

# IEEE FOUNDATION FOR INTELLIGENT PHYSICAL AGENTS STANDARDS COMMITTEE (FIPA SC)

## Working Group: Design Process Documentation and Fragmentation

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### Problem Statement:

Complex software system development with the agent-oriented approach requires suitable agent oriented modeling techniques and processes providing explicit support for the key abstractions of the agent paradigm.

Several design processes supporting analysis, design and implementation of Multi-Agent Systems (MAS) have been to date proposed in the context of Agent Oriented Software Engineering (AOSE).

Each of them presents different advantages when applied to specific problems. A unique design process cannot be general enough to be useful to everyone without some kind of customisation; when developing a new design process, several MAS developers/designers prefer to use phases or models or elements coming from existing design processes in order to build up a personalised approach for their own problem thus spending time and increasing the cost for learning different approaches.

This problem can be faced by adopting the method engineering paradigm (more precisely the situational method engineering paradigm). Situational method engineering paradigm provides means for constructing ad-hoc software engineering processes following an approach based on the reuse of portions of existing design processes, the so called *method fragments* stored in a repository, called *method base*.

Method fragment or simply fragment is the building block of ad-hoc design processes; several well known approaches in literature present different definitions and descriptions of method fragment but all of them share the same assumption: each existing design process can be considered as composed of self contained components, the fragments. The definition of method fragment in every kind of situational method engineering approach constitutes the base for the extraction of fragments from existing design processes, for their retrieval from the method base and for their assembly in the new design process. Today it does not exist (yet) a unique, standard, definition of method fragment besides when looking at existing design processes, usually designers have to cope with an additional difficulty consisting in the lack of uniformity in their documentation.

We think that in the FIPA context, the adoption of a standardised way for representing design aimed at developing multi-agent systems is very advisable. This would facilitate the comparison of different processes, their evaluation and an easier transition to the next step of our proposal: the fragmentation of such processes in a set of fragments abiding to the same structure. The definition of a standard way for documenting design processes and the definition of a standard structure of the fragments that compose these processes are therefore the aims of this working group.

### Objective:

This working group will propose a definition of method fragment to be used during a situational method engineering process, the fundamental elements it is composed of and the metamodel it is based on.

The first step will be the identification of the most suitable process metamodel and notation: (i) for the representation of the existing design processes from which the fragments have to be extracted, and (ii) for the representation of fragments themselves. An important contribution about that might come from an OMG specification, the Software Process Engineering Metamodel 2.0 (SPEM), or from the ISO 24744 specification.

The second step will consist in the definition of a proper template for the description of agent-oriented design processes. Such a template will, obviously, refer to the selected process metamodel and suggest the adoption of good practices in documenting existing processes as well as defining new ones.

The third step will be the definition of the Method Fragment Structure and Documentation Template. This work will start from the results obtained by the FIPA Methodology Technical Committee (years 2003-2005).

The documentation and fragmentation of some existing design processes (members already committed for: ADELFE, ASEME, ASPECS, INGENIAS, GORMAS, PASSI, SODA) will be performed with the aim of defining guidelines and best practices for process fragmentation according to the specification provided in the Method Fragment Structure and Documentation Template.

The proposed work aims at providing the possibility of representing design processes and method fragments through the use of a standardized structure thus allowing the creation of sharable repositories and enabling an easier composition of new design processes.

In the future this standardized way of representing method fragments could be used for the implementation of fragments in a CAPE (Computer Aided Process Engineering) tool supporting the designer during the construction phases.

#### Documents Generated:

- Process Metamodel and Notation Specification [Experimental]. This document specifies the adopted process metamodel and the notation used to design a process. Experimental version of the document.
- Design Process Documentation Template [Experimental]. This document specifies the template suggested for the documentation of a process. Experimental version of the document.
- Method Fragment Structure Definition and Documentation Template [Experimental]. This document specifies the adopted definition of process fragment and the template adopted for the documentation of fragments extracted from existing processes or new ones. Experimental version of the document.
- Reference documentation and fragmentation of some design processes. A collection of documents describing existing processes according to the prescribed metamodel, notation and documentation templates.
- Process Metamodel and Notation Specification [Proposed Standard]. Version of the document proposed for adoption as a IEEE FIPA specification to the FIPA board.
- Design Process Documentation Template [Proposed Standard]. Version of the document proposed for adoption as a IEEE FIPA specification to the FIPA board.
- Method Fragment Structure Definition and Documentation Template [Proposed Standard]. Version of the document proposed for adoption as a IEEE FIPA specification to the FIPA board.

#### Technology:

- FIPA Abstract Architecture Specification, 00001
- FIPA ACL Message Structure Specification, 00061
- OMG, Software Process Engineering Metamodel (SPEM)
- ISO 24744 (Software Engineering — Metamodel for Development Methodologies )
- Enable reuse and composition of portion of existing design processes
- Enable standardized representation of existing design processes
- Enable the creation of public repositories of design process fragments

#### Plan for Work and Milestones:

Activity	From	To
Proposal submission to the FIPA board	24/03/2009	31/03/2009
Call for Proposal (CFP) dissemination	01/04/2009	29/05/2009
Study of the CFP answers, finalization of work plan	01/06/2009	30/06/2009
Definition of the Process Metamodel and Notation Specification	01/07/2009	30/11/2009
Definition of the Design Process Documentation Template	01/09/2009	30/11/2009
Definition of Method Fragment Structure and Documentation Template (Draft)	01/09/2009	29/01/2010
Reference documentation and fragmentation of some design processes	01/10/2009	29/01/2010
Revision of Process Metamodel and Notation Specification	01/12/2009	26/02/2010
Revision of Design Process Documentation Template	01/12/2009	26/02/2010
Revision of Method Fragment Structure and Documentation Template	01/02/2010	30/04/2010
Revision of existing processes documentation and fragmentation	01/02/2010	30/04/2010

Milestone	Date
Publication of final work plan	30/06/2009

Publication of Process Metamodel and Notation Specification Document [Experimental]	30/11/2009
Publication of Design Process Documentation Template [experimental]	30/11/2009
Publication of Method Fragment Structure and Documentation Template [experimental]	29/01/2010
First version of the existing processes documentation and fragmentation	29/01/2010
Publication of (proposed) standard Process Metamodel and Notation Specification	26/02/2010
Publication of (proposed) standard Design Process Documentation Template	26/02/2010
Publication of standard Method Fragment Structure and Documentation Template	30/04/2010
Publication of the reference documentation and fragmentation of existing processes	30/04/2010

**Dependencies:**

- OMG Software Process Engineering Metamodel (SPEM)
- ISO 24744 (Software Engineering — Metamodel for Development Methodologies)
- FIPA Abstract Architecture Specification, 00001
- FIPA ACL Message Structure Specification, 00061
- Synergies with Eu projects.
- Synergies with Italian projects, MEnSA, etc.

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