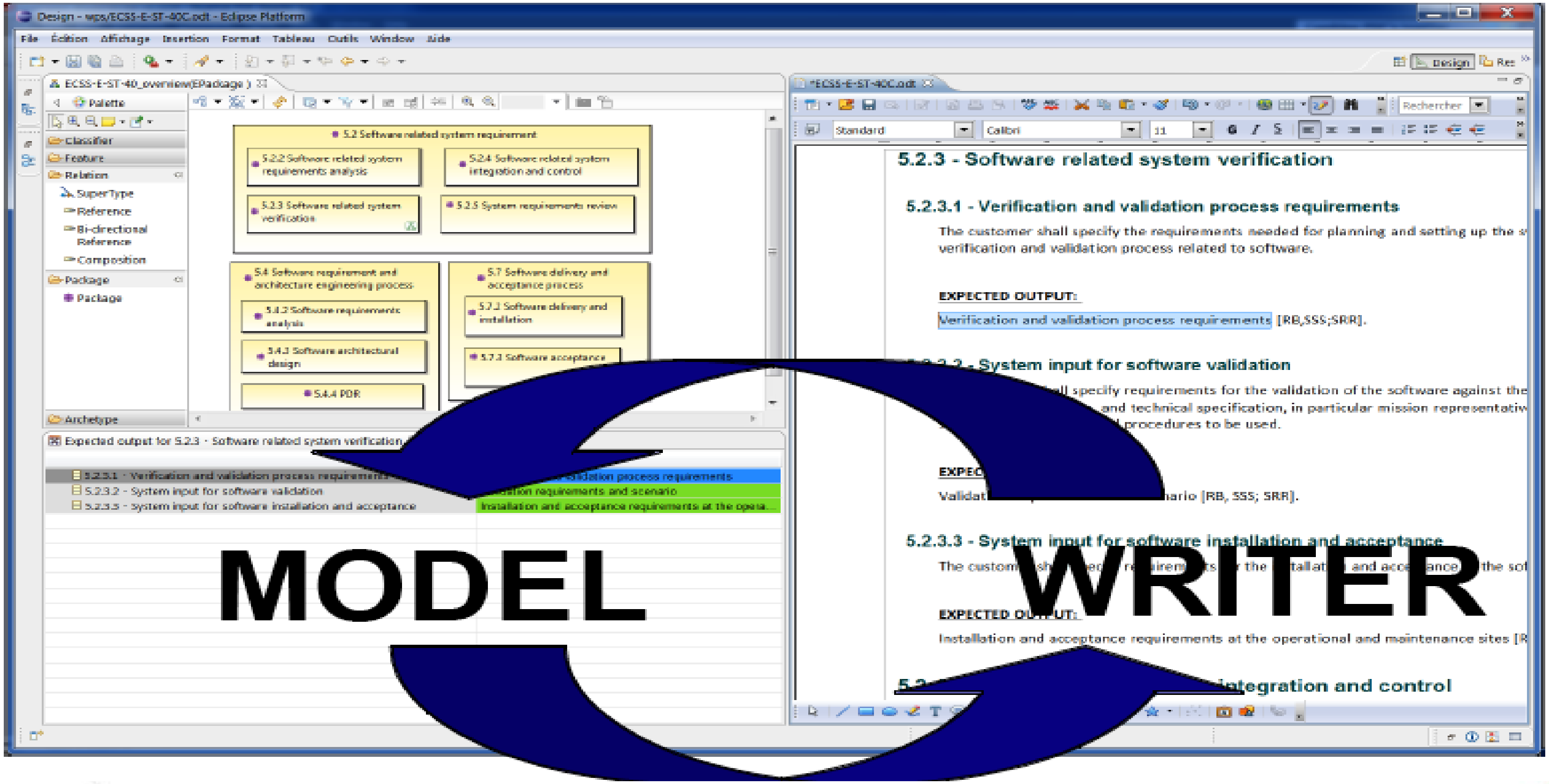
ModelWriter

Text & Model-Synchronized Document Engineering Platform


Design - wps/ECSS-E-ST-40C.odt - Eclipse Platform
File Édition Affichage Insertion Format Tableau Outils Window Aide
ECSS-E-ST-40_overview(EPackage)
Palette
Classifier
Feature
Relation
SuperType
Reference
Bi-directional Reference
Composition
Package
Package
Archetype
5.2 Software related system requirement
5.2.2 Software related system requirements analysis
5.2.4 Software related system integration and control
5.2.3 Software related system verification
5.2.5 System requirements review
5.4 Software requirement and architecture engineering process
5.4.2 Software requirements analysis
5.4.3 Software architectural design
5.4.4 PDR
5.7 Software delivery and acceptance process
5.7.2 Software delivery and installation
5.7.3 Software acceptance
*ECSS-E-ST-40C.odt
Rechercher
Standard
Calibri
11
MODEL
WRITER

Expected output for 5.2.3 - Software related system verification

5.2.3.1 - Verification and validation process requirements	...alidation process requirements
5.2.3.2 - System input for software validation	...ation requirements and scenario
5.2.3.3 - System input for software installation and acceptance	Installation and acceptance requirements at the opera...

5.2.3 - Software related system verification

5.2.3.1 - Verification and validation process requirements

The customer shall specify the requirements needed for planning and setting up the s verification and validation process related to software.

EXPECTED OUTPUT:

Verification and validation process requirements [RB,SSS;SRR].

5.2.3.2 - System input for software validation

...ll specify requirements for the validation of the software against the ... and technical specification, in particular mission representativ ... procedures to be used.

EXPEC...

Validat... ...ario [RB, SSS; SRR].

5.2.3.3 - System input for software installation and acceptance

The custom... sh... re...irem...ts ... the ...tallat... and acc...ance ... the sof

EXPECTED OU...UT:

Installation and acceptance requirements at the operational and maintenance sites [R

5.2... ...integration and control

Project Leader: Ferhat Erata (ferhat@computer.org)
Project Email: project@modelwriter.eu

Project 13028

ModelWriter

Text & Model-Synchronized Document Engineering Platform

The project envisions an integrated authoring environment called "ModelWriter" for Technical Authors (such as Software or Systems Engineers etc.) which will combine a Semantic Word Processor (= the "Writer" part) and a Knowledge Capture Tool (= the "Model" part).

Project information

Project name	13028 ModelWriter
Status	Running
Period	Oct 2014 - Sep 2017
Call	ITEA 2 Call 8
Challenge	Knowledge-based society
Website	www.modelwriter.eu
Partners	10
Countries	Belgium France Turkey

Project leader

Name
Ferhat Erata
Organisation
UNIT Information Technologies R&D Ltd.
Country
Turkey
Project involvement
13028 ModelWriter

Project documents

Project publications

- ITEA Annual report 2013 published online
- ModelWriter Posters Co-summit 2015
- ModelWriter Project Leaflet

Project partners

Airbus Group SAS
France

Centre National de la Recherche Scientifique
France

Havelsan
Turkey

Hisbim Bilgi ve İletişim Teknolojileri
Turkey

Katholieke Universiteit Leuven
Belgium

KoçSistem
Turkey

Mantis
Turkey

OBEO
France

Sogeti Belgium
Belgium

UNIT Information Technologies R&D Ltd.
Turkey

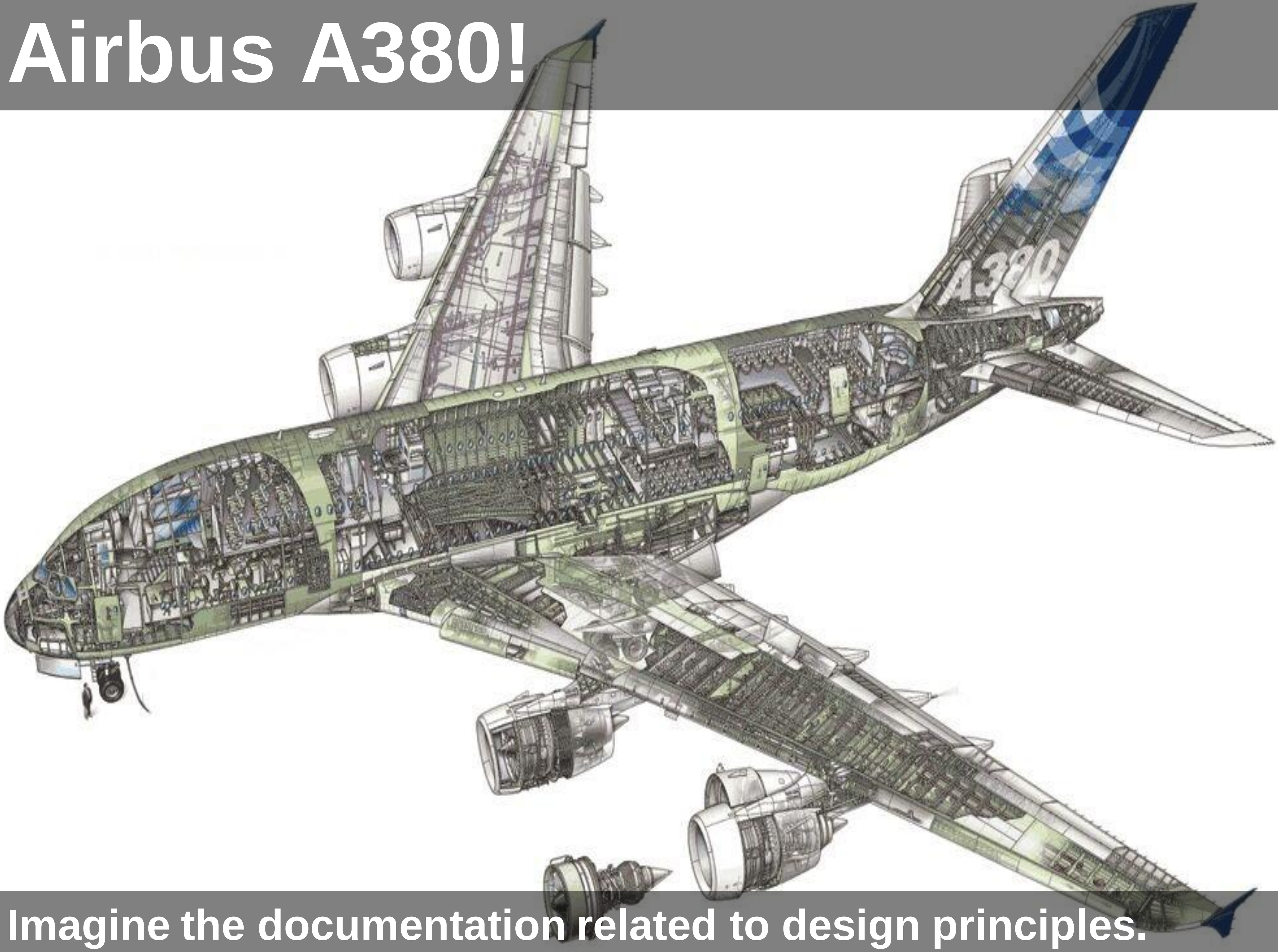
ModelWriter
Project Overview

- Resource Allocation: 68,71 person year
- Project Duration: 36 months
- Planned Budget: 5,543,000 Euro
- Start and Finish Date: 01 Oct 2014 – 30 Sep 2017
- Open-Source Software Platform to be submitted to Eclipse Foundation

What is the problem?

ITEA3

Airbus A380!



Imagine the documentation related to design principles.

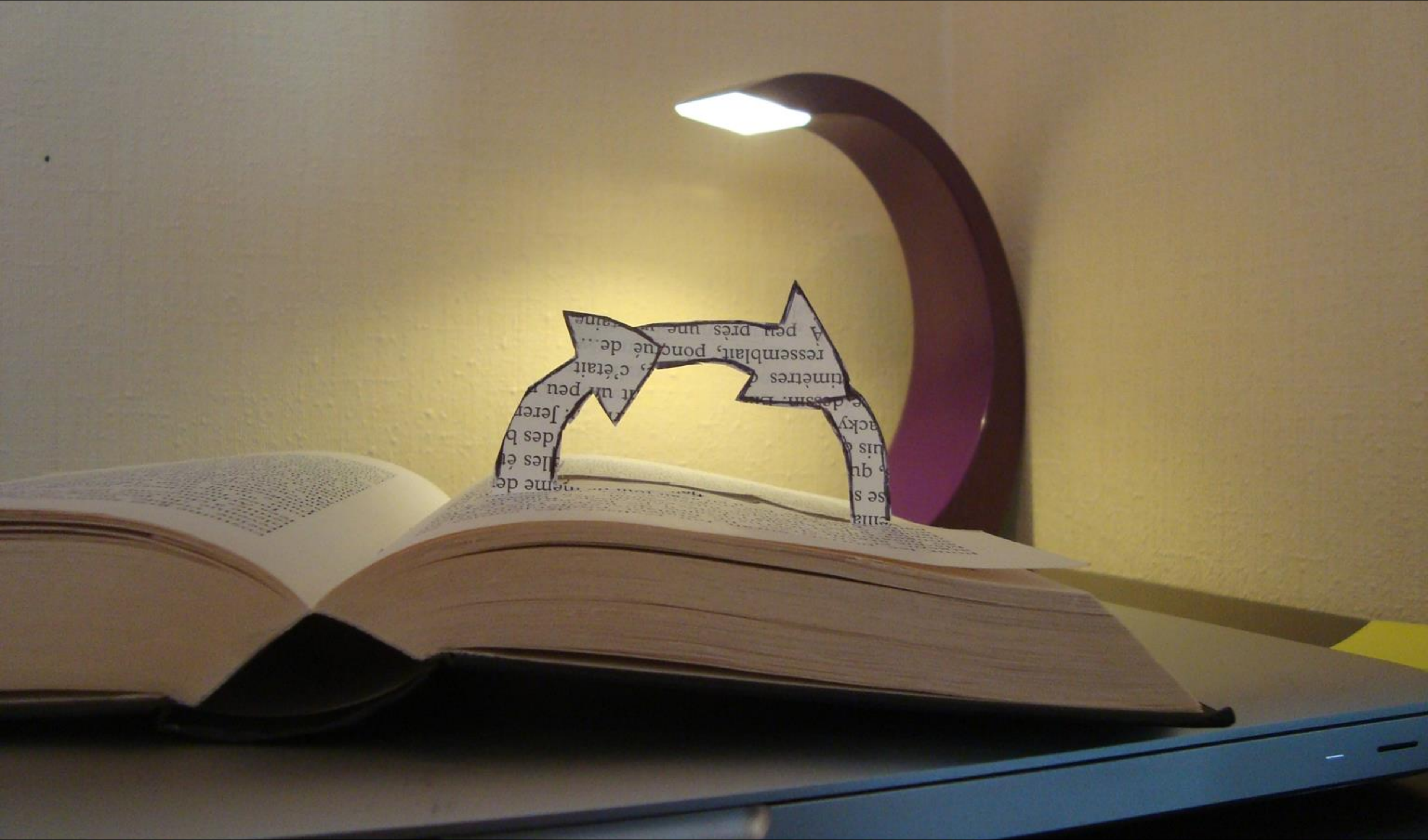
Plants!

Imagine the documentation of a construction site.

Documentation!

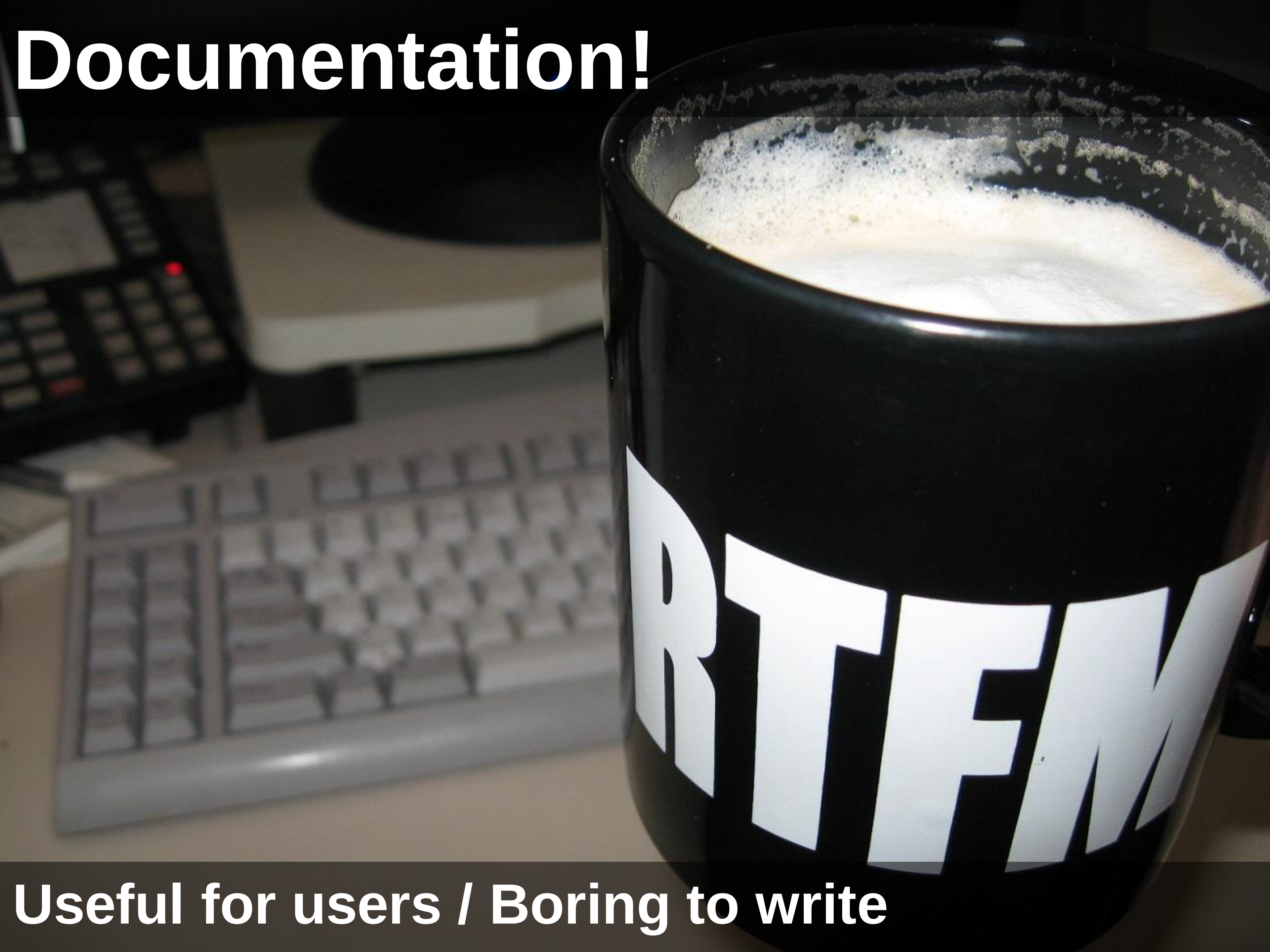
Write once … and never look at after

Documentation!



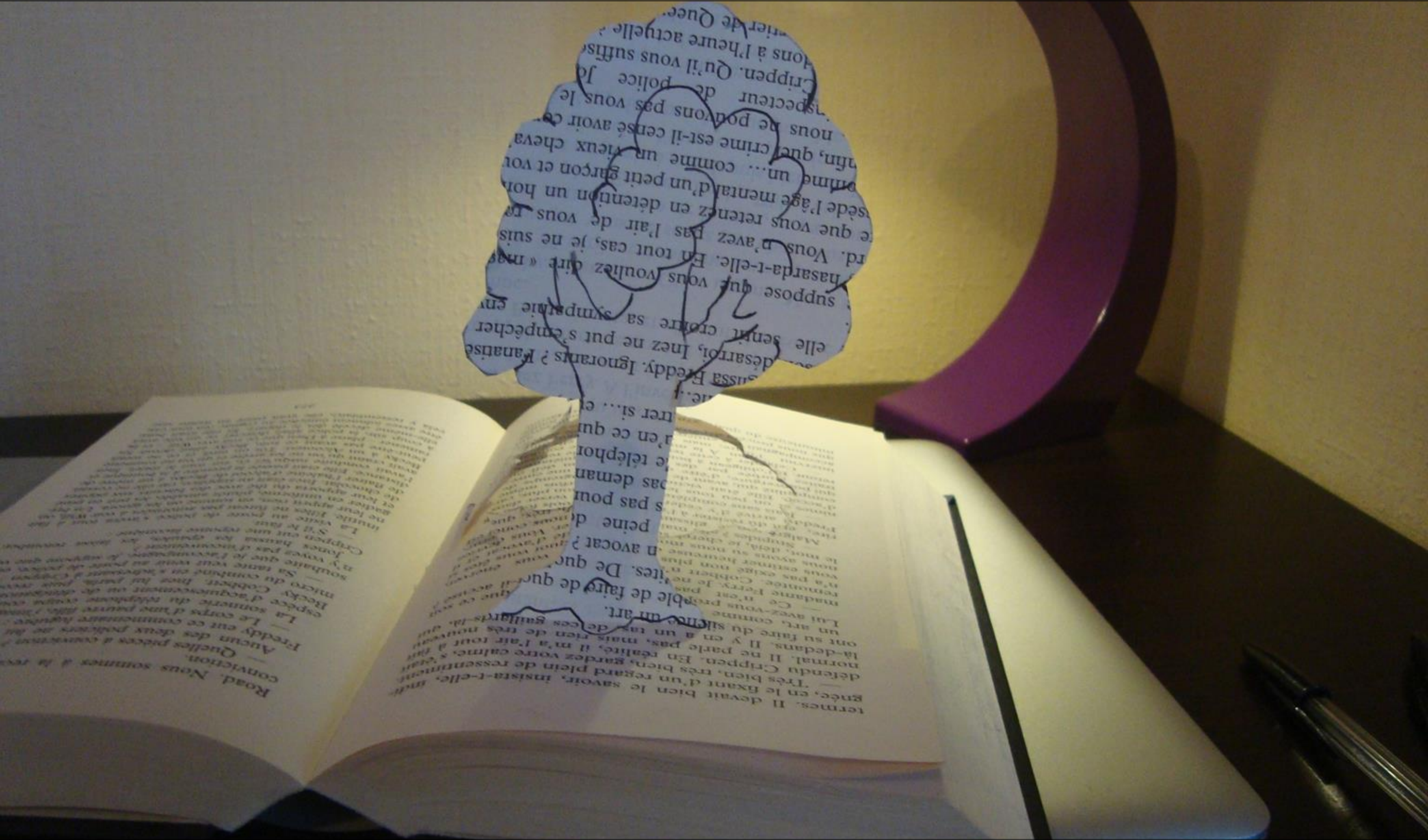
Hard to keep it up-to-date

Documentation!



Useful for users / Boring to write

Semantics!

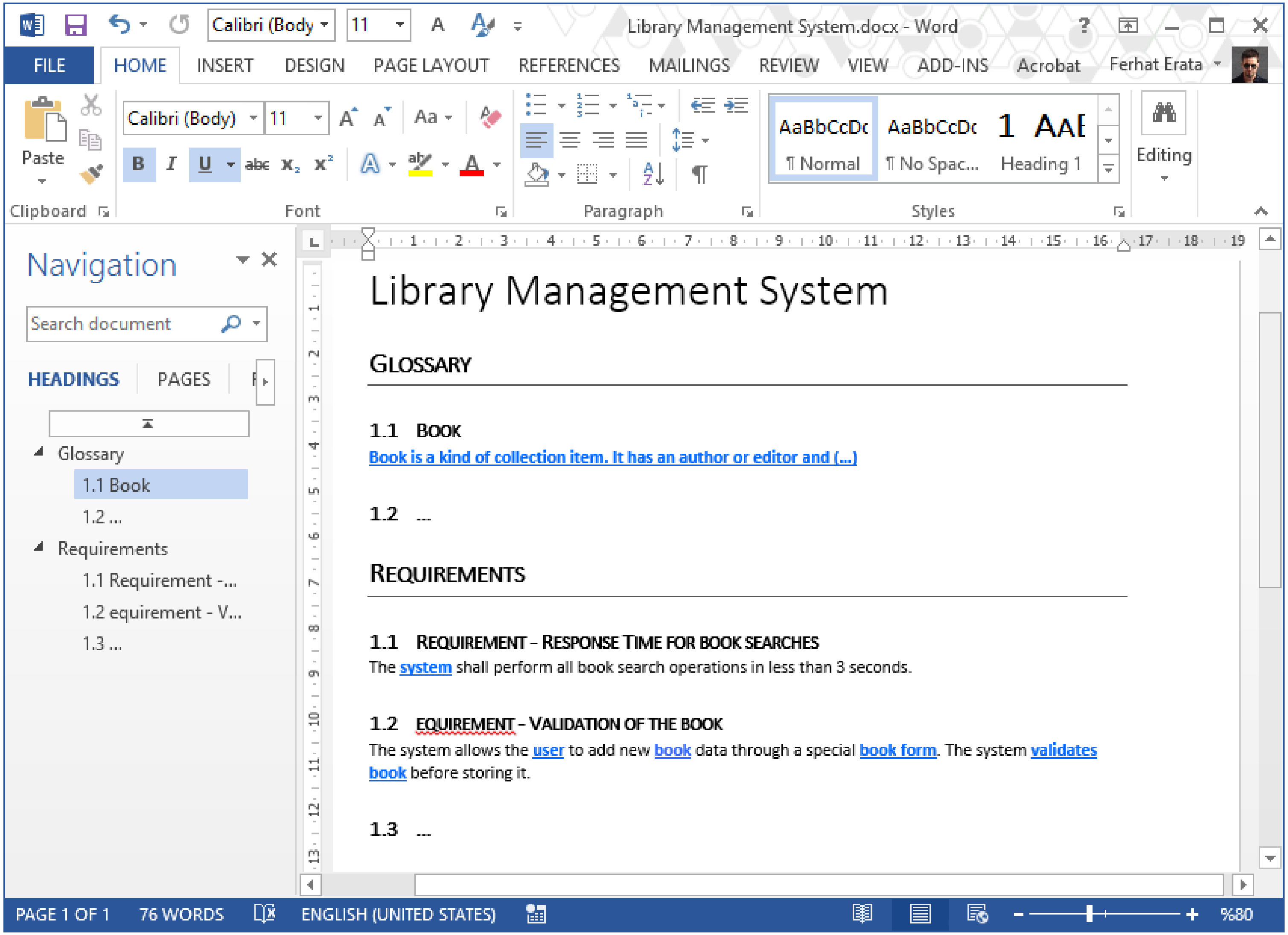


No meaning of syntax (words, sentences …)

What is a text?

What is a text? (document file formats)

Office Open XML (.docx) (ISO/IEC 29500)



Library Management System

Glossary

1.1 Book

Book is a kind of collection item. It has an author or editor and (...)

1.2 ...

Requirements

1.1 Requirement – Response Time for Book Searches

The system shall perform all book search operations in less than 3 seconds.

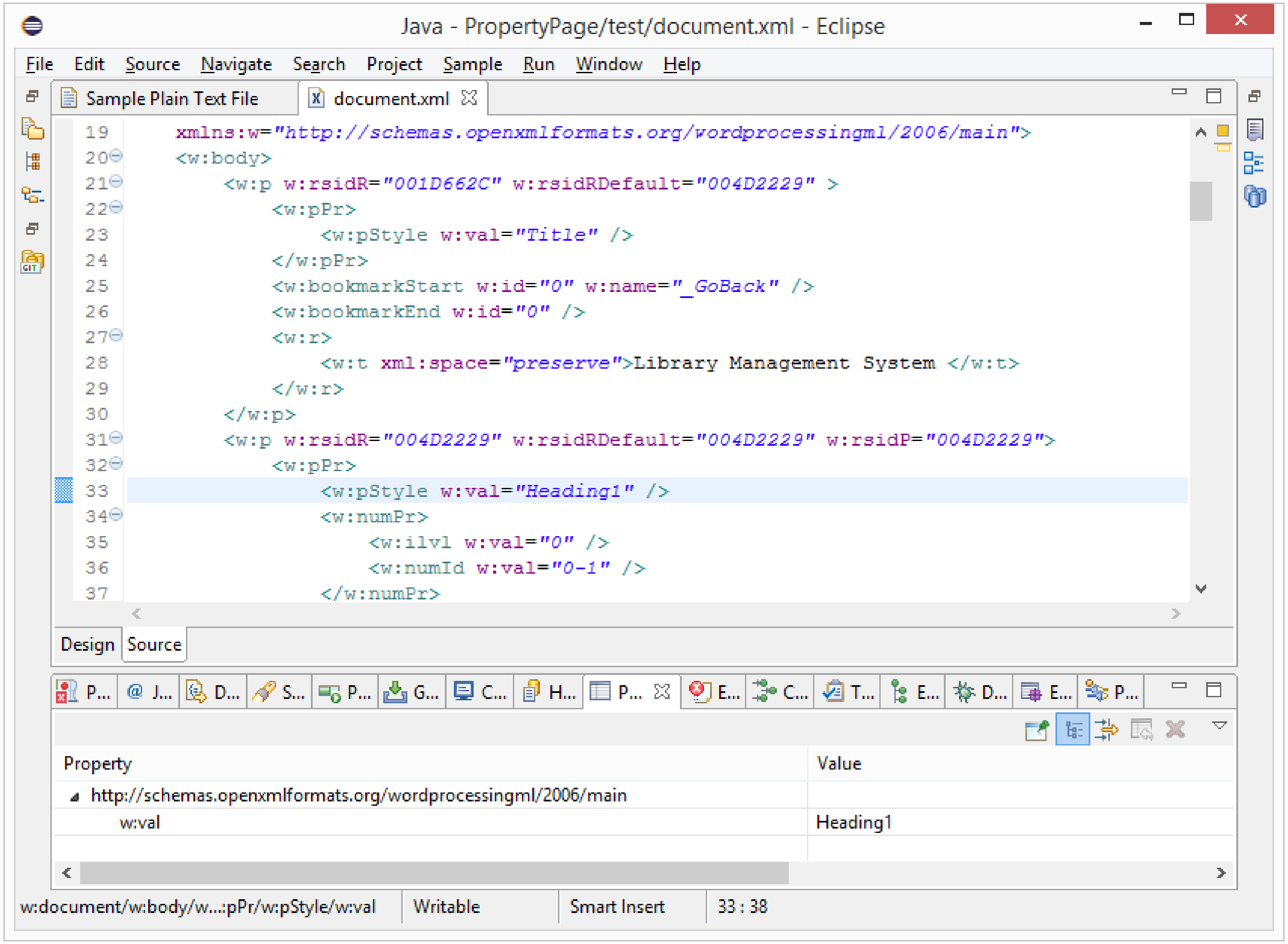
1.2 Equirement – Validation of the Book

The system allows the user to add new book data through a special book form. The system validates book before storing it.

1.3 ...

What is a text? (document file formats)

Office Open XML (.docx) (ISO/IEC 29500)

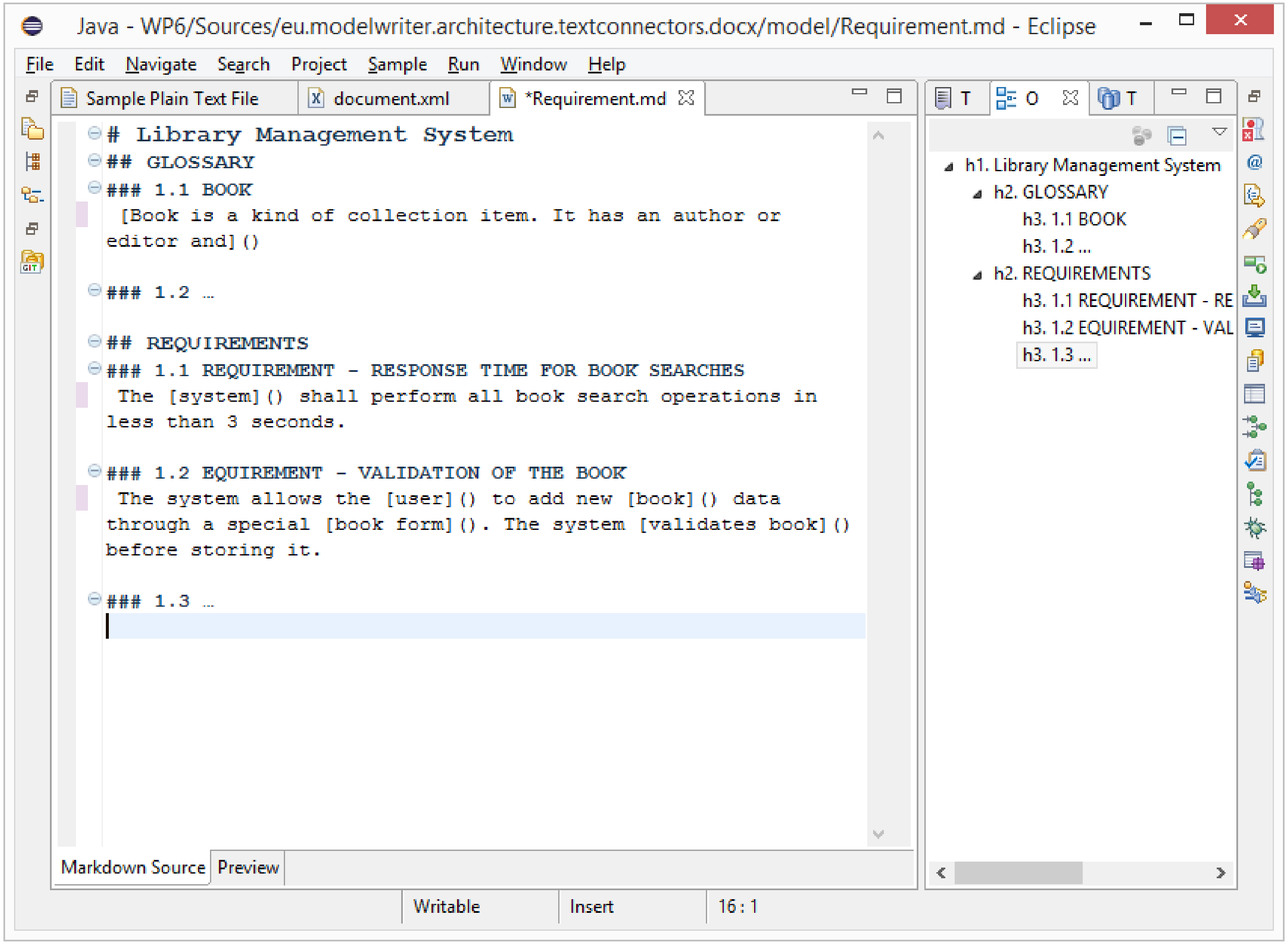


```
xmlns:w="http://schemas.openxmlformats.org/wordprocessingml/2006/main">
<w:body>
    <w:p w:rsidR="001D662C" w:rsidRDefault="004D2229" >
        <w:pPr>
            <w:pStyle w:val="Title" />
        </w:pPr>
        <w:bookmarkStart w:id="0" w:name="_GoBack" />
        <w:bookmarkEnd w:id="0" />
        <w:r>
            <w:t xml:space="preserve">Library Management System </w:t>
        </w:r>
    </w:p>
    <w:p w:rsidR="004D2229" w:rsidRDefault="004D2229" w:rsidP="004D2229">
        <w:pPr>
            <w:pStyle w:val="Heading1" />
            <w:numPr>
                <w:ilvl w:val="0" />
                <w:numId w:val="0-1" />
            </w:numPr>
```

Property	Value
http://schemas.openxmlformats.org/wordprocessingml/2006/main	
w:val	Heading1

w:document/w:body/w...:pPr/w:pStyle/w:val | Writable | Smart Insert | 33 : 38

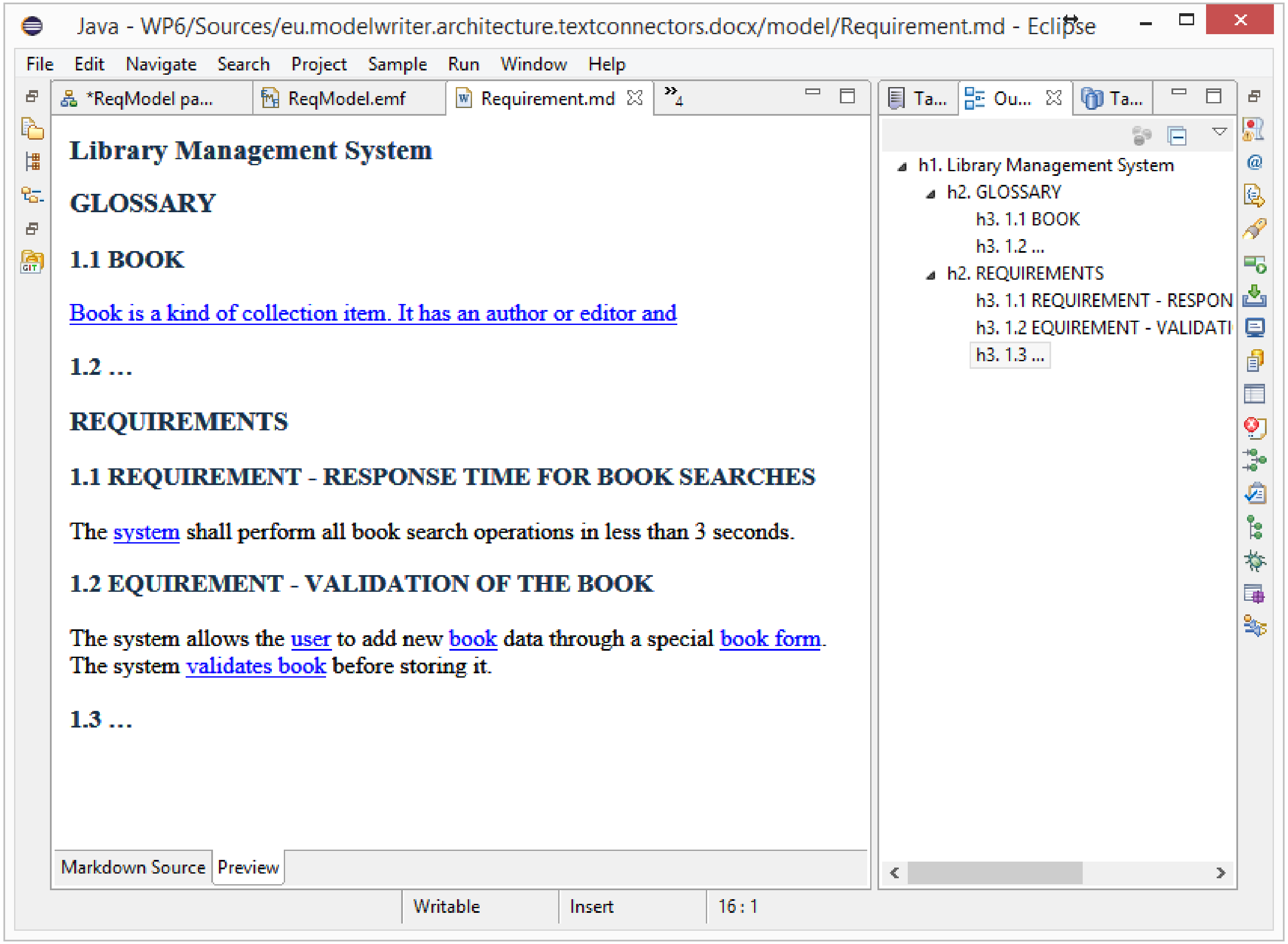
What is a text? (.md source file)
text/markdown (ICANN Standard)


Java - WP6/Sources/eu.modelwriter.architecture.textconnectors.docx/model/Requirement.md - Eclipse
File Edit Navigate Search Project Sample Run Window Help
Sample Plain Text File
document.xml
*Requirement.md
T
O
T
Markdown Source
Preview
Writable
Insert
16 : 1

```
# Library Management System
## GLOSSARY
### 1.1 BOOK
 [Book is a kind of collection item. It has an author or
editor and]()

### 1.2 …

## REQUIREMENTS
### 1.1 REQUIREMENT - RESPONSE TIME FOR BOOK SEARCHES
 The [system]() shall perform all book search operations in
less than 3 seconds.

### 1.2 EQUIREMENT - VALIDATION OF THE BOOK
 The system allows the [user]() to add new [book]() data
through a special [book form](). The system [validates book]()
before storing it.

### 1.3 …
```

- h1. Library Management System
  - h2. GLOSSARY
    - h3. 1.1 BOOK
    - h3. 1.2 ...
  - h2. REQUIREMENTS
    - h3. 1.1 REQUIREMENT - RE
    - h3. 1.2 EQUIREMENT - VAL
    - h3. 1.3 ...

What is a text? (HTML Preview)
text/markdown (ICANN Standard)



Java - WP6/Sources/eu.modelwriter.architecture.textconnectors.docx/model/Requirement.md - Eclipse
File Edit Navigate Search Project Sample Run Window Help
*ReqModel pa...
ReqModel.emf
Requirement.md
Ta...
Ou...
Ta...
Markdown Source
Preview
Writable
Insert
16 : 1

Library Management System

GLOSSARY

1.1 BOOK

Book is a kind of collection item. It has an author or editor and

1.2 …

REQUIREMENTS

1.1 REQUIREMENT - RESPONSE TIME FOR BOOK SEARCHES

The system shall perform all book search operations in less than 3 seconds.

1.2 EQUIREMENT - VALIDATION OF THE BOOK

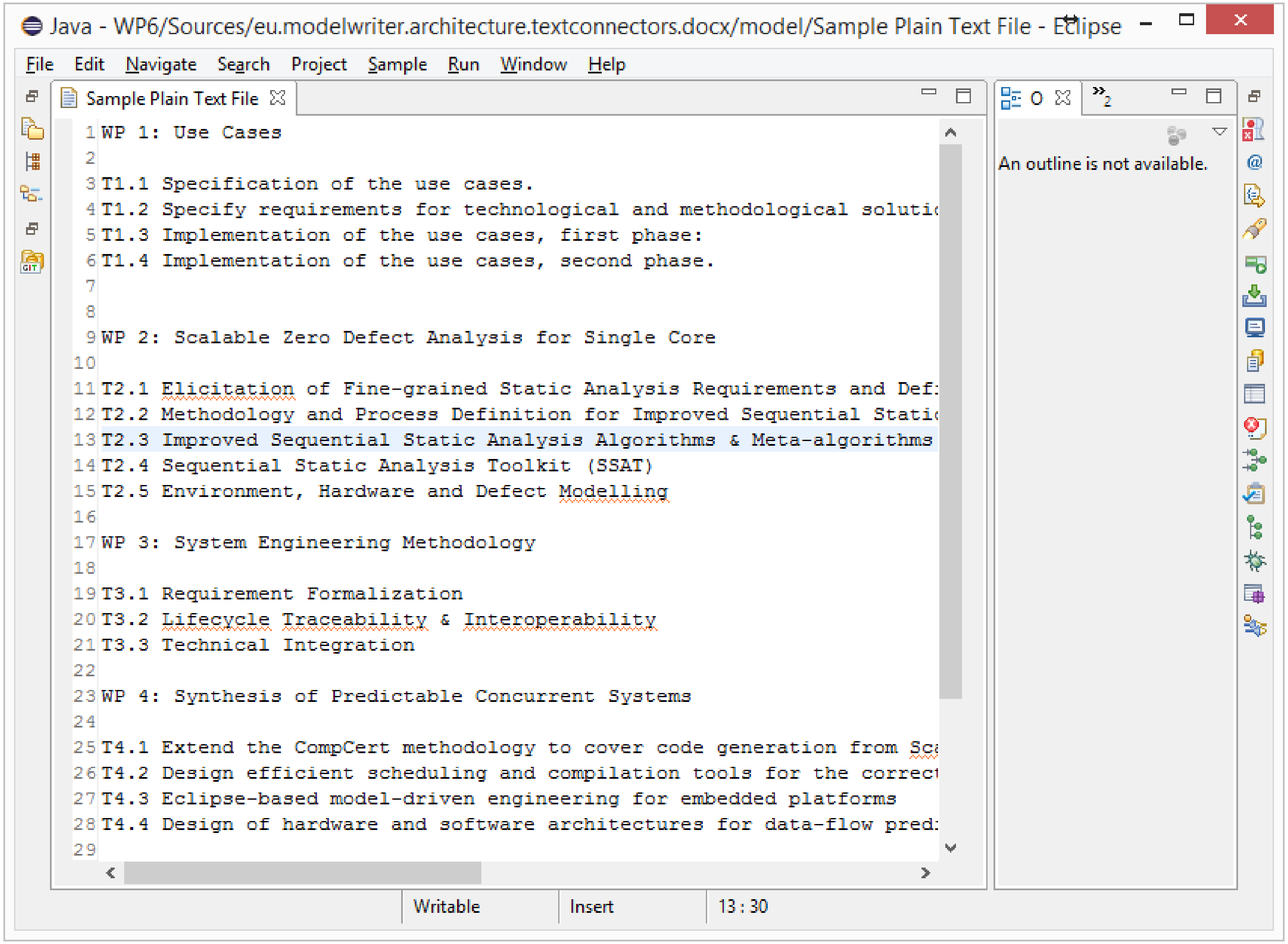
The system allows the user to add new book data through a special book form.
The system validates book before storing it.

1.3 …

- h1. Library Management System
  - h2. GLOSSARY
    - h3. 1.1 BOOK
    - h3. 1.2 ...
  - h2. REQUIREMENTS
    - h3. 1.1 REQUIREMENT - RESPON
    - h3. 1.2 EQUIREMENT - VALIDATI
    - h3. 1.3 ...

What is a text? (unformatted text)

text/plain (ICANN Standard)


Java - WP6/Sources/eu.modelwriter.architecture.textconnectors.docx/model/Sample Plain Text File - Eclipse
File
Edit
Navigate
Search
Project
Sample
Run
Window
Help
Sample Plain Text File
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Writable
Insert
13 : 30

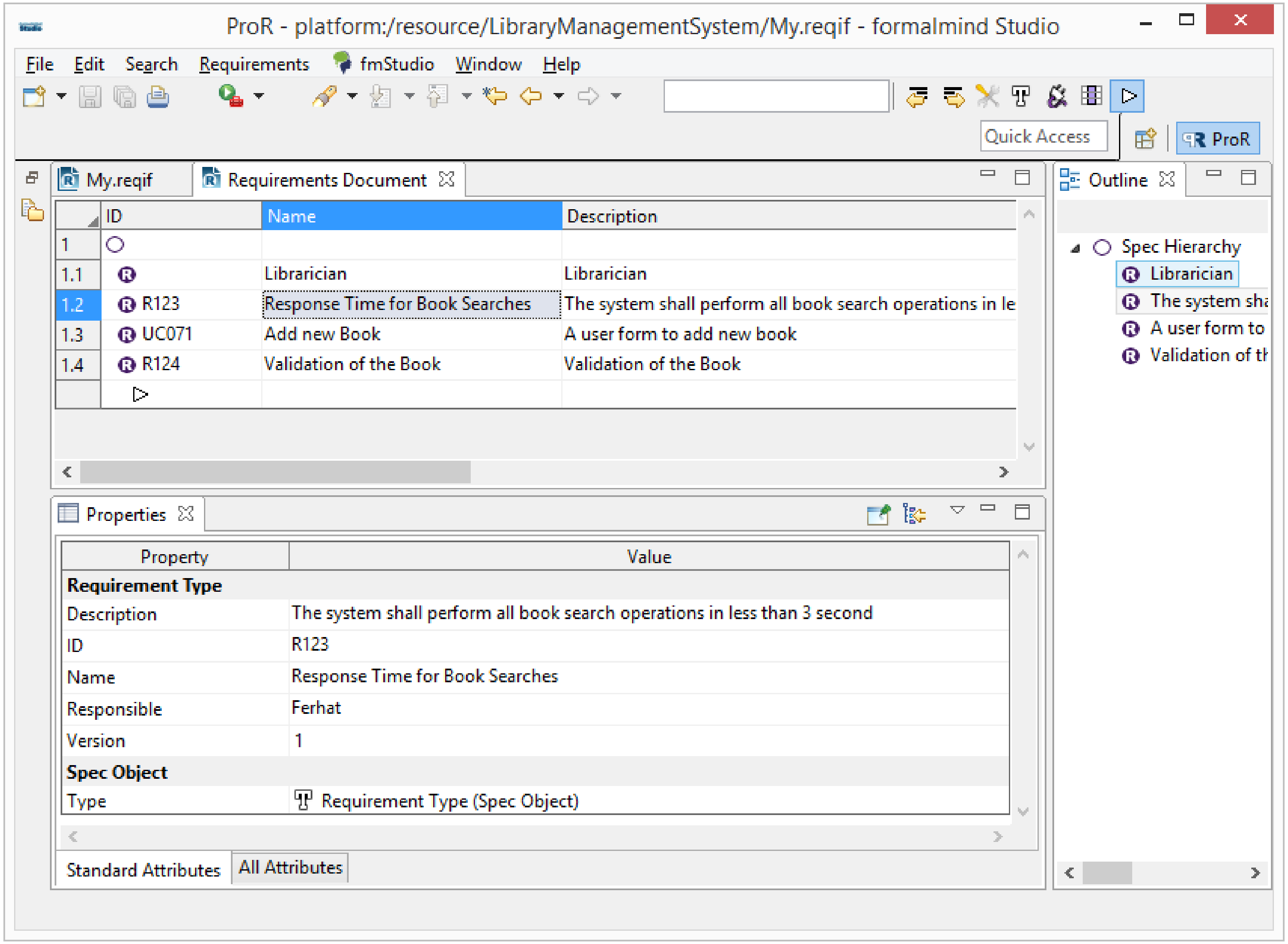
```
WP 1: Use Cases

T1.1 Specification of the use cases.
T1.2 Specify requirements for technological and methodological solutic
T1.3 Implementation of the use cases, first phase:
T1.4 Implementation of the use cases, second phase.


WP 2: Scalable Zero Defect Analysis for Single Core

T2.1 Elicitation of Fine-grained Static Analysis Requirements and Def:
T2.2 Methodology and Process Definition for Improved Sequential Static
T2.3 Improved Sequential Static Analysis Algorithms & Meta-algorithms
T2.4 Sequential Static Analysis Toolkit (SSAT)
T2.5 Environment, Hardware and Defect Modelling

WP 3: System Engineering Methodology

T3.1 Requirement Formalization
T3.2 Lifecycle Traceability & Interoperability
T3.3 Technical Integration

WP 4: Synthesis of Predictable Concurrent Systems

T4.1 Extend the CompCert methodology to cover code generation from Sca
T4.2 Design efficient scheduling and compilation tools for the correct
T4.3 Eclipse-based model-driven engineering for embedded platforms
T4.4 Design of hardware and software architectures for data-flow pred:

```

An outline is not available.

What is a model?

Everything is a model! (ReqIF Standard)

Requirements Interchange Format



ProR - platform:/resource/LibraryManagementSystem/My.reqif - formalmind Studio

	ID	Name	Description
1	○		
1.1	R	Librarician	Librarician
1.2	R R123	Response Time for Book Searches	The system shall perform all book search operations in le
1.3	R UC071	Add new Book	A user form to add new book
1.4	R R124	Validation of the Book	Validation of the Book

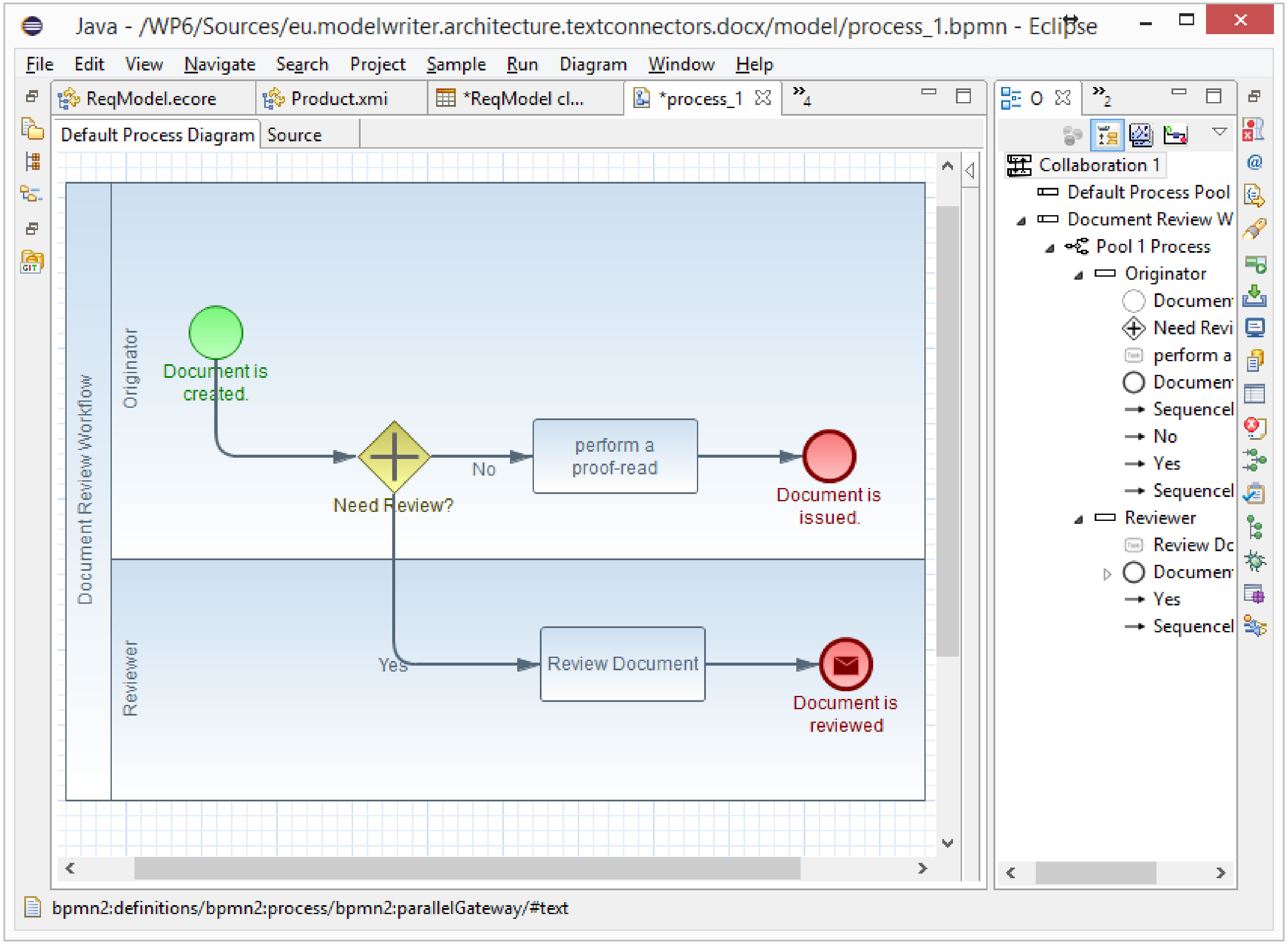
Outline:

- Spec Hierarchy
  - Librarician
  - The system sha
  - A user form to
  - Validation of th

Property	Value
Requirement Type	
Description	The system shall perform all book search operations in less than 3 second
ID	R123
Name	Response Time for Book Searches
Responsible	Ferhat
Version	1
Spec Object	
Type	Requirement Type (Spec Object)

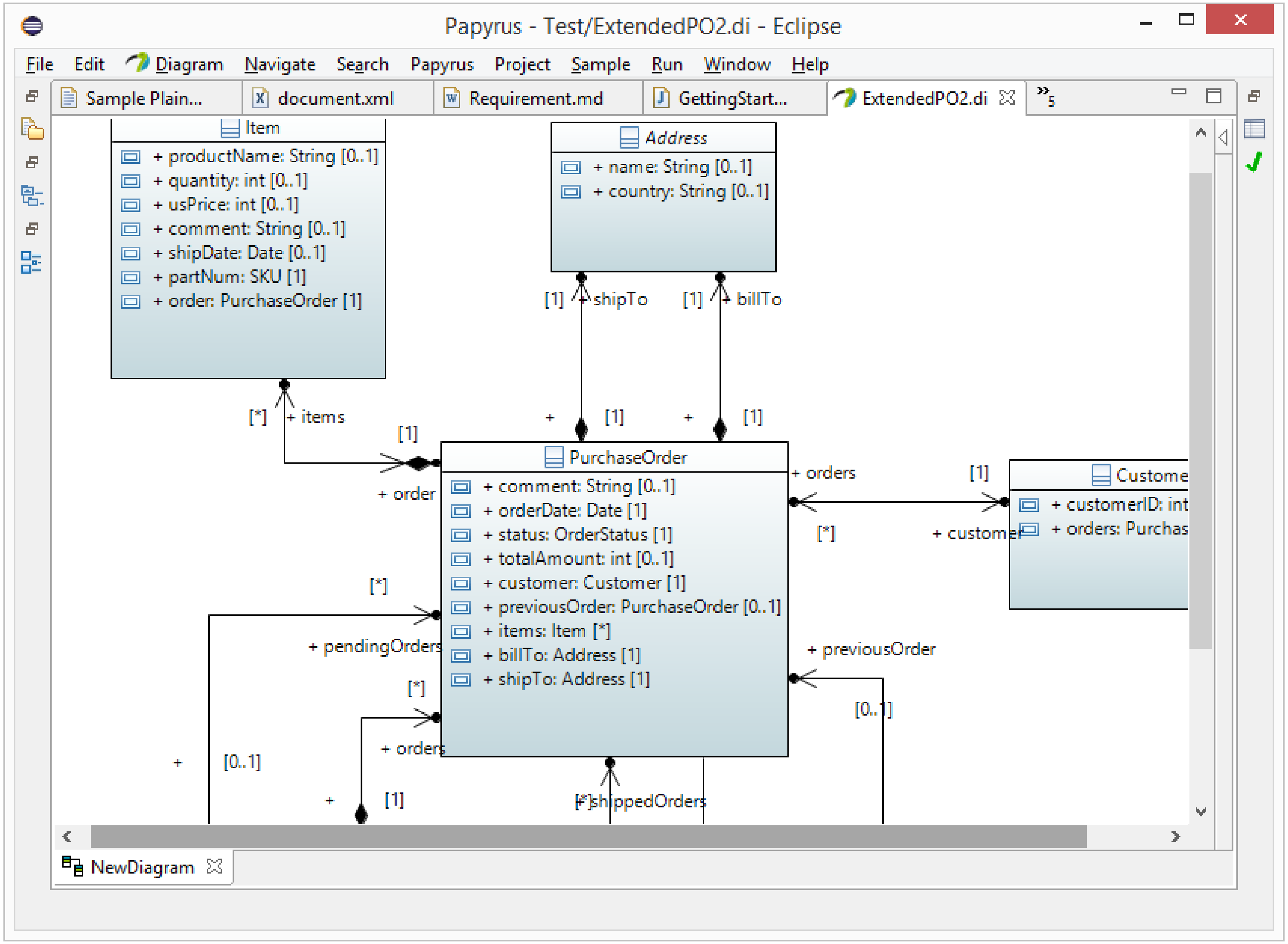
Everything is a model! (BPMN Standard)

Business Process Model & Notation



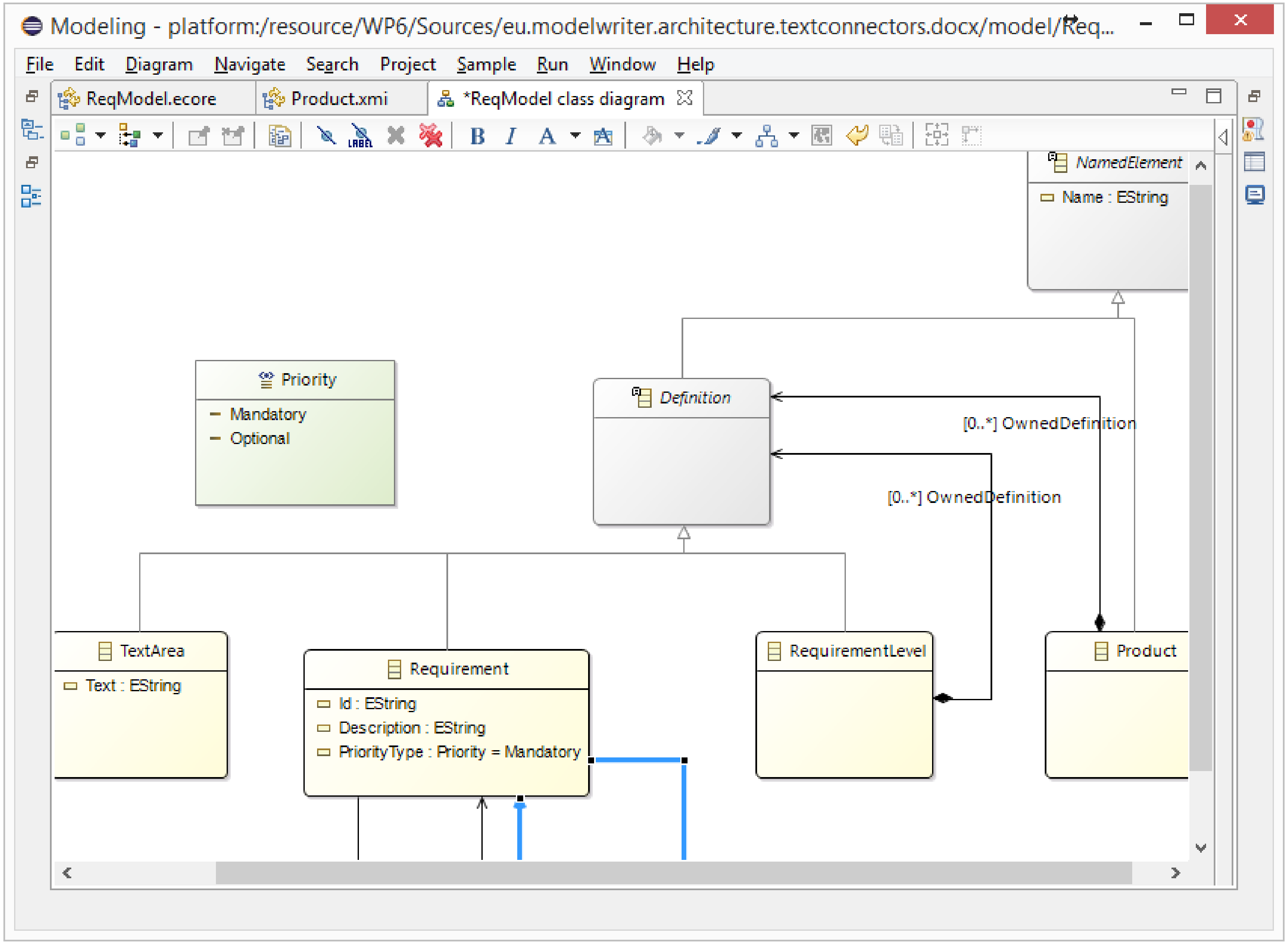
bpmn2:definitions/bpmn2:process/bpmn2:parallelGateway/#text

Everything is a model! (UML Standard)
UML Modeling Languages



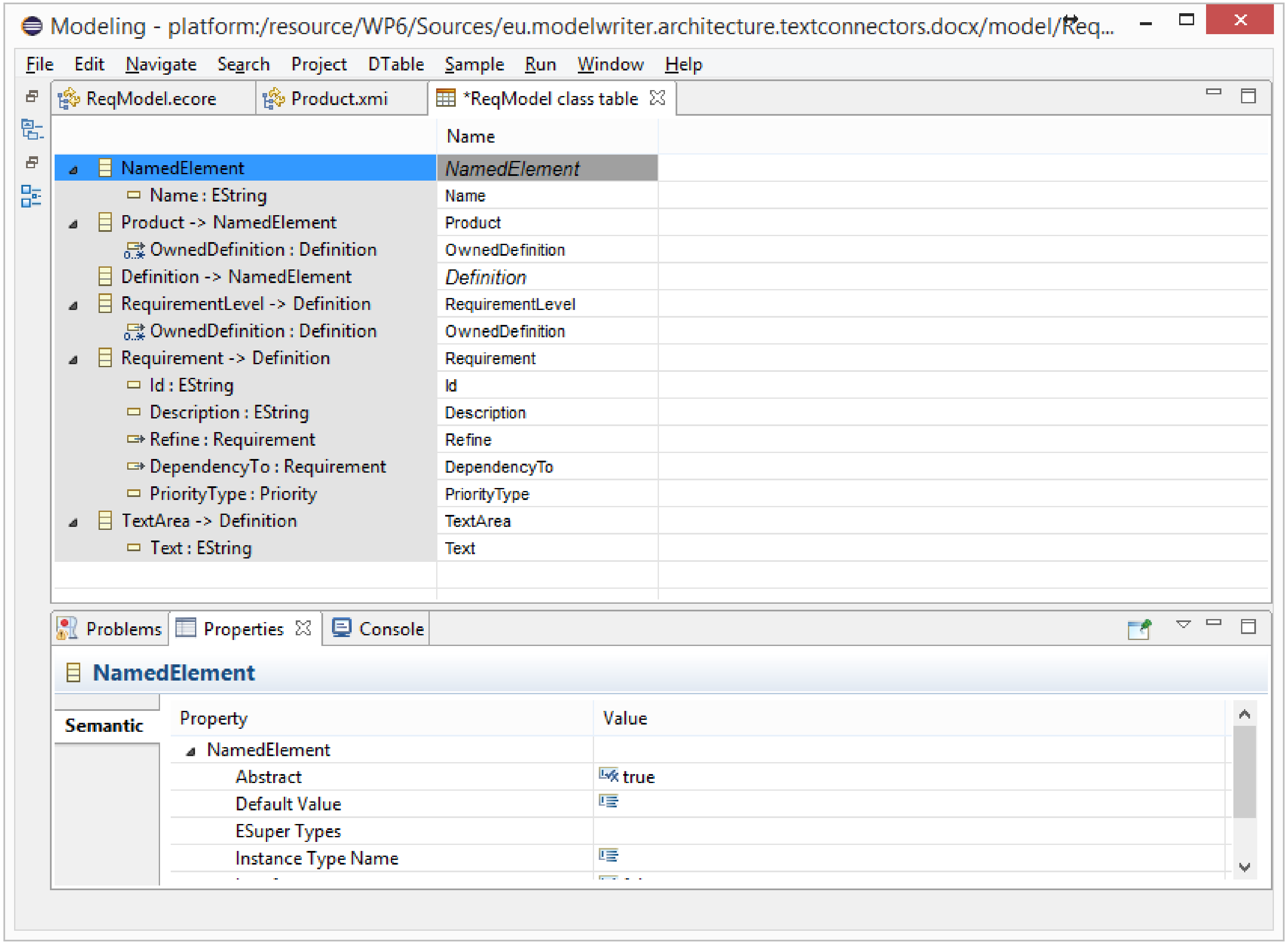
Everything is a model!

Eclipse Modeling Framework (EMF)



Everything is a model!

Tree-based or Tabular Representations



Modeling - platform:/resource/WP6/Sources/eu.modelwriter.architecture.textconnectors.docx/model/Req...

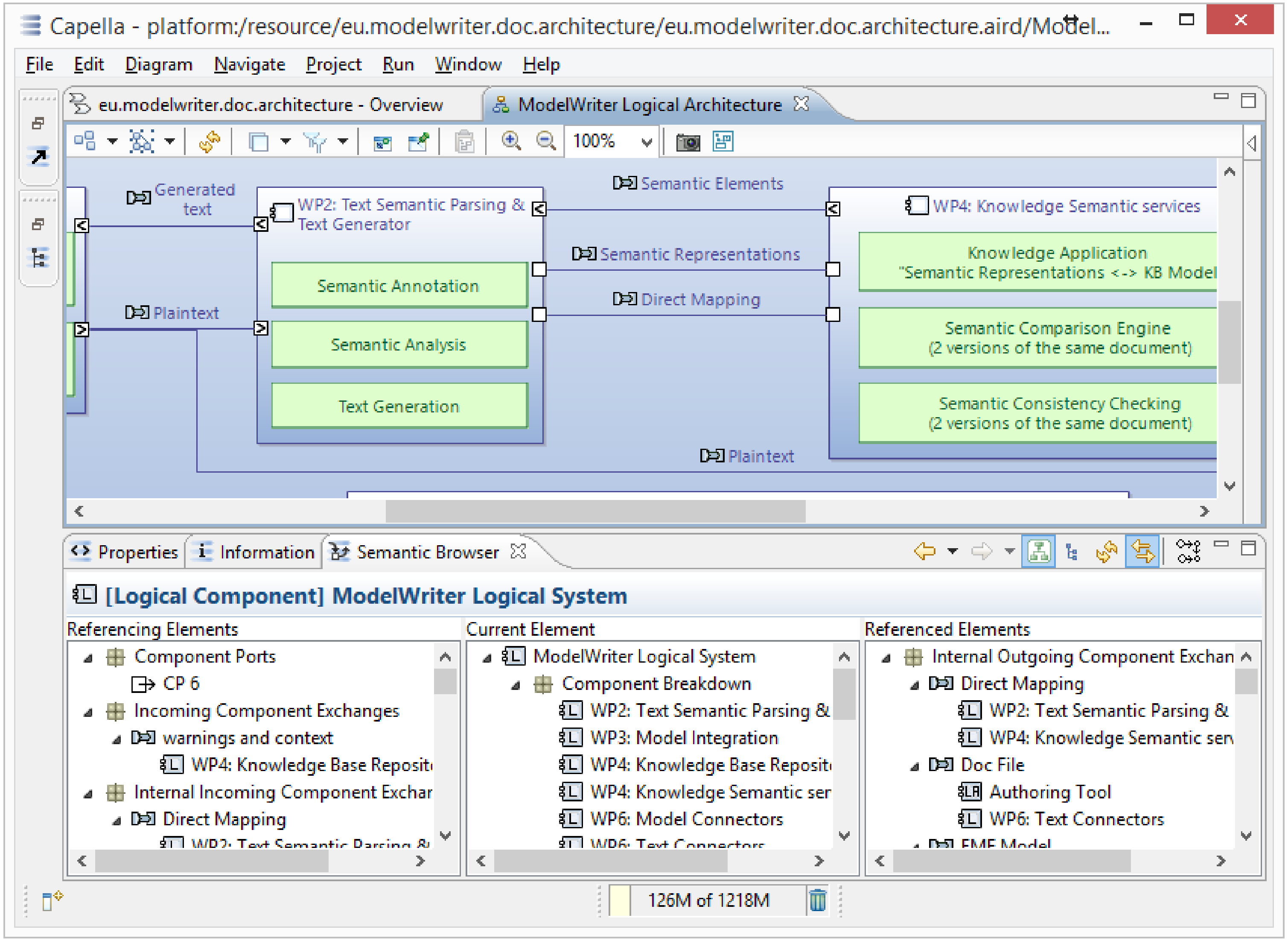
	Name
NamedElement	*NamedElement*
Name : EString	Name
Product -> NamedElement	Product
OwnedDefinition : Definition	OwnedDefinition
Definition -> NamedElement	*Definition*
RequirementLevel -> Definition	RequirementLevel
OwnedDefinition : Definition	OwnedDefinition
Requirement -> Definition	Requirement
Id : EString	Id
Description : EString	Description
Refine : Requirement	Refine
DependencyTo : Requirement	DependencyTo
PriorityType : Priority	PriorityType
TextArea -> Definition	TextArea
Text : EString	Text

NamedElement

Property	Value
NamedElement	
Abstract	true
Default Value	
ESuper Types	
Instance Type Name	

Everything is a model!

Software/System Architecture Design

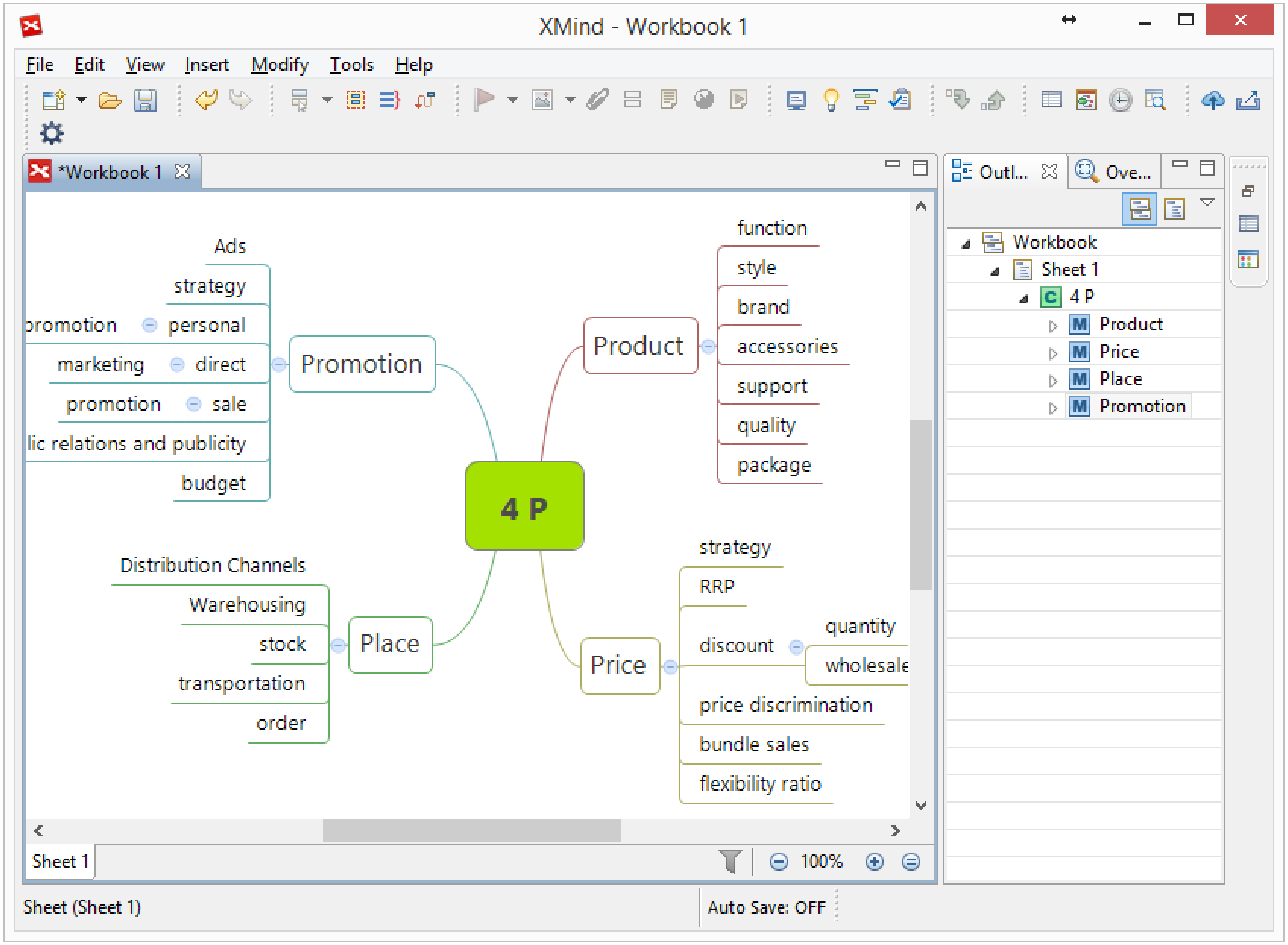


Capella - platform:/resource/eu.modelwriter.doc.architecture/eu.modelwriter.doc.architecture.aird/Model...

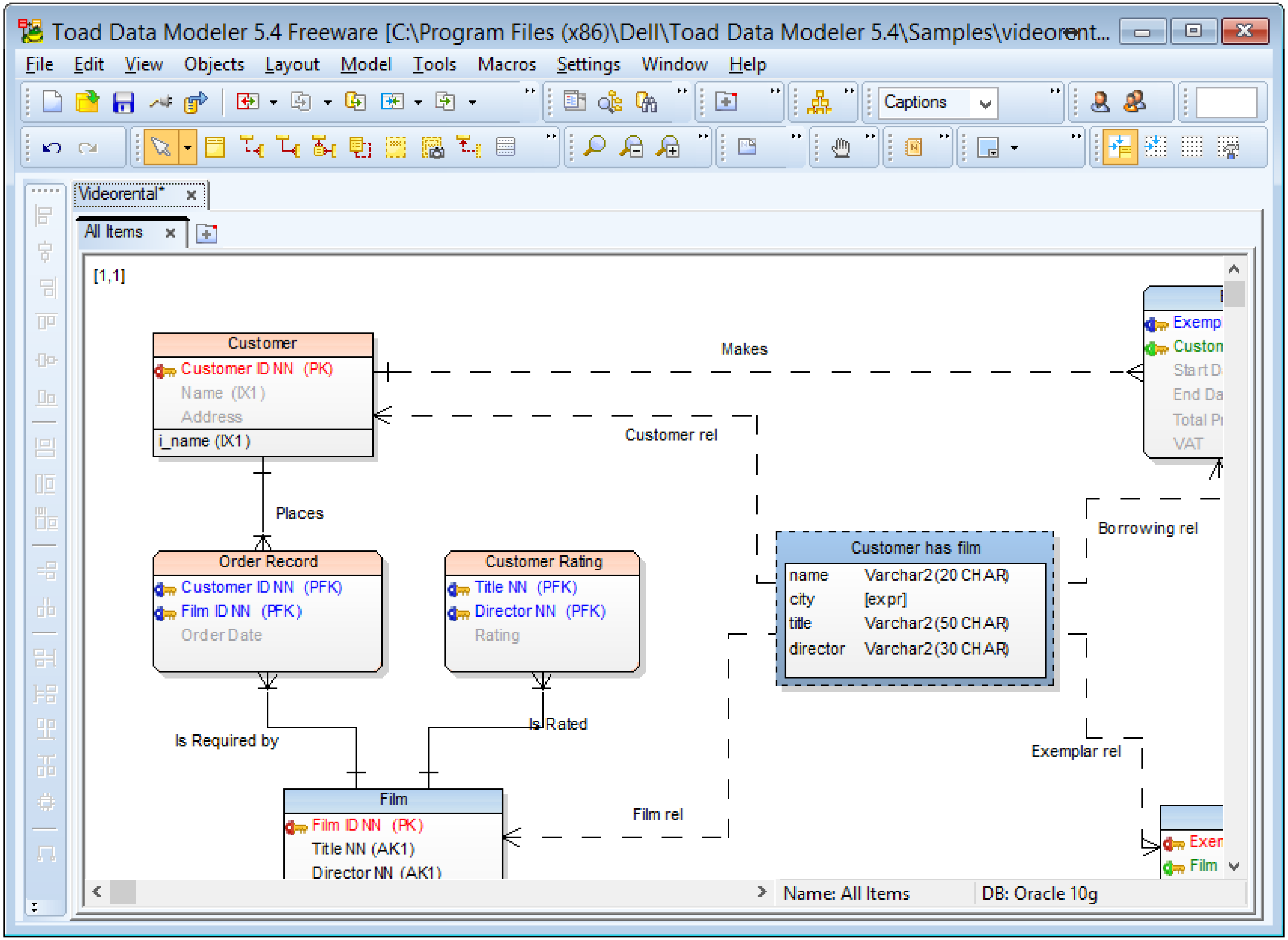
File Edit Diagram Navigate Project Run Window Help
eu.modelwriter.doc.architecture - Overview
ModelWriter Logical Architecture
100%
Generated text
WP2: Text Semantic Parsing & Text Generator
Semantic Elements
WP4: Knowledge Semantic services
Semantic Representations
Knowledge Application "Semantic Representations <-> KB Model
Semantic Annotation
Direct Mapping
Plaintext
Semantic Analysis
Semantic Comparison Engine (2 versions of the same document)
Text Generation
Semantic Consistency Checking (2 versions of the same document)
Plaintext
Properties
Information
Semantic Browser
[Logical Component] ModelWriter Logical System
Referencing Elements
Component Ports
CP 6
Incoming Component Exchanges
warnings and context
WP4: Knowledge Base Reposit
Internal Incoming Component Exchar
Direct Mapping
WP2: Text Semantic Parsing &
Current Element
ModelWriter Logical System
Component Breakdown
WP2: Text Semantic Parsing &
WP3: Model Integration
WP4: Knowledge Base Reposit
WP4: Knowledge Semantic ser
WP6: Model Connectors
WP6: Text Connectors
Referenced Elements
Internal Outgoing Component Exchan
Direct Mapping
WP2: Text Semantic Parsing &
WP4: Knowledge Semantic ser
Doc File
Authoring Tool
WP6: Text Connectors
EMF Model
126M of 1218M

Everything is a model!

Topic Maps, Mind Maps, Vocabularies …

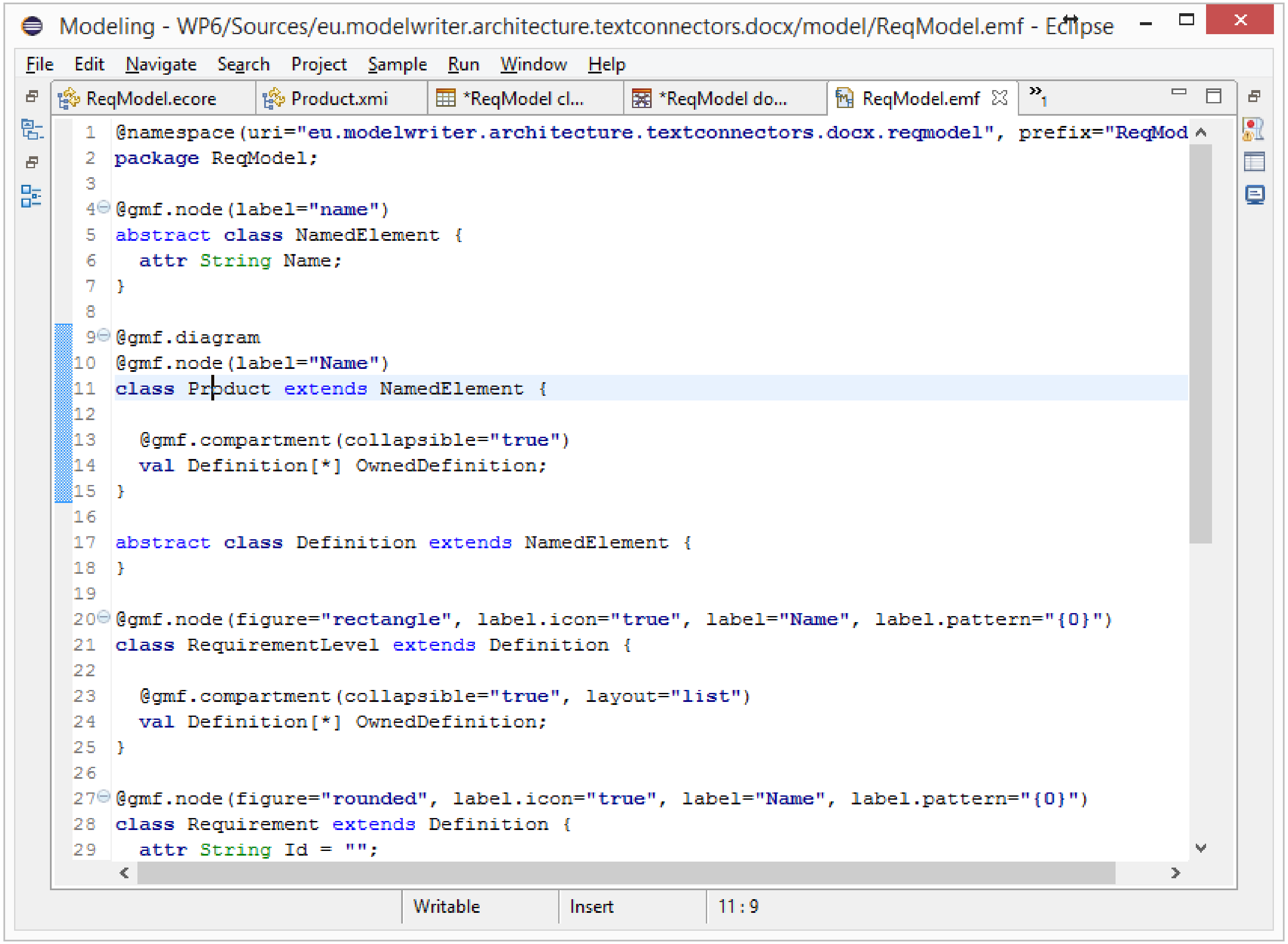


Everything is a model!
Databases (ER, IDEF1.x)



Everything is a model! (Textual Lang.)

Domain Specific Languages



Modeling - WP6/Sources/eu.modelwriter.architecture.textconnectors.docx/model/ReqModel.emf - Eclipse
File Edit Navigate Search Project Sample Run Window Help
ReqModel.ecore
Product.xmi
*ReqModel cl...
*ReqModel do...
ReqModel.emf
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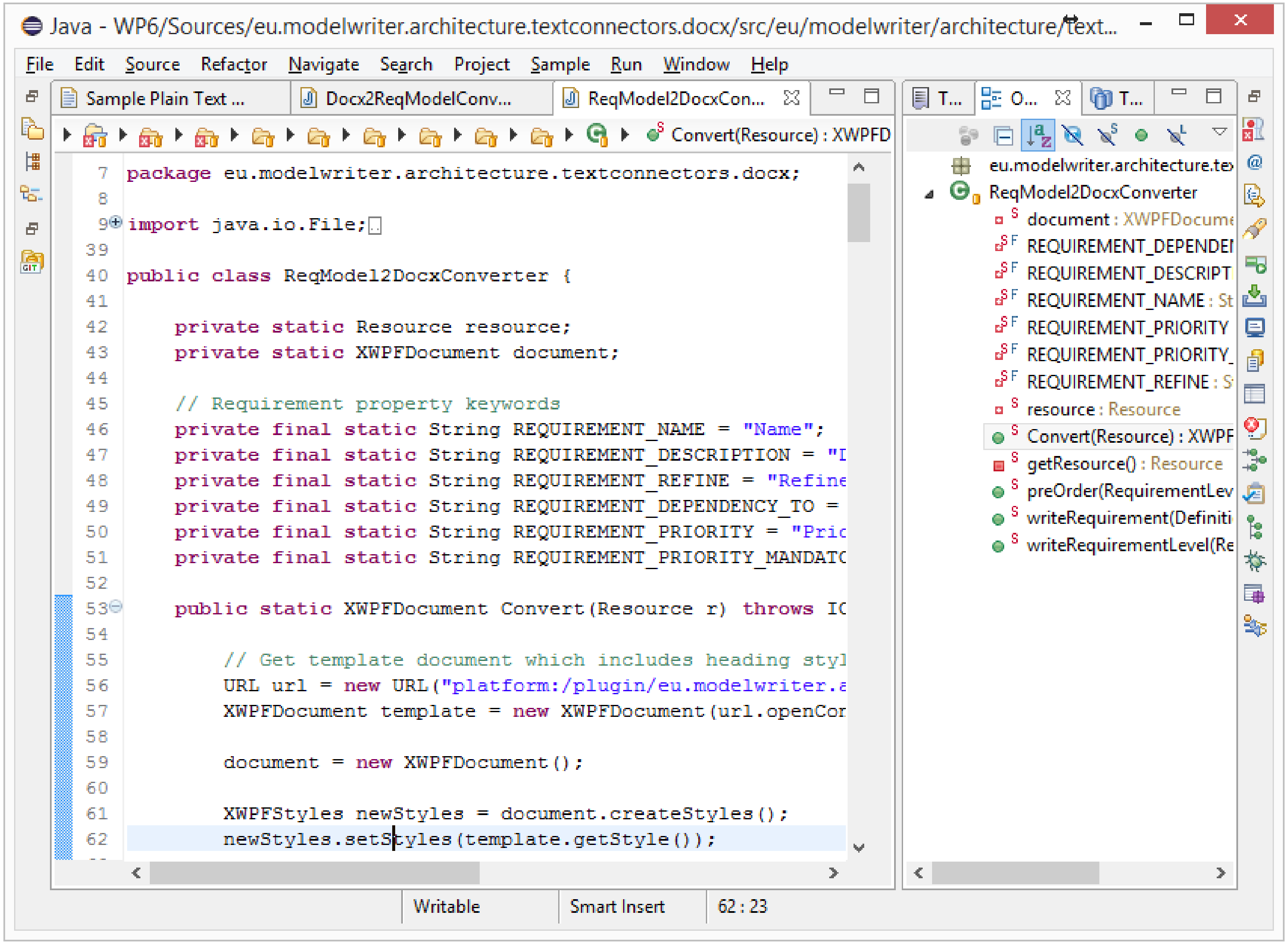
11 : 9

```
@namespace(uri="eu.modelwriter.architecture.textconnectors.docx.reqmodel", prefix="ReqMod
package ReqModel;

@gmf.node(label="name")
abstract class NamedElement {
  attr String Name;
}

@gmf.diagram
@gmf.node(label="Name")
class Product extends NamedElement {

  @gmf.compartment(collapsible="true")
  val Definition[*] OwnedDefinition;
}

abstract class Definition extends NamedElement {
}

@gmf.node(figure="rectangle", label.icon="true", label="Name", label.pattern="{0}")
class RequirementLevel extends Definition {

  @gmf.compartment(collapsible="true", layout="list")
  val Definition[*] OwnedDefinition;
}

@gmf.node(figure="rounded", label.icon="true", label="Name", label.pattern="{0}")
class Requirement extends Definition {
  attr String Id = "";
```

Everything is a model! (Java, C++, etc.)

Even Programing Languages


Java - WP6/Sources/eu.modelwriter.architecture.textconnectors.docx/src/eu/modelwriter/architecture/text...
File Edit Source Refactor Navigate Search Project Sample Run Window Help
Sample Plain Text ...
Docx2ReqModelConv...
ReqModel2DocxCon...
T...
O...
T...
Convert(Resource) : XWPFD

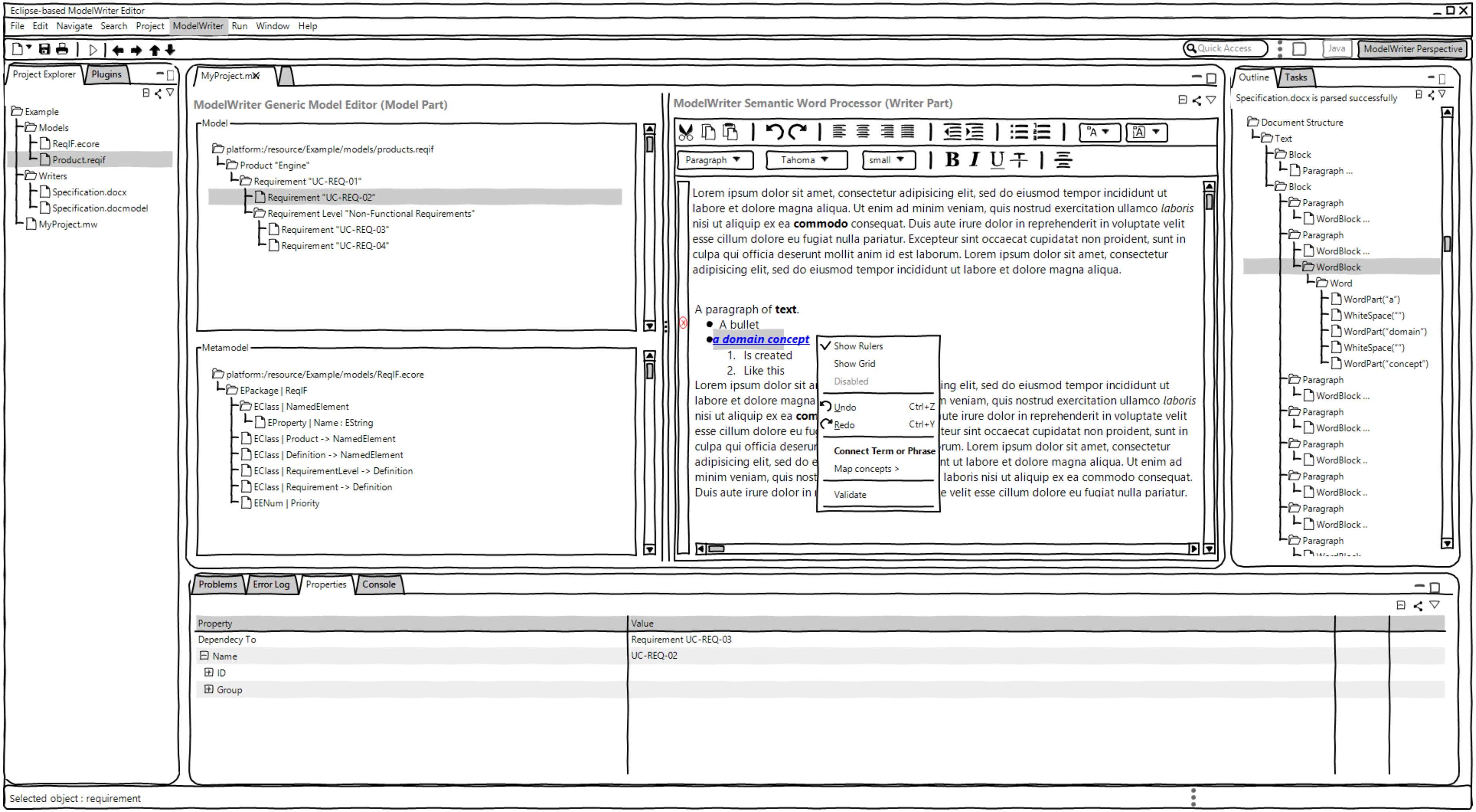
```
package eu.modelwriter.architecture.textconnectors.docx;

import java.io.File;

public class ReqModel2DocxConverter {

    private static Resource resource;
    private static XWPFDocument document;

    // Requirement property keywords
    private final static String REQUIREMENT_NAME = "Name";
    private final static String REQUIREMENT_DESCRIPTION = "I
    private final static String REQUIREMENT_REFINE = "Refine
    private final static String REQUIREMENT_DEPENDENCY_TO =
    private final static String REQUIREMENT_PRIORITY = "Pric
    private final static String REQUIREMENT_PRIORITY_MANDATC

    public static XWPFDocument Convert(Resource r) throws IC

        // Get template document which includes heading styl
        URL url = new URL("platform:/plugin/eu.modelwriter.a
        XWPFDocument template = new XWPFDocument(url.openCon

        document = new XWPFDocument();

        XWPFStyles newStyles = document.createStyles();
        newStyles.setStyles(template.getStyle());
```

eu.modelwriter.architecture.te
ReqModel2DocxConverter
document : XWPFDocume
REQUIREMENT_DEPENDEI
REQUIREMENT_DESCRIPT
REQUIREMENT_NAME : St
REQUIREMENT_PRIORITY
REQUIREMENT_PRIORITY_
REQUIREMENT_REFINE : S
resource : Resource
Convert(Resource) : XWPF
getResource() : Resource
preOrder(RequirementLev
writeRequirement(Definiti
writeRequirementLevel(Re

Writable | Smart Insert | 62 : 23

Is it possible to connect and keep arbitrary software/system engineering artifacts synchronized ?

ModelWriter – The Solution



Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco *laboris* nisi ut aliquip ex ea **commodo** consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum. Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua.

A paragraph of **text**.

- A bullet
- ***a domain concept***
  1. Is created
  2. Like this

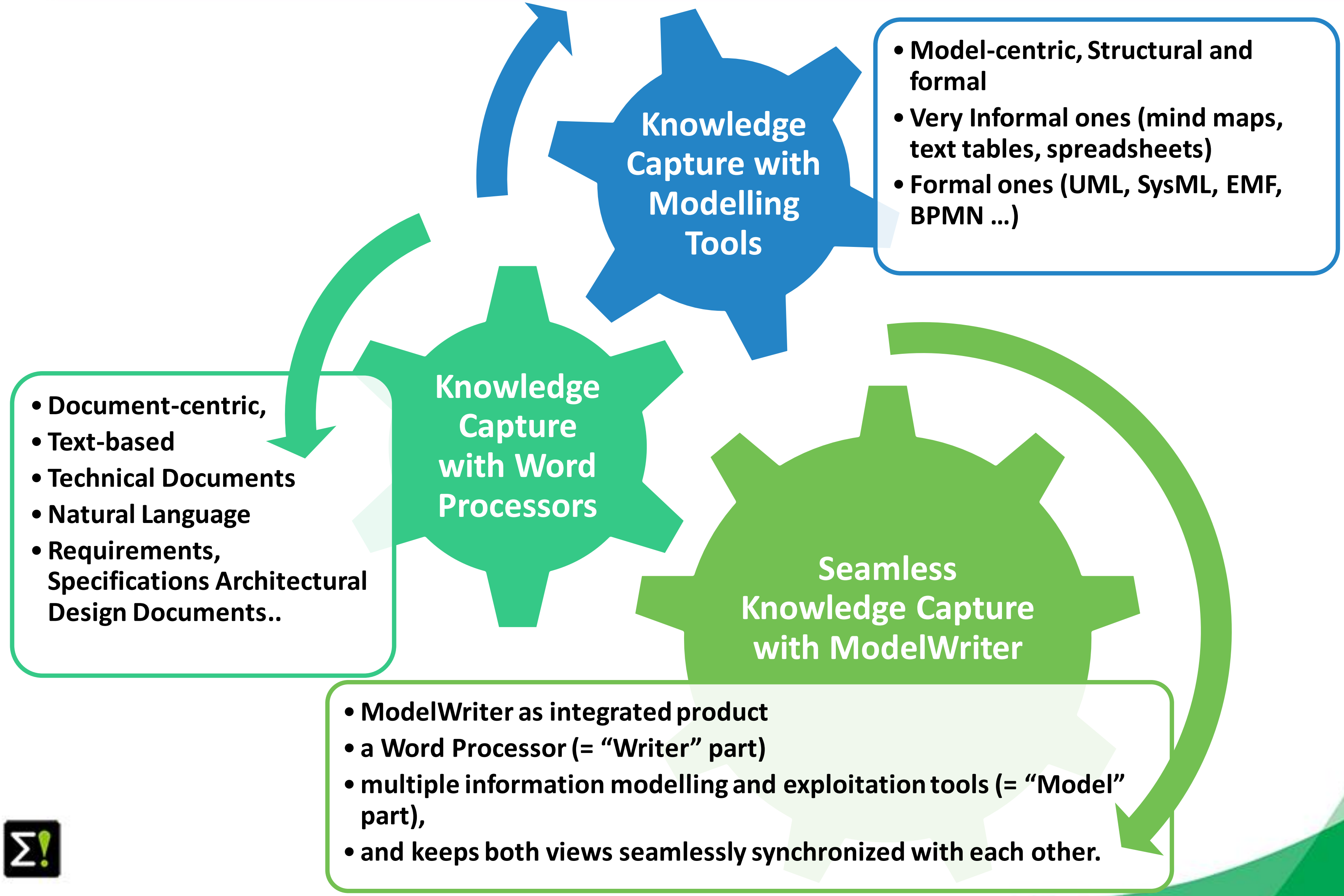
Lorem ipsum dolor sit a ing elit, sed do eiusmod tempor incididunt ut labore et dolore magna n veniam, quis nostrud exercitation ullamco *laboris* nisi ut aliquip ex ea **com** ute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fu teur sint occaecat cupidatat non proident, sunt in culpa qui officia deseru rum. Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do e nt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nost laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in r e velit esse cillum dolore eu fugiat nulla pariatur.

Property	Value
Dependecy To	Requirement UC-REQ-03
⊟ Name	UC-REQ-02
⊞ ID	
⊞ Group	

Text & Model-Synchronized Document Engineering Platform

Synchronization is maintained!

ModelWriter
Today's Knowledge Capture



Knowledge Capture with Modelling Tools

- Model-centric, Structural and formal
- Very Informal ones (mind maps, text tables, spreadsheets)
- Formal ones (UML, SysML, EMF, BPMN …)

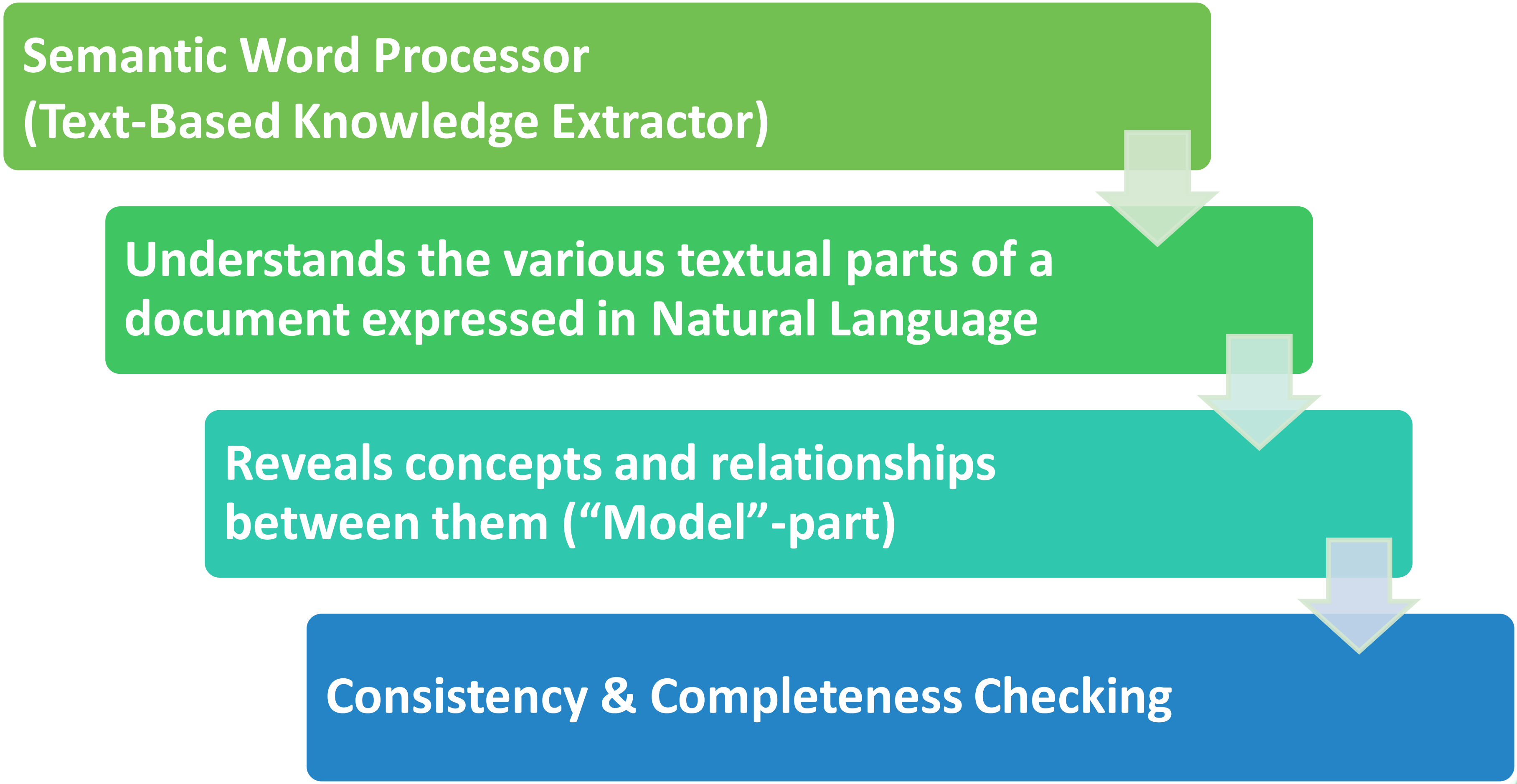
Knowledge Capture with Word Processors

- Document-centric,
- Text-based
- Technical Documents
- Natural Language
- Requirements, Specifications Architectural Design Documents..

Seamless Knowledge Capture with ModelWriter

- ModelWriter as integrated product
- a Word Processor (= "Writer" part)
- multiple information modelling and exploitation tools (= "Model" part),
- and keeps both views seamlessly synchronized with each other.

ModelWriter
Text-Based Knowledge Extraction



Semantic Word Processor
(Text-Based Knowledge Extractor)

Understands the various textual parts of a document expressed in Natural Language

Reveals concepts and relationships between them (“Model”-part)

Consistency & Completeness Checking

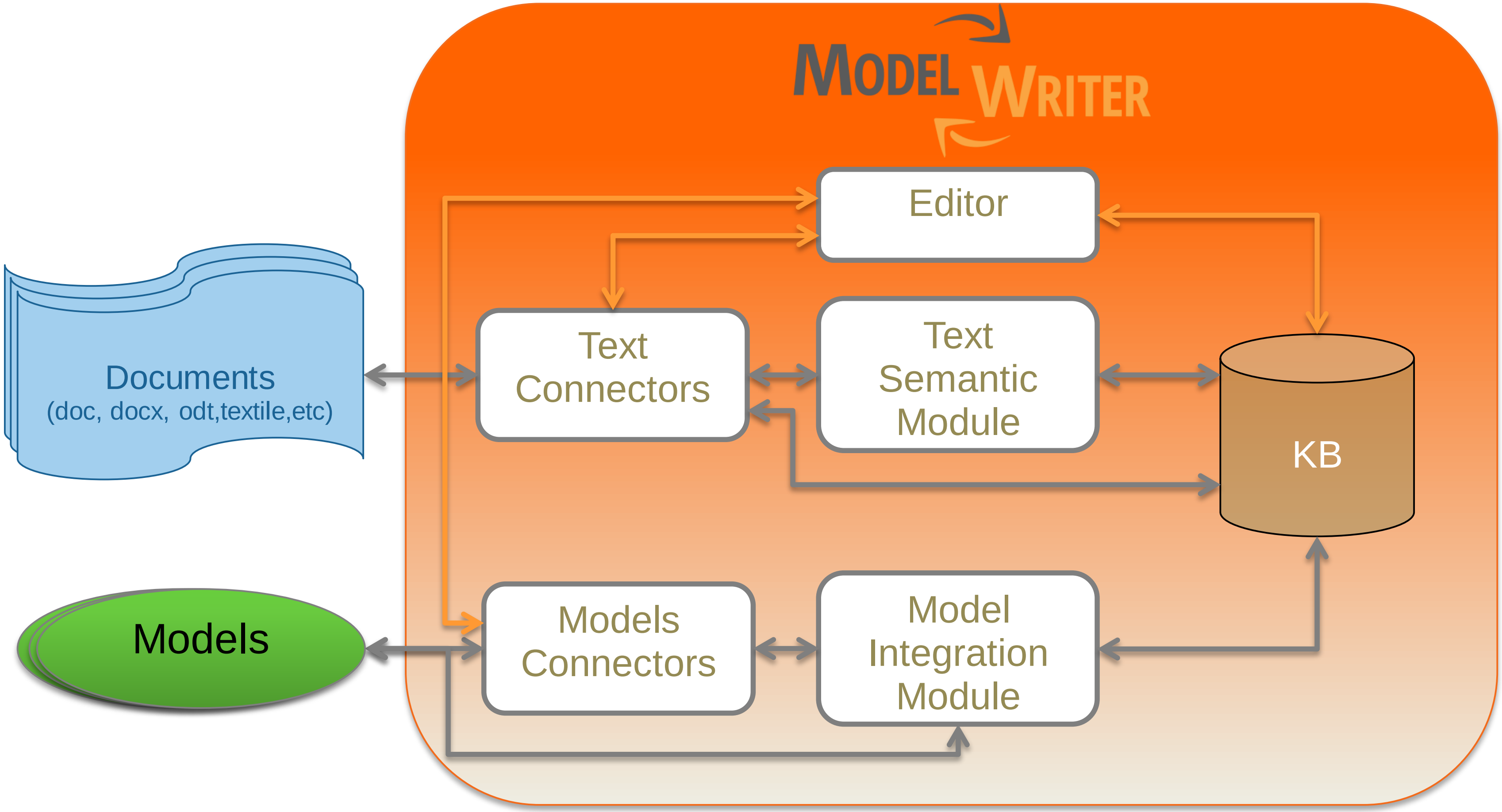
ModelWriter
Quantification of the expected benefits

- Improvement in quality and productivity of technical documentation.

- Quality increase of the product with consistent requirements and designs.
  - For instance, according to AIRBUS’s claims in their use cases, the global saving would be 5 M€ to 7 M€ (A350 Recurring Cost)

- 50% reduction of costs for keeping the documentation up-to-date with the developed software

ModelWriter Architecture



ModelWriter:
Work packages & Concrete Results

WP1 Industrial Use Cases and Requirements (AIRBUS)

WP2 (LORIA)

- Semantic Word Processor
- bi-directional transformation between text and formal knowledge representation

WP3 (UNIT)

- An extensible model-model transformation framework
- Model checker plug-in for consistency

WP4 (MANTIS)

- A federated Knowledge Base and its API
- Bi-directional sync. mechanism between texts and models

WP6 (OBEO)

- A complete "ModelWriter" tool integrating of all these in a consistent

WP5 Project Management (UNIT)

WP7 Standardization, Dissemination and Exploitation (OBEO)

ModelWriter

Industrial Use Cases (French Consortium)

Help determining the impacts of a change in the Enterprise Architecture

UC-FR-02

Enterprise Architecture

CEISAR - Center of Excellence in Enterprise Architecture

OBEO, TOTAL, AIR France, AXA

This use case will explore the use of ModelWriter concept to structure and manage a repository of system installation rules.

UC-FR-03

Synchronization of regulation documentation with a design rule repository

OBEO, AIRBUS, LORIA

Focus on building synchronized links between regulation documents in natural language and rules (as models).

UC-FR-04

Production of a context specific design document

OBEO, AIRBUS, LORIA

ModelWriter

Industrial Use Cases (Turkish Consortium)

UC-TR-03

IBM Rational Doors Plug-in and Eclipse Requirement Frameworks Sub-component which supports OMG's ReqIF Standard.

Sync between Requirement Documentation and Feature Models

KoçSistem, UNIT

UC-TR-04 (UC-FR-01)

Demonstrate that the ModelWriter concept can be usefully applied on System design / Requirement generation activities.

Requirements Engineering with SysML Designer (requirement-model consistency)

UNIT, HAVELSAN

UC-TR-05

Synchronous Business Process Design with Use Cases

UNIT, KoçSistem

BPMN and Use Case Documentation

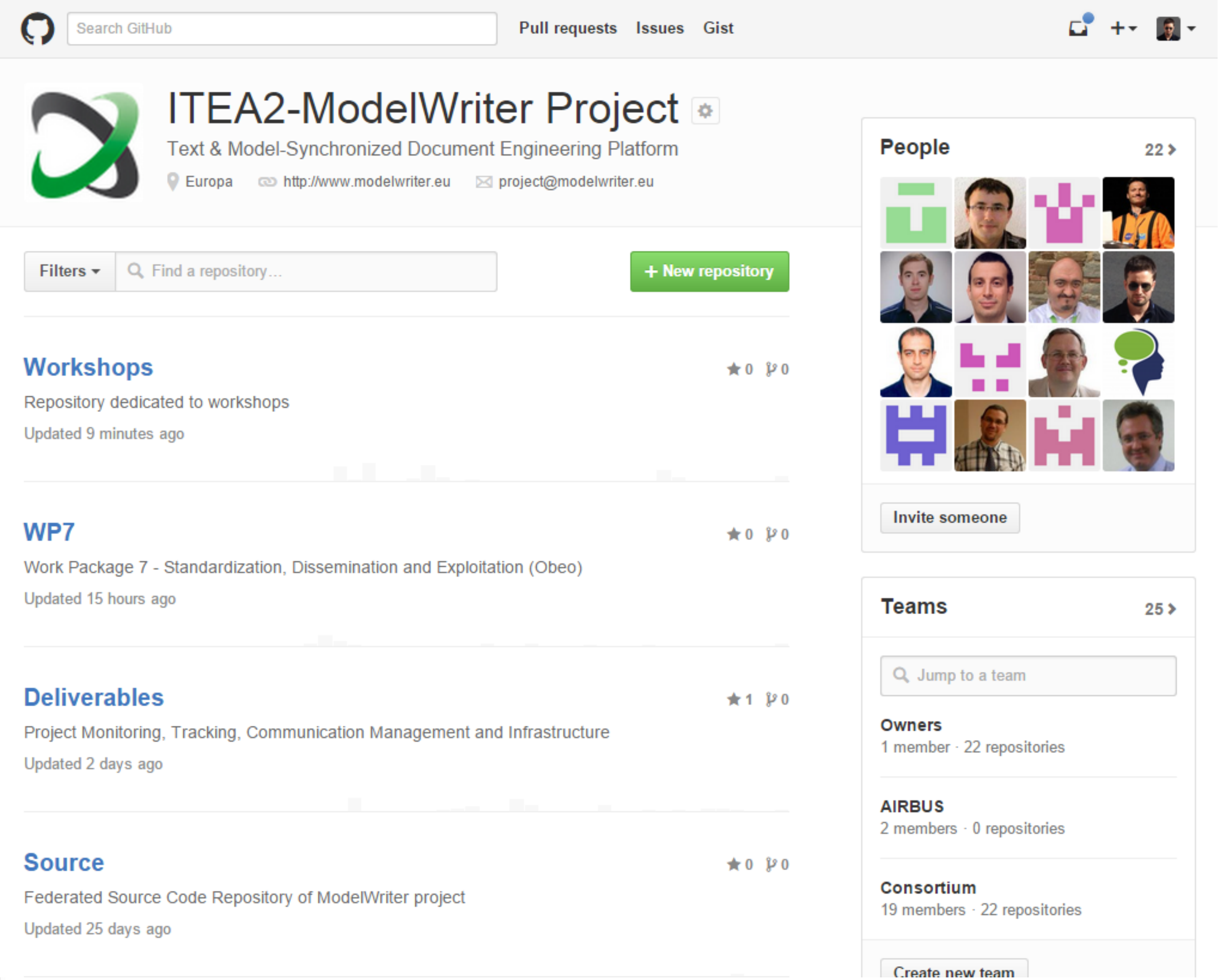
ModelWriter Business Strategy

Open Source Campaign
Open Call for Industrial User Stories

- *Shape the future ModelWriter*
- *Early adaptation of the technology*
- *Long Term Support*

ModelWriter Open Source Campaign

https://github.com/modelwriter



ITEA2-ModelWriter Project

Text & Model-Synchronized Document Engineering Platform

Europa · http://www.modelwriter.eu · project@modelwriter.eu

Workshops ★ 0 ⑂ 0

Repository dedicated to workshops

Updated 9 minutes ago

WP7 ★ 0 ⑂ 0

Work Package 7 - Standardization, Dissemination and Exploitation (Obeo)

Updated 15 hours ago

Deliverables ★ 1 ⑂ 0

Project Monitoring, Tracking, Communication Management and Infrastructure

Updated 2 days ago

Source ★ 0 ⑂ 0

Federated Source Code Repository of ModelWriter project

Updated 25 days ago

People 22 ›

Teams 25 ›

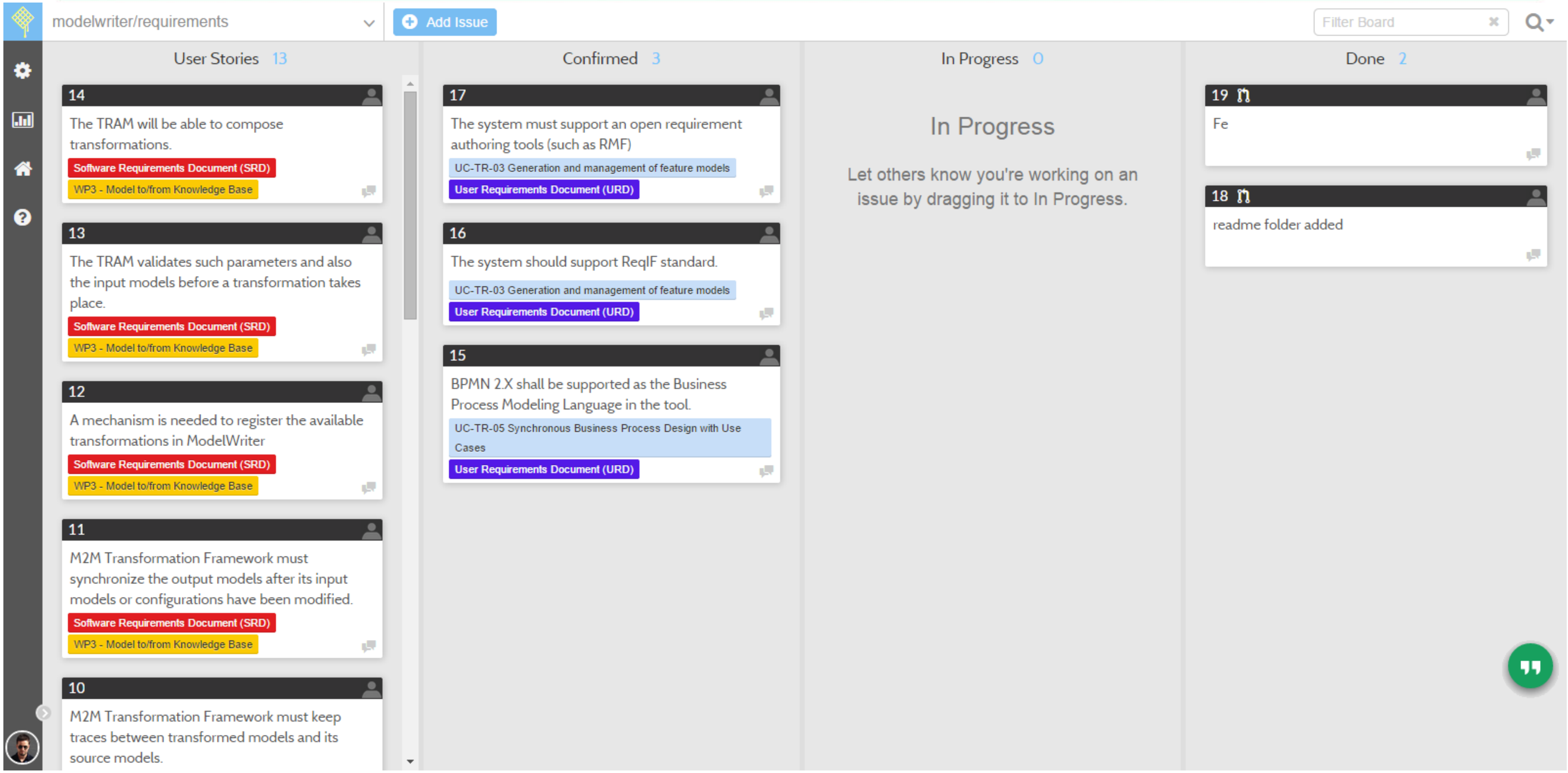
Owners
1 member · 22 repositories

AIRBUS
2 members · 0 repositories

Consortium
19 members · 22 repositories

ModelWriter Requirements & User Stories

https://waffle.io/modelwriter/requirements



User Stories 13

14
The TRAM will be able to compose transformations.
Software Requirements Document (SRD)
WP3 - Model to/from Knowledge Base

13
The TRAM validates such parameters and also the input models before a transformation takes place.
Software Requirements Document (SRD)
WP3 - Model to/from Knowledge Base

12
A mechanism is needed to register the available transformations in ModelWriter
Software Requirements Document (SRD)
WP3 - Model to/from Knowledge Base

11
M2M Transformation Framework must synchronize the output models after its input models or configurations have been modified.
Software Requirements Document (SRD)
WP3 - Model to/from Knowledge Base

10
M2M Transformation Framework must keep traces between transformed models and its source models.

Confirmed 3

17
The system must support an open requirement authoring tools (such as RMF)
UC-TR-03 Generation and management of feature models
User Requirements Document (URD)

16
The system should support ReqIF standard.
UC-TR-03 Generation and management of feature models
User Requirements Document (URD)

15
BPMN 2.X shall be supported as the Business Process Modeling Language in the tool.
UC-TR-05 Synchronous Business Process Design with Use Cases
User Requirements Document (URD)

In Progress 0

In Progress

Let others know you're working on an issue by dragging it to In Progress.

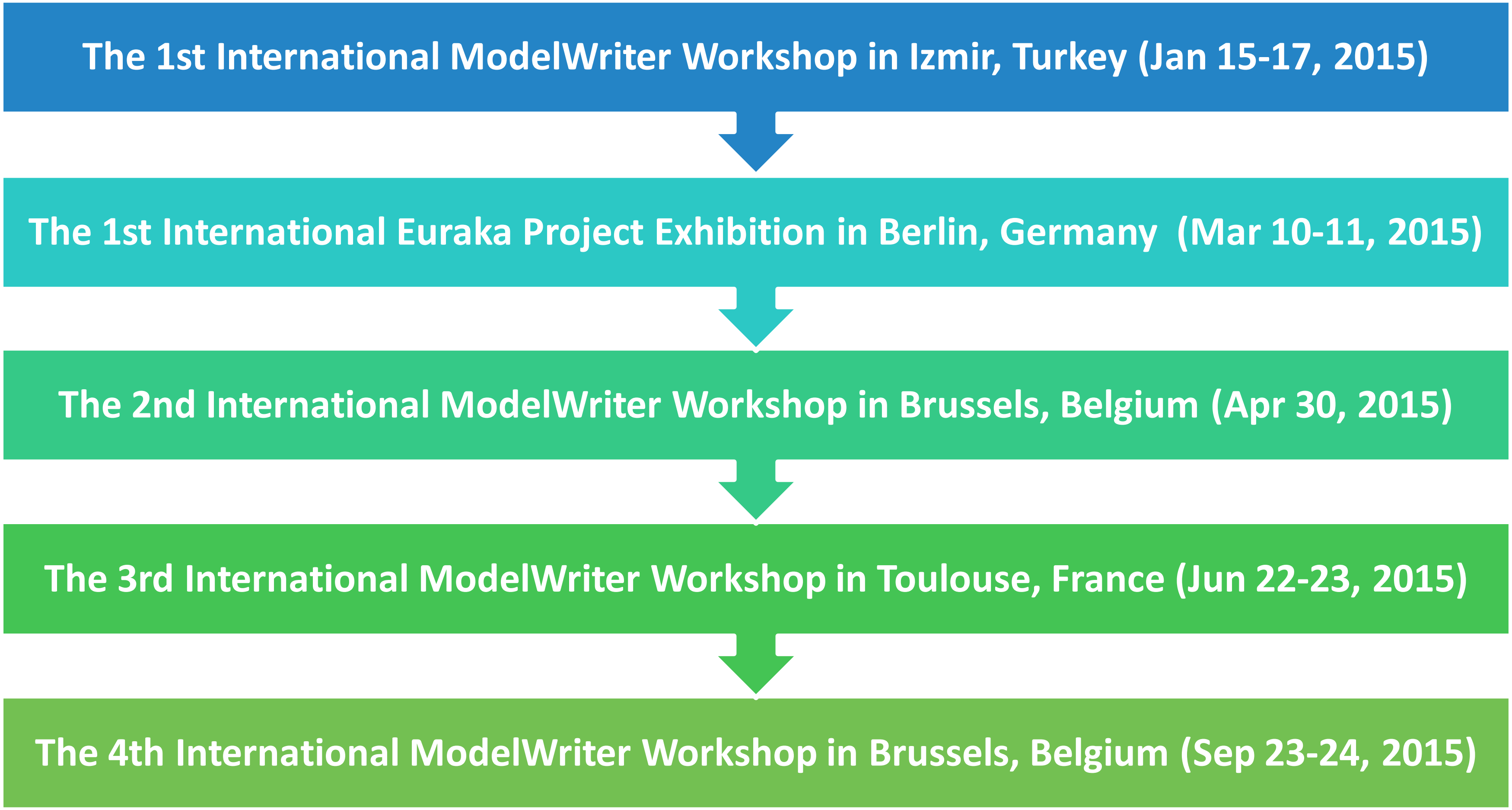
Done 2

19
Fe

18
readme folder added

ModelWriter Open Workshops in 2015

https://github.com/modelwriter/workshops



The 1st International ModelWriter Workshop in Izmir, Turkey (Jan 15-17, 2015)

The 1st International Euraka Project Exhibition in Berlin, Germany (Mar 10-11, 2015)

The 2nd International ModelWriter Workshop in Brussels, Belgium (Apr 30, 2015)

The 3rd International ModelWriter Workshop in Toulouse, France (Jun 22-23, 2015)

The 4th International ModelWriter Workshop in Brussels, Belgium (Sep 23-24, 2015)

Thank you for your attention
We value your opinion and questions.