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Chapter XIII

Enterprise Organisational Structure Integration and Service-Oriented Architectures

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Abstract

This chapter examines the service-oriented architectures (SOA) in conjunction with the enterprise organisational structure integration problem, applied to innovative organisation schemes such as virtual enterprises (VE). The evolution of software architectures from traditional to SOA is presented, along with the characteristics, advantages and disadvantages, and problems and difficulties in applying the SOA, while also focusing on the compatibility between SOA and modern organisational structures. The new standard in the service orchestration level, BPEL, is considered as a language for business process modelling, and its impact to the integration problem is examined. New messaging protocols and frameworks such as the enterprise service bus (ESB) or messaging service bus are also examined. The main focus is on the SOA technology trends of modern organisational structures, with regards to their formation and integration. The comparison between SOA and traditional architectures provides a clear path to their adoption in various cases.

Introduction

Service-oriented architecture was first introduced by Gartner in 1996. Since then, SOA has excited many software architects and developers, and a lot of effort has been put worldwide in this area. However, only recently with the advent of Web services, SOA has found its route to real applications. Web services is the most prominent technology that forms a solid base to develop robust SOA applications. SOA has an inherent ability to apply itself efficiently across enterprises, being the most promising technology to form and operate virtual enterprises where different economic organisations are combining their strengths to provide a specific service traditionally provided by a single enterprise. In the following, we will examine in more detail SOA and Web services when applied to virtual enterprise integration.

Background

Gartner (1996) defined SOA as a software architecture that starts with an interface definition and builds the entire application topology as a topology of interfaces, interface implementations, and interface calls. Gartner states that SOA would be better named *interface-oriented architecture*. SOA is a relationship of services and service consumers, both software modules large enough to represent a complete business function. Services are software modules that are accessed by name via an interface typically in a request-reply mode. Service consumers are software that embeds a service interface proxy (the client representation of the interface).

Plummer, Blosch, and Woolfe (2002) defined Web services as modular business services with each module fully implemented in software and delivered over the Internet. The modules can be combined, can come from any source, and can eventually be acquired dynamically and without human intervention when needed.

SOA and Web services are complimentary technologies that represent the most recent step in the evolution scale, which started with distributed programming and object distribution technologies like CORBA, COM/DCOM, DCE and more recently J2EE. Web services represent a technology specification, meaning that an application must use its standards like Web Services Description Language (WSDL), simple object access protocol (SOAP), or universal description, discovery, and integration (UDDI) to be considered as Web services. SOA, on the other hand, is more considered as a design principle (Natis, 2005) meaning that Web services interfaces like WSDL and SOAP are suitable interface definition standards (Atkinson et al., 2002; IBM, 2001; SOAP, 2001; UDDI, 2001; WSDL, 2001).

SOA has an inherent ability to apply itself efficiently across enterprises, being the most promising technology to form and operate virtual enterprises where different economic organisations are combining their strengths (and thus minimising their weaknesses) to provide a specific service traditionally provided by a single enterprise. Such a development will offer, in the long term, immense influence on the economy and enterprise development strategies. The availability, through SOA on the Internet, of standardised SME information, relevant for participating in virtual enterprises, will dramatically multiply the number of