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Using and extending the SPEM specifications to represent agent oriented methodologies

Valeria Seidita

Università degli Studi di Palermo

Outline

- The need for a formal methodology description
- SPEM for describing an agent oriented methodology
- PASSI: an example
- The needed extension
- Discussion and conclusion

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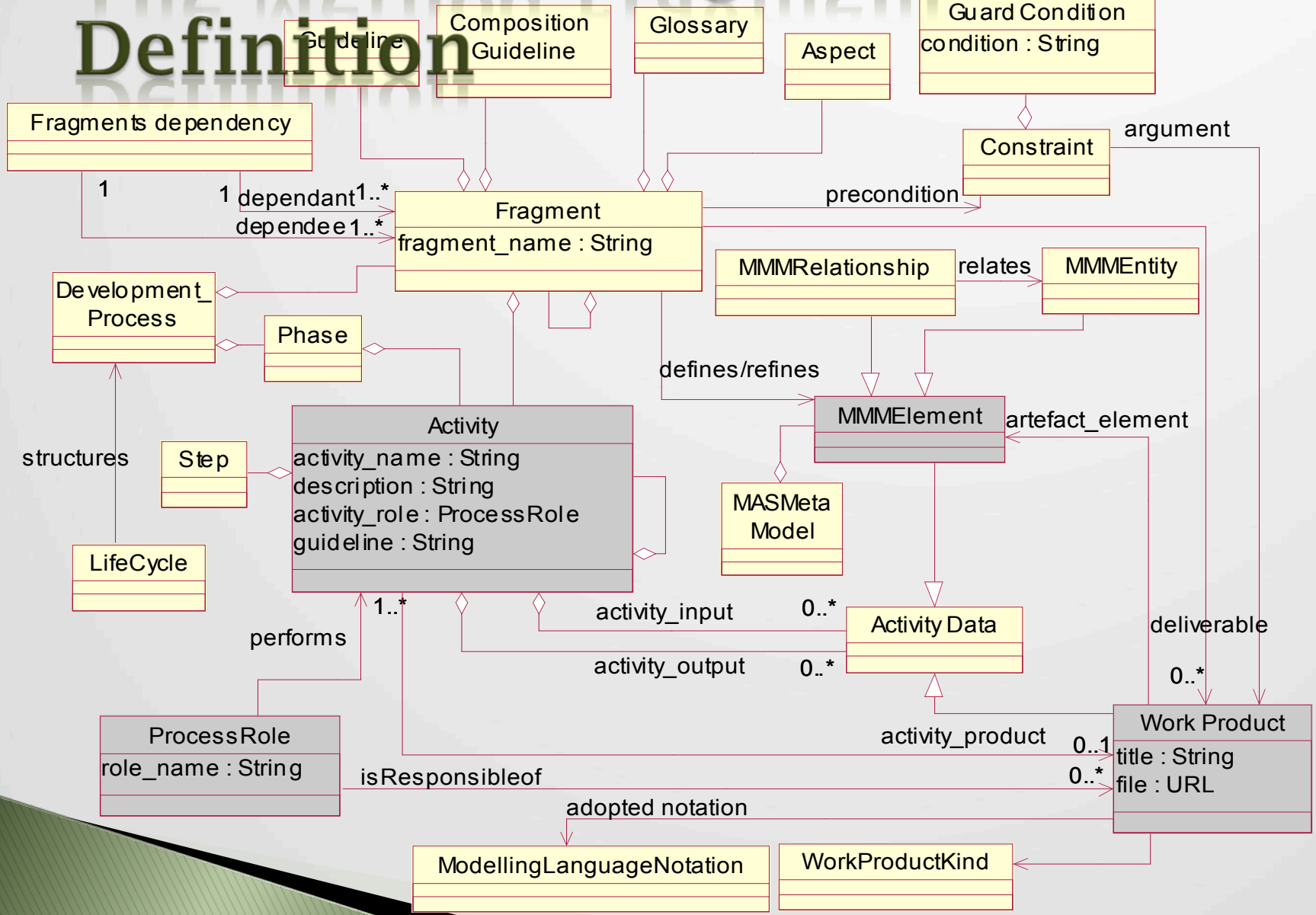
Introduction

- Adopting Situational Method Engineering for composing agent oriented design processes
  - Process Requirements Analysis
  - Method Fragments Selection
  - Method Fragments Assembly
- It is fundamental the creation and the use of a method fragments repository
  - To be constructed following a specific process
- Elements for constructing the repository
  - A well known set of existing methodology
  - The definition of method fragment to be used
  - A notation to describe a development process

The Method Fragment Definition



The Process Description

- Three are the main elements of a design process
  - Activity
  - Process Role
  - Work Product
  - MMM Element
- The SPEM (Software Process Engineering Metamodel) is based on the idea that "*a software development process is a collaboration between abstract entity called process role that perform operation called activities on tangible entities called work product*".

The Process Description

- Each fragment refers to one (or more) MMM element
- The MMM element is the constituent part of a Work Product
- The MMM is not part of SPEM metamodel
  - It is the main element leading in modifying and extending SPEM diagram
- When we construct a new design process we start from the creation of its meta model
  - Each part (one or more elements) of this meta model can be designed in one fragment (or more)

The Process Description

- The need for establishing which is the real action a process role performs on a MMM element when he is carrying out a specific activity
- The set of actions:
  - Define – it is performed when a MMM element is introduced for the first time and its features are defined in a portion of process (hence in a fragment)
  - Relate – when a relationship is created (defined) among two or more MMM elements previously defined in another portion of process
  - Quote – a MMM element or a relationship is quoted in a specific work product

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Modelling a methodology with SPEM

- SPEM version 1.0
- A top-down approach to describe *who* performs *what* and *how*
- SPEM main process component element we use:
  - Process Component – a portion of process description that is internally consistent
  - Discipline – is a specialization of process component that partitions activities under common theme

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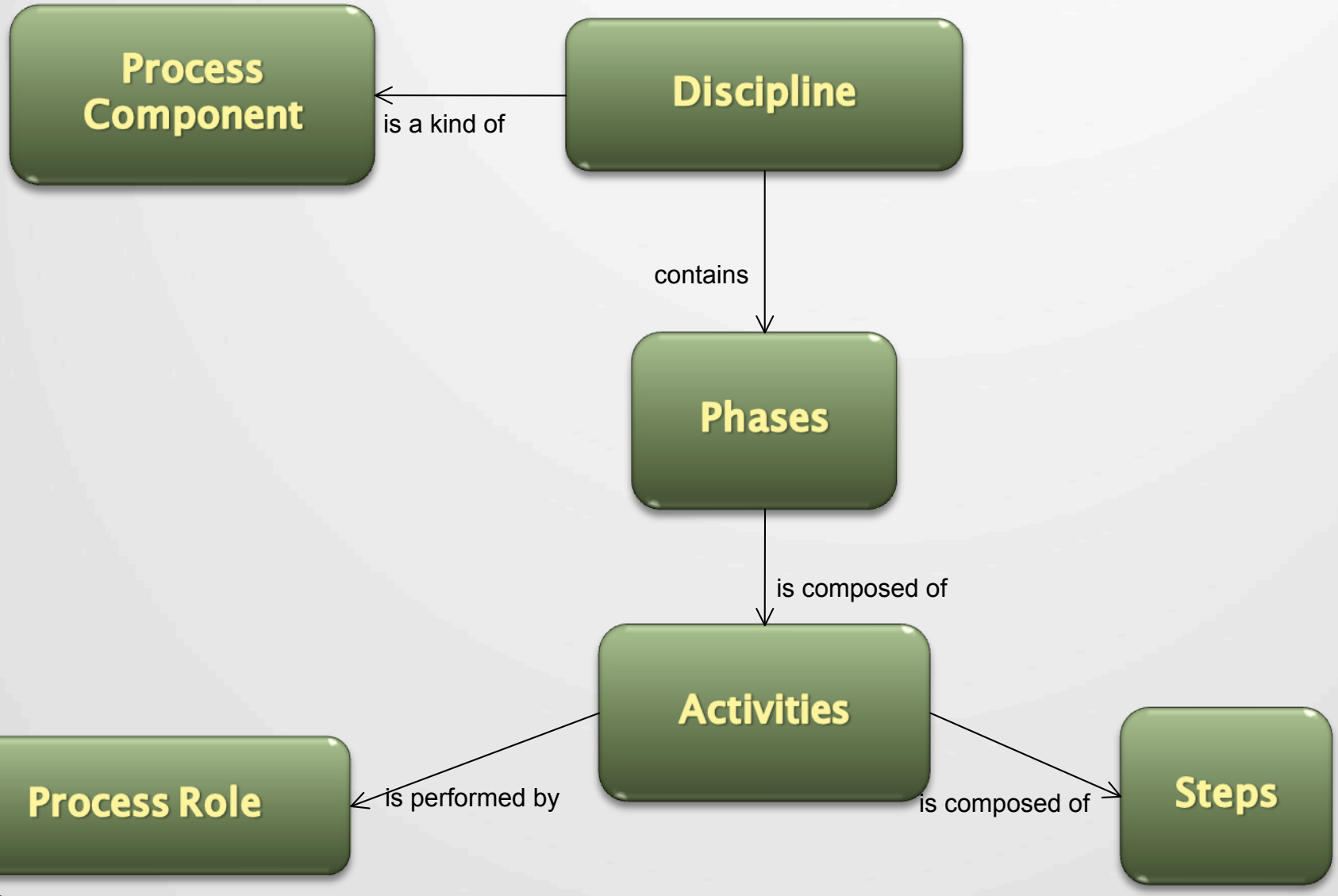
Modelling a methodology with SPEM

- SPEM main structural elements a process description is composed of:
  - WorkDefinition – the kind of operation describing the work performed in the process
    - Phase – it is a specialization of WorkDefiniton and contains some milestones
  - Activities – it describes a piece of work performed by one process role
  - Step – the atomic part of an activity
  - Process Role – defines the responsibility over a specific work product
  - Work Product – the artifact, produced, consumed or modified by a process


Process Component
is a kind of
Discipline
contains
Phases
is composed of
Activities
Process Role
is performed by
is composed of
Steps

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SPEM Diagram

- The most important one for our purposes are:
  - Activity Diagram – it allows describing the sequencing of activities with the input and output work products and separating the responsibility of each process role through swimlanes.
  - Work Product Dependency Diagram – it allows to represent the dependencies among all the work product of design process.

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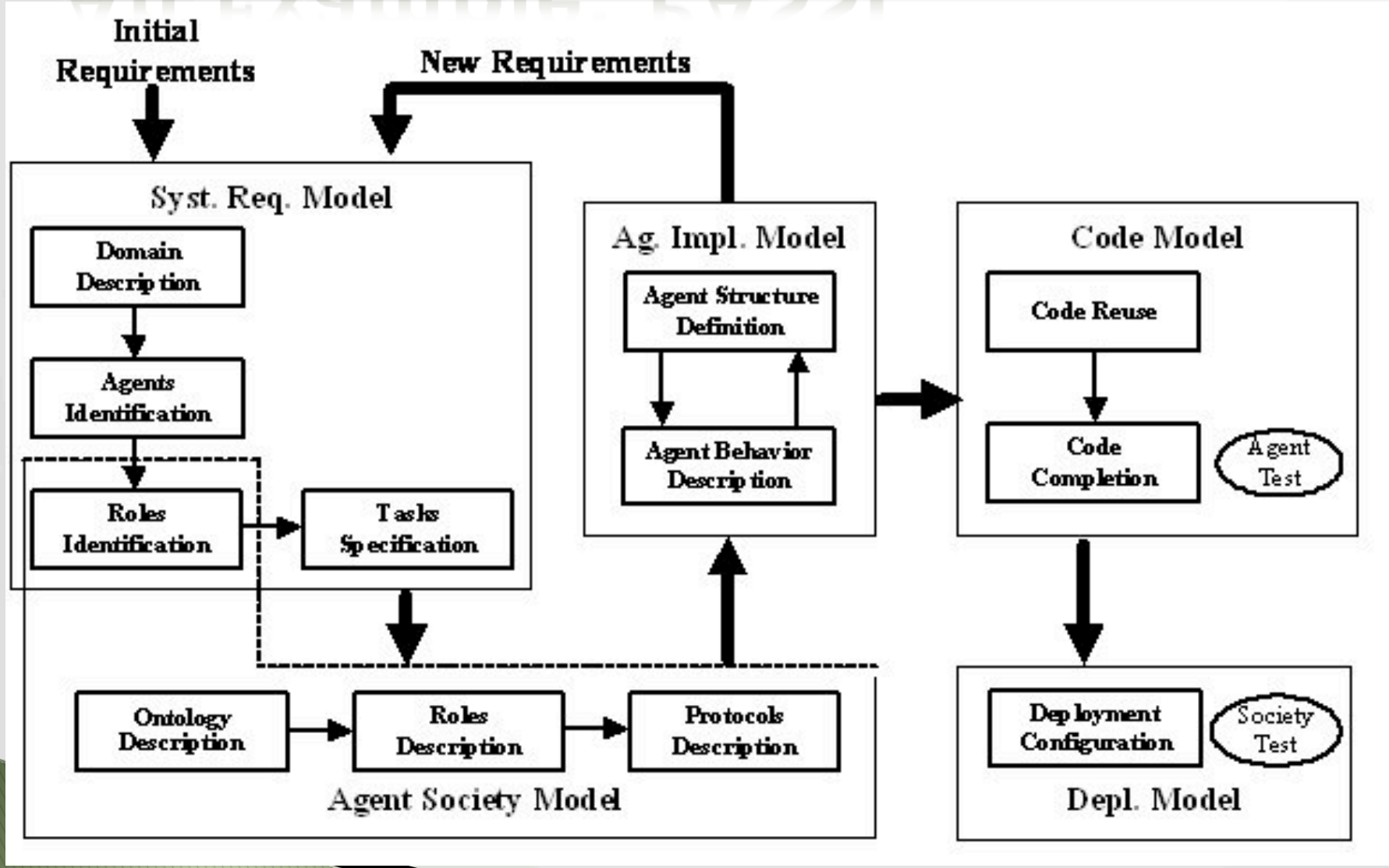
SPEM Diagram

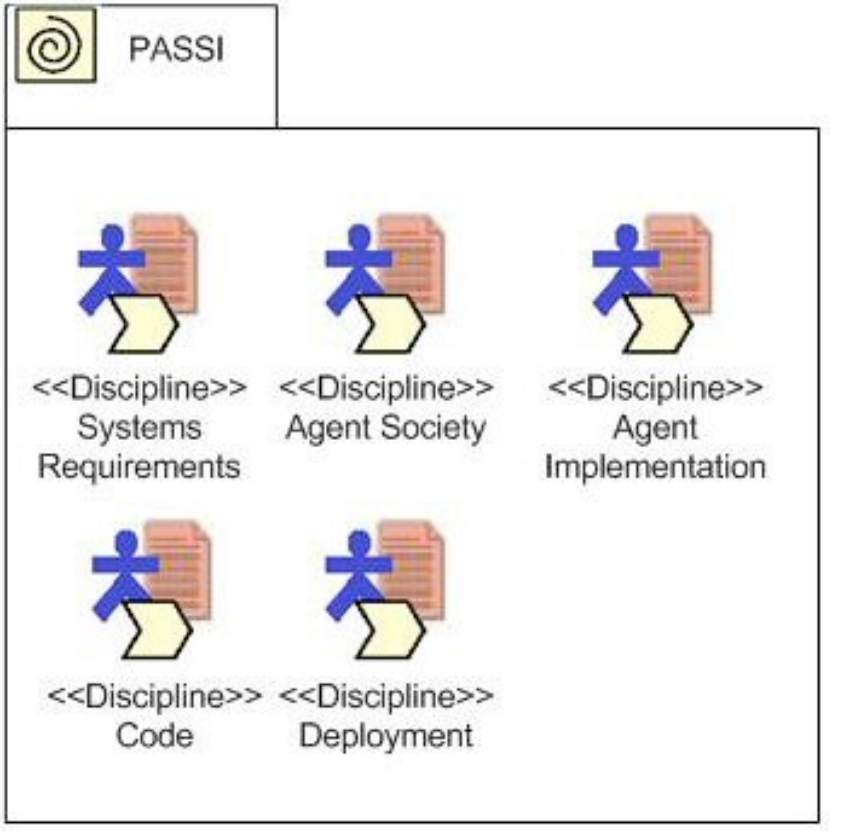
- Other diagrams we use:
  - Package diagram – allowing the representation of process component and discipline and its related process roles and workproducts
- Use Case diagram – for representing the relationships (for each discipline) among process roles and activities.

- Three different levels of details for activity diagrams:
  - Process Component → Phase and Workproducts
  - Phase → WorkDefinitions and UML Diagrams\Documents
  - WorkDefioniton → ProcessRoles, Activity and UMLDiagr./Doc.

An Example: PASSI

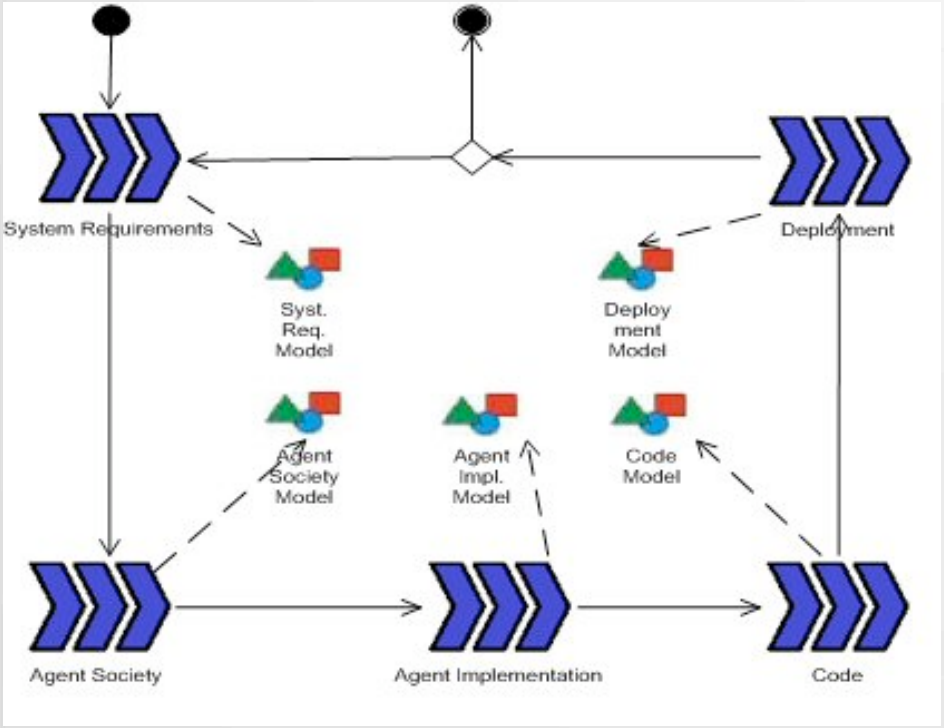


An Example: PASSI

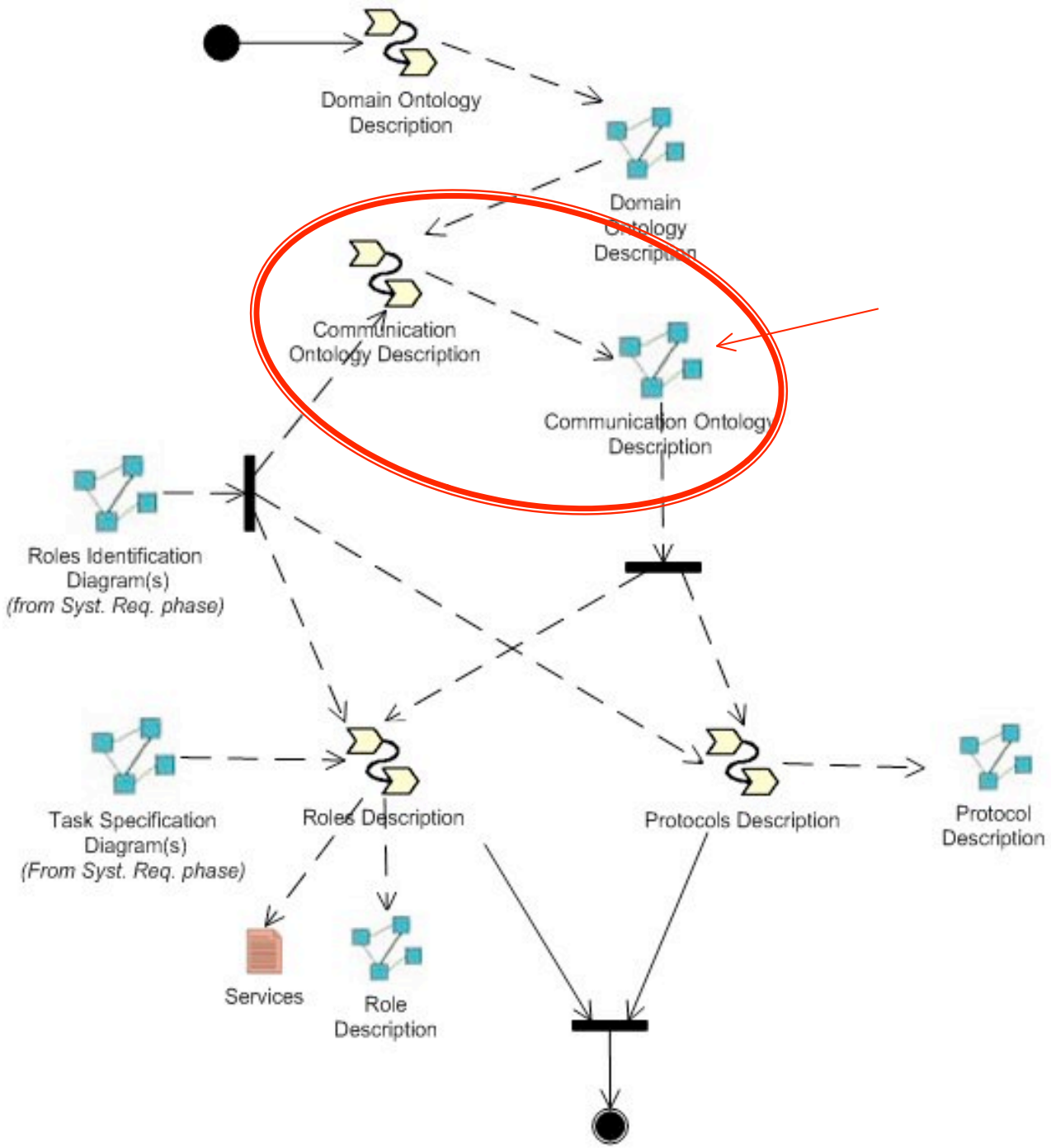


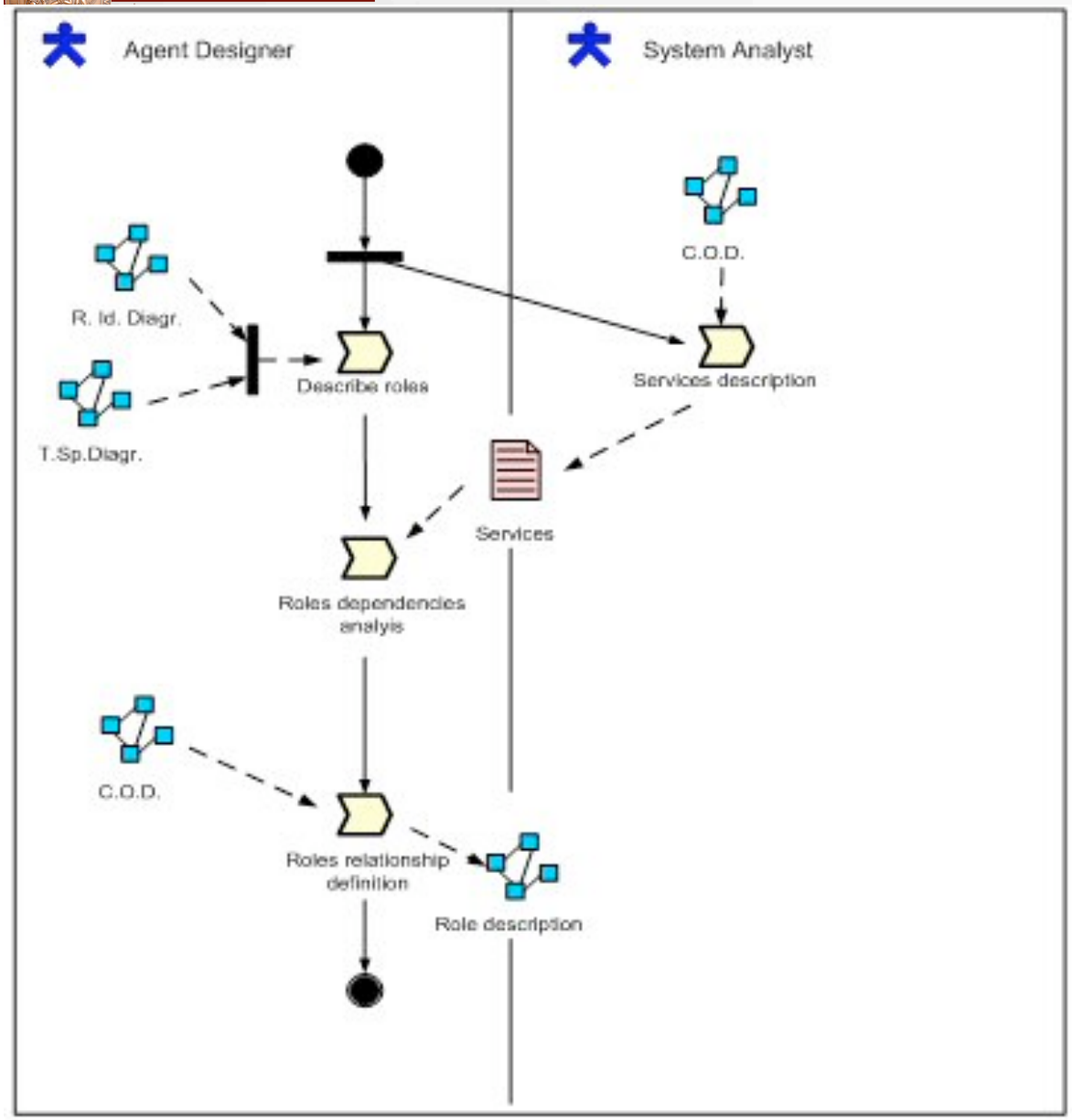
- PASSI includes six disciplines
- Direct correspondence between the disciplines and the PASSI phases

An Example: PASSI



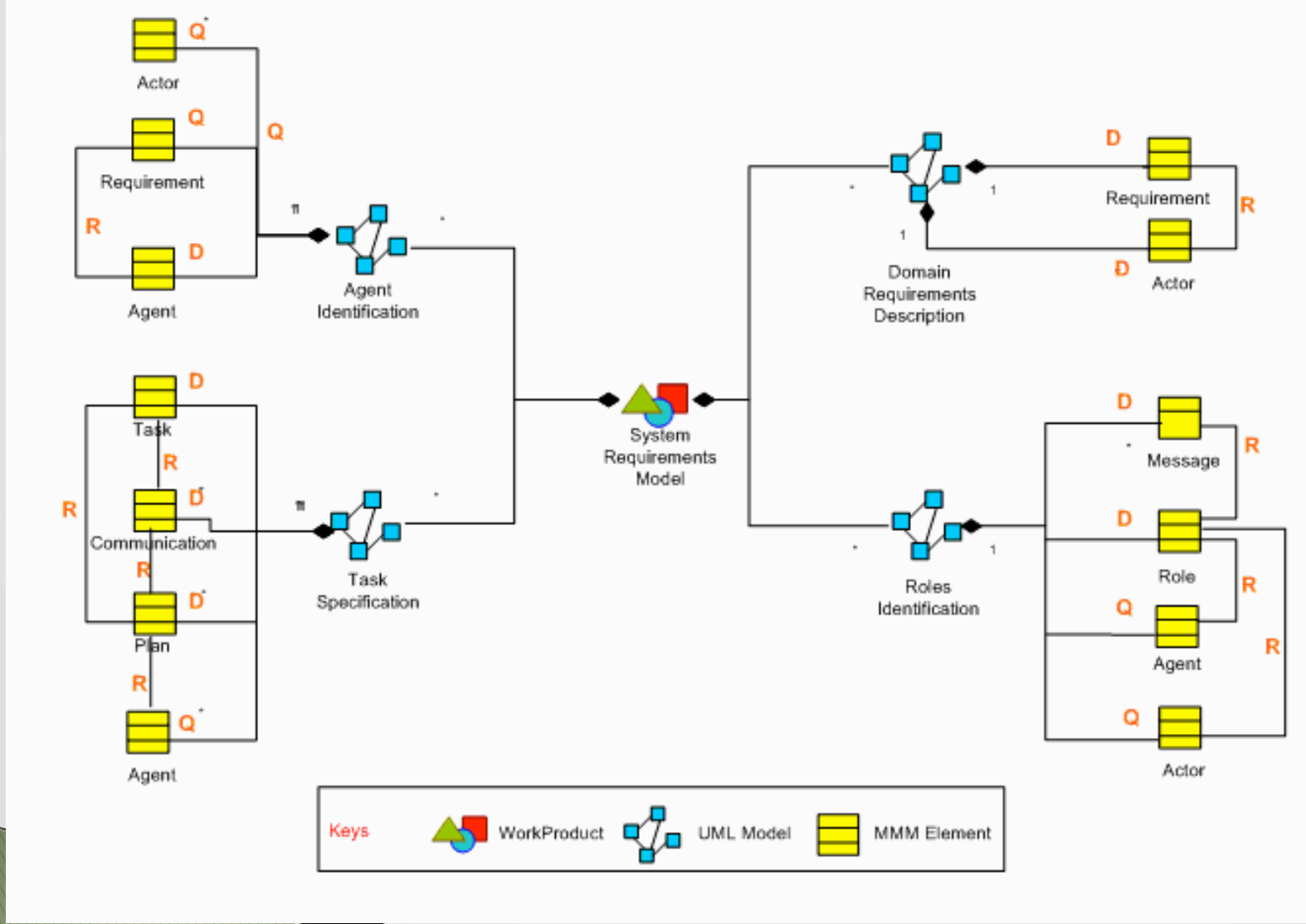
- Each phase produces a WorkProduct
- Each phase is composed of one or more sub-phases that we represented as WorkDefinitions
- A sub-phase is responsible for designing or refining one or more artefacts that are part of the corresponding model


Domain Ontology Description
Domain Ontology Description
Communication Ontology Description
Communication Ontology Description
Roles Identification Diagram(s) (from Syst. Req. phase)
Task Specification Diagram(s) (From Syst. Req. phase)
Roles Description
Protocols Description
Protocol Description
Services
Role Description



- Input and output WorkProducts
- Responsibilities of each Process Roles
- Each Activity produces as results a WorkProduct where one (or more) MMM element is defined/quoted/related

The need for extension



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Conclusion

- SPEM is well suited for the description of an agent oriented methodology
- It provides a set of elements allowing a top-down decomposition of a methodology
- The proposed decomposition allows an easy identification/extraction of method fragments
- However we found some difficulties in the application and discrimination of the concepts of WorkDefinition, Phase and Activity; some simplifications was required

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Thanks for your attention

seidita@csai.unipa.it