

# Exploration of Discovered Process Views in Process Spaceship

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## 1 Introduction

Business processes are important for streamlining the operations of public and private enterprises. Over the last decade, capabilities arising from advances in online technologies, especially Service Oriented Architectures (SOA), enabled enterprises to increase productivity, simplify automation, and extend the execution of business processes to various systems in the enterprise. While business process management systems, which allow for modeling, analysis, and management of business processes, are relatively successful, currently, they only cover a fraction of business processes in the enterprise. One challenge in modern enterprises is that information about business process execution is maintained over multiple heterogeneous systems (e.g., email systems, ERP, document management systems, etc), and rarely there exists a central workflow log, where all process execution information can be found. The next challenge is that the traditional one-view-fits-all fashion of process definition does not scale, as different users may have their own perspective of the business process execution in the enterprise. In such environments, not only one but a space of processes can be defined corresponding to the perspectives of different users or systems involved in the process.

We define *process views* as an abstract representation of a process, from the perspective of a user or a system, in terms of tasks and their relationships, i.e., control and data flow, and properties such as participating roles, and execution times. Process views can be defined at various levels of abstractions (high level or detailed). Furthermore, we define a *process space* as the superimposition of a set of process views in the enterprise, at various levels of abstractions, over heterogeneous information systems containing process execution information.

We have developed *Process Spaceship* for the discovery of process views from process related data sources [2]. Unlike process discovery from workflow logs [3], where the *process instances*<sup>1</sup> are known and the problem is that of discovering the process definitions, in process spaces, the new challenge is that of *events correlation*, i.e., identifying which set of events in application logs are related to the same process instance. Events correlation in SOA can be done following various patterns, e.g., based on the content (data attributes) of events

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<sup>1</sup> A process instances specifies a set of messages that are exchanged to fulfill a certain goal.

or their timestamp [1]. In principle, there are more than one way of correlating events into process instances, corresponding to various process views that can be defined in the enterprise. We define *correlation condition* as binary predicate over the attributes of event content (e.g., *orderID=orderID*) to specify if two events correspond to the same process instance. Correlation conditions could be atomic (defined over a pair of attributes) or composite (consists of several atomic conditions). We have proposed a set of algorithms and heuristics to discover interesting correlation conditions following a level-wise approach starting from atomic conditions followed by the discovery of composite conditions [2].

## 2 Demonstration Scenario

We demonstrate two features of *Process Spaceship*: (i) explorative process views discovery, and (ii) process space navigation. For the sake of working in the context of a concrete example, we use the logs of interactions of a set of Web services in a supply chain scenario as the input. The system has been developed in Java, and uses HP SOA Manager to monitor service interactions.

*Explorative discovery of process views.* The explorative discovery of process views in *Process Spaceship* starts with capturing information that the user might have about how events are correlated in the input data sources. This includes selection of attributes that are potentially used in correlation, and if known, the correlation pattern. Based on this information, a set of basic process views are discovered and presented to the user, among which she may select the ones that are of her interest. Depending on the input data, and the correlation pattern(s) that is(are) used for correlation, the basic views may be composed to form composite process views. These views contain larger processes, compared to the basic ones. This procedure can continue until a process view corresponding to the business process of the enterprise is discovered. However, only user-selected views are kept and used as a basis for discovering larger, more abstract views.

*Process Space Navigation.* The discovered process views (in an explorative manner or automatic way) are organized in a *process map*, where each process is represented by a node and is linked to other process views, which have *part-of* or *subsumed* relationship with it. We demonstrate how this organization facilitates navigation of process views, and also the use of various perspectives that *Process Spaceship* provides for end users.

## References

1. Barros, A., Decker, G., Dumas, M., Weber, F.: Correlation patterns in service-oriented architectures. In: Dwyer, M.B., Lopes, A. (eds.) FASE 2007. LNCS, vol. 4422, pp. 245–259. Springer, Heidelberg (2007)
2. Motahari, H., et al.: *Process Spaceship: Discovering process views in process spaces*. Technical Report UNSW-CSE-TR-0721, The University of New South Wales (2007)
3. van der Aalst, W., et al.: Workflow mining: a survey of issues and approaches. *DKE Journal* 47(2), 237–267 (2003)