# ABSTRACTION OF PROCESS MODELING LIKE SUPPORT TO REQUIREMENTS ENGINEERING TO COMPLEX SYSTEMS

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***Abstract*** *— The requirements for non-conventional systems tends to be a critical process and often prone to failure, particularly as regards their understanding. This working progress paper describes a proposal for elucidation requirements based on process modeling. This way, exploring processes and protocols languages like an abstraction tool during system specification. As a case study, this research involves a real environment: a flow process of electronic data interchange (EDI) in a pharmaceutical company.*

*Index Terms — Software Requirements; Requirements Elicitation; Process Modeling; Information System.*

## INTRODUCTION AND OVERVIEW

The software requirements are base, generally, by text representation [1]. The main variation of representation techniques to requirements are the visual language, i.e.: UML (Unified Modeling Language), Flowcharts, DFD (Data Flow Diagram) e MDA (Model Driven Architecture), all of them oriented to support the documentation and project phase of software development.

Concern to elicitation of system information, is possible reach many traditional and empirical methods, i.e.: Interview, Ethnography, Prototyping, and Brainstorming.

While the elucidation strategies concerns about approaching stakeholder, the modeling techniques focus on project activities. These two scenarios are based on textual representations. This can contribute with a gap that is often failures to link the initial collection step of representation requirements, especially for non-traditional systems. Complex systems have specific characteristics in their flows, treatment and communication among its modules or subsystems.

The main objective of this working progress research is a proposal to improve the software requirements for non-traditional systems. This proposal is oriented by a support modeling tools for manipulating processes to facilitate the abstraction and understanding about the artifact to be developed.

This research considers a real laboratory environment, an EDI (Electronic Data Interchange) process in a pharmaceutical organization. This collaboration allows reach better results from problems and validations more realistic.

There are others researches that also propose improve the software requirements by the model language. Bortoli and Price [2] presents a method based on workflow environments like a support to identification initial information to produce a system. In addition, there is work that explores MDA [6] abstraction to facilitate the specification to software.

Both papers present good results. However, this research concern to consider a real non-traditional system, comprised by subsystem and process dependency. Furthermore, this article involves real study case, problems, and validation environment, like a special feature.

## PRACTICAL ACTIVITY AND PROPOSAL STUDY

The practical activity of the work was conducted in collaborating with a real organization: a multinational pharmaceutical industry responsible for EDI transactions (Electronic Data Interchange) of the pharmaceutical company. This partner had a robust and complex IT infrastructure (Information Technology) to support the practical activities in an actual environment with real problems.

### Support Tool Analysis

Initially, this work has considered some tools that could serve as a resource for this activity, such as Microsoft Visio, SE Process (SoftExpert), EPF Composer (Eclipse Process Framework), and Bizagi Business Process (Bizagi Co.).

Considering the various criteria and requirements, PArchitect [4] was chosen to support the concrete activities. PArchitect (Figure 1) has exclusively focused on the interaction of the modules that make up a process. PArchitect also is especially centered on the communication protocol between them.

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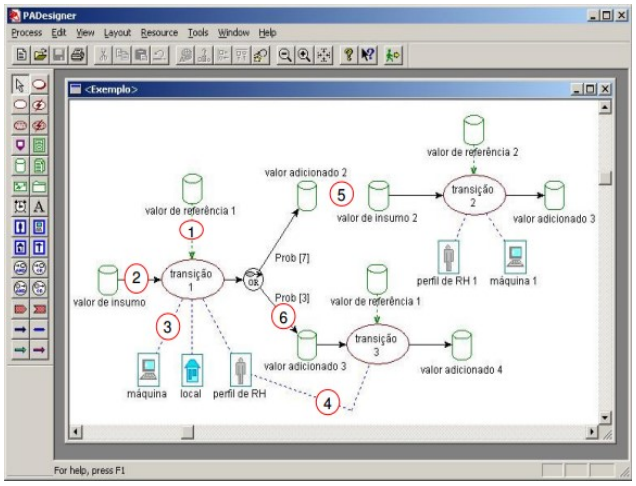


FIGURE 1
PARCHITECT [3] CONSOLE DESIGN EXAMPLE

PArchitect is an environment based on integrated graphic language, for the identification, characterization and simulation of business processes. It provides mechanisms to ensure high productivity and quality of the produced models built into the reality context. The interface and language explored in PArchitect are simple and intuitive and easy to learn (Figure 2).

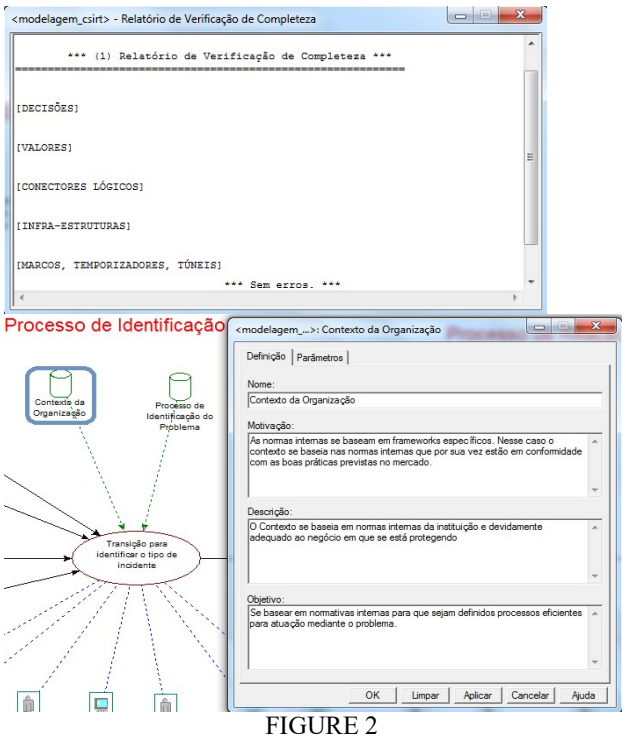


FIGURE 2
PARCHITECT SIMULATION REPORT AND COMPONENT FLOW CONFIGURATION

The PArchitect automatically generates simulators for each identified and characterized that process is complete and syntactically correct. The generated simulators running the business language described in a process. The analysis of the simulation provides information about runtime, cost, time, gaps, productivity issues, risks, and waste. From these data, the analyst can correct and improves the process problems [5].

### Problems Identification

This use case runs a process with an important feature. It must provide visibility of the flow among provider, distributor and industry in a Web platform system. Nowadays, there are 26 active clients, which are 106.637 points of sale (POS) that can realize orders to 122 distribution centers and integrated with about 300 Brazilian subsidiaries. The system is responsible for managing 45.000 orders per day for their respective distributors through 1.600 different FTP connections.

Today, the process runs by the simple exchange of files among the organization and its trading partners. There is no auxiliary tool. If the environment has some inconsistency, it is necessary to carry out the monitoring by Telnet service.

After the completion of the first activities requirements assisted by process tool, we could identify the main problems identified in the current environment; i.e.: GUI problems, manual processes, slow down the process file, scalability problem with new integration, internal concurrent among corporate systems, standardization of file descriptors (mapping), and low settings reuse, mapping files and connectors.

## PRELIMINARY RESULTS AND CONCLUSION

The use of tools allowed a more dynamic and participatory development of those involved. This case study allowed noticing that a user is easier to negotiate and validate functional tactics before a process tool than textual contracts. The initial system prototype, preliminary results of this case study, still in progress, showed the following characteristics:

- Elimination of unnecessary manual processes for the process
- Reduction of 19 seconds of the average processing time
- Reduction of errors in the interpretation of received files
- Reduction of decision-making

Table 1 shows the evaluation results for comparison between the current and proposed model. The values in this table were taken from simulations using the prototyping process modeling tools. To simulate the processes were considered a data volume of a month of an execution process.

TABLE I
EVALUATING COMPARABLE POINTS TO PROPOSAL ENVIRONMENT

| Activity | Average Current Process | Average Proposal Process | Compared Benefits |
|---|---|---|---|
| Feedback Order Module | 53,1'' | 39,5'' | 25,41% |
| Electronic Order Module | 12,0'' | 5,0'' | 58,33% |
| Order Module | 14,2'' | 6,3'' | 57,74% |
| EDI Integration | 95,6'' | 69,2'' | 27,36% |

The use of PArchitect and its integrated modules proved essential for problem determination and design phases of a syntactically and semantically correct proposal.

This proposal is under observation and validation phase. In the pharmaceutical context, we defined a new business integration model, including the definition of protocols and data exchange schemes.

Finally, the results presented in this study allows making various future work; both more technical line as the special area.

## ACKNOWLEDGMENTS

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