

# Internet Enterprise Service Design Based on Existing Architectural Knowledge

**Paul de Vrieze**

*Bournemouth University, UK*

**Lai Xu**

*Bournemouth University, UK*

## INTRODUCTION

Enterprise information systems play a vital role for the competitiveness of a business in a fast-changing market. Existing enterprise systems are hard to extend to satisfy new business requirements or strategies rapidly. Service Oriented Architecture (SOA) provides an architectural approach in which modern business processes and enterprise knowledge can be effectively (re) organized and (re)deployed to support and enable the strategic plans and productivity levels required by modern business environments, such as virtual enterprises. A comprehensive SOA migration methodology is critical for service-enabling an enterprise, providing a way to reduce cost of software system development for organizations. This chapter introduces a flexible analysis approach, which detects and assesses the reuse of available architecture knowledge to shape a to-be business process.

Organizations run various business processes, such as accounting, finance, human resources, inventory control, manufacturing, marketing, sales, and distribution, resource planning, etc. Many different enterprise software systems support different aspects of business operations in one or multiple organizations (or even divisions). Advanced enterprise software provides linkages with customers, business partners, and suppliers to allow these organizations to work together to fulfill particular purpose and reduce costs. Enterprise software has been deployed to many business domains like the financial, manufacture, pharmacy, health care, etc. domains.

Existing systems are generally inflexible and quite hard to extend. In modern business environments, no organization can afford to face a loss in market share due to long-term software development. To enable business to respond to increasingly frequent market changes, organizations need to change, modernise and extend how they support and manage their business processes. Business process management systems provide this support. The idea is that the more flexible, maintainable and reusable software is, the lower the cost of developing and maintaining a software system will be. This holds for the business process management systems, as well as the various systems linked together through their use.

Service-oriented architecture (SOA) provides an architectural blue print in which modern business processes can be effectively improved, amended, changed or created instantaneously without too much interference on daily business operations. Flexibility, maintainability and reusability of software are essential for organizations to reduce costs.

The SOA concept of loose coupling allows enterprise systems to easily adapt to new business requirements and changes in business context. Such flexibility however requires services that are designed for it (Papazoglou, 2007). A methodology is needed to support the migration of legacy systems towards SOA. This methodology could also help gathering architectural insights and knowledge from pre-existing

enterprise knowledge, transforms them into meaningful enterprise services and associates them modern business processes to support and enable strategic plans of an organization.

Currently, the design of enterprise services generally happens in an ad-hoc manner (Nguyen *et al.* 2009a) (Nguyen *et al.* 2009b). There are two extreme approaches to the design of services. One is to assume a green-field in which completely new services are developed. This green field approach is, however, in many cases not realistic as existing systems represent significant investments and cannot simply be discarded. This corroborated by experience with from-scratch redevelopment of software (Bisbal, 1999). On the other hand some vendors wrap arbitrary chunks of existing functionality as services with many implementation details (and often too many parameters) exposed through the interface (de Vrieze, Xu & Xie, 2010). Services that are complex, or expose implementation details are hard to use, and cannot easily be replaced by other services. This violates the SOA concept of loose coupling. Both approaches cannot provide the full potential of a service-oriented enterprise system, which needs to easily adapt to new business requirements and changes in business context.

Current service-oriented system analysis and design methodologies rely only on intuitive or experience-based service identification techniques that identify enterprise services from existing best-in-class case studies (Nguyen *et al.* 2009a, 2009b; de Vrieze, Xu & Xie, 2010). There is a lack of a more rigorous approach that ensures that the resulting enterprise services can provide high business value and have the right granularity level for maintainability and reusability purposes across the enterprise. In this chapter a methodology is proposed to support the migration of the old software architecture toward SOA, in particular using elicited software architectural knowledge (SAK) from legacy systems.

This research aims to address in a service-enabled process, each activity contributes to a well-defined business objective and could be realized by a high-level composite enterprise service interaction. This research introduces a technique driven by architecture and knowledge and business processes to identify and conceptualise meaningful enterprise services. This works by collectively grouping all activities that contribute to the same course into logically cohesive and loosely coupled enterprise services. The right level of granularity for the maintainability and reusability of enterprise services is crucial for a high-quality SOA design.

In this chapter, we introduce a design methodology for Internet enterprise services using software architectural knowledge. We start with providing some background information in Section 2 and then identify characteristics of Internet enterprise Service in Section 3. The design methodology is explained in Section 4. To illustrate the ideas in our Internet enterprise services, we use a case study from the financial domain which is described. We demonstrate how the design methodology can be applied in terms of this example in Section 5. Section 6 brings in related work. Finally, conclusions and future research are presented

## BACKGROUND

### Definition of Enterprise Services

Enterprise services are “a standards-based way of encapsulating enterprise functionality and exposing it as a reusable business service that can be combined with other services to meet new requirements. Enterprise services can be assembled together to compose new applications or enable new business processes.” (Source: <http://wiki.scn.sap.com/wiki/display/ESpackages/Enterprise+Services>)

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