Me4MAP

A method for the development of metadata application profiles

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Where?

Algoritmi Research Center, University of Minho, Portugal

PhD Thesis (supervisor: Ana Alice Baptista)
Sources of information

Knowledge base from early stages (data modeling) of software development processes (e.g. RUP)

State of the art on methods for the development of MAP

Me4MAP

Analysis of 3 semi-structured interviews conducted to MAP developers
Perspective and intentions

- a software engineer perspective;
- no universal solution;
- intention: to establish a starting point for the study and design of methods for the development of MAPs.
What is a method?

- a selection of techniques
What is a method?

- a selection of techniques
- the control of their usage
What is a method?

- a selection of techniques
- the control of their usage
- the integration of the obtained partial results
Me4MAP defines the path to follow ...

- which activities to develop
Me4MAP defines the path to follow ...

- which activities to develop
- when these activities may take place
Me4MAP defines the path to follow ...

• which activities to develop

• when these activities may take place

• how they are interconnected
Me4MAP defines the path to follow …

- which activities to develop
- when these activities may take place
- how they are interconnected
- which artifacts they produce
... and the ideal work-team

- Project Manager
... and the ideal work-team

- Project Manager
- System Analyst
... and the ideal work-team

- Project Manager
- System Analyst
- Semantic Developer
... and the ideal work-team

- Project Manager
- System Analyst
- Semantic Developer
- Technical Editor
... and the ideal work-team

- Project Manager
- System Analyst
- Semantic Developer
- Technical Editor
- Application Domain Expert
... and the ideal work-team

- Project Manager
- System Analyst
- Semantic Developer
- Technical Editor
- Application Domain Expert
- Final User
On big MAP projects

- Core team: persons with technical skills, i.e. System Analyst and Semantic Developer
On big MAP projects

- Core team: persons with technical skills, i.e. System Analyst and Semantic Developer

- Extended team: all
Singapore Framework

- Functional Requirements (S1)
- Domain Model (S2)
- Description Set Profile (S3)
- Syntax Guidelines (S4) (*optional*)
- Usage Guidelines (S5) (*optional*)
Shall we start?

How are we now going to proceed....
All activities

Method for the development of metadata application profiles

- Mandatory deliverable (Singapore)
- Optional deliverable (Singapore)
- * Composite activity
A1: Development of the Glossary

Method for the development of metadata application profiles
# A1: Development of the Glossary

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>A list of keywords and accompanying definitions used by the MAP development team.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>When the team has questions about a concept they should open a new entry on the Glossary and agree on a definition of the new key term. A tool that allows the text entry and insertion of images may be used.</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Extended Team, led by the Project Manager</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>Glossary</td>
</tr>
</tbody>
</table>
A2: Development of the MAP Documentation

Method for the development of metadata application profiles
## A2: Development of the MAP Documentation

| **What** | Developed by recording the results of the development process as well as the justification of the choices made. The development of the documentation of each process is fundamental since the documents produced will help some MAP users (such as app designers or programmers) to apply the properties and classes correctly to the specific context. It also ensures that future MAP developers understand the MAP development process used. |
| **How** | As the artifacts and models are being defined throughout the development process, the related documentation should be defined at the same time, in a collaborative way. A tool that allows text entry and insertion of images may be used. |
| **By Whom** | Core Team, led by the Technical Editor |
| **Deliverable** | MAP Documentation |
Developing the Functional Requirements

Method for the development of metadata application profiles
Developing the Functional Requirements

- S1.1 - Vision
- S1.2 - Work-Plan
- S1.3 - Application Domain
- S1.4 - High-Level Requirements
- S1.5 - Use-Case Model

Functional Requirements

- Mandatory deliverable (Singapore)

* Composite activity
S1 - Developing the Functional Requirements

- S1.1 - Vision
- S1.2 - Work-Plan
- S1.3 - Application Domain
- S1.4 - High-Level Requirements
- S1.5 - Use-Case Model

Mandatory deliverable (Singapore)

* Composite activity
### S1.1: Developing the Vision

<table>
<thead>
<tr>
<th>What</th>
<th>A document that states what developers want to achieve with the MAP development and that defines the scope of the MAP. The result may be a simple document with a clear and accurate view of the vision.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How</td>
<td>Me4MAP recommends the use of brainstorming technique, where all members of the team should feel free to write ideas on a board (physical board or web tool), followed by discussion. In the end, the set of ideas chosen should be organized in simple sentences. A tool that allows text entry and insertion of images may be used.</td>
</tr>
<tr>
<td>By Whom</td>
<td>Extended Team, led by the Project Manager</td>
</tr>
<tr>
<td>Deliverable</td>
<td>Vision</td>
</tr>
</tbody>
</table>
Developing the Functional Requirements

- S1.1 - Vision
- S1.2 - Work-Plan
- S1.3 - Application Domain
- S1.4 - High-Level Requirements
- S1.5 - Use-Case Model

- Functional Requirements

- Mandatory deliverable (Singapore)
  - Composite activity
## S1.2: Development of the Work-Plan

| **What** | This activity has as goal the time planning of the project’s activities and serves as a guide to the team. The Work-Plan defines the beginning and ending dates of each activity and their outputs. It also includes information on the responsibilities of each part of the work team in each activity. It is acceptable for the Work-Plan to be modified as the project evolves. |
| **How** | The members of the team give inputs on their availability for each task they have to develop. Each task has to be defined in terms of time (when it starts and finishes) and how it is articulated with other tasks. The team can use a Gantt Chart or any other type of graph or scheme that the team finds most convenient to define the Work-Plan. |
| **By Whom** | Extended Team, led by the Project Manager |
| **Deliverable** | Work-Plan |
Developing the Functional Requirements

1. Vision
   - Work-Plan
   - Application Domain
   - High-Level Requirements
     - Use-Case Model
       - Functional Requirements

- Mandatory deliverable (Singapore)
- Composite activity
### S1.3: Definition of the Application Domain

<table>
<thead>
<tr>
<th>What</th>
<th>This activity has as goals to: (i) understand the scope of the MAP; and (ii) define the boundaries of the application of the MAP.</th>
</tr>
</thead>
<tbody>
<tr>
<td>How</td>
<td>This task can be done using several sources: 1) A study of the literature or other documental sources may be developed where the main concepts of the application context should be explored, 2) Visits to events organised by entities of the application context to collect information, 3) talks to or observation of application domain specialists, through techniques such as interviews or direct observation. In this last case the information collected can be treated using content analysis tools. A tool that allows text entry and insertion of images may be used.</td>
</tr>
<tr>
<td>By Whom</td>
<td>Extended Team, led by the Application Domain Expert</td>
</tr>
<tr>
<td>Deliverable</td>
<td>Application Domain Report</td>
</tr>
</tbody>
</table>
Developing the Functional Requirements

- S1.1 - Vision
- S1.2 - Work-Plan
- S1.3 - Application Domain
- S1.4 - High-Level Requirements
- S1.5 - Use-Case Model

Mandatory deliverable (Singapore)
* Composite activity
### S1.4: Elicitation of High-Level Requirements

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>A list of the functional and non-functional requirements expressed by the work team members. This document should provide a very short description for each requirement.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>The work team can use the same technique (brainstorming) used in the definition of the Vision Statement. The team may also wish to start eliciting requirements on the interviews and direct observations taking place for defining the Application Domain (the boundaries between activities are not strict). A tool that allows text entry and insertion of images may be used</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Extended Team, led by the System Analyst</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>High-Level Requirements</td>
</tr>
</tbody>
</table>
Developing the Functional Requirements

Mandatory deliverable (Singapore)

* Composite activity
S1.5: Use Case Model

- S1.5.1 - General Use-Cases
- S1.5.2 - Detailed Use-Cases
S1.5: Use Case Model

- S1.5.1 - General Use-Cases
- S1.5.2 - Detailed Use-Cases
### S1.5.1: Definition of the Use-Case Diagram

| **What** | A Use-Case Diagram presents the actors that interact in the use-cases and describes the functionality of the system. Use Cases “offer a systematic and intuitive means of capturing functional requirements” (Booch et al., 1999, p. 37). It is important to understand the concepts of use case and actor in building a Use-Case Model. “A use case is a sequence of actions a system performs and an actor is someone or something outside the system that interacts with the system.” (Booch et al., 1999, p. 98) |
| **How** | For information on how to build a Use-Case diagram see Booch et al. (1999) |
| **By Whom** | Extended Team, led by the System Analyst |
| **Deliverable** | Use-Case Diagram |
S1.5: Use Case Model

- S1.5.1 - General Use-Cases
- S1.5.2 - Detailed Use-Cases
### S1.5.2: Definition of the Detailed Use-Cases

| **What** | To detail the use-cases. “Each use-case must include details about what has to be done to achieve its functionality” (Schneider & Winters, 2001, p. 21). “The most important part of the use case in the requirements workflow is the flow of events. The flow of events describes the sequence of actions between the actor and the system” (Booch et al., 1999, p. 98). The documentation that presents the detailed use-cases should set the sequence of actions - a specific sequence of events that happen in the system - that a system performs to bring added value to a specific actor |
| **How** | The detailed use-case may be developed using (i) the template and a guide on how to fill the template proposed by Schneider & Winters (2001, pp.28). For more information on how to develop a flow of events, see Fowler (2004) A tool that allows the text entry and insertion of images may be used |
| **By Whom** | Extended Team, led by the System Analyst |
| **Deliverable** | Functional Requirements (mandatory Singapore Stage Component) |
Developing the Functional Requirements

- S1.1 - Vision
- S1.2 - Work-Plan
- S1.3 - Application Domain
- S1.4 - High-Level Requirements
- S1.5 - Use-Case Model

- Functional Requirements

* Mandatory deliverable (Singapore)

* Composite activity
All activities

- Method for the development of metadata application profiles

- Composite activity

- Mandatory deliverable (Singapore)

- Optional deliverable (Singapore)
Developing the Domain Model

A1 - Development of the Glossary
A2 - Development of the MAP Documentation
A3 - Environmental Scan
A4 - Validation in Production
S1 - Developing the Functional Requirements
S2 - Developing the Domain Model
S3.1 - Vocabulary Alignment
S3.2 - Constraints Matrix
S3.3 - Constraints Matrix Test
S3.4 - DSP Encoding
S4 - Developing the Syntax Guidelines
S5 - Developing the Usage Guidelines
F - Functional Requirements
D - Domain Model
M - Description Set Profile
U - Usage Guidelines
R - Syntax Guidelines

Legend:
- Mandatory deliverable (Singapore)
- Optional deliverable (Singapore)
- * Composite activity

Method for the development of metadata application profiles
Developing the Domain Model

- S2.1 - Domain Model
- S2.2 - Domain Model Test Criteria
- S2.3 - Domain Model Test

Mandatory deliverable (Singapore)
Developing the Domain Model

- **S2.1 - Domain Model**
- **S2.2 - Domain Model Test Criteria**
- **S2.3 - Domain Model Test**

- Mandatory deliverable (Singapore)
S2.1: Definition of the Domain Model

**What**

A domain model “captures the most important types of objects in the context of the system.” (Booch et al., 1999, p. 119). According to Baker & Coyle (2009) “a domain model is a description of what things your metadata will describe, and the relationships between those things. The domain model is the basic blueprint for the construction of the application profile”. It identifies the entities and their relationships, and the entities attributes (e.g., datatypes and other attributes with literal values). The Domain Model is based on the Functional Requirements described in Section 3.5.

**How**

If there is access to documentation that describes resources or databases of the application domain, the work team can resort to the document analysis technique as a starting point to define the Domain Model. The team needs to capture the things (entities) and their relationships that support the previously identified Functional Requirements. The Domain Model is developed using a graphical data modeling technique such as e.g. ORM diagrams, Entity-Relationship diagrams (ER), UML diagrams or RDF graphs. The data modeling technique should be the one that best serves the whole work team - not the technique that best serves only the core team.

**By Whom**

Core Team, led by the System Analyst

**Deliverable**

Domain Model (mandatory Singapore Stage Component)
Developing the Domain Model

S2.1 - Domain Model

S2.2 - Domain Model Test Criteria

S2.3 - Domain Model Test

Mandatory deliverable (Singapore)
### S2.2: Definition of the Domain Model Test Criteria

<table>
<thead>
<tr>
<th>What</th>
<th>Defines a way or a model to test if the MAP supports the Functional Requirements. The team has to verify if the attributes that were chosen on the Domain Model support the Functional Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>How</td>
<td>“MAPs are, essentially, intangible - users cannot interact with them directly” (Walk, 2010). The same happens to other models or MAP components as the Domain Model. The use of paper prototyping technique (see for example Ema Tonkin (2009) can be a way to engage prospective end-users in the Domain Model Test</td>
</tr>
<tr>
<td>By Whom</td>
<td>Extended Team, led by the Semantic Developer</td>
</tr>
<tr>
<td>Deliverable</td>
<td>Domain Model Test Criteria</td>
</tr>
</tbody>
</table>
Developing the Domain Model

S2.1 - Domain Model

S2.2 - Domain Model Test Criteria

S2.3 - Domain Model Test

Mandatory deliverable (Singapore)
## S2.3: Application of the Domain Model Test

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>Application of the test defined in the S2.2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>It depends on the technique used, for the paper prototyping technique suggested in S2.2 see Tonkin (2009) where Tonkin presents an example of validation on the context of MAP development</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Prospective end-users such as representatives of application programmers that make use of the MAP or representatives of final users that feed the system or any general final user, or even team members that have been involved in the development of the requirements and domain model</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>Report with the results of the Domain Model Test</td>
</tr>
</tbody>
</table>
All activities

Method for the development of metadata application profiles
Method for the development of metadata application profiles
**A3: development of the Environmental Scan**

| **What** | A report that contains a review of the metadata schemas that are available in any serialization of the Semantic Web (e.g. RDF/XML, turtle, etc.) and that may serve the needs of the Domain Model deliverable |
| **How** | Searches should be made in order to find existing, appropriate metadata schemas. To perform an environmental scan, online tools can be used - e.g. the Open Metadata Registry - http://metadataregistry.org/, the Linked Open Vocabularies (LOV) - http://lov.okfn.org/dataset/lov/, the Basel Register of Thesauri, Ontologies & Classifications (BARTOC) - http://www.bartoc.org/, among others. A spreadsheet to register and organize the information may be used |
| **By Whom** | Semantic Developer |
| **Deliverable** | Environmental Scan |
All activities

- A1 - Development of the Glossary
- A2 - Development of the MAP Documentation
- A3 - Environmental Scan
- A4 - Validation in Production
- A5 - Developing the Usage Guidelines
- S1 - Developing the Functional Requirements
- S2 - Developing the Domain Model
- S3 - Developing the Description Set
- S4 - Developing the Syntax Guidelines
- S5 - Developing the Usage Guidelines

Legend:
- Mandatory deliverable (Singapore)
- Optional deliverable (Singapore)
- * Composite activity

Method for the development of metadata application profiles
Developing the Description Set

Method for the development of metadata application profiles
Developing the Description Set

S3.1 - Vocabulary Alignment

S3.2 - Constraints Matrix

S3.3 - Constraints Matrix Test*

S3.4 - DSP Encoding

Description Set Profile

- Mandatory deliverable (Singapore)
  - Composite activity
Developing the Description Set

S3.1 - Vocabulary Alignment

S3.2 - Constraints Matrix

S3.3 - Constraints Matrix Test*

S3.4 - DSP Encoding

Description Set Profile

Mandatory deliverable (Singapore)

* Composite activity
### S3.1: Definition of the Vocabulary Alignment

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>Matches the terms of the metadata schemas identified in the Environmental Scan (A3) with the needs of the Domain Model.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>Identification of the Domain Model Attribute - metadata schema property pairs in a table. Note that the team may identify more than one metadata schema property per Domain Model attribute. However, at the end of the development of this activity only one has to be chosen. That property will be the one included in the Constraints Matrix (S3.2). Note that some properties may not be present in the schemas previously identified in the environmental scan, but that may be present, with the adequate semantics, in other schemas of other application domains. Also, for generic properties, the team may prefer to use cross-domain schemas such as DC Terms.</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>The Core Team, led by the Semantic Developer</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>Vocabulary Alignment</td>
</tr>
</tbody>
</table>
## Excerpt of a Vocabulary Alignment

<table>
<thead>
<tr>
<th>Entity</th>
<th>DM Attribute</th>
<th>Metadata Schema</th>
<th>Metadata Property Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiative</td>
<td>Name</td>
<td>dcterms</td>
<td>title</td>
</tr>
<tr>
<td></td>
<td>Good relations</td>
<td>name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Description</td>
<td>dcterms</td>
<td>description</td>
</tr>
<tr>
<td></td>
<td>Good Relations</td>
<td>description</td>
<td></td>
</tr>
<tr>
<td>Email address</td>
<td>Vcard</td>
<td>hasEmail</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Foaf</td>
<td>mbox</td>
<td></td>
</tr>
<tr>
<td>URL</td>
<td>Foaf</td>
<td>Homepage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Vcard</td>
<td>hasURL</td>
<td></td>
</tr>
<tr>
<td>Network</td>
<td>Name</td>
<td>dcterms</td>
<td>title</td>
</tr>
<tr>
<td></td>
<td>Good relations</td>
<td>name</td>
<td></td>
</tr>
<tr>
<td>isPartOf</td>
<td>dcterms</td>
<td>isPartOf</td>
<td></td>
</tr>
<tr>
<td>Product-or-service</td>
<td>Category</td>
<td>Good relations</td>
<td>category</td>
</tr>
<tr>
<td></td>
<td>VCard</td>
<td>category</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unit</td>
<td>Good relations</td>
<td>hasUnitOfMeasurement</td>
</tr>
</tbody>
</table>
Developing the Description Set

Mandatory deliverable (Singapore)

* Composite activity
## S3.2: Definition of the Constraints Matrix

| **What** | Deepening of the Vocabulary Alignment. It is the detailed definition of each attribute or entity of the Domain Model by means of its constraints, through the identification of the metadata schemas, Vocabulary Encoding Schemes (VES), or Syntax Encoding Schemes (SES). |
| **How** | Me4MAP provides a template of the Constraints Matrix which is based in the matrix presented in the DCMI Guidelines. The Constraints Matrix template has two tables that should be filled: (1) Definition of Namespaces used and (2) Definition of Description Templates. In case the work team cannot find a property that conveniently expresses the semantics of a given attribute present in the Domain Model, that property may be declared in a new schema created by the work team and made openly available using a proper encoding (RDFS and/or OWL). The same applies for controlled vocabularies (RDFS and/or OWL and/or SKOS) |
| **By Whom** | Semantic Developer |
| **Deliverable** | Constraints Matrix |
### Constraints Matrix: name of the Application Profile

#### Identification of Namespaces used

<table>
<thead>
<tr>
<th>Title</th>
<th>Full Namespace IRI</th>
<th>Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>

#### Definition of Description Template (as many Description Sets as needed)

<table>
<thead>
<tr>
<th>Description Template:</th>
<th>name of the class</th>
<th>Term:</th>
<th>name of term</th>
<th>Usage:</th>
<th>description of the class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>name of the class</td>
<td>Term:</td>
<td>name of term</td>
<td>Usage:</td>
<td>description of the class</td>
</tr>
<tr>
<td></td>
<td>name of the class</td>
<td>Term:</td>
<td>name of term</td>
<td>Usage:</td>
<td>description of the class</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Label</th>
<th>Property</th>
<th>Range</th>
<th>Value</th>
<th>String</th>
<th>SES</th>
<th>IRI</th>
<th>VES</th>
<th>IRI</th>
<th>Related description</th>
<th>Min</th>
<th>Max</th>
<th>Type</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td></td>
<td></td>
<td></td>
<td>...</td>
</tr>
</tbody>
</table>

as many rows as needed...
Developing the Description Set

- S3.1 - Vocabulary Alignment
- S3.2 - Constraints Matrix
- S3.3 - Constraints Matrix Test* 
- S3.4 - DSP Encoding

Description Set Profile

- Mandatory deliverable (Singapore)
- * Composite activity
S3.3: Constraints Matrix Test

S3.3.1 - Constraints Matrix Checking

S3.3.2 - Questionnaire Development

S3.3.3 - Questionnaire Administration

Method for the development of metadata application profiles
S3.3: Constraints Matrix Test

- S3.3.1 - Constraints Matrix Checking
- S3.3.2 - Questionnaire Development
- S3.3.3 - Questionnaire Administration
### S3.3.1: Constraints Matrix Checking

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>This process is the application of the MAP in development to a set of sample resources.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>The team should identify a set of resources that constitute a trustworthy sample of the application domain of the MAP under development and complete the form (Me4MAP provides a template of such a form) with data referring to each resource. This form should be simple to fill, where each element of the metadata is populated with the data that corresponds to the resource. This work may be developed with the support of the Syntax Guidelines and Usage Guidelines (S4 and S5, respectively)</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Representatives of application programmers that make use of the MAP or representatives of final users that feed the system or any general final user. This activity is led by the Semantic Developer</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>Test in Laboratory</td>
</tr>
</tbody>
</table>
## Constraints Matrix Checking Template

### Resource A

<table>
<thead>
<tr>
<th>Label</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instance of Class</strong></td>
<td>Class X</td>
</tr>
<tr>
<td>Property A1</td>
<td></td>
</tr>
<tr>
<td>Property A2</td>
<td></td>
</tr>
<tr>
<td>as many rows as needed</td>
<td></td>
</tr>
</tbody>
</table>

### Resource B

<table>
<thead>
<tr>
<th>Label</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instance of Class</strong></td>
<td>Class Y</td>
</tr>
<tr>
<td>Property B1</td>
<td></td>
</tr>
<tr>
<td>Property B2</td>
<td></td>
</tr>
<tr>
<td>as many rows as needed</td>
<td></td>
</tr>
</tbody>
</table>

### Resource n

<table>
<thead>
<tr>
<th>Label</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instance of Class</strong></td>
<td>Class Z</td>
</tr>
<tr>
<td>Property n1</td>
<td></td>
</tr>
<tr>
<td>Property n2</td>
<td></td>
</tr>
<tr>
<td>as many rows as needed</td>
<td></td>
</tr>
</tbody>
</table>

(As many resources as needed)
S3.3: Constraints Matrix Test

S3.3.1 - Constraints Matrix Checking

S3.3.2 - Questionnaire Development

S3.3.3 - Questionnaire Administration
## S3.3:2: Questionnaire Development

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>To develop the questionnaire that will be administrated in the next activity (S3.3.4 - Questionnaire Administration). This questionnaire will assess the difficulties of the Constraints Matrix checking. The goal is to understand: (i) if there is data for which there are no properties available in the Constraints Matrix; (ii) if there are properties defined in the Constraints Matrix that are not suitable to the resources; (iii) whether there are VES and SES, domains and ranges that are not suitable to the resources; (iv) any other kind of difficulty or ambiguity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>A set of questions should be set in order to achieve the goals defined. The team can observe the execution of the Constraints Matrix Checking and from there think on the questions that might highlight problems and its reasons. The Questionnaire can be implemented on paper or using any Web service like surveymonkey.com or even any open-source software like LimeSurvey software (limesurvey.org) installed in a Web Server</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Semantic Developer</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>The Questionnaire Template</td>
</tr>
</tbody>
</table>
S3.3: Constraints Matrix Test

S3.3.1 - Constraints Matrix Checking

S3.3.2 - Questionnaire Development

S3.3.3 - Questionnaire Administration
### S3.3.3: Questionnaire Administration

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>To administrate the Questionnaire that was developed in the S3.3.3 activity (Questionnaire Development).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>The persons involved in the Constraints Matrix checking (S3.3.1) should respond to the Questionnaire using the tool proposed</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Semantic Developer administrates, participants of the Constraints Matrix checking (S3.3.1) fill the Questionnaire</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>The completed Questionnaire</td>
</tr>
</tbody>
</table>
S3: Developing the Description Set

S3.1 - Vocabulary Alignment

S3.2 - Constraints Matrix

S3.3 - Constraints Matrix Test*

S3.4 - DSP Encoding

Description Set Profile

Mandatory deliverable (Singapore)

* Composite activity
# S3.4: Encoding the Description Set Profile

<table>
<thead>
<tr>
<th>What</th>
<th>A document with the description of the MAP using the mark-up language defined by Nilsson (2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How</td>
<td>Use the DSP constraint language having as reference the Constraints Matrix. Further information on DSP, including implementation examples, can be found in Baker &amp; Coyle (2009)</td>
</tr>
<tr>
<td>By Whom</td>
<td>Semantic Developer</td>
</tr>
<tr>
<td>Deliverable</td>
<td>Description Set Profile (mandatory Singapore Stage component)</td>
</tr>
</tbody>
</table>
S4: Developing the Syntax Guideline
## S4: Developing the Syntax Guideline

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>The Syntax Guidelines describe “any application profile-specific syntaxes and/or syntax guidelines, if any” (Baker &amp; Coyle, 2009).</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>Using text processor, software tools or by any other means deemed appropriate by the team</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Semantic Developer</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>Syntax Guidelines (optional Singapore Stage Component)</td>
</tr>
</tbody>
</table>
S5: Developing the Usage Guidelines

Method for the development of metadata application profiles
## S5: Developing the Usage Guidelines

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>The DCMI Guidelines explain: “Description Set Profile defines the “what” of the application profile; usage guidelines provide the how and why.” (Baker &amp; Coyle, 2009). Usage guidelines offer instructions to those who will create the metadata records. Ideally, they explain each property and anticipate the decisions that must be made in the course of creating a metadata record” (Baker &amp; Coyle, 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>Using text processor, software tools or by any other means deemed appropriate by the team</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Technical writer, supported by the Core Team and the Application Domain Expert</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>Usage Guidelines (optional Singapore Stage Component)</td>
</tr>
</tbody>
</table>
Validation in Production
### A4: Validation in Production

<table>
<thead>
<tr>
<th><strong>What</strong></th>
<th>Validates, in production, the MAP. Changes should only be made in a controlled environment, before releasing the MAP for the Web</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How</strong></td>
<td>Using a log registration technique or observing final-users working with the system that has implemented the MAP</td>
</tr>
<tr>
<td><strong>By Whom</strong></td>
<td>Semantic Developer</td>
</tr>
<tr>
<td><strong>Deliverable</strong></td>
<td>Validation in Production report</td>
</tr>
</tbody>
</table>


Thank you

Mariana Curado Malta
mariana@iscap.ipp.pt