DAT151
Database and Unix System Management

Spring 2018

Assignment 2

Obligatory assignment. Deadline: Monday 05.02.2018

The report should include all necessary commands to complete the tasks, printout from the system, explanation of what is done, the result and explanation of the result.

Remember to include the names of the group members on the front page of the report. The report can be in English or Norwegian. The report should be handed in via it's learning.

The assignment should be accomplished in groups of three or four students.

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Part 1 – The Filesystem

Task 1: Filesystem basics

1. Describe some of the key differences between the Linux/UNIX filesystem and how files and folders are organised in Windows.

2. What is a "mount point"? Create a new folder, and use the **mount** command to let this be the mount point for another directory/filesystem. Is this in any way related to how devices are handled in Linux? Explain.

3. In most UNIX systems, there are seven types of files defined. What are these? Use the **file** command to display the information of a few files. In which of the seven categories do these files belong?

Hints:

- Remember that many things can be considered as "regular files", such as texts and executables.
- The command **ls -l** can display the exact type of all files in a directory. Look at the very first letter of each line. If there is no letter (instead only a "-"), then it's a regular file.

4. From a user perspective, hard links and symbolic links allow the same file to exist in more than one place. Find an empty directory, and create a new file with some text in it. Create a hard link for

this file in the same directory using the command **ln**. Now, create a symbolic link for the file using **ln -s**. Then delete the original file, leaving only the links.

    a) Check if the hard link still works. Why/why not?
    b) Check if the soft link still works. Why/why not?

Task 2: File attributes and permissions

1. In the traditional Linux/UNIX filesystem model, every file comes bundled with a set of 16 bits. What are these bits, and why are they needed? Explain.

2. The nine permission bits are often represented using octal numbers. Explain what these are, and how the permissions bits 110 100 101 can be represented using octals. What permissions does a file with the octal value 745 have?

3. **chmod** is a tool that allows users to change the permission bits of a file, either by providing octal values, or by a mnemonic syntax where you can combine a set of targets (**u**, **g**, **o** for user, group and others, or **a** for all three) combined with an operator (+ , - , = for add, remove or set) before providing the wanted permissions. For instance, to add read and write permissions to the group and all others for a file, the command **chmod go+rw** can be used.

    a) Create a new file, and use **chmod** with the mnemonic syntax to add read and write permissions to the file owner, read and execute permissions for the group, and read and execute permissions for everyone else.
    b) Create a second file with the same permissions, but now use **chmod** with octal numbers to set the permissions.
    c) Can you think of any reasons why octal numbers can be preferred over the mnemonic syntax?

Part 2 – Software installation and management

Task 3: Package management systems and lower level package management

1. What is a package management system, and why do we need one? What is the package format used by the package management system on your machine?

2. Package management can often be considered to have two layers, where lower level package management contains tools used to install, uninstall and query packages.

    a) Use the package management tool available on your system to list all installed packages. How many are installed on your system? Select one package, and use the tool again to display all its dependencies.

        Hints:

        • Remember that there is a query option available.
        • You can use the **wc** utility as a filter to count the number of packages.

b) Use **wget** to download the package for the application called **pdfedit**.

The *rpm* file can be found at:

http://dl.fedoraproject.org/pub/epel/6/x86_64/Packages/p/pdfedit-0.4.5-8.el6.x86_64.rpm

While the *deb* can be found at:

http://archive.ubuntu.com/ubuntu/pool/universe/p/pdfedit/pdfedit_0.4.5-2_i386.deb

c) Try to install this package using your system's packaging tool. What happens? Why?

Task 4: High-level package management

High-level package management systems aim to simplify the process of installing, updating and maintaining packages. The two most common of these systems are **apt** (the Advanced Package Tool) and **yum** (the Yellowdog Updater, Modified).

1. Explain how these systems can locate and install software. What is the high-level package management system on your machine?

2. What is a software repository? If you are using a *yum* as your high-level package management system, add the **epel** software repository to your system.

Hints:

- More information available at http://fedoraproject.org/wiki/EPEL
- Download the "epel-release" package, and install it using **rpm**.

3. Try using **yum** or **apt** to install the **pdfedit** package. Does this differ in any way from Task 3? If it installs, remove the package afterwards.

Hints:

- Both **yum** and **apt** have commands named **install** and **remove**.
- Simply type **yum** or **apt** in your terminal to see a list of all available commands.

4. Use **yum** or **apt** to update the packages on your system.