

## ADVANCED PROCESS MODEL REPOSITORIES

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### THE FACT

Both empirical and anecdotal evidence indicate that enterprises across the globe and in various industries, such as finance, healthcare and government, tend to collect hundreds if not even thousands of business process models over time [1-5]. It is quite common that such set of industry-strength business process models includes thousands of activities and further related objects such as data, applications, risks etc. These models are increasingly published over an Intranet to a large number of stakeholders with varying skills and responsibilities [6]. In that sense, it may not come as a surprise that many organizations find it difficult to keep track of such large amounts of complex process models – an issue that is referred to as “model (lifecycle) management” [3], “model maintenance” [5] or “modeling in the large”. The problem is amplified by overlapping content across models, poor version management, process models that are used simultaneously for different purposes, the use of different modeling notations such as EPCs, BPMN, etc.

At the same time, research in the field of process modeling and model management has flourished over the past decade more than in hardly any other part within the business process management discipline. Extensive work has been done for the development of sophisticated algorithms to evaluate the quality of process models [e.g. 7], while experimental investigations have been carried out to establish the factors that contribute to making process models understandable to users [8,9]. Furthermore, support has been provided to identify similarities between process models [e.g. 10] and to deal with sets of closely related process models [11,12]. While separate techniques and tools have been developed to carry out the analyses that are related to these works, these techniques and tools have always looked at process models *in isolation*, rather than viewing a process model *in relation* to other process models. Moreover, there has been no attempt to integrate all these techniques and tools in a single platform.

### THE CHALLENGE AND THE OPPORTUNITY

The requirement to deal with an increasing number of business process models within organizations forms both a challenge and an opportunity. The challenge is how to sensibly deal with such large volumes of models and how to scale up approaches that work with a small set of models. Especially, it becomes essential to keep track of the various models, as they may refer to each other, mutually overlap, supersede one another, and evolve. The opportunity lies in exploiting this potentially rich source of content in combination with the abundance of process management tools and techniques that are available, to create new models and support application scenarios that were unforeseen at the time of their conception. The demand for large-scale process model management is driven by the increasing pressure to conduct enterprise-wide BPM initiatives.

### THE PROPOSAL

To face the challenges and exploit the opportunities related to the use of (large) collections of process models, the Business Process Management (BPM) Group at the Queensland University of Technology is laying the foundations for the development of an *Advanced Process MOdel REpository* (APROMORE). APROMORE will provide an *open* and *extensible* IT platform to store and disclose business process models of a variety of types and languages, and beyond that, it will build on top of existing tools and techniques, to provide state-of-the-art features for model presentation, analysis, integration, contextualization, improvement, and re-use.

APROMORE is expected to substantially ease and improve the industrial use of business process models, take full advantage of available and emerging technologies (e.g. Web 2.0, cloud computing) as well as stimulate further research into the discipline of process modeling.

The features envisioned in APROMORE go well beyond the data-management oriented functionalities typically offered by commercial process model repositories. Rather, the emphasis is on sophisticated, state-of-the-art functionalities that are of relevance when dealing with a large set of process models that are interrelated on different levels of abstractions and in various relationships (predecessor, successor, resource dependency) on the same level. Specifically, APROMORE 's functionalities can be classified according to four broad service areas:

1. *Evaluation*, concerned with establishing the adherence of process models to various quality notions. It will be possible to evaluate process models with respect to correctness criteria (syntactic quality), to usability issues such as understandability and maintainability (pragmatic quality), or assess them against well-know benchmarking frameworks, e.g. the APQC Classification Framework<sup>1</sup> (semantic quality) [13].
2. *Comparison*, offering capabilities to determine similarities between processes. This is an essential task as part of the increased focus on services that can be re-used in multiple processes (e.g. fraud detection in multiple claims processes). It will be possible to check the conformance of a process model to given industry standards, represented in the form of reference models (e.g. ITIL<sup>2</sup>, SCOR<sup>3</sup>) or business patterns for specific domains (e.g. approval), and to track extensions to a model over time and their relations with the originating reference models.
3. *Management*, supporting the creation, modification and completion of process models, on the basis of existing content. For example, it will be possible to individualize a reference model to a specific context, such as a new organization or project; to create a new process model from the merge of a collection of similar models (e.g. as part of an integration project that results from a merger or an acquisition); or to complete a process model based on a collection of business patterns. Any changes to a process model will be stored in a log file for auditing purposes and communicated via contemporary communication channels (e.g. Twitter).
4. *Presentation*, providing support for improving the understanding of large process models and collections thereof. For example, using TomTom-like coloring techniques, it will be possible to highlight the most followed process flow depending on the user context, or zoom out from a process model while abstracting away irrelevant details [14]. Moreover, advanced reports on process model statistics, such as number of users and density of decisions, will enrich the more traditional visual representation of process models. Web 2.0 and mash-ups will be utilized to connect process model contents to available information on the Internet. For example, hyperlinks might link from terms used in the process model to entries in Wikipedia or specific attributes in user descriptions might link to LinkedIn profiles. Down the track, it is also planned to include spatial information into process models [15] and to appropriately visualize often hidden attributes such as idle time or waiting time.

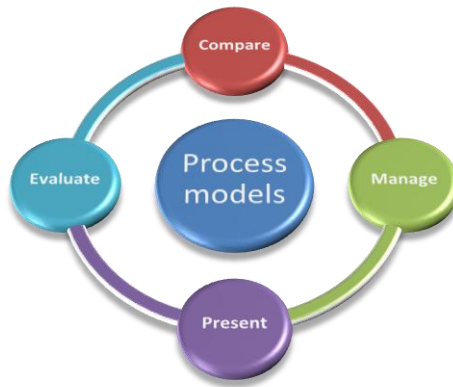
Scenarios then become possible where end users combine functionalities from different service areas. For example, the result of a process model *evaluation* could lead to an improvement plan describing a number of modifications on the process model (*management*) to align the latter to a reference model (*comparison*). Or more, after *evaluating* the quality of a collection of process models, the best performing models are selected and *compared* to each other in order to detect similarities. This result is used to merge the selected models into a configurable reference model (*management*) that is then *presented* for a specific application scenario.

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<sup>1</sup> [www.apqc.org](http://www.apqc.org)

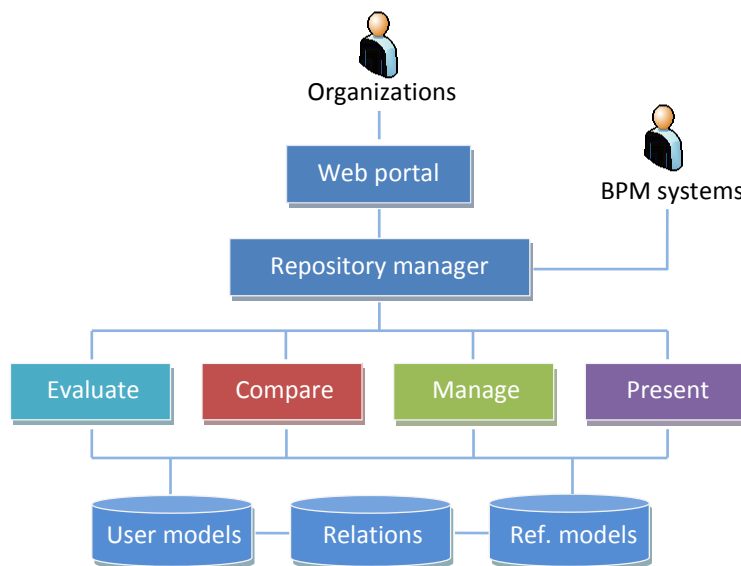
<sup>2</sup> [www.itil-officialsite.com](http://www.itil-officialsite.com)

<sup>3</sup> [www.supply-chain.org](http://www.supply-chain.org)



The four service areas of APROMORE.

APROMORE will be deployed as a Software-as-a-Service, in order to guarantee convenient access to its features via standard Web browsers. Its features will also be exposed as Web services for direct integration with third-party applications, e.g. a proprietary BPM System. Users will be able to upload their individual process models and an evaluated model will be returned that might be visualized differently according to defined user specifications. The repository will be filled with *realistic content*, which will serve as a relevant test-set for the development of both basic and advanced features of the platform. This includes popular reference models for specific industry verticals, such as SCOR and ITIL, which will be shared in the form of *configurable* process models [12] and business patterns, to foster their reuse. Other content will be confidential and only used for experimentation. Proper security mechanisms will be put in place to enforce only authorized usage of the models.



An overview of the APROMORE architecture.

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## THE INVITATION

APROMORE is expected to be of significant impact on the process modeling practice. The direct beneficiaries of APROMORE are clearly those organizations that already apply process modeling on a large scale and wish to extract greater value from their process models' content; specifically those who are involved in process improvement plans. Their success will be enhanced to comply with regulations and innovate in their operations using process modeling. Moreover, technology vendors may find it interesting to extend their offerings by tapping into APROMORE's advanced features.

The BPM group, in collaboration with other renowned researchers from three European universities, is seeking industry interest to start up a research project on APROMORE. For more information, please contact one of the authors.

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