A Tool for Assisted Business Process Redesign

—

T. Fehrer[1], D.A. Fischer[1], S.J.J. Leemans[2], M. Röglinger[1], M.T. Wynn[3]

Fraunhofer FIT

fm Research Center Finance & Information Management

QUT the university for the real world

The assisted business process redesign (ABPR) tool is a stand-alone desktop application that guides users in improving business process models using an assisted approach and by providing redesign recommendations: As the user models and optimizes a process model, new recommendations are generated and suggested to the user. The tool helps to maintain valid BPMN diagrams and encapsulates modeling and simulation settings in a single file ready for export.

Innovation and Characteristics

The basis for the application of redesign patterns is a process model and process improvement objectives (any dimension from the Devil's Quadrangle). The application of the patterns then follows a repeatable pattern of four successive work steps, at the end of which new process models are created:

1. **Select** redesign patterns that, based on their description and functionality, are generally suitable for the process at hand.
2. **Identify** suitable places in the process model where the pattern can be applied.
3. **Create** (multiple) alternative process models through modeling.
4. **Evaluate** the process redesign option by assessing the impact on the process improvement goals and balancing the effort required for subsequent implementation.

The ABPR tool is an implementation of the reference architecture presented the research paper "an assisted approach to business process redesign"[4] and aims to support the development of process improvement options in two ways. First, the tool implements the four-step approach in the user interface. The user is therefore encouraged to go through these steps one by one. Furthermore, the tool provides interfaces for *recommendation providers* to automate parts of the four-step scheme and to generate improvement suggestions. Thereby, it creates recommendations for process improvement. Four types of recommendations are generated, distinguished by their level of automation: *idea, hint, guided advice,* and *advice*. Embedding process improvement guidance and support via recommendations in a modeling tool represents an innovation for the very act of process improvement.

Example: Guided advice wizard for triage

—
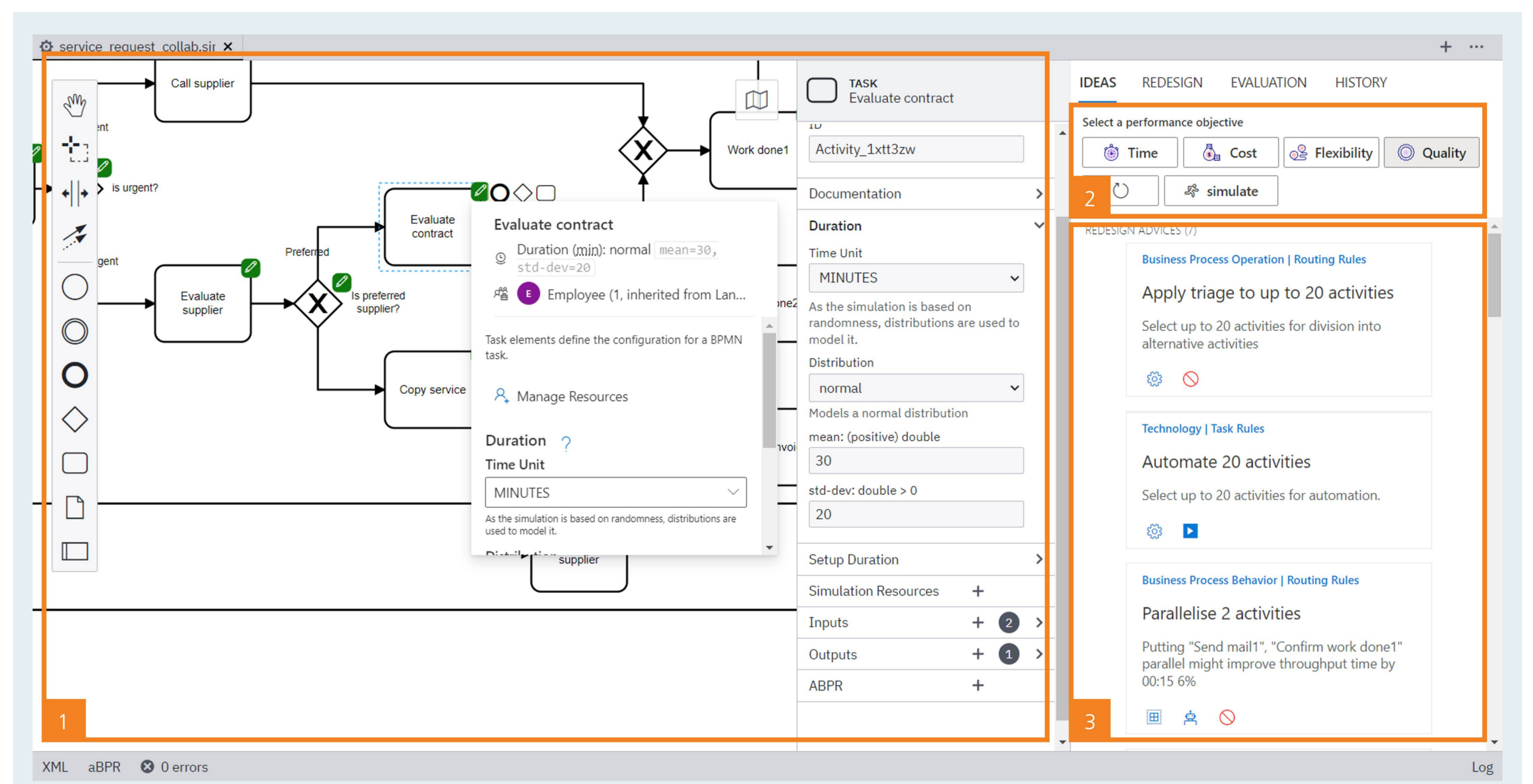
Software prototype. General overview with GUI elements (1) diagram editor, (2) selection of process improvement targets and (3) the list of recommendations.

Diagram editor

In the ABPR tool, a blank diagram canvas is the starting point to model a new business process, unless an existing BPMN diagram is imported. The process diagram is the central starting point for process improvement and can therefore be enriched with far-reaching information to resemble a comprehensive picture of the as-is state. In addition to traditional control flow descriptions, events, documents, organizations, and lanes, a custom extension of the BPMN metamodel captures simulation configurations, performance data, and approach-specific annotations. This allows the information to be stored consistently in the model and imported and exported as a .simubpmn file. Via static model analysis, the tool identifies modeling errors, detects misconfigurations or missing properties, and provides visual feedback to fix the model.

Recommendation providers

The ABPR tool generates redesign recommendations by invoking *recommendation providers* containing the logic to execute (parts of) the four-step procedure for applying redesign patterns. A recommendation provider may return more than one recommendation and several recommendation providers might provide recommendations for the same redesign pattern. In the GUI, each recommendation is characterized via a distinct name, a description, and, optionally, the expected impact and affected process elements. How a recommendation can be applied to the diagram varies per AL. The ABPR tool supports all patterns presented in Reijers and Mansar[5] in varying automation levels. The triage and activity automation patterns are implemented as *guided advice*, the parallelism, and extra resources patterns are implemented as *advice*, whereas the remaining ones are implemented as *ideas* and *hints*. An example of guided advice is shown in the figure on the left, where a wizard requests additional information to model a triage and automatically adjusts the diagram in the background.
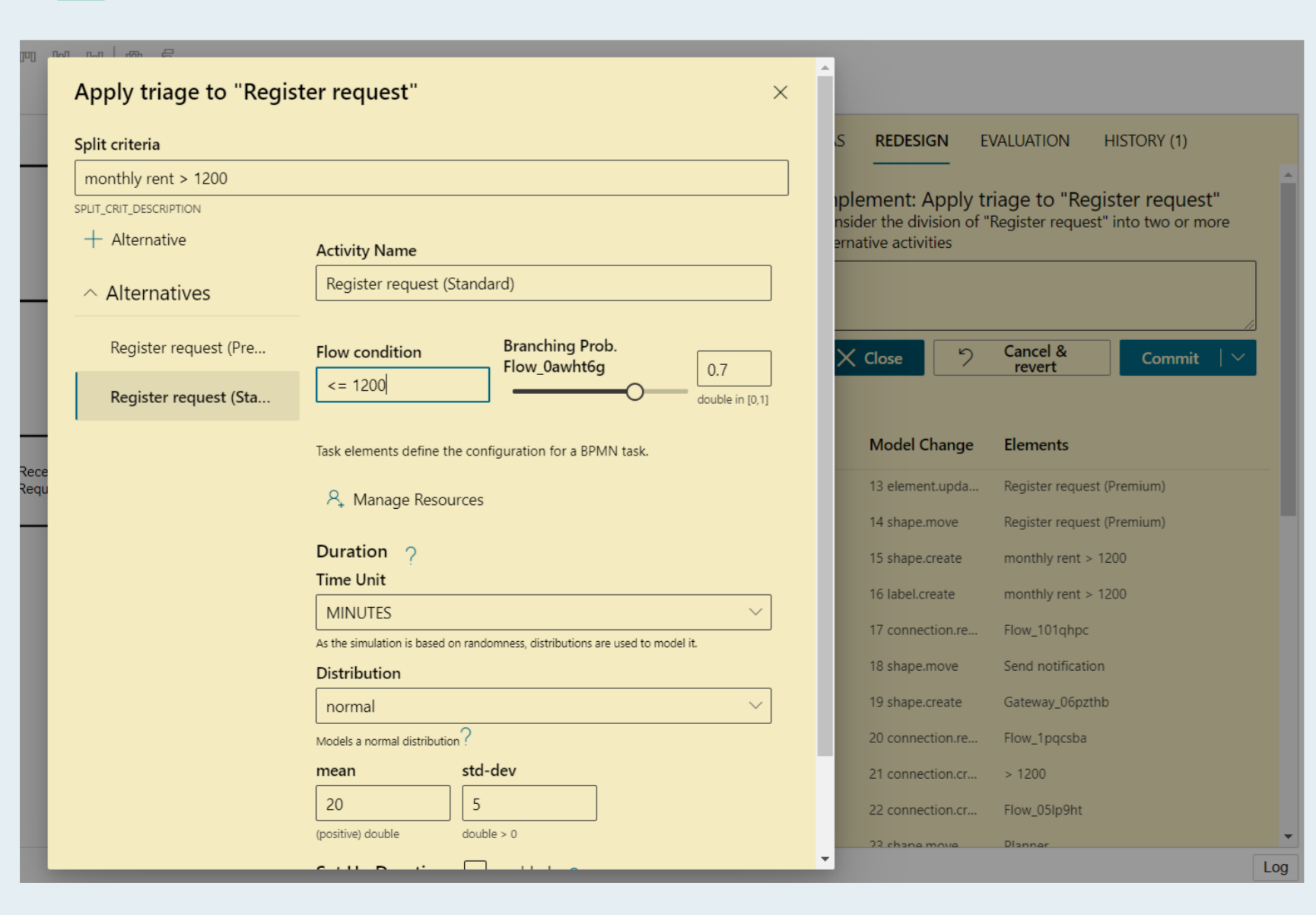
Process simulation

To estimate the impact of a redesign option, the ABPR tool offers a simulation of the process model in the "evaluate" step. Input for the simulation is the simulatable BPMN model. The results of the simulation are compared to the current process model so that differences to the as-is state can be compared. This function is also available to the recommendation providers so that they can create and simulate new process models in the background. In this way, the recommendations of the advice type can already specify the expected impact in the GUI.

Maturity and Evaluation

In designing the ABPR tool along a design science process, the tool has been evaluated for applicability and usefulness within multiple case studies in artificial and real-world settings. Even though the tool is a demonstrator, a case study conducted as a process improvement workshop for a warehousing process has shown promising results, also in terms of tool usability and robustness.