Chapter IV
Adaptive Service Choreography Support in Virtual Enterprises

Adomas Svirskas
Institute Eurécom, France

Bob Roberts
Kingston University, UK

Ioannis Ignatiadis
Kingston University, UK

ABSTRACT

Service oriented architecture (SOA) approach in general and the Web services technology in particular enable creation of business applications from independently developed, deployed and owned components called services. A service captures a distinct business function offering some value independently of its usage context. However, it is not enough to have the business functionality of the partners packaged as (Web) services; there is also a need for business-aligned order of interaction between these services also known as business protocols, which can also be reused. The contribution of the chapter is two-fold: it explores reusability of the applicable business protocols in different business scenarios and it also suggests possible ways to adapt the implementations of the partners' services (end-points) to the changes in the business protocols.

INTRODUCTION

The Web services, as the main realization of the SOA (Hao, 2003) paradigm, imply a significant integration potential at both application and business process levels. These services, being homogeneous in terms of their functional description and advertising mechanisms such as WSDL, UDDI (WSDL, 2006; UDDI, 2006) and the protocols needed to use them (SOAP/HTTP), do not suffer from the usual middleware-level interoperability problems. On the other hand, the services are typically realized as wrappers around the existing or planned business functionality (components, legacy systems, etc.), therefore both types of requirements: heterogeneous infrastructure support and business-aligned discreet functionality are addressed.

A Web service typically exposes a number of operations for clients to invoke and a certain

order (agreed by all the involved parties) must be observed to achieve their goals. As an example, the purchasing scenario can be taken, where the customer will need firstly to request a quote, then order the goods, and finally make a payment. In order for the goods to be delivered to the customer, the agreed shipper needs to be informed and provided with the shipment details such as addresses, delivery terms and so forth. In addition, some other players can be brought into the picture, such as financial and/or trade-regulating institutions and so forth.

Such interactions between Web services and their clients are called conversations (Casati, 2004). These conversations need to be governed by the business rules, specifying which conversations are valid and what kinds of data at what point are properly understood by the services. This set of rules is specified as part of the business protocol supported by the service (where the word "business" is used to differentiate it from a communication protocol) (Alonso, Casati, Kuno et al., 2004). Business protocols are examples of why a simple interface description is not enough in Web services. In fact, to completely describe a service, it is necessary to specify not only its interface but also the business protocols that the service supports.

The business protocols, however, are subject to frequent changes and their capability to adapt is crucial for success of participating businesses, which, in turn, need to respond fast to the protocols' changes. In this chapter we present an approach of adaptive business protocol support through dynamic processing of Web services choreography at the partners' end-points and flexible mapping of choreographed message exchanges to the local processes and components.

The rest of this chapter is structured as follows: Section 2 provides some background; Section 3 outlines adaptivity and choreography support requirements; Section 4 describes the main concepts of our approach, followed by Section 5, which concludes the chapter.

THE BACKGROUND

The area of business process modelling, re-engineering and management has been in the focus of attention of IT research and industry for several decades. However in the era of the Internet, SOA and Web services this area is once again getting a lot of attention and in this section we give a brief overview of the latest major efforts in this field.

In the specification of the business protocols there are two aspects that need particular consideration. On the one hand, there is a need to capture the commonality of business rules and the interaction scenarios together with the semantics of business data to be used in the conversations. On the other hand, these protocols need to be described in some declarative machine-readable form for all the prospective collaboration partners to agree upon collectively and enact individually at run-time. Traditionally, each industry sector, for example paper, forest and pulp, and separate "eco-systems" (conglomerates of companies, forming themselves around big vendors) within the individual sectors have their B2B collaboration rules. In order to facilitate the reuse of this knowledge and increase the business-level interoperability, a number of organizations are trying to develop standardized libraries of business collaboration definitions. An example of such an organization is the Open Applications Group (OAGIS, 2006), a nonprofit consortium of enterprise application software developers, formed in February 1995 to create common standards for the integration of enterprise business applications. Member companies are building specifications to standardize integration between enterprise business applications.

There were always a variety of opinions how to model the interactions between the business partners that is, should they be interacting like peers or should some master-slave scheme be put in place. As each of the two approaches has their merits and applicability areas it is important to realize the differences between the two, the

8 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/adaptive-service-choreography-support-virtual/4992

Related Content

Mobility Support Resource Management for Mobile Networks
Mohammad Mahfuzul Islamand Manzur Murshed (2006). *Handbook of Research in Mobile Business: Technical, Methodological, and Social Perspectives (pp. 332-365).*
www.irma-international.org/chapter/mobility-support-resource-management-mobile/19486

Managing SaaS Risk in Higher Education Organisations: A Case Study
Indrit Troshani, Giselle Rampersadand Nilmini Wickramasinghe (2013). *International Journal of E-Business Research (pp. 8-23).*
www.irma-international.org/article/managing-saas-risk-higher-education/78294

Strategic Success Factors for Selling Content Online: Which Success Factors will make Internet Content a Sustainable and Profitable Business?
Stephan A. Butscher, Frank Lubyand Markus B. Hofer (2005). *Strategies for Generating E-Business Returns on Investment (pp. 187-208).*
www.irma-international.org/chapter/strategic-success-factors-selling-content/29868

The Evolution from E-Commerce to M-Commerce: Pressures, Firm Capabilities and Competitive Advantage in Strategic Decision Making
Esther Swilley, Charles F. Hofackerand Bruce T. Lamont (2012). *International Journal of E-Business Research (pp. 1-16).*
www.irma-international.org/article/evolution-commerce-commerce/62275

Electronic Risk Management
Tapen Sinhaand Bradly Condon (2009). *Electronic Business: Concepts, Methodologies, Tools, and Applications (pp. 2228-2244).*
www.irma-international.org/chapter/electronic-risk-management/9408