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 systems 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 customization; 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 personalized 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 process following an approach based on the reuse of portion 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 standardized 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 that 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 language for the representation of the existing design processes from which the fragment have to be extracted and for their own representation in a way that could emphasize their fundamental elements useful for the retrieval from the method base and for their assembly. An important contribution about that might come from an OMG specification, the Software Process Engineering Metamodel 2.0 (SPEM). This could be the natural candidate to be the meta-model adopted for describing FIPA processes since it has been already an accepted standard.

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 defining new ones.

The third step will be the definition of the method fragment structure and its documentation template. This work will start from the results obtained from the FIPA Methodology Technical Committee (years 2003-2005).

The fragmentation of some existing design processes will be performed with the aim of defining guidelines and practices for processes fragmentation according to the specification provided in the Method Fragment Structure and Description 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 (method bases) and enabling an easier composition of new design processes.
In the future this standardized way of representing method fragment 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:
- Design Process Description Template [Experimental]
- Method Fragment Structure and Description Template [Experimental]
- Reference documentation and fragmentation of some design processes
- Design Process Description Template [Proposed Standard]
- Method Fragment Structure and Description Template [Proposed Standard]

Technology:
- FIPA Abstract Architecture Specification, 00001
- FIPA ACL Message Structure Specification, 00061
- 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:
- Creation of the working group, definition of modus operandi, definition of precise working agenda, technical work, 17 December, 2008, Bath, UK (@AOSE-TFG6, co-located with EUMAS08).
- Submission to the FIPA Board, 30 December, 2008.
- Call for Proposal (CFP), 15 January, 2009.
- Study of the CFP answers, finalization of work plan, draft of the Design Process Description Template, 28 February, 2009.
- Reference documentation of some design processes, 31 May 2009
- Revision of Design Process Description Template 30 June 2009.
- Publication of standard Design Process Description Template 15 July, 2009
- Draft of Method Fragment Structure and Description Template, 30 April, 2009
- First version of the reference fragmentation, 30 June 2009.
- Revision of Method Fragment Structure and Description Template, 15 September 2009
- Publication of the reference fragmentation, 15 September 2009.
- Publication of standard Method Fragment Structure and Description Template, 30 September 2009

Dependencies:
- OMG Software Process Engineering Metamodel (SPEM)
- 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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