

Assignment IS-209 fall 2010, University of Agder

Assignment 1

Week 34 (Aug 23 - Aug 27): Read Module 1 in the book [Introduction to the GNU/Linux Operating System \(Esteve J. J., first edition, sep 2007\)](#)

Lab: Research on GNU/Linux distributions (due **tuesday 31st of August** in [IS-209 \(ver 1, 1. termin, 2010 høst\)/Hand-in/Assignment 1/](#))

Make an analysis about the system and its possible advantages and disadvantages for the following configurations:

- 1) a server for internet services (web, mail, identification, openssh, webdav etc.)
- 2) a desktop machine (office tools, printing, mounted network drives, video, music, web browsing etc.)

Analysis should be based on the available information about a distribution, like documentation, forums, personal experience etc. Analysis might be a useful tool for a systems architect to choose a most suited distribution in a particular case.

You are also expected to install a GNU/Linux distribution on your own computer (or in your virtual environment) or on a computer at the lab. The lab will be accessible for you all the time (there are no other classes scheduled in this lab as far as I know).

Text added after the first version of those instructions for the assignment:

Tips: choose 3-5 distribution for the analysis; distributions do not need to be from different vendors, for example, Ubuntu Server and Ubuntu Desktop

Look also into the Forums [IS-209 \(ver 1, 1. termin, 2010 høst\)/Discussion forum/](#). The forum participation will not be graded but please contribute. This is a valuable resource for the whole class.

Assignment 2

Week 35 and Week 36 (assignment due is 14th of September 2010)

It is strongly recommended that you read the chapter 2 in the course materials before starting to work in this assignment.

- 1) Perform an detailed analysis of the installation and configuration of GNU/Linux to a concrete computer (netbook, laptop or desktop).

Given the specific computer (might be your own laptop), perform an analysis of its hardware (cpu, ram, hard disks, periferal units like keyboard, network card etc.), and describe how the distribution what you have chosen, fits to the hardware profile of the computer. You should also describe installation and / or use of additional software that you had to use during the installation and configuration process of the GNU/Linux (like gparted or virtual box, for example).

- 2) Consider that you must coordinate a migration process in a company that offers streaming services and storage of large amount of multimedia files on the Internet (according to the criteria described in the Chapter 2 of the course book). Clients must have the following services

available:

- disk space to upload multimedia files (videos, music etc.)
- an e-mail address
- an online space for users to administrate their files
- streaming service (video on demand, VoD)
- print service

The company wants to move from a proprietary software infrastructure to free software with following features:

- 1000 external customers
- a set of new services (email accounts, websites, streaming services, ftp service)
- data integration with current computer system (computers that can not be migrated)
- the solution should be based on free software

Current situation:

- 10 computers running Windows (9 Vista licenses for 2.3GHz Intel dual cores with 1Gb RAM, 1 server with Windows 2003, PIV 2GHz, 2Gb RAM)
- file and printer sharing service, website in IIS, office-based version of MS Office 2003

Migration project:

- The company has 15 employees and each must have a desktop computer
- The new system must integrate existing Windows computer that will contain data that can not be migrated and must be visible from the other computers on the network

Prepare a project for the migration, including an estimate of the cost of the new system using real data for both the proposed free software solution and an update of the current infrastructure based on proprietary software.

You can make assumptions that you consider necessary to focus the problem and suggest the most appropriate solution.

Assignment 3

Week 37 (assignment due is 21st of September 2010)

Read the module 3 in the course materials and study bash references that you can find in the course room ([Bash reference manual](#), [Introduction to shell scripting in BASH with some examples](#)) and in the course materials.

In the assignment 1 you recommended a GNU/Linux distribution for two different and basic cases, - server and desktop.

In the assignment 2 you prepared a migration plan for a specific case of company providing multimedia services.

Now it is time for some system administration.

In this assignment (3) you will develop a series of shell scripts, which are essential tools for systems administrators. The command interpreter of choice is up to the user, nonetheless bash is recommended.

Write a script to search the directory tree, starting from the directory given as first parameter, for files with names that match a pattern given as second parameter and a size greater than or equal

to the value passed as the third parameter. For example,
\$ mish /home *mov 1000k

would return all files from the /home directory that end with " mov" (movie mpeg4) and are larger than or equal to 1 MB. As indicated, it should be possible to use * as a wildcard in the file name. The shell script will save a log in /tmp/size.txt with information (accumulated and sorted by file size) of the files found including at least (one line per file) name, path, size, ownership, date.

From the files found, the script will move to a directory (protected from reading, writing and execution, except for "root") those belonging to local users (except "root") and that exceed in 3 KByte the size indicated in the third parameter. These files will be stored under /tmp/username for each user individually (e.g. all files belonging to the user "john" will be stored in the directory /tmp/john/). The script will send an email to each user informing of the files that have been moved by the administrator.

Finally, the script will schedule a task to be executed 48 hours later. This task will delete all the files that were moved to /tmp/username (see description above). Note that if the script is run in two consecutive days, on the third day it should only delete the files from the first run, but NOT from the second one (which will be deleted on the fourth day).

You should give a detailed description of all your scripts in your answer.

Assignment 4

Week 38 (assignment due is 28th of September 2010)

In the assignment 1 you recommended a GNU/Linux distribution for two different and basic cases, - server and desktop.

In the assignment 2 you prepared a migration plan for a specific case of company providing multimedia services.

In the assignment 3 you developed a series of shell scripts, which are essential tools for systems administrators.

As a final assignment (4) for this course you will make a security analysis of your computer. In addition, you will configure a firewall based on iptables and explain the details related to this configuration.

Studying the module 9 in the course materials will help in your work with this assignment.

1) Implement a firewall using iptables to allow access to Apache (httpd) and SSH (sshd) from a set of IP addresses. All other packets should be discarded (DROP).

Verify from a remote machine (you can use several machines at the lab) that the firewall works by scanning open ports with nmap or a similar tool. If you don't have access to another machine you can use a web service like GRC's ShieldsUP! [<http://grc.com>]. (keep in mind that many DSL

(Digital Subscriber Line) routers already include a firewall that blocks incoming connections, but this shouldn't be a problem if you are doing your test at the lab 48-118).

Your answer should include all the steps taken to configure the firewall, an explanation of every rule and the tests performed.

2) Taking the section on Security Administration as reference, do a full security analysis of your computer.

You must analyse at least:

- a) Whether there have been intrusion attempts. You must simulate at least one such attempt and describe how it can be detected.

- b) The general status of local security

- c) The general status of network security

The final report will include all the weak points found during the analysis or, if there are none, which possible weak points have been analysed to reach this conclusion.

The end.