Building the Web Server for a Web Systems Class

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ABSTRACT
One major element in IT education is teaching many students how to develop and maintain Web applications, which presents a sizable challenge for universities that standard business environments do not encounter. Each student must have a separate place for storing HTML, JavaScript, Perl, PHP, MySQL, and JSP web systems on the server. As a result, multiple programs must be able to run with separate user spaces. This paper discusses how to design and build a single server to solve this unique problem.

The proposed solution uses the Linux operating system to host the server environment, with Apache 1.3 as the base web server and Tomcat as the JSP solution. The paper describes the details of installing the web server and allocating space for each user to store their web pages. In particular, this paper demonstrates the methods and challenges associated with multi-user MySQL and Tomcat installations. The server is designed to let the students design and build web systems without the equipment and administrative overhead of maintaining separate servers for each student. It also gives the students a secure place to develop web applications as part of their IT education. The paper also discusses the administration of the server including adding users to the system.

Categories and Subject Descriptors
D.4.6 [Security and Protection] *access controls*

General Terms
Management, Design, Security

Keywords
Multi-user web server, partition, security, access

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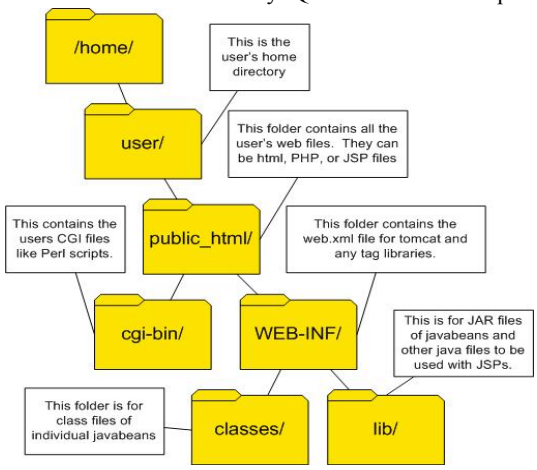
THE PROBLEM
Web systems, a core element of IT, are developed in many languages and standards including HTML, JavaScript, CGI, MySQL, Perl, PHP, JSP, .NET, and EJBs. IT Students need to be able to understand most of these languages and standards if they want to have a successful career, which creates a challenge for IT educational institutions. A single-server configured to handle all these packages would relieve some of the administrative and resource burdens. This goal by itself is not too difficult. The challenge arose since we needed to create a secure environment with multiple users, each having their own space for web systems, isolated and protected from other users. This challenge was compounded by the numerous technologies that needed to be supported.

1. THE SOLUTION
The server was implemented using open-source software. The operating system software chosen was Debian Linux. Apache was the primary web server software, with Tomcat being used for the Java web environment. MySQL was added to provide



database functionality. Additional dynamic capabilities were provided through CGI, Perl and PHP. After considerable administration research and experimentation, the environment was completed with security and separation between users, giving each their own space, as shown, and freedom to develop their web systems in a safe environment. The project will continue to increase in scope as our curriculum expands to teach a greater number of web systems technologies.