Using Home Based Servers To Create Course Web Presence

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Abstract

Several ASEE papers have been presented on the usefulness of websites to improve communications with students and the students' expectations of those websites [1,2]. Unfortunately, with the proliferation of viruses, hacker attacks and other security issues, The University of Southern Mississippi Information Technology Department has been forced to restrict the use of scripting languages, file transfers, and disallow email attachments so that the full power of the Internet cannot be utilized. This paper will discuss: the use of high speed Internet access and a home pc to establish a web presence, useful scripts that could benefit instructors, lessons learned and the students' reactions to the author's efforts.

Introduction

To improve communications and interactions with students, many faculty members turn to the Internet to enhance and supplement course content. Unfortunately, with the amount of data being generated by one instructor's classes, universities have started to limit server space made available to faculty. In addition, they have had to restrict the use of scripting languages and file transfers due to hacker attacks, viruses and other security issues. These policies, although necessary, limit the instructor's ability to provide information and services online.

With the introduction of High Speed Internet Access (such as Cable Internet and DSL) and Open Source Server Software (such as Linux) it is now possible to set up a home server to provide grade access, electronic submission of assignments, course information, useful links and additional course material outside the above restrictions.

Background

The equipment used to set up the home-based server was a DELL Dimension XPS M200 Pentium MMX 200MHz computer, a ten-gigabyte hard drive, Comcast Cablevision Internet service and Redhat Linux operating system (version 7.2).

Redhat Linux was installed using the "SERVER" installation option. This option installs set up Apache Web Server as well as Secure Shell, which can be used for remote access and file transfers. Scripting languages such as PERL and PHP are available for free download or from the install disk, as is MySQL database. All three were added to allow for scripting functionality.

High Speed Internet

To set up the Home Based Server, a high speed Internet connection was needed to provide the necessary bandwidth to allow students to access the data stored on the server. Comcast High Speed Internet Service was available in the area and provided the necessary connection. Although Comcast uses DHCP to assign IP addresses to its' users it was discovered that the address rarely changes, even after a reset. This allows for the assignment of a domain name

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without the need to frequently reset the domain-name / IP assignments. (As of the writing of this paper the IP address has not changed for over six months).

Services Available

The Home Based Server was established to provide services to improve communications between the instructor and students and to manage ongoing courses. Many services have been made available to accomplish these goals:

Grade Access

One feature requested by students was online access to their grades. In their paper "GradeWatch - the Software Package Displaying on Web Pages Student Grades"[3], Bogdan M. Wilamowski and Aleksander Malinowski introduce a grade access package to the 2000 ASEE Annual Conference. This system, written in PERL, was adopted for use on the server, and, although developed under the Windows operating system, was ported to the Linux environment with little modification.

Assignment Submission

For certain types of assignments it is more convenient to receive the submitted material electronically instead of on paper. Assignments such as programs, CAD drawings and simulations are easier to evaluate in their electronic form. Unfortunately, with limitations on file attachments, both in size and type, this has become more difficult as the battle against viruses rages. To solve this problem, a PHP script was used to allow student to submit work via a web page to the Home Based Server. The script that was chosen was FileFusian. This simple script may be customized so that students can easily submit their work, to a password-protected directory, safe from unauthorized access.

Senior Project Administration

Until the creation of the Home Based Server, senior projects administration was done via large notebooks containing the student's work for the semester. Status reports were submitted via email and rough drafts were submitted in printed form. Only the course administrator was privy to these materials throughout the semester. With the use of the Home Based Server, these materials are now submitted via SSH file transfer to individual accounts. Each account is indexed by a PHP script that shows the date and time the file was created and compares that to the due date of the assignment. All comments back to the student are available via a password protected area of their accounts. This allows the owner of the account and the faculty access to commented material. Another bonus of this system is that students preparing for senior projects can view previous work serving as examples. The senior project websites have also raised interest in projects currently underway. Lastly, since all graded material is available online, the faculty has access to the students work so that they are better informed of students progress.

Only two PHP scripts are currently in use. One provides a description of each assignment, the due date and date delivered as content for each student's homepage. The second script provides content for the faculty. It shows the status of all students' progress at a glance.

Student Organizational Websites and Personal Use

Currently one student organization's website is also on the Home Based Server. This allows the Webmaster more flexibility to add features to the site that would be restricted on the university's server.

The use of the Home Based Server has also provided an invaluable service to the author of this paper. It has allowed for SECURE file transfers from home to the university and back. File transfers could be done before, but only via FTP, which does not have encrypted passwords, leaving it vulnerable to hacking.

Also, with the use of the universities wireless network, access to presentations and handouts is available for projection at anytime. This has been most beneficial when a question is posed in class and you want to refer to a presentation done earlier in the semester.

The Home Based Server has also allowed access to a web based bookmark page for access to favorite websites without the need to memorize URL's or copy your bookmarks from one computer to another. This is achieved using another PHP script.

Student Feedback

Surveys were conducted in four classes: EET 200 (Introduction for Fabrication and Design), CET 302 (Microprocessors I) and Senior Projects during the Fall 2003 semester. Forty-seven responses were obtained for each question (except for class specific questions).

When asked about the speed of the WebPages served by the Home Based Server, the majority (91%) rated the website as average or fast. Only 7% rated the server as slow or somewhat slow.

Students found it more important to retrieve supplementary course material than their grades. Approximately 30% rated retrieving supplementary course material as their favorite feature of the site, as apposed to 26% rating grade retrieval as their favorite feature.

In the Sophomore level course, only 20% of students viewed material from ongoing senior projects. In the Junior level class surveyed, 42% of the students viewed senior project material.

None of the students currently enrolled in senior projects felt that the website detracted from their project. 100% of students felt that the website helped them organize their project material.

Surprisingly, when asked about what they would change, only two students stated that they would change the look of the site. Additional feedback included comments that it was very easy to find material or that they would not change a thing.

Conclusions and Lessons Learned

Setting up the server was time consuming. It was done over the summer session and did take a large portion of the semester to complete. That said, it should be noted that it has saved time over the semester it has been in use. Many student's questions are now answered by "have you looked on the website" and students do not have to ask for handouts or missed assignments, since they are all posted on the web.

The availability of scripts via the internet from sites like http://www.hotscripts.com/ make it easy to find specified scripts. There is a multitude of scripts for file transfers, calendars, usage logging, and quiz/test administration. If a script is not available, modifying an existing script for your needs is still a possibility. There are also a number of user forums that were helpful in the creation of specialized scripts, like those used for senior projects.

One mistake that was made was the use of Redhat Linux 7.2, which is an older version of Linux that uses an older version of PHP. This unfortunately led to some problems using downloaded scripts. A number of environment variables that allow information to be passed to a script via a request line have been changed. This made it necessary to edit many scripts that would have worked perfectly on a newer version of Linux and PHP. An upgrade to the latest version of Redhat Linux and PHP is planned for the upcoming months.

The first attempt at installing Redhat Linux ended in disaster due to the fact that Anonymous FTP was left on during the initial installation. This allowed a hacker to take over the system in less than one day. Since the re-installation, without Anonymous FTP installed, no further attacks have been detected.

Putting senior projects on line has dramatically cut down on the amount of paper shuffling. All work is automatically backed up and logged for an up to the minute accounting of the student's progress. Students also like the fact that, since all course handouts and current student work are on-line, it has de-mystified the senior project process. Students come into the capstone course with a clear idea of the goals and requirements. Also, the faculty is better informed of the students' progress in the course and the feedback the students received throughout the semester.

Because of the massive amount of data generated by senior projects (including video clips of presentations for self evaluation), the ten-gigabyte hard drive is filling up quickly. A larger hard drive should have been selected.

The web based file transfer eliminates the need for instructors to guide students though the file attachment process for the various email programs and services. Now the class can be guided though the process one time with only one set of instructions.

It was also found that support via internet forums was actually faster than getting answers from the university information technology office. If software installation or server configuration changes were needed, it was much faster to do it personally than to wait for the IT department to get to your request.

Lastly, the creation of the Home Based Server was a leaning experience for the author. Linux, Web serving, scripting languages and MySQL are proliferating the fields of computers, networking and embedded systems. This newly obtained knowledge and experience can be integrated into the students' educational experience.

In conclusion, the Home Based Server is an alternative to university-supported servers. Although time consuming to set up, the benefits of improved communications and decreased limitations made the project worthwhile.

References

1. Capt Shad Reed, MAJ Steve Schweitzer , "Developing Effective Course Websites to Supplement Traditional Classes" Proceedings ASEE Annual Conference 2003

2. Steven Braddom, Charles Campbell, Robert Floersheim, Shad Reed "Course Websites: Are You Giving Your Students What They Want?" Proceedings ASEE Annual Conference 2003

2. Wilamowski, Bogdan and Malinowski, Aleksander, "GradeWatch – the Software Package Displaying on Web Pages Students Grades" Proceedings ASEE Annual Conference 2000.

Resources

1. Gradewatch: system for grade access http://cegt201.bradley.edu/~olekmali/grades/

2. FileFusian: file submission script http://www.efusian.co.uk/v2/index.php?page=filefusian

3. Online-Bookmarks: bookmark scripts http://www.frech.ch/online-bookmarks/

4. Hotscripts.com: script collection http://www.hotscripts.com/

5. Author's Homepage: http://ceetusm.com/

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