Chapter 8
Service-Oriented Architecture

ABSTRACT
Service-Oriented Architecture (SOA) is considered a piece of cohesive integration glue that ties all the available computing services together across an organization. In enterprise integration, SOA is essentially a set of design and implementation principles that can guide integration practitioners to design and develop interoperable support services that are derived from individual enterprise applications in an organization, facilitating smart integration across distributed applications so that all business domains in the organization can strive for a common business goal in a competitive way. This chapter first discusses SOA fundamentals, covering all the design principles and underlying supporting technologies. As organizations would have different business priorities in integrating their distributed applications, different practical integration entry points to SOA design and implementations are then articulated. Finally, Malvern iStore’s SOA attempts to meet the dynamics business needs are an illustrative example presented in this chapter.

1. THE FUNDAMENTALS OF SERVICE-ORIENTED ARCHITECTURE

With the quick development of Web services technologies, the service-orientation design and development indeed becomes an emerging trend in enterprise integration. Web services as standard integration technologies are now widely adopted to integrate distributed applications, fostering the best mechanism ever to conquer heterogeneous issues in distributed computing. The ease of integration enabled by Web services makes possible disparate operation support services across different business domains and at a variety of granular levels in support of business activities, internally or externally (please refer to Figure 1 in chapter 5). As a result, the best-of-breed business operation support services across an organization can be offered to end users in an efficient and cost-effective manner. In general, the continuously improved IT services in organizations surely make not only their employees pleasant and productive at work but also their customers satisfactory with their offered quality product and/or responsive services.

By taking advantage of the inherent good interoperability of Web services, distributed applications can be ad hoc integrated to meet the
immediate business needs as long as the deployed Web services based interfaces that offer access to the needed data and functions of the distributed applications are technically the results of solid designs and implementations. Figure 1 shows how Web services can be applied in the Malvern iStore’s integration cases, a.k.a., the Order Management business operations in the OiA application, the Order Fulfillment Management business operations in the WMS application, and the Returns Management business operations in the CRM application.

When business operation and assistant support services empowered by Web services are widely offered across an organization, distributed applications could be integrated faster as these support services are technically interoperable. Note that although they can be integrated to share the needed data and functionalities across business domains in the organization, the established communications using ad hoc approaches are in chaos once the number of links between each other grows substantially due to lacking appropriate design guidance in general. As shown in Figure 2, the supported business operations become inflexible at the service binding level. A better service design architecture becomes essential for integration practitioners to realize agile business operations in the organization.

No matter which business sector an organization is in and how its business is operating, business operations across different business units in the organization must be coordinated to act together to serve its customers well. The needed coordination could be done differently, i.e., manually, semi-automatically, or automatically, which radically depends on its invested underlying IT systems and what kind of integration has been done or will be supported down the road. Normally, as the business of an organization grows, the organization must discover and address its operational inefficiency and weakness issues to improve its productivity and customer satisfaction. Although business operations differ from organization to organization, organizational functions are frequently structured in a hierarchy. To serve customers well, employees must work together and collectively and collaboratively operate business functions defined across the organizational hierarchy in an organization.

A simplified version of hierarchical business operations is shown in Figure 3. A variety of business processes at different levels might be running manually, semi-automatically, or automatically,