

BPM – The Case for Standard, Holistic and Flexible Process Modeling Techniques

Akhil Kumar, Professor
Department of Supply Chain and Information Systems
Smeal College of Business
420 Business Building
Penn State University

Background and Status

In the last 10 to 15 years there has been considerable academic research into ways of modeling, verifying, analyzing and optimizing business processes. It has led to modeling methods such as BPEL, XPDL, BPMN, etc. However, we still do not have a well-accepted "standard" like SQL that would allow seamless interoperability between processes of different organizations. Also lacking is an ability to model "holistic" processes that encompass *which role* will do an activity, *what resources* will be needed (such as documents, equipment, space), and any *constraints* that might apply to the process (e.g. the same person cannot do more than two activities). Another problem is that process design techniques are rigid, whereas real-world processes are riddled with many exceptions and special situations. This leads to frequent breakdowns at run time. Hence, we need ways to design flexible processes that can be adapted and modified.

Most processes have several variants. While all insurance claim processes follow similar steps like 'review application', 'perform appraisal', and 'make payment', yet there are variants based on the type of policy (auto, home), amount of claim, type of vehicle or home, etc. For instance, the policy may require two appraisals and three approvals for a large claim, while only one appraisal and one approval for a small one. For large customers the approvals may be deferred. Ideally, as policy changes occur, it should be possible to adjust the process without manual intervention.

Directions

Flexible processes must satisfy certain requirements. First, it should be possible to modify a running process by adding, deleting and reordering various activities and events related to it. Second, flexibility also entails that human resources and roles associated with the activities of a process may be altered. An agent assigned to an activity would be able to delegate it to an alternate. Third, in a similar vein, resource substitution for a physical resource like equipment should also be allowed. Fourth, an activity should be able to use default input data when actual data is not available so that the process does not get stuck. Naturally, all these changes must be subject to overriding constraints so that arbitrary modifications do not occur.

Creating a single, flexible super-process that subsumes all variants can produce a large spaghetti-like model. Hence, there is a need for rule based methods that can encapsulate policy as rules, and separate rules from a basic process flow skeleton. By applying the rules it would be possible to materialize a unique process model for each specific case. Of course, adding rules raises the risk of conflicts among them. Hence, conflict resolution methods are required. Clearly, there are tradeoffs between the expressive power of process models and the complexity of the process description framework.

Summary

Current process design techniques are non-standard, non-holistic and non-flexible. Rigid design methods cause breakdowns at execution time. New approaches for robust process design that suitably balance expressive power and complexity are needed.