

## A Structure to Software Process Definition in *ImPProS*

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To help an organization in the gradual software process implementation, it is useful to supply automated support by means of an environment (*ImPProS* – Gradual Software Process Implementation Environment) capable to support the phases that the specialized literature considers as necessary: software process definition, simulation, execution and evaluation. The *ImPProS* is a project of initiative the Center of Informatic at UFPE – Federal University of Pernambuco with the partnership at UNAMA - University of Amazônia, financed by CNPq - National Advice of Scientific and Technological Development, which aims the creation of an environment of support to the implementation a software process in an organization of gradual way. The “gradual” term denotes the fact that the process implementation is performed with the experiences learned in its previous phases.

This gradual implementation tends to make it possible the processes specification in accordance with the specific project domain and the organization characteristics; the software process instantiation in accordance with the properties of each project; its simulation from the configuration parameters (stated period, pressures, cost, resources, etc.); an execution (enacting) more similar than it waits for a organizational process; and an evaluation from the collection of execution metrics.

The goals of the *ImPProS* had been adapted from the structure that composes the software meta-process, the characteristic proposals for the implementation of a software process and the life cycle for continuous improvement of process defined by IDEAL Model. Thus, it is composed of a cooperative environment, formed for nine main tools:

- **ProDefiner:** it provides the definition of software process from the analysis of specific characteristics and learning acquired with other definitions;
- **ProSimulator:** it makes possible the simulation of software process instantiated from a execution plan of the process and thus to foresee problems;
- **ProEnacter:** it allows the automatized execution and accompaniment of software process by project team;
- **ProEvaluator:** it provides the evaluation of software process execution from the analysis of qualitative and quantitative criteria;
- **ProImprove:** it makes possible the systematic execution of activities the software process improvement, from the IDEAL model;
- **ProAnalyser:** it allows the analysis and taking of decision concerning the evaluation items which composes the software process;
- **ProReuse:** it provides the execution of software process reuse from the definition of project scope and its adaptation to the use context;
- **ProKnowledge:** it makes possible the collection, analysis and use of knowledge learned during the execution of software process;
- **ProConverter:** it provides the conversion of software process components from the structures of quality norms/models and their mapping.

The focus this work is detailing the Process Definition structure. This way, this one to *ProDefiner* tool will be taken in consideration, almost it that have

the development phase concluded and validated. In the software processes definition of *ImPProS*, adapted from TABA environment, initially meets the software process meta-model, made up of components and the relationships between them that are deriving the mapping of some software quality process norms and models (CMMI, SPICE – ISO/IEC 15504, ISO/IEC 12207, etc.).

The objective of this meta-model is to determine a unique terminology for the software process definition in *ImPProS*. It is great to stand out that the structure of meta-model was defined to contemplate all the software process components (process, activities, devices, etc.), but not to restrict its composition for some software process norms/models (common in the works found in specialized literature), or either, depending on norm/model to be used, the user can make the mapping of the same one using as base the ISO/IEC 12207 terminology and define its processes from the use of this new meta-model.

The definition of a standard process establishes a common structure to be used by organization in its software projects and constitutes the base for definition of all its processes. This way, a basic process is established that will serve as starting point for the posterior definition of the adequate software processes to the different characteristics of each project, allowing economy of time and effort in the definition of new processes.

In view that different types of software have distinct characteristics and require different development boarding, the standard software process of organization will have to be adapted (specialized) considering the characteristics related to the type of software (for example, information systems) and to the development paradigm used (for example, object-oriented). Thus, during the stage of standard process specialization, activities could be added or be modified, in accordance with the context for which it is carrying through the specialization.

The instantiation for specific projects consists the adaptation of a specialized process to a project, considering its peculiarities. In this stage, the life cycle model, the methods and the tools that will be used in

the project, the human resources and its responsibilities during the process and the consumed and generated devices (products) are defined. The ISO/IEC 9126 norm is used to identify the requirements of quality product. Such characteristics will influence the process from activities, methods and techniques. The activities of specialized process will have to be adapted to the life cycle model chosen for the project and new activities could be inserted in a determined life cycle. Thus, as result of this phase an instance of process is generated contends the components necessary for the software process in order to represent the specific project to be developed, taking care of all characteristics of this development.

The *ImPProS* considered three contribution points that, from analyses made in process definitions and what specialized literature considers as use, had perfected the specification of software process in the three definite levels and make possible that the definite components to the process could be simulated in order to foresee problems in the execution by project team:

- Inclusion a set of new organizational, software projects and products characteristics;
- Suggestion of software process components from definitions processes have done previously and knowledge learned during these definitions;
- Planning Level of Instantiated Process so that it can serve as base for the simulation of this process for a specific project.

The definition of execution plan an instantiated process consists a specification of some characteristics the process planning that make possible its previous execution. This way, the user can shape one or more plans to verify how the instantiated process holds from the characteristics of execution a specific project: financial resource; metric; estimates; profiles and its hierarchy; cost; and schedule. These attributes will be parameterized to *ProSimulator* tool.