LIS653

Information Management Systems

2012–03–08

See http://openlib.org/home/krichel/courses/lis653n12a for the latest online version of this file.

Course Description
In recent years, cloud computing on standard operating systems has made the outsourcing of basic computing infrastructure an affordable proposition. This course will allow students to reach a level of system administration competence that will enable them to maintain such systems for the purpose of providing digital services to patrons. The course starts with basic systems administration, covering devices, users, network administration, and security. Auxiliary software systems that implement web servers, email, databases are also covered in class. Front line systems, such as, for example, web contents management systems, are implemented by students individually, and presented to others in class. The final systems can be used for digital projects of a wide variety.

Objectives
After taking this course all students

- will be able to understand the basic concepts of computer hardware
- will have seen the most basic concepts on files, directories, symbolic links
- will be able to manipulate a simple text file editor remotely
- will have a hands-on start in the running Unix-based systems such as i.e. Mac OS 10, Linux or FreeBSD, issuing a basic set of commands
- will have standard output and error, redirections and pipes
- will have basic concepts of networking including IP addresses, domain names, routers and ports
- will have an understanding of client/server protocols and seen application of client server protocols, including web, mail, and database
- will understand the compound structure of computer software systems
- will have seen basic concepts of databases administration
- will be able to retrieve information from the web about system administration problems.

The Palmer School Student Learning Objectives covered by the course are

- 2.E Students will build information systems and/or records used in such systems.

Prerequisites
There are no formal prerequisites for this course. People should be curious about the potential of information technology, and be ready to be surprised how easy it is to run a completely independent web presence without professional IT support. Prior knowledge of the MARC format and of HTML is desirable but not required.

Class structure
Classes will be held in the PC1 lab between 18:30 and 20:20.
There are basically five parts to the course. The first four parts contain concepts and practice. The fifth part untites all previous strands to do applied software installations.

1. security and access. concepts: public key cryptography and TCP/IP networking. practice: connections and key authentication.

2. shell computing. concepts: regular expressions, shell envrionments, redirections and pipes. practice: commands execution and file management

3. operation systems. concepts: dependencies, packaging and software licencing. practice: Debian upgrades and maintenance

4. backend software. concepts: http, smtp, SQL practice: exim, apache and mySQL setup

Provisional class details are:

2012–09–10	18:30 to 20:20	background to the course, choosing a provider, the domain name system
2012–09–17	18:30 to 20:20	public key cryptography, from course server to the rented server
2012–09–24	18:30 to 20:20	basic commands and how to deal with files
2012–10–01	18:30 to 20:20	redirections, shell initialization and environment
2012–10–08	*18:30 to 20:20*	*no class*
2012–10–15	18:30 to 20:20	software licensing and the Debian operating system
2012–10–22	18:30 to 20:20	versions, dependencies and installations
2012–10–29	18:30 to 20:20	electronic mail
2012–11–05	18:30 to 20:20	relational database systems
2012–11–12	18:30 to 20:20	http and the web
2012–11–19	18:30 to 20:20	web servers
2012–11–26	18:30 to 20:20	the Koha integrated library system
2012–12–03	18:30 to 20:20	student installations
2012–12–10	18:30 to 20:20	student installations
2012–12–17	18:30 to 20:20	student installations

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Private contact details may be obtained from the online CV at /home/krichel/cv.html.

Mailing list
There is a mailing list for the course at https://lists-1.liu.edu/mailman/listinfo/cwp-lis653-krichel. All students are encouraged to subscribe. As a rule, answers to email sent to the instructor are copied to the list. There are exceptions to this rule

- if the question writer requests the answer not to be posted;
- if the question is a purely private matter.

Readings
There is no textbook. For part 1, students may consult chapter 7 and 8 of Tanenbaum and Wetherall (2003). For part 2 Blum and Bresnahan (2011) appears appropriate. For part 3, we will cover parts of Jackson and Schwarz (2011). For part 4 Foundation (2012), Hazel (2001), Exim Maintainers (2012)), and Welling and Thomson (2008) should be amply sufficient reating.
Thomas Krichel makes slides and instructions available. There are presentations and the instructions on the course resource page at http://dlib.info//home/krichel/courses/lis653/ on the web. Finding relevant information on the web is an integral part of the learning experience.

Costs

Students need to either run a server at home, or rent a server. When the server is at home, and the home has already an Internet connection, the additional cost is negilible, it's essentially the electricity. The server hardware can be an old PC that is

The course will not contain a component on how to build a server by installing the Debian operating system on an old computer. The instructor is happy to help out of class to get this to run. But it may not be possible to do this in the classroom because of access restrictions there. After-class time may be taken to do this. Once the server is built, the more important problem is how to run the server at home. While there will be some time taken in class to understand the basic concepts required to set up home hosting, it may not be convenient to deploy the home Internet connection for a variety of reasons. These reasons are related to the domestic situation of the student.

To avoid this hassle, students are encouraged a server. Renting will cost between $10 to $40 per month. When renting, studentsh should request a Debian server, preferably sitting in XEN rather than OpenVZ virtualization environments. The http://wiki.debian.org/DebianHosting lists many of service providers. Student should look at the section called "Virtual Dedicated Server". Students could also get a "Dedicated Server" but this will generally be more expensive.

Here are some virtual dedicated server deals the instructor has seen, they should work

https://www.sevenl.net/cheap-dedicated-server choose "Celeron $40" or more expensive

http://www.ramhost.us/?page=vps/kvm-los-angeles-west choose "standard" or better

http://www.vpsfarm.com choose "IAD.1G" or better. This look like openVZ rather than XEN

http://vpslink.com/debian-vps/ choose "Link-4"

Students have previously worked with the last company. In the winter of 2012, one of six students experienced a dysfunctional server that was not fixed within class time.

Once a student have a machine, send the instructor the IP address, as well as a name for the machine. The machine can be anything stundents like as long as it has just one word. Thus "snoopy" or "me" is fine but "mikey mouse" is not. Students need to the instructor the IP address (a sequence of 4 numbers, each between 0 and 255, separated by dots) as well as the name students you want to give the machine. Students should not send the root password.

Assessment

There will be a quiz after every lecture except the ones that allow for student presentations. The three worst quiz performances will be discounted. The average over all quizzes counts for 11/21 parts of the final grade.

Each students installs a package for information management and reports to class during the last weeks in class, as described in the instruction set for the final presentation. The instructions are available at http://openlib.org/home/krichel/courses/lis653/admin/final_presentation.html. The presentation assesses the Palmer School learning objective 2.E. It is worth 10/21.

References

Blum, Richard and Christine Bresnahan (2011). *Linux Command Line and Shell Scripting Bible* (2nd ed.). Wiley.

Exim Maintainers (2012). Specification of the Exim Mail Transfer Agent. available at http://www.exim.org/exim-pdf-current/doc/spec.pdf.

Foundation, Apache Software (2012). Apache HTTP Server Version 2.2 Documentation. available at http://httpd.apache.org/docs/2.2/.

Hazel, Philip (2001). *The Exim SMTP Mail Server*. O'Reilley.

Jackson, Ian and Christian Schwarz (2011). Debian Policy Manual. available at http://www.debian.org/doc/debian-policy/.

Tanenbaum, Andrew S. and David J. Wetherall (2003). *Computer Networks*. Prentice Hall.

Welling, Luke and Laura Thomson (2008). *PHP and MySQL Web Development* (forth ed.). Sams Publishing.