



Chapter V

Server Development for Online Computer Labs

Introduction

The previous chapters have covered the important design stages in developing an online computer lab. Chapter III discussed the issues on understanding the requirements and planning the development of online computer labs. In Chapter III, we discussed the issues about collecting information to get the perceptions of the future online computer lab from the users' points of views. In Chapter IV, the users' perceptions were translated into technical terms. The lab activities were represented by a flowchart. Computer lab models representing different types of labs were examined. Physical design related topics such as strategies for selecting technologies were also discussed in Chapter IV.

In the next few chapters, we will discuss issues related to the implementation of online computer labs. Once the technologies are specified for the components in a computer lab model, the next task is to put these technologies together to construct a computer lab physically to support teaching and hands-on practice. In this chapter, the issues about server implementation will be addressed.

Based on the activities required for teaching and hands-on practice, the servers should be configured to support these activities. The developers need to make a decision on the configuration of each building block in the server architecture. To accomplish this task, the developers need to specify the speed of the central processing units (CPUs), the size of the hard drives, and the size of the memory for each server. They will also need to specify how the servers communicate with each other and with client computers in the network, how to deploy the servers, and how the peripheral equipments can be attached to the servers.

This chapter will first address the server-side hardware configuration issues. After the discussion of the hardware configuration, we will deal with the server-side software configuration issues. We will discuss some general procedures of configuring the hardware and software with the lab design objectives in mind. Lastly, we will discuss some configuration issues about various special purpose servers.

Background

Properly configuring a server to support the network-based computing environment is a critical step in an information system. Servers are widely deployed in various organizations from small companies to global enterprises. For online computer labs, except the peer-to-peer lab model, the other lab models all need the support of various servers. For server development, Boer (2002) discusses a delivery server infrastructure developed for distributing sophisticated multimedia content. This delivery server infrastructure provides a platform independent framework to support interactive distance learning. Ayala and Paredes (2003) report the development of a learner model server that supports a personalized learning environment. This kind of server can provide different sets of applications based on learners' interests.

There are very few instructional design studies on the development of a Web server which is one of the special purpose servers mentioned in this chapter. In their paper, Fansler and Riegle (2004) discuss a data-driven online instructional design analytics system. In their project, a Web server is involved in the design process. As described in the above, the studies about servers focus on delivering the course content to support instruction. In this chapter, not only shall we cover the servers used to deliver the course content, but also cover the servers that manage the networks in an online computer lab and the servers that support remote access.

As mentioned in the previous chapter, there are various server platforms such as x86, IBM POWER, Sun SPARC, and Itanium 2. Servers with the x86 platform are popular for the small or medium computer lab model. Part of the reason is that technical support teams and users are more familiar with the x86 platform. It takes less effort for a technical support team to implement the computer lab and it requires

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