

Process oriented approach for enterprise information system design

Abstract of PhD work

Jihed TOUZI

Centre de Génie Industriel
Ecole des Mines d'Albi Carmaux
Campus Jarlard Route de Teillet
81 013 Albi Cedex 09-France
jihed.touzi@enstimac.fr

1 Introduction

The information system (IS) of an enterprise(or collaborative enterprise network), constitutes an essential support of its functional processes. For this reason, this platform of management and pooling of enterprise data, presents a character which is extremely specific to each enterprise(or collaborative enterprise network). The definition of the "good information system" for a given enterprise constitutes a difficult task.

Our objective in this PhD work, is to define a “translator” that make possible, starting from a certain number of models, related or not to the enterprise (process models, enterprise models, generic models of information system, ect.) and using enterprise knowledge, business rules, company culture, current information system modules to emerge the most precise and the most usable specification of an information system(model) which is relevant and specific to the enterprise.

Our research work is centered on the “information system design” field. It’s based on three axes. The first axis is about **Formalisms**, we mean IS architecture, IS generic model, enterprise modeling, process modeling and exploitable process models. The second axis concerns **Knowledge**, we mean ontology and structured knowledge bases. The third axis is based on **Integration Tools**, we mean concepts, methods and software for integration and interoperability.

2 Research axes and IS design approach

In the first axis we started exploring enterprise modeling methods/methodologies. An *enterprise model* is a computational representation of the structure, activities, processes, information, resources, people, behavior, goals, and constraints of a business. So before we have to think about which kind of information system is good for one enterprise ,we must know “every thing” about it. Methods/methodologies like CIMOSA,GRAI and OLYMPIOS , give a complete representation of the structure of the enterprise. a process is represented by a formal sequence of procedures, activities and steps. However, process models in the functional view, are not expressive enough to reflect dynamism, flexibility and the need for interoperability of enterprise process. Some process modeling languages like BPMN (*Business Process Management Notation*) which is on the way to become a standard in process modeling , have a rich vocabulary. Moreover BPMN offer integration capability with enterprise data and applications. In this context we aim to find one process formalism that permit describing perfectly enterprise process and integrating completely other enterprise views (information, organization and resources). Formal exploitation of process models remains a delicate point.

In the second axis we admit that (enterprise) ontology present key aspects of an enterprise. Ontology contains business knowledge, resource structures and person capabilities. This ontology (enterprise) is semiformal; it provides a glossary of terms expressed in a restricted and structured form of natural language supplemented with a few formal axioms. We started by study ontology build phases and existing ontology types. We are interested by TOVE(Toronto Virtual Enterprise) project. It describes an object enterprise ontology based on structure, behavior, authority, empowerment and commitment competencies.

In the third axis, we look for workflow enactment of the resulted information system model. For this, we must integrate different enterprise modules (or components). Enterprise modules are implemented building blocks or systems (products, or families of products), that can be utilized as common resources in enterprise engineering and enterprise integration. As physical entities (systems, subsystems, software, hardware, available human resources/professions) such modules are accessible in the enterprise, or can be made easily available from the market place. EAI (Enterprise Application Integration) concepts are a solution for integrating heterogeneous applications using data exchange language like XML (eXtensible Markup Language).

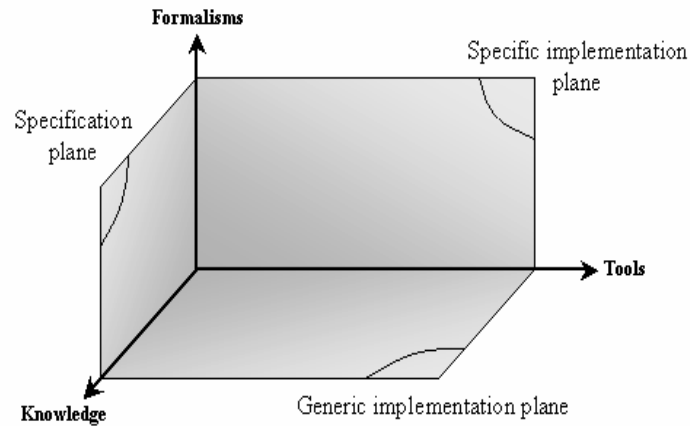


Fig. 1. Process research axes concerning the information system translation. The *Formalisms* and *Knowledge* axes deal with *specification* issue while *Tools* axis brings *implementation* notion to others axes. Indeed, *Formalisms* and *Tools* are linked by specific process or IS or enterprise modeling (or implementation). Similarly, *Knowledge* and *Tools* are connected by generic concepts of implementation.

The **process-based approach** is a strong feature of our current research, but formal exploitation of process models remains a delicate point. This approach aims to translating a confident process model into a pertinent IS design model. This translation is based on “general knowledge”, which includes *generic IS models*, *EAI components* and *models of existing IS*. The components of that “general knowledge” should be used by the semi-automatic translator during the construction of the pertinent IS model. They are guiding the translation by providing additional (and essential) elements for the IS model design.

Technically, if BPMN seems to be the best candidate for pertinent workflow modeling, it is difficult to find trustable ways of exploiting generated models. XML is certainly an adequate medium for data spread but obtaining BPEL4WS files from BPMN models is not a trivial action (BPEL4WS is Business Process Execution Language for Web Services and is a XML language designed for business process). Thus, if we want to use XML files to generate (using the translator) UML IS models

(in XMI), we must be able to obtain BPEL4WS models (or such XML business models).

3 Conclusion

the IS model generation cannot simply be a compilation of workflow models because the single process model does not contain the whole information required for IS model design. Indeed, the objective is not to translate a process expressed in language A into a process expressed in language B. It is to create an IS model (thus located on a different level) from specific data contained in process models, by using general knowledge surrounded by *reference models*, *existing IS models* and by every other kind of knowledge that could be useful including information provided by actors to the translator.

References

1. Morley, C.: La modélisation des processus : typologie et proposition utilisant UML. In Processus et Systèmes d'information – Journées ADELI, Paris, France (2002).
2. Darras, F.: Proposal of a formal framework for the design and use of an Enterprise Resource Planning software. PhD thesis – INP Toulouse, (2004).
3. Vernadat, F.: Enterprise modeling and integration. Chapman & Hall (1996)
4. Vernadat, F. UEML: Towards a Unified Enterprise Modeling Language. In Conception, Analyse et gestion des Systèmes Industriels, pages 3–10. 3ème Conférence Francophone de MODélisation et SIMulation - MOSIM'01, (2001)