A Business Process Explorer: Recovering Business Processes from Business Applications

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Abstract

A business process contains a set of logically related tasks executed to fulfill business goals. Business applications enable organizations to automatically perform their daily operations. Business processes and business applications keep on changing independently due to dynamic business environments. Therefore, business process definitions are rarely up-to-dated to reflect the processes deployed in business applications. This inconsistency creates difficulties for the communications between business analysts and software developers. We present a business process explorer tool which automatically recovers business processes from business applications and refines the process definitions by detecting business task clones which have similar functionality across processes.

1. Introduction

Business processes define the execution order of business operations conducted by an organization. A business process consists of a set of tasks that represent processing steps for achieving a business objective. For example, a book purchase process has tasks, such as searching for books, adding the selected books into the shopping cart and providing payment methods. Business applications implement a collection of business processes to automate the daily operations of organizations. In the business domain, business processes are often changed to accommodate new business initiatives and improve the performance of organizations. In the software domain, business applications are modified to add new features. This changing nature in business environments leads to the inconsistencies between as-documented business processes and as-implemented business processes. Without up-to-date documentation, it is difficult for business analysts to optimize business processes. It is also challenging for software developers to implement the changes proposed by business analysts.

To ease the maintenance of business applications, we developed a business process explorer tool which recovers as-implemented business processes from business applications. Typically, a business application consists of user interfaces (UI), business logic and database tiers. Our tool uses static analysis techniques that follow the navigation flows among the UI screens and the interactions between the UI and business tiers to recover business processes. The details are discussed in our previous papers [2][3].

2. Overview of the Tool Features

The current version of our business process explorer tool has the following features: establishing traceability between business processes and business applications, identifying task clones to refine business processes, and visualizing business processes using commercial business process modeling tools, such as IBM WebSphere Business Modeler (WBM) [4].

Traceability between business processes and business applications: In order to help software developers quickly locate the code blocks that implement a task, our tool maintains the traceability between process entities (e.g., tasks and control flows) and the code entities (e.g., code blocks). We represent the recovered business processes with two levels of abstraction: high-level and low-level processes. High-level business processes give an overview of business operations and contain tasks which require user interactions through UI screens or which are executed by back-end components in the business logic tier; (2) low-level business processes contain the detailed steps performed in the back-end components. As shown in Figure 1, the high-level process viewer displays tasks recovered from the UI code and sub-processes. A sub-

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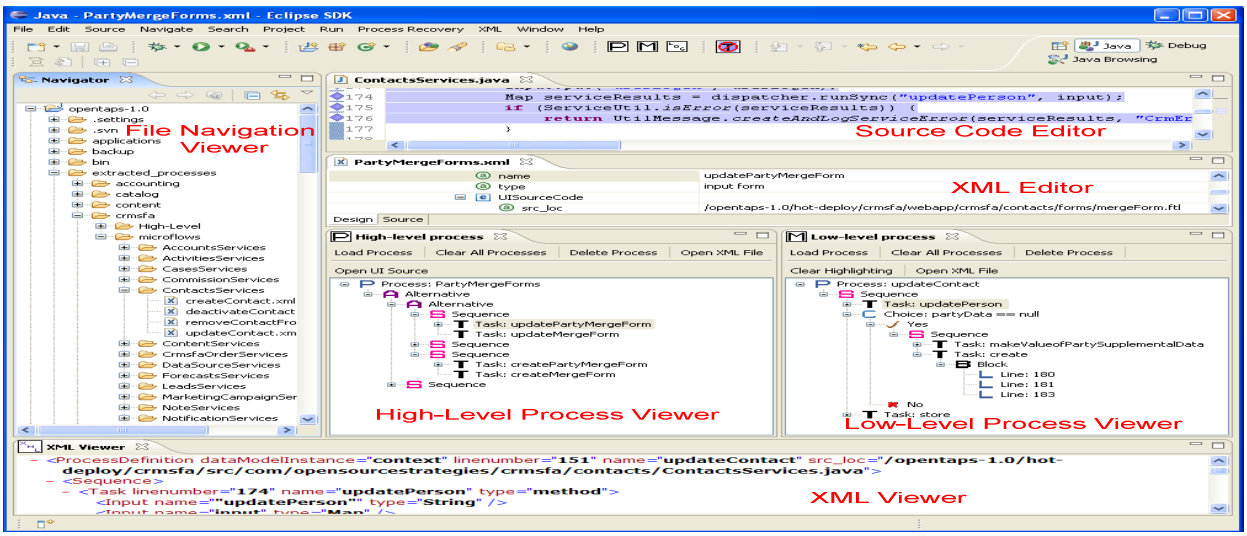

Figure 1: Overview of the Business Process Explorer

process encapsulates a sequence of tasks to be reused in other processes. The low-level process viewer lists the sub-processes recovered from the business logic tier. Once a process entity in the low-level process viewer is selected, the corresponding task implementation is highlighted in the source code editor. The recovered business process is represented using XML format as shown in the XML viewer in Figure 1.

Clone detection for refining processes: Task clones are tasks of similar functionality but using different names across business processes. Instead of using string matching to identify task clones, we apply the clone detection techniques on the task implementations to recognize task clones in business application. When task pairs have identical or near identical implementations, such task pairs are task clones. We apply existing clone detectors (i.e. CCFinder[5] and CloneDR[1]) to detect code clones, and map the detected code clones to the business process level in order to locate task clones. Moreover, we refine the business processes by assigning task clones with unique names across business processes. The refinement is carried through the XML editor (shown in Figure 1) which displays the XML formatted business processes and allows the changes to business process entities.

Visualization of the recovered business processes using IBM WebSphere Business Modeler (WBM): We transform our recovered business processes into the format used by WBM in order to visualize the recovered business processes. Using WBM, business analysts can easily modify and analyze the business processes. The changes can be synchronized with the processes recovered by the BPE tool.

3. Conclusion

Business applications often go through fast changes and evolution without updating the business process documentation due to market pressure. The out-of-date business process documentation is difficult for business analysts to improve business processes. It is also challenging for software developers to maintain business applications. Using our business process explorer tool, we can automatically recover business processes from business applications, establish the mappings between business processes and business applications, and detect task clones in business processes. This tool eases the communications between business analysts and software developers, and decreases the maintenance costs.

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