

# Chapter V

## Yet Another Workflow Language:

### Concepts, Tool Support, and Application

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#### ABSTRACT

*Due to the absence of commonly accepted conceptual and formal foundations for workflow management, and more generally Business Process Management (BPM), a plethora of approaches to process modelling and execution exists both in academia and in industry. The introduction of workflow patterns provided a deep and language independent understanding of modelling issues and requirements encountered in business process specification. They provide a comparative insight into various approaches to process specification and serve as guidance for language and tool development. YAWL (Yet Another Workflow Language) is a novel and formally defined workflow language based on workflow patterns and Petri nets, thus leveraging off both practical and theoretical insights in the field of BPM. This chapter provides an overview of this language and its corresponding open source support environment.*

#### INTRODUCTION

There exists an abundance of approaches to business process modelling and execution. This is partly due to the lack of commonly accepted

conceptual and formal foundations. Standardisation efforts over time, while significant in number and level of industry support, have not (fully) succeeded in providing such foundations. In order to provide a deeper insight into constructs used

in business process specification and execution, a collection of workflow patterns was introduced (van der Aalst, ter Hofstede, Kiepuszewski & Barros, 2003). Note that the word “patterns” here refers to components within business processes that have generic applicability and are recurrent in form.

The original patterns collection focussed on control-flow specification only and derived from an analysis of a number of commercially available systems and research prototypes. Over time, this pattern collection was revised (Russell, ter Hofstede, van der Aalst & Mulyar, 2006) and extended with patterns for the data perspective (Russell, ter Hofstede, Edmond & van der Aalst, 2005), the resource perspective (Russell, van der Aalst, ter Hofstede & Edmond, 2005), and exception handling (Russell, van der Aalst & ter Hofstede, 2006). The original control-flow patterns have been used for comparing process modelling languages, tool selection and as a basis for language development.

While Petri nets have a number of distinct advantages for the specification of executable processes (van der Aalst, 1996), they lack sufficient support for a number of the originally identified workflow control-flow patterns (van der Aalst & ter Hofstede, 2002). This observation led to the development of YAWL (Yet Another Workflow Language) (van der Aalst & ter Hofstede, 2005), a formally defined language that took Workflow nets (van der Aalst, 1997), which are based on Petri nets, as a starting point and introduced a number of constructs directly supporting those patterns. As such, YAWL provides powerful support for control-flow specification, and over time an open source support environment was developed which also provided support for the specification of data aspects, resource aspects and exception handling.

It is worthwhile noting that when it comes to the derivation of executable process models, two fundamentally different approaches can be observed. In the first approach emphasis is on the

specification of intuitive models, easily understood by the various stakeholders, using an informal language. These models are subsequently to be transformed to models captured in an executable language. A typical example of this approach is BPMN (OMG, 2006) combined with BPEL (Jordan & Evdemon, 2007) (mappings from BPMN to BPEL are, for example, described in (Ouyang, Dumas, van der Aalst, ter Hofstede & Mendling, 2008)).

In the second approach, process models are captured in a formal language of which the models are directly executable. YAWL falls in the latter category and in this chapter this language and its support environment are examined in some depth. Firstly, the workflow patterns are elaborated upon and a brief overview of approaches to process specification is presented. Secondly, the specification of the various aspects involved in business process modelling using YAWL is studied. Thirdly, the support environment of YAWL is examined. Fourthly, we present a case study of the application of the YAWL environment in the film and TV domain. Finally, we conclude the paper briefly listing, among others, a number of current research topics in BPM.

## **BACKGROUND**

### **Workflow Patterns**

To gain a better understanding of the fundamental concepts underpinning business processes, the Workflow Patterns Initiative ([www.workflowpatterns.com](http://www.workflowpatterns.com)) was conceived in the late 1990s with the goal of identifying the core architectural constructs inherent in process technology. After almost a decade of research, more than 120 workflow patterns have been identified in the control-flow, data, and resource perspectives. The control-flow perspective captures aspects related to execution order of various tasks in a process, e.g. sequence, choice, parallelism and synchroni-

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