Chapter VI

An Approach to Web-Based Application Integration Using Java Adapters and XML

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ABSTRACT
This chapter is concerned with Application-to-Application (A2A) integration, in dynamic heterogeneous environments, where applications are not aware of each other in advance and must therefore exchange data in a peer to peer (P2P) fashion. This is achieved via dynamic discovery of application services and integration through XML message exchange using Java adapters.

INTRODUCTION
The business landscape has been radically changed since the advent of the Internet. The Internet has opened new opportunities for companies to introduce new business models. In particular, the integration of business processes across organisations that can form dynamic virtual enterprises can be potentially enabled by relying on the Internet as the backbone. However, organizations attempting to integrate their systems across the value chain are facing complex issues such as integrating enterprise models, semantic interoperability, definition of interfaces and
interchange standards, wrapping legacy system components, and implementing secure and reliable distributed transactions in such highly distributed and heterogeneous environments. According to Forrester Research, one-third of most companies’ IT budgets is now spent on application-integration software. The market is expected to grow from US$400 million in 1999 to US$1.8 billion in 2002, according to the Gartner Group.

This chapter is concerned with an innovative approach to Application-to-Application (A2A) integration. The integration approach is based on the peer-to-peer (P2P) computing paradigm and proposes dynamic discovery and integration of applications through XML message exchange using Java adapters. This approach was influenced by requirements of the shipping industry such as:

• The cost of satellite communications is currently quite high compared to other types of radio and landline communications. The integration architecture described in this chapter implements techniques for efficient transmission of data from ship to shore depending on communication media availability.

• The need to integrate “low level data,” such as data from ship sensors with ship management software. This is very important since the office wants to keep track of the location as well as monitor the status of each ship. This in turn requires some kind of expert monitor adapter that will make decisions on when and how to send the data.

• The need to integrate ship applications with external applications such as information services, i.e., weather information, navigation maps, etc.

However, the integration approach described in this chapter can also be applied to all integration problems where two applications need to exchange data without prior knowledge of the existence of each other and without the use of a centralised integration server. Moreover, the assumption is that the two applications operate on heterogeneous platforms and can communicate using different protocols and media, where the issues of available bandwidth and cost of communications need to be considered. Our proposal differs from conventional integration approaches that rely on integration middleware to which existing applications must somehow be adapted. In the following sections, the main ideas of the proposed integration approach are discussed.

APPLYING INTEGRATION ARCHITECTURES

In any business scenario involving multiple parties, there are likely to be a large number of connections to be made between different applications belonging to different partners that need to be integrated. Implementing this in an uncontrolled, ad hoc manner will lead to a complex web of connections that is difficult
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