

Chapter XXVI

Enterprise Integration Architecture for Harmonized Messaging

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ABSTRACT

Integrating business processes across disparate systems of partner organizations is known to be one of the biggest challenges facing enterprise systems development. Recent developments in service technologies and advanced middleware solutions, together with efforts toward standard interfaces, have helped overcome some of the difficulties. However, managing the rules that govern the interactions between cross-organizational business processes is still under developed. In this chapter, we present an approach for enterprise integration facilitated through a rule based messaging technology. In particular, we will present insights into rule specification, verification, and execution for such an enterprise integration architecture.

INTRODUCTION

With the current business trends toward outsourcing and virtual alliances, the importance of business process integration has emerged very strongly. Business process integration (BPI), understood as the controlled sharing of data and applications within and across an enterprise boundary, is considered to be one of the main strategies of many organizations. BPI offers new business opportunities, benefits of maximizing operational productivity, and business resource usefulness, and also supports businesses in gaining competitive advantages through customer and supplier satisfaction.

However, the research efforts and development paths pursued by many research groups and system developers to target heterogeneous system integration have not been easy and have not always delivered effective and practical results. From a technical perspective, the challenges that BPI systems or large-scale collaboration systems deal with are:

- **Scalability:** The great number of instances that come as and are delivered by the systems per a unit of time, in the number of geographical locations, the number of systems/applications/functions involved, the number of organizations participating, the number of products/services offered, the amount of data needed to retrieve and update.
- **Volatility:** A characteristic of the business environment, which refers to a dynamically changing environment where data and services can appear, be removed, or be updated in a timely manner, where the changes can be predictable or not.
- **Autonomy:** The flexibility to change one's own processes with controlled reduction of impact on other partners. The limited trust in trading partner relationships, however, will be present, thus requiring the traceability

and controlled monitoring of the automated processes that are established between the trading participants.

- **Heterogeneity:** Customers do not want to rip and replace legacy applications and so diverse systems exist across a trading community. There are countless business applications, data formats, and points of integration that increase the process integration complexity exponentially.

Historically speaking, process enablement has been a driver for enterprise systems for a significant period of time. The pitfalls of functional over-specialization and lack of overall process control has been well documented. Technology response to this business demand was met with a suite of technologies, ranging from groupware and office automation, to workflow systems, and more currently business process management (BPM) technologies. Recently, BPM has been used as a broader term to reflect the fact that a business process may or may not involve human participants and may also cross organizational boundaries.

It is this integration aspect of business process management that has attracted significant interest in academia and industry. We can find in literature a range of technologies, standards and formal approaches that have been put forth to address this complex problem.

Our study also indicates that it is well known that messaging technologies play a key role in BPI. This role is primarily that of facilitating interactions between partner organizations running potentially heterogeneous systems. Message-oriented middleware is known to tackle some key issues of cross enterprise data exchange without violating individual system autonomy.

Process enactment systems traditionally rely on the control flow defined within the process model, which triggers the invocation of the underlying application component(s). Even though the interaction between the application components

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