | x |  |
| caption | x |  |  |  |  |
| center |  |  | x |  |  |
| cite | x | x |  |  |  |
| **code** | **x** | **x** | **x** | **x** | **code** |
| col | x |  |  |  |  |
| colgroup | x |  |  |  |  |
| **dd** | **x** | **x** | **x** | **x** |  |
| dfn | x |  |  |  |  |
| **div** | **x** |  | **x** | **x** | **section** |
| dl | x | x | x | x |  |
| dt | x | x | x | x |  |
| em | x | x |  |  |  |
| font |  |  | x |  |  |
| **h1** | **x** |  | **x** | **x** | **title (dependent from section level)** |
| **h2** | **x** |  | **x** | **x** | **title (dependent from section level)** |
| **h3** | **x** |  | **x** | **x** | **title (dependent from section level)** |
| **h4** | **x** |  | **x** | **x** | **title (dependent from section level)** |
| **h5** | **x** |  | **x** | **x** | **title (dependent from section level)** |
| **h6** | **x** |  | **x** | **x** | **title (dependent from section level)** |
| **hr** | **x** |  | **x** | **x** |  |
| **i** | **x** |  | **x** | **x** |  |
| **img** |  |  | **x** | **x** | **inlinemediaobject** |
| kbd | x |  |  |  |  |
| **li** | **x** | **x** | **x** | **x** | **listitem** |
| **ol** | **x** | **x** | **x** | **x** | **orderedlist** |
| **p** | **x** |  | **x** | **x** | **para** |
| **pre** | **x** |  | **x** | **x** | **synopsis** |
| q | x |  |  |  |  |
| s |  |  | x |  |  |
| samp | x |  |  |  |  |
| small | x |  |  |  |  |
| span | x |  |  |  |  |
| strike |  |  | x |  |  |
| **strong** | **x** | **x** | **x** | **x** |  |
| **sub** | **x** |  | **x** | **x** | **subscript** |
| **sup** | **x** |  | **x** | **x** | **superscript** |
| **table** | **x** |  | **x** | **x** | **informaltable** |
| table/@border="1" | x |  |  |  | informaltable/@frame=all |
| tbody | x |  |  |  |  |
| **td** | **x** |  | **x** | **x** | **td** |
| tfoot | x |  |  |  |  |
| **th** | **x** |  | **x** | **x** | **th** |
| thead | x |  |  |  |  |
| **tr** | **x** |  | **x** | **x** | **tr** |
| **tt** | **x** |  | **x** | **x** |  |
| u |  |  | x |  |  |
| **ul** | **x** | **x** | **x** | **x** | **itemizedlist** |
| var | x |  |  |  |  |

**Action item:**

* The content of the column on DocBook needs review and completion.
1. <http://docbook.org/> [↑](#footnote-ref-1)
2. <http://wiki.docbook.org/DocBookXslStylesheets> [↑](#footnote-ref-2)
3. <http://en.wikipedia.org/wiki/Darwin_Information_Typing_Architecture>, <https://www.oasis-open.org/committees/dita/> [↑](#footnote-ref-3)
4. <http://www.dita-ot.org/> [↑](#footnote-ref-4)
5. <http://www.sagehill.net/docbookxsl/TOCcontrol.html> [↑](#footnote-ref-5)
6. <http://www.sagehill.net/docbookxsl/Chunking.html#ControllingChunks> [↑](#footnote-ref-6)
7. <http://docbook.sourceforge.net/release/xsl/1.77.0/webhelp/docs/content/index.html>, sample: <https://www.oxygenxml.com/doc/ug-author/index.html#topics/web-help.html> [↑](#footnote-ref-7)
8. <https://www.oxygenxml.com/xml_editor/webhelp.html#webhelp_for_mobile>, similar sample from DITA: <https://www.oxygenxml.com/samples/DITA-WebHelp-Mobile/> [↑](#footnote-ref-8)
9. <http://www.elinks.or.cz/> [↑](#footnote-ref-9)
10. DocFlex/XML - XSDDoc - XML Schema Documentation Generator, <http://www.filigris.com/docflex-xml/xsddoc/> [↑](#footnote-ref-10)
11. How to format my comments using XHTML?, <http://www.filigris.com/docflex-xml/xsddoc/faq.php#xhtml> [↑](#footnote-ref-11)
12. <http://www.w3.org/TR/rdf11-concepts/#section-html> [↑](#footnote-ref-12)
13. <http://protegewiki.stanford.edu/wiki/OWLDoc> [↑](#footnote-ref-13)
14. <http://www.essepuntato.it/lode> [↑](#footnote-ref-14)
15. <http://ontorule-project.eu/parrot/parrot>, <https://bitbucket.org/fundacionctic/parrot/downloads> [↑](#footnote-ref-15)
16. <https://code.google.com/p/co-ode-owl-plugins/wiki/OWLDoc>, <http://smi-protege.stanford.edu/repos/protege/owldoc/trunk/>, sample: <http://ontologydesignpatterns.org/ont/framenet/html/> [↑](#footnote-ref-16)
17. OWLDoc source file lang/LanguageMap.java, line 173 [↑](#footnote-ref-17)
18. <http://www.ddialliance.org/Specification/DDI-Lifecycle/3.2/XMLSchema/ddi-xhtml11.xsd> [↑](#footnote-ref-18)
19. <http://www.docbook.org/tdg5/en/html/docbook.html> [↑](#footnote-ref-19)