



Chapter VII

Client Development for Online Computer Labs

Introduction

After the servers and networks have been developed, it is time to configure client computers so that they can be used to access the servers. Correctly configured client hardware and software will allow students to access the servers and complete their hands-on practice through the Internet. In this chapter, we will discuss issues related to the configuration of the client side. There are two types of client computers. Students' home computers can be used as client computers. Also, some of the computers in the online computer lab can be configured to be client computers as part of the client-server architecture. The hardware on the client side includes desktop computers, notebook computers, PDA, printers, scanners, network equipments, and audio and video devices. The client-side software includes client operating systems, remote access utility, multimedia software, programming software, office production software, security software, Web browser, and other application software.

This chapter starts with the discussion of the issues related to the configuration of client hardware and software. Next, this chapter will discuss the configuration of remote access. We will take a closer look at how to connect students' computers to the server located on campus. Then, we will discuss the issues related to the installation and configuration of audio and video devices with which students can listen and watch live demonstrations on their client computers. We will also discuss the tools for collaboration. These collaboration tools will help students with group activities.

Background

An online computer lab is constructed on client-server architecture. Networks covered in the previous chapter link servers to clients. For the development of clients, the first task is to select a proper remote access scheme. There are many ways to remotely access an online computer lab. The commonly used remote access methods are virtual private network (VPN), Terminal Services, virtual machine remote client, and database remote client. When the VPN technology is used to access a remote online computer lab, the VPN client-side software installed on students' computers needs to be properly configured (Snader, 2005). Citrix is a commercial remote access tool (Kaplan, Reeser & Wood, 2006). It is used by many companies and higher education institutions. Terminal Services is another commonly used remote access tool. In fact, Terminal Services are based on the technology developed by Citrix (Tritsch, 2005). The Terminal Services technology is included in Windows XP Professional called remote desktop connection. If Windows 2000 Professional or an older version operating system is used on the client side, one needs to install and configure the Terminal Services client software on the client's computer.

Multimedia can be used to greatly improve the quality of online teaching and learning. Instructors and students who will create and use multimedia course materials need to know how to correctly use the multimedia technology in Web-based teaching and learning (Clark & Mayer, 2003). To create multimedia course materials, instructors should know how to use multimedia authoring tools. Flash is one of the commonly used multimedia technologies (Castillo, Hancock, & Hess, 2004). The Flash technology can be used to develop multimedia e-learning materials. With Flash, one can create interactive Web pages. Castillo et al. (2004) show how to communicate with learning management systems.

Many of our students prefer learning through hands-on practice. They need to practice and try things to enhance their understanding. Tools are developed to perform and create interactive online e-learning materials (Watkins, 2005). These tools can help users to develop interactive course content with chat rooms, discussion

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