

# Enabling Process Support for Advanced Applications with the AristaFlow BPM Suite

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**Abstract.** A process-aware information system (PAIS) will be not accepted by end users if its software clients do not support their native workflows or are too complex for them. When implementing business processes based on process management technology important issues are, therefore, how end-users can participate in the execution of the processes and how this can be accomplished as intuitively as possible. This becomes extremely important if high flexibility demands need to be fulfilled during process execution, while PAIS robustness and error safety need to be assured. In this software demonstration we show how the AristaFlow BPM Suite – an adaptive process management system developed by us – was applied to challenging applications in domains like healthcare, logistics, disaster management, and software development. The implementation of adaptive software clients in these different applications particularly proves the benefits provided by an open application programming interface (API) as offered by AristaFlow.

## 1 Introduction

In many domains IT support can benefit from BPM technologies and the PAIS based on them. However, in many cases still specialized application systems are developed for accomplishing tasks being similar to process management functions. One reason for this is that available PAIS often cannot be adapted to domain-specific problems. This leads to inflexible systems with hard-wired processes where small changes in the underlying process often require changes to the whole system. Especially in domains with high flexibility demands, existing BPM technology is not used due to its brittleness and inflexibility. Another side effect of these specialized systems is that processes are only known implicitly and are not modeled explicitly, making it hard to analyze and improve them.

During the last decade we developed the ADEPT2 process management technology [1–3]. Due to the high interest companies had in ADEPT2 we transferred it into an industrial-strength process management system called *AristaFlow BPM Suite* [4–6]. One of our basic goals is to enable robust and flexible PAIS for a large number of processes from different domains. Recently, together with partners, we applied the AristaFlow BPM Suite to a variety of challenging application domains like healthcare, disaster management, logistics, and software

engineering. In our software demo we will show some of the tools and software clients developed in this context using the AristaFlow Open API.

Section 2 presents results from domain-specific projects in which we applied the AristaFlow BPM Suite. Section 3 describes the AristaFlow Open API. We conclude with a short summary and outlook in Section 4.

## 2 Applying AristaFlow to Advanced Applications

Generally, domain experts only have little or no IT knowledge. Therefore, the standard clients as offered by existing BPM systems are inappropriate for them and domain-specific tools and PAIS interfaces have to be developed. This means that working habits of end-users need to be analyzed and specific tools be developed. These tools must provide exactly that functionality as required by the respective domain expert and it must present this functionality in a way the user can easily handle, i.e., the respective systems needs to be tailored to the users' needs and the given application domain.

Recently, AristaFlow BPM Suite was applied to a number of challenging domains. In each project sophisticated BPM tools were implemented supporting end-users in their work as best as possible.

### 2.1 Application 1: Emergency Management

**Domain.** The project for *process-aware, cooperative emergency management of water infrastructures* [7] aimed at improving and supporting emergency management for flood responses through new IT methods. During the project, procedures and courses of actions were analyzed, and results were mapped to formal process models. On the basis of an organizational model, the activities of the process models were assigned to the responsible parties, thus enabling the involved organizations to act faster and in a more coordinated way.

**Applying AristaFlow.** AristaFlow was used to manage and control the procedures and tasks during flood events as well as the corresponding information flow. Thus, it supported the responders in planning and executing flood response operations. Fig. 1 shows a domain-specific PAIS user interface that was implemented using the AristaFlow Open API. In particular, users may order resources and deploy them to emergency locations.

**Discussion.** AristaFlow supports responders in accomplishing their operations in a coordinated, but flexible way. One important aspect was to provide the necessary flexibility, while ensuring robustness and error safety of the PAIS.

### 2.2 Application 2: Healthcare and Logistics

**Domain.** Healthcare and logistics are both characterized by high flexibility demands. Additionally, both require tools that are easy to use since domain specialists have no IT knowledge. By supporting domain-specific views on processes

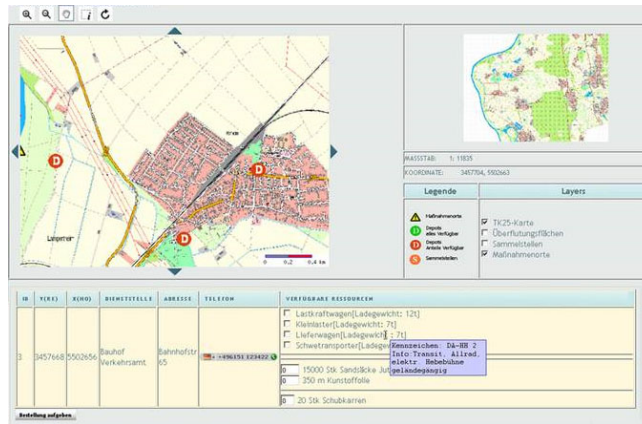


Fig. 1. User interface for interacting with disaster management processes [7]

(e.g., clinical pathways) and services, the *SPOT* project [8] (*Service-based technologies for orchestrating PrOcesses in logisTics and healthcare*) enables end-users to actively shape the different phases of the process as well as the service life cycle. Another important aspect concerns application integration. In both domains system integrators are confronted with heterogeneous, autonomous applications, to be integrated in a process-oriented way.

**Applying AristaFlow.** The *SPOT* project team selected AristaFlow BPM Suite as implementation platform for several reasons: Besides its correctness-by-construction principle, its strict modular design and its service-oriented architecture were basic points in favor of AristaFlow. This enabled the service-oriented provision of advanced process support features and simplified the integration of existing application systems. Fig. 2 shows a mobile client for patient assistance in a hospital being connected to an AristaFlow process server. For representing clinical pathways the *SPOT* project uses editable tree structures, which are automatically mapped to (block-structured) AristaFlow process models. In particular, adaptations within such tree structure are translated into corresponding changes of the underlying process model and can be automatically applied to the considered instance using ad-hoc changes. This empowered domain experts (e.g. nurses) to change processes at a high level of abstraction.

**Discussion.** Again, the AristaFlow Open API facilitated the integration of our process engine into the overall architecture of the *SPOT* system. Additionally, features like robust process execution and user assistance in connection with ad-hoc process instance changes were considered being extremely useful features.

### 2.3 Application 3: Software Engineering

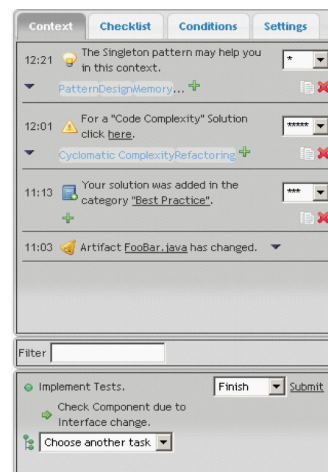
**Domain.** Due to the dynamic nature and high degree of collaboration, communication, and coordination inherent in software engineering projects, automated workflows can assist overburdened software engineers by providing orientation

and guidance. Yet, since there are so many different kinds of issues with ambiguous and subjective delineation, it is difficult and burdensome to universally and correctly model them in advance. This will also lead to workflows of considerable size and complexity. The Q-Advice project [9] tries to alleviate this by starting with a basic and simple workflow for each case and then, utilizing context information and AristaFlow BPM Suite, dynamically extends it with activities matching the current situation.

**Applying AristaFlow.** The Q-Advice project uses the AristaFlow BPM Suite as its process module. Thereby it makes heavy use of the AristaFlow API for automatically constructing and adapting process models as well as for developing specialized activity components. Based on context information an issue workflow is automatically, dynamically, and uniquely constructed for every software engineering issue. The activities of the workflow are then distributed to the responsible users based on the organization model maintained by AristaFlow. Fig. 3 shows part of the Q-Advice user interface where in the lower section the user can see his current task as well as the next upcoming tasks. In the upper section additional information is provided by the framework.



**Fig. 2.** SPOT project: Mobile client for personal treatment plan [8]



**Fig. 3.** Q-Advice user interface [9]

**Discussion.** Q-Advice makes it possible to provide situational and tailored support and guidance for software engineers. In particular the workflows resulting from the Q-Advice approach are much simpler than pre-modeled workflows would be. Thereby Q-Advice makes use of the advanced change facilities of AristaFlow and integrates them into its framework. By using AristaFlow BPM Suite it became possible to hide the inherent complexity of process-orientation, dynamic process changes, and flexible task management from users; i.e., all complex things are performed “beneath the surface” within the AristaFlow system.

## 2.4 Other Projects using the AristaFlow BPM Suite

Over the last years, more than 20 other groups from academia and industry applied the ADEPT/AristaFlow process management technology in the context of research projects. In the E-Commerce domain, for example, CONSENSUS [10] offered a flexible support system for e-negotiations based on parameters like quality, delivery, warranty, and financial terms. In the MTCT project [11] a process-aware system architecture for the processing of client requests (CRs) in container transportation was realized. AgentWork and HematoWork [12] offered a rule-based system for automatically adapting clinical process instances in case of exceptional events. These are just some of the projects that used the AristaFlow BPM Suite (or its academic counterpart ADEPT) to realize domain-specific PAIS.

## 3 The AristaFlow Open API

Due to its Open API as well as its strict modular and service-oriented design (see Fig. 4), AristaFlow can be easily applied and adapted to different application domains. This way we enable integration of advanced process support functions into domain-specific PAIS as well as provision of domain-specific client, service and activity implementations.

All services of the upper layers of the overall architecture of the AristaFlow BPM Suite depicted in Figure 4 can be utilized by domain-specific client applications and thus be easily integrated using the AristaFlow Open API. A functional overview of the different services is provided in [13].

The development of the platform itself was driven by the development of its API. Even the built-in client applications of AristaFlow (including, e.g., the process editor) are just implementations of this Open API. The structure of the API also enables easy integration of different execution platforms and client types (e.g., rich-clients, web-clients, or mobile devices) and further enables integration into specialized applications. Last but not least, ad-hoc changes cannot only be applied by system administrators, but also by end-users. Thereby one or more low-level change operations can be combined to form higher-level change patterns in order to perform domain-specific operations.

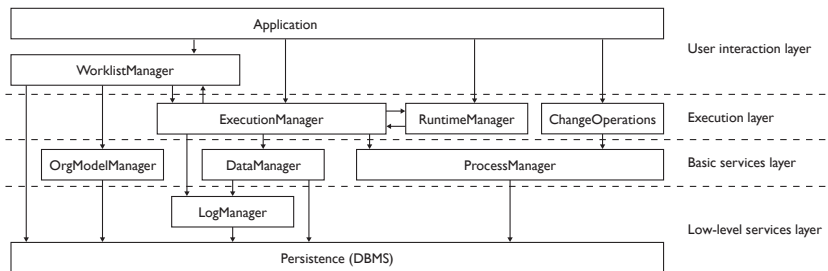


Fig. 4. Basic architecture of the AristaFlow BPM Suite

## 4 Summary and Outlook

Domain-specific solutions can be easily developed based on the AristaFlow Open API. This API is not limited to solely high-level client applications, but includes all levels of the architecture; e.g. new services can be integrated easily and even the process and application meta models themselves can be extended (see [13] for more information on this topic).

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