

Chapter X

Service Oriented Architecture: A Research Review from the Software and Applications Perspective

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ABSTRACT

This chapter presents the basic ideas underlying Service Oriented Architecture as well as a brief overview of current research into the phenomena also known as SOA. SOA is defined, and principal components of one proposed SOA framework are discussed. The more relevant historical background behind the move toward SOA is presented, including SOA antecedents such as Web Services, SOAP, and CORBA, and enabling technologies such as XML and EJB. A basis for understanding SOA is presented, based on Krafzig, Banke, and Slama's (2005) three-level hierarchical perspective. The common SOA components including UDDI, Application Programming Interface, Service Bus, Service Contract, Interface, Implementation, Data, and Business Logic are also presented. Finally, relevant research in four categories is presented, including implementation strategies, patterns and blueprints, tool development, standards proposals, or modifications (including middleware), and ontological or meta-model development or modification.

INTRODUCTION

Service Oriented Architecture (SOA), Service-Oriented Computing, and Web Services, along with some of their underlying middleware realization schemas such as SOAP, UDDI, XML, CORBA, and many other ideas or approaches to cutting edge information system architectures, have become the buzzwords of the day for many in the business world. In many ways the entire area of “Service” is also somewhat hazy from a definitional perspective in the Information Technology (IT), and Information Systems (IS) communities as well. While the situation among Enterprise Architecture, Service Oriented Enterprises, and Services is arguably more developed and stable, there is nevertheless a lacking in cohesiveness that seems to plague the entire Service area. It has proven quite difficult, perhaps nearly impossible to pick up any relatively current practitioner publication without encountering an article focusing on at least one of the above topics. A recent library database search using key words Service Oriented Architecture, Web Services, and SOA resulted in 800-plus returns. Further investigation revealed that roughly 25 of those 800 articles were sourced in research journals while the other (still roughly 800) articles were all from more practitioner-oriented sources.

When it comes to adopting and implementing SOA applications, it appears that businesses are doing it at astounding rates. Of course what they are actually doing, even though they may say that their efforts represent a move toward Service Oriented Architecture, may not match anyone else’s definition of SOA but their own. Further, how can SOA be defined, and how can we define the benefits of moving toward such architectures? It seems that there is little agreement among practitioners and researchers alike as to a standard definition of SOA.

Worse still, a growing number of practitioners are now beginning to question the business return of some of the approaches. For example, Dor-

man (2007), Havenstein, (2007), Ricadela (2006), and Trembly (2007) indicate that there is doubt emerging as to the real value of SOA for adopting businesses and organizations. Perhaps the question of Return on Investment (ROI) should not be that surprising since it sometimes seems that each organization has its own definition of what SOA really is.

Finally, an entire genre of research has emerged relatively recently that focuses on the architecture of the enterprise itself in conjunction with service orientation. It is not the intent of this chapter to examine or discuss the enterprise architecture element, but to focus on the software and application side of the service issue.

This paper attempts to reach for a more clear understanding of what SOA really is from the software perspective, and proposes some possible areas of research into SOA that could help clear up some of the definitional confusion, which could in turn and if conducted, help lead to better understanding of ROI as it relates to SOA. Section 1 consists of the introduction, while Section 2 provides existing definitions of Service Oriented Architecture (SOA), Web Services, and Section 3 details some of the related and underlying technologies and protocols. Section 4 combines the various definitions of SOA into a more coherent form, while Section 5 reviews current SOA research. Finally, Section 6 will conclude the paper with recommendations for future research efforts.

BACKGROUND, HISTORY AND DEFINITIONS OF SERVICE ORIENTED ARCHITECTURE

A minimum of nine formal definitions of SOA exist as of this writing, from sources such as the OASIS Group, the Open Group, XML.com, javaworld.com, the Object Management Group (OMG), W3C (World Wide Web Consortium), Webopedia, TechEncyclopedia, WhatIs.com,

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