A Systematic Approach for the Development of Integrative Business Applications

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ABSTRACT

Modern business applications consist of many subsystems (or components) potentially developed and maintained by diverse organizations. Generally, there are three different points of view. First, organizations using business applications are interested in the unified look and feel of composed applications, the maximum interoperability and synergetic features among subsystems, the high availability of all subsystems, and quick and seamless updates after new releases or bug fixes. Second, organizations providing single subsystems want, on the one hand, of course, to satisfy their customers and business partners, but on the other hand, to minimize their overall effort. Third, organizations integrating single subsystems aim at a uniform and cost-efficient integration architecture. This chapter takes the two latter viewpoints and describes a methodology for organizations integrating their subsystems with many business applications and all relevant types of subsystems, as well as with the whole family of subsystems from different vendors. The methodology is a product-line approach optimally tailored to the needs of such organizations. It views subsystems delivered by a single organization with all corresponding integration contexts and requirements as a family of similar systems, and engineers this family by taking systematical advantage of common characteristics and proactively considering differences in anticipated future scenarios. The methodology is based on Fraunhofer PuLSE™ (PuLSE™ is a trademark of the Fraunhofer Gesellschaft), a customizable product-line approach validated in practice by many industry organizations since 1997. The integration methodology has been developed in the German research project UNIVERSYS by tailoring Fraunhofer PuLSE™ together with industry partners to the integration context described.
INTRODUCTION

Modern business applications consist of many subsystems (or components) potentially developed and maintained by diverse organizations. Consequently, installing such a business application includes a significant effort in integrating all required pieces, typically subsumed by the term enterprise application integration (EAI).

There are generally three different points of view for looking at EAI solutions. First, organizations using business applications are interested in the unified look and feel of composed applications, the maximum interoperability and synergetic features among subsystems, the high availability of all subsystems, and quick and seamless updates after new releases or bug fixes. Second, organizations providing single subsystems, on the one hand, want to satisfy their customers and business partners; on the other hand, however, they also want to minimize their overall effort. Third, organizations integrating single subsystems aim at a uniform and cost-efficient integration architecture.

This article takes the two latter viewpoints and describes a methodology for organizations integrating their subsystems with many business applications and all relevant types of subsystems, as well as with the whole family of subsystems from different vendors. The section titled “EAI Viewpoints” introduces the two viewpoints in more detail.

EAI solutions are of special importance to small and medium-sized enterprises (SMEs), which rarely can sell their products as isolated single systems due to their special but limited focus. By their very nature, SME applications are favorably seen more as one element integrated into bigger application suites.

Technically, EAI solutions are to date being realized with the help of special EAI frameworks or tool infrastructures. There are numerous products in this area. Apart from the fact that most of these products are not affordable for SMEs, they mainly focus on the technical realization of integrative solutions and do not provide concrete methodological support. Additionally and maybe most importantly, existing EAI frameworks explicitly deal neither with the different EAI viewpoints nor with the flexibility expected from an EAI solution. Therefore, the section “Related Work” provides a survey of existing EAI methodologies and identifies their support for the two viewpoints addressed in this chapter.

The approach presented in this chapter addresses explicitly the two different viewpoints discussed above, namely, the composition and the integration viewpoint, and furthermore provides a concrete methodology for the creation of integrative software architectures. Finally, the approach addresses the flexibility issue by viewing subsystems delivered by a single organization with all corresponding integration contexts and requirements as a family of similar systems. The approach engineers this family by taking systematical advantage of common characteristics and proactively considering differences in anticipated future scenarios. The methodology is based on Fraunhofer PuLSE™ (Product Line Software Engineering), a customizable product-line approach validated in practice by many industry organizations since 1997. The section “Engineering Approach: Fraunhofer PuLSE™” introduces the original approach; the section “Developing Integrative Business Applications” then presents a version of it tailored to the addressed viewpoints and scenarios.

The section titled “Case Studies” then presents two real case studies covering both viewpoints; that is, each case study is described by one of the two special viewpoints. The section “Conclusion and Future Work” concludes the chapter with some final remarks and a brief outlook on future activities.
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