



Chapter VII

Integrating Agents and Web Services into Adaptive Distributed Learning Environments

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Abstract

This chapter discusses an integrated approach to designing and developing adaptive distributed learning environments. It presents a distributed learning environment based on agent technology and Web services technology. Agents are expected to be used as the core components in intelligent distributed learning environments because of their inherent natures: autonomous, intelligent, sociable, etc. However, to integrate agents into existing legacy learning environments or into heterogeneous

learning environments, one may encounter many difficulties. They may be technical issues, economical issues, social issues, or even political issues. Web services technology, on the other hand, characterized by its standardized communication protocol, interoperability, and easy integration and deployment, is an excellent complimentary partner with agents in distributed learning environments. The integration of Web services and agents simplifies the complexity of development, saves time, and, most important of all, makes distributed learning environments feasible and practical. To take advantage of the merits of agents and Web services, we advocate agent-supported Web services in designing and developing distributed learning environments.

Introduction

Over the last few years, universities and colleges have made substantial progress in using the Internet to deliver courses. This is referred to as “e-learning” or digital learning. This trend blurs the differences between information technology applications in education and distance education. While taking courses, students on campuses often extensively acquire distributed learning resources, communicate, and collaborate with other teachers and learners anywhere and at any time. Therefore, campus-based education and distance education, to some extent, tend to be integrated. As well, distance training is frequently used in enterprise training. Distance education and training developed rapidly over the past several years. The research on distance education and distance training has become one of the hottest fields in educational technologies.

The Internet and Web-based distributed learning can potentially deliver personalized course materials and services, and therefore, are potentially able to accommodate a larger variety of learners than what can be accommodated currently.

A distributed learning environment can be implemented practically by using a set of Web services. These Web services offer a set of software artifacts and technologies that service providers or users can modularize and encapsulate with well-defined standard interfaces, host on their platforms of choice, manage and run either locally or remotely, transport over the Internet or any intranet by using standard protocols over and above TCP/IP, locate from central regis-

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