

Linux Lab 2 - system configuration

During this laboration we will learn how to work on a deeper level with the system, handling hardware, drivers and processes.

Goals

- A method to configure the network.
- How to upgrade single packages and the whole system.
- How to manage processes.
- Mounting devices.
- Backups and compression.
- Handeling hardware.

Preparations

Read about all the commands needed in this laboration. Document their function and arguments for typical use.

lspci, lspci -v	_____
lsmod	_____
ifconfig	_____
nano	_____
tar	_____
mount	_____
umount	_____
dpkg -l	_____
wc -l	_____
apt-get update	_____
apt-get upgrade	_____
ps	_____
kill	_____
tar xvzf	_____
tar cvf	_____
gzip	_____
bzip2	_____

Starting up

1. Make a copy of the Ubuntu server machine in the same way as in lab 1. Start it up and log in.
2. Check the network connection. Eg. `ping google.com`. There seems to be a problem with the network configuration. We have to solve that.
 - a. Run the command `ifconfig`. The IP and MAC-address should show up for each interface in the computer. The Ethernet interface is named `ethX`, where X is a digit.

What interfaces are listed? _____

Is there an IP for the `ethX` interface? _____

- b. View the file `/etc/network/interfaces`. The problem is that there is no entry for the interface you found using `ifconfig`. Edit this in the same way as you did in lab 1. The file `/etc/network/interfaces` is owned by root so you must use `sudo`.
- c. Now we have reconfigured our network settings, but before anything actually happens we have to restart the program that uses this configuration file. This is done using:
`sudo /etc/init.d/networking restart`

Installing, updating and upgrading

1. Using `dpkg -l` you can list all installed packages on your system. To keep track of the number of installed packages you can simply pipe the output to the command `word count (wc)` that is able to count lines in a text.
`dpkg -l | wc -l`
How many packages are there installed? _____
2. We are interested in upgrading two of the packages in the system, `tar` and `nano`. Using `dpkg -l` we will get the current version of the packages, but the list is long. Solve this problem using a filter for `nano` (pipe to a command) using a construction from lab 1. Repeat for `tar`.

What version is `nano` _____ `tar` _____

3. Now we have to synchronize with the Internet based repositories and check what new files are available. This is done with `sudo apt-get update`.
4. After the synchronization is performed we can upgrade our packages. To upgrade a single package you use the option `install`. Do this for `nano` (`sudo apt-get install nano`).
5. Now we are going to upgrade the rest of the system, that is, all packages that have a more recent version in the repository. This is done using `sudo apt-get upgrade`.

Re-check versions `nano` _____ `tar` _____

Processes

1. What process id does the process `init` have? _____

What does this indicate? _____

2. Start the command `sleep 15`. The terminal locks up and waits for the command to finish. Wait until the terminal prompt gets back. Start `sleep 15` again. Now press `<CTRL>-Z`. The process will be suspended and you can use the terminal. If you want

the process to continue you give the command `fg` (foreground). Let the process complete and start it once more. Press `<CTRL>-Z` and this time you restart the process using `bg` (background). This puts the process in the background and you can continue working in the terminal at the same time as the process finishes in the background. Using the ampersand (`&`) you can start processes in the background of your terminal directly without the need for suspension and `bg`. Suspension is possible at any time. For example, try suspension out using `vim`. Don't start it as a background process though...

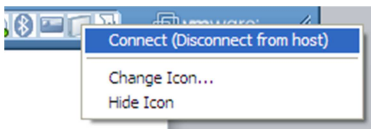
3. Start the command `sleep 3000` as a background process (`&`). Find the process id using `ps`. Kill the process and make sure the process is gone.

Mounting

1. Insert a usb stick in your host computer. Make sure that the stick shows up in the status field of the VM-Ware player.



incorrect



connect



correct

2. Find the device that represents your usb stick. This can be done using `sudo sfdisk -l`. The devices `/dev/sdaX` are the hard drive and should be ignored.

The device/s representing the usb stick: _____

3. Create a folder `/mnt/usb` where we are going to mount the usb stick. This must be done by the super user.
4. Check the content of the folder `/mnt/usb`.
5. Mount the usb stick in the folder `/mnt/usb`. In my case this was done using `sudo mount /dev/sdb1 /mnt/usb`, but this might vary.
6. Check the content of the folder `/mnt/usb`.
7. To remove the usb stick from the system you need to unmount it first. Make sure you are not in the folder `/mnt/usb` or any of its sub folders. Then simply unmounts using `sudo umount /mnt/usb`.

Backup and compression

1. Create a backup of your home directory using `tar`.
`tar cvf /tmp/backup_1.tar /home/ide`
2. Explain the parts of the command:

`tar` _____

`cvf` _____

- /tmp/backup_1.tar _____ /home/ide _____
3. Create a copy of the file /tmp/backup_1.tar named /tmp/backup_2.tar.
 4. Move to the folder /tmp. Compress the files in the following way:
gzip -9 backup_1.tar
bzip2 backup_2.tar
 5. Compare the size of the file /tmp/backup_1.tar and /tmp/backup_2.tar.
- /tmp/backup_1.tar _____ /tmp/backup_2.tar _____
6. Extract the file /tmp/backup_1.tar.gz to the folder /tmp using tar only. Refer to the manual for correct switches. Check the result.

Identifying hardware and drivers

1. To list all connected PCI-devices you give the command `lspci` with no argument or `-v`, `-vv`, `-vvv` ... To pipe through a filter might be a good idea.
2. Find the name of the sound card: _____

Find the name of the driver (kernel module): _____

3. Come up with an idea on how to document all the information for all pci devices, without using paper and pencil (see lab 1 for ideas).

Your suggestion: _____

4. To list usb devices you give the command `lsusb`. Try it out with different number of `-v` arguments as well.
5. To list drivers (kernel modules) you use the command `lsmod`. Make sure you can find the driver used by the sound card.