Chapter XXII
Composite Process-Personalization with Service-Oriented Architecture

Rajani Shankar Sadasivam
University of Alabama at Birmingham, USA

Murat M. Tanik
University of Alabama at Birmingham, USA

ABSTRACT

The integration of large systems remains problematic in spite of advances in composite services approaches, such as Web services and business process technologies. The next challenge in integration is composite process-personalization (CPP), which involves addressing the needs of the interaction worker. An interaction worker participates and drives business processes. As these workers increasingly perform their work from mobile devices, CPP becomes an important area of mobile research. In this chapter, an agent-based approach to composite services development is introduced, addressing the lack of CPP in integration. A case study is used to demonstrate the steps in the agent-based approach.

INTRODUCTION

Enterprise development approaches have continually evolved to meet the ever-changing demands of businesses. Business gurus in the fifties preached management dimensions of planning, organization, integration, and measurement. Consequently, in the sixties and seventies, advancements in mainframe computers and computer languages enabled businesses to implement systems addressing the different management dimensions. In the eighties, the focus was on information processing, and consequently, the rise of information processing tools in the late eighties and early nineties addressed these needs. In the nineties, the focus was on integration of business processes, which has lead to the rise of the service-oriented architecture and business process engineering in the early 2000s. The next challenge of enterprise development is the composite process-personalization (CPP) challenge (Sadasivam, 2007), which involves developing personalized, customized systems to address the needs of the interaction worker (Harrison-Broninski, 2005; Miller, 2005; Ramamoorthy, 2000).

An interaction worker participates and drives business processes (Harrison-Broninski, 2005). Business analysts, CEOs, market analysts, accountants, and

researchers can all be categorized as interaction workers. Interaction worker processes are knowledge-intensive, that is, processes in which humans are involved in the decision-making processes (Ramamoorthy, 2000). The rich sets of applications that are available in handheld and mobile devices make it possible for interaction workers to conduct their business from these devices. Therefore, interaction workers are interacting with enterprise systems from their mobile devices increasingly. This option of working from mobile devices, in turn, implies that the processes should also adapt to the needs of the mobile worker. In (Liang & Wei, 2004), different examples of mobile applications for interaction workers are provided: time-critical services, location-aware and location-sensitive services, identity-enacted services, ubiquitous communications and content delivery services, business process streamlining, and mobile offices. The success of each of these applications depends on the ability of the enterprise processes to adapt to the needs of the mobile worker (Brezillon, 2003; Gutmann & Fox, 2002). As such, CPP becomes an important research area of mobile computing.

The knowledge-intensive nature of the interaction worker processes dictates that these processes constantly change (Harrison-Broninski, 2005). As a result, current process-oriented approaches of developing integrated systems in which the processes are specified during design time, using technologies such as Business Process Execution Language (BPEL), and cannot adapt to constant changes cannot work. Therefore, a critical need exists for flexible yet comprehensive approaches of representing business processes to accommodate the complex and flexible needs of interaction workers.

This chapter discusses the following: First, the notion of CPP is expanded and an example is used to show the lack of CPP in large systems integration. Process-oriented composite services development is leveraged to address the lack of CPP problems. A discussion of process-oriented composite services development is provided. An agent-based development approach is described to alleviate the problems of supporting CPP. A case study is used to outline the steps in the agent-based development approach and differentiate them from current approaches.

COMPOSITE PROCESS-PERSONALIZATION AND PROCESS GAP

Composite services technologies have evolved to address the many integration challenges of enterprises (Alesso & Smith, 2005; Juric, Mathew, & Sarang, 2004; Newcomer & Lomow, 2005; Pasley, 2005). The advances in Web services and business process technologies, in particular, have enabled us to develop enterprises by composing services quickly and effectively (Leymann, Roller, & Schmidt, 2002; Sadasivam, Sundar, Tanik, Jololian, & Tanju, 2007; Stone, 2004; Tsai, 2005; van der Aalst, Aldred, Dumas, & ter Hofstede, 2004; Yeh, Pearlson, & Kozmetsky, 2000). In spite of these technological advances, a process gap occurs in most integration efforts (Fingar, 2006; Gleghorn, 2005; Khoshafian, 2007; Vojdani, 2003; Yeh, Pearlson, & Kozmetsky, 2000). The process gap occurs when the implemented system delivers a process that does not meet the needs of the users. The complex needs of the interaction worker (Harrison-Broninski, 2005) and the use of mobile devices only compounds the problem of process gap.

The lack of CPP support causes the process gap problem. Reflect on Ramamoorthy's interaction model (RIM) of enterprises (Ramamoorthy, 2000). RIM describes three types of enterprise interactions (Ramamoorthy, 2000): 1) Mechanistic interactions among service processes, 2) interactions between service processes and individuals, and 3) interactions between service processes and teams. RIM implies that the scope of the integration problem is more than just the integration of mechanistic processes. It encompasses the integration of processes with human interactions. However, our Web service and business process technologies are only suitable for integration of mechanistic processes (Harrison-Broninski, 2005). They are not capable of handling processes with human interaction. We refer to this integration challenge as the CPP challenge (Sadasivam, Sundar, Tanik, Jololian, & Tanju, 2007).

Consider the following example of an interaction worker in a firm that deals with stock quotes. Assume that one of the specific tasks of the worker is to obtain some data from the Yahoo finance portal (Yahoo Inc., 2007); perform a few transformations on a spreadsheet, such as sorting and drawing customized charts with