

SAPERE Methodology

Alpha Version

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SAPERE Meeting
Lyon, France, 10 September 2012



- 1 Work package 1 - Task 1.3
- 2 SAPERE Meta-model
- 3 SAPERE Process
- 4 SAPERE Methodology: Next Steps



Outline

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WP1

T1.3 from DoW

The focus of this task is on the development of a methodology for the design of the SAPERE services, namely methodological guidelines for the proposed computational models coupled with tools to support the development process



Methodology

Methodology [Ghezzi et al., 2002]

- A methodology is a collection of methods covering and connecting different stages in a process
- The purpose of a methodology is to prescribe a certain coherent approach to solving a problem in the context of a software process by preselecting and putting in relation a number of methods
- A methodology has two important components
 - one that describe the process elements of the approach: the **abstractions**
 - one that focuses on the steps that have to be done, the work products that have to be produced – and their documentation – ...: the **process**



Methodology Documentation

- A new standard for the processes documentation [FIPA-DPDF, 2012] [Cossentino, 2009] [Molesini and Omicini, 2012] has been recently approved by IEEE-FIPA with number SC00097B.
- The Process Documentation Template
 - has been conceived without considering any particular process or methodology → all processes can be documented using it
 - is neutral regarding the (MAS) meta-model and/or the modelling notation adopted in describing the process
 - has a simple structure resembling a tree, so documentation is made in a natural and progressive way:
 - addressing in first place the general description and meta-model definition which constitute the root elements of the process
 - detailing in a second step the branches which are the phases
 - is easy to use for a software engineer as it relies on few previous assumptions
 - suggests as notation the use of the OMG's standard SPEM [Object Management Group, 2008] with few extensions [Seidita et al., 2009]



Methodology Documentation in SAPERE

- Adoption of the Process Documentation Template for documenting the SAPERE methodology
 - documented in a standard way
 - comparable with other methodologies



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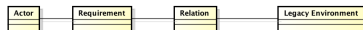


Meta-model Abstractions

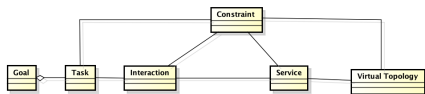
- From our experience the starting point in the construction of a new methodology is the definition of the abstractions meta-model
- Here we propose a complete abstractions meta-model where:
 - the abstractions belonging to the Design phases coming from the model defined in D1.1
 - the abstractions belonging to the Analysis phases coming from different sources: traditional software engineering, agent-oriented software engineering, requirements engineering
 - the abstractions are logically located in two different domains – analysis and design – each of them composed by two different phases
 - the mappings from analysis's abstractions and design's abstractions are presented (red arrow)



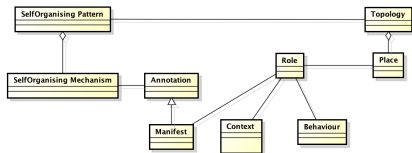
Abstractions Meta-model



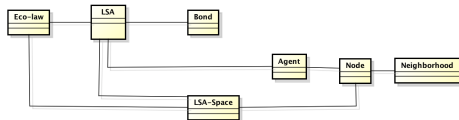
Requirements Analysis



Analysis

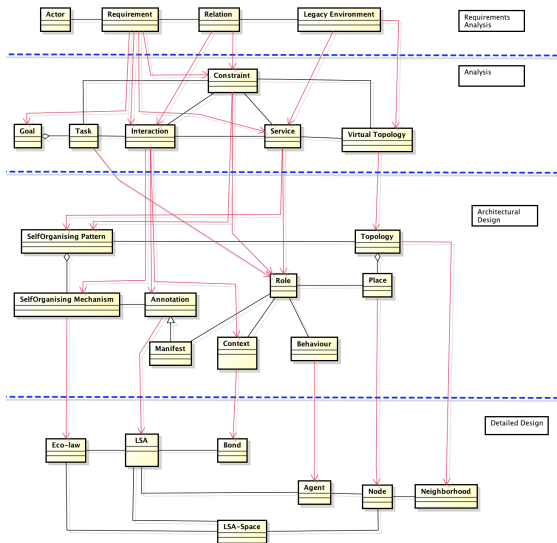


Architectural Design

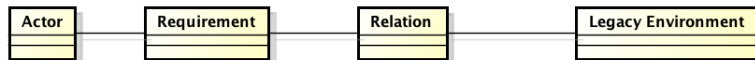


Detailed Design

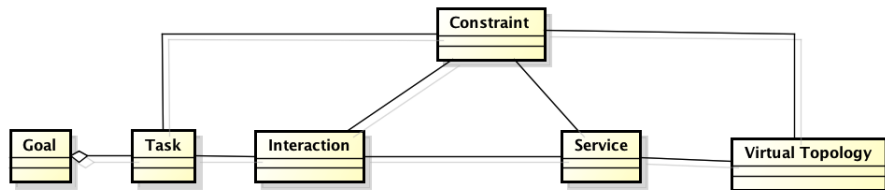
The Complete Abstractions Meta-model



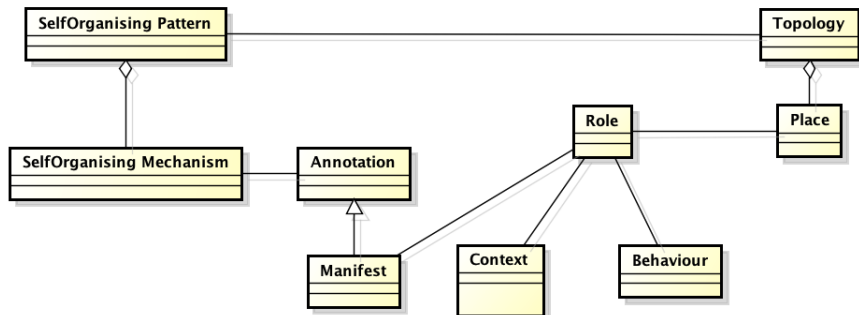
Requirements Analysis Abstractions Meta-model



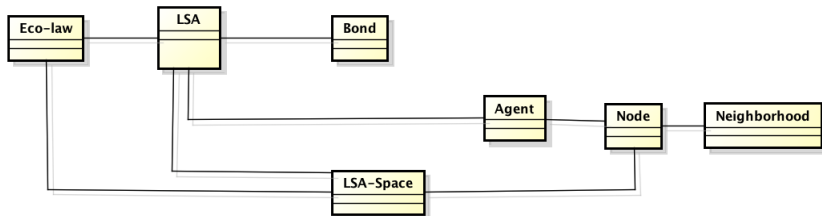
Analysis Abstractions Meta-model



Architectural Design Abstractions Meta-model



Detailed Design Abstractions Meta-model



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Process Construction

- Before starting the creation of a new design process we have to define the process requirements:
 - what kind of process model?
 - how many phases?
 - what kind of phases?
 - what kind of notation language?

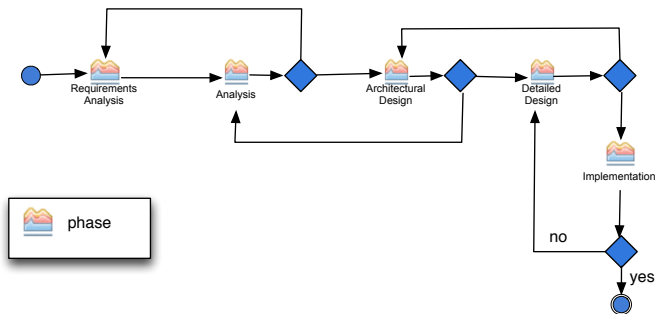


SAPERE Process's Requirements

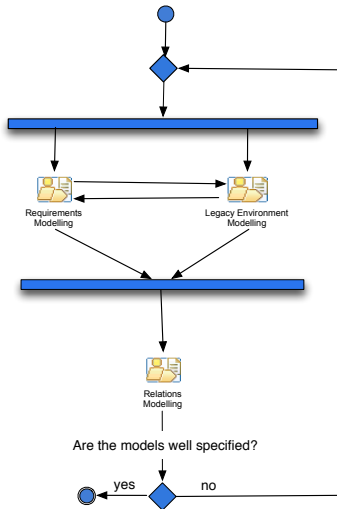
- Process model: iterative incremental
- Phases: traditional design phases such as Requirements Analysis, Analysis and Design
- Activities: specific SAPERE activities such as Simulation, Verification, Prediction, Quantitative Measures
- Notation Language:
 - new ad hoc language?
 - creation of a new UML Profile?
 - ...



The Process Lifecycle

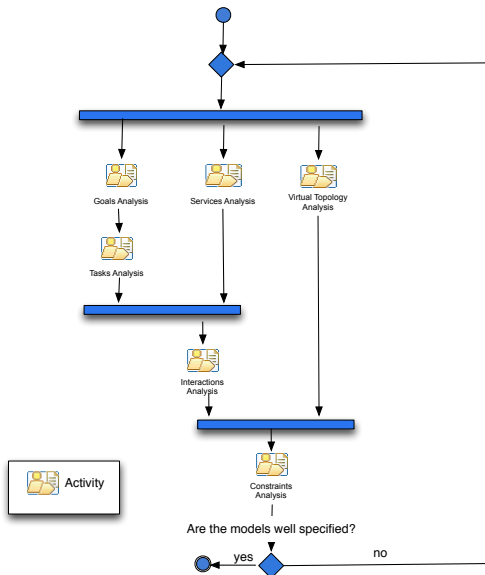


Requirements Analysis Process

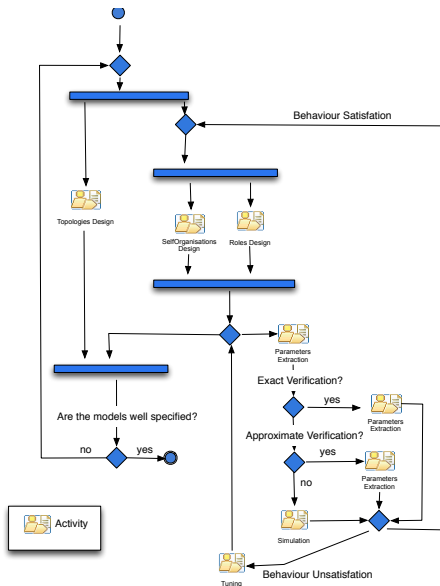


Activity

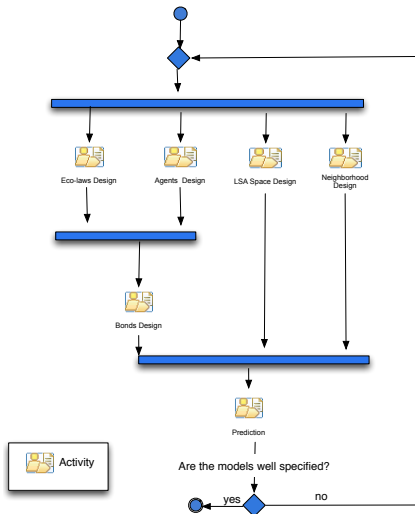
Analysis Process



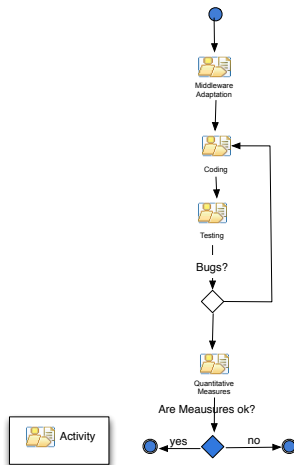
Architectural Design Process



Detailed Design Process



Implementation Process



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Abstractions Meta-model

- Next steps
 - evaluation of the completeness of the meta-model
 - identification of the relationships among meta-model elements and methodology work products



Process

- Next steps
 - identification of the methodology work products
 - for each activity
 - identification of the tasks and their relationships
 - specification of the input and output (work product)
 - possible identification of other new specific phases
 - simulation
 - verification
 - prediction
 - quantitative measures
 - ...
 - to be tentatively integrated in the SAPERE process
 - to be tested and validated in the last year of the project



References I



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