

## Laboration 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.
- Handling hardware.

### Required material

You are required to print out this document. It will serve as guide during the laboration.

You are going to need your student user name and the password in order to login in the lab computers.

*Take with you the material from **previous** laboration exercises.*

### Preparation

**BEFORE** each laboration exercise, you will be required to prepare the PREPARATION assignment (Page 2).

Doing this preparation before the exercise will help you solve the exercises and, more important, understand what you are doing in the exercise.

# Preparations

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

apt-get update

apt-get upgrade

bzip2

dpkg -l

fg

bg

gzip

ifconfig

kill

lsmod

lspci

lspci -v

lsusb

mount

nano

ping

ps

sleep

tar

tar cvf

tar xvzf

umount

wc -l

/etc/network/interfaces

# Laboration

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## 1. Setting up the environment

- 1.1. Check the course web page for information about where the virtual machine repository is located.
- 1.2. Copy the virtual machine folder called DO2003 from the repository to D:\VMW\DO2003.
- 1.3. Execute (double click) the file do2003.vmx (VMware virtual machine configuration).
- 1.4. Log in to the system  
User:               ide  
Password:           ide

## 2. Check the network connection.

- 2.1. Which command could you use to check network connection? Use it to check if you can connect to google.com.
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- 2.2. There seems to be a problem with the network configuration. We have to solve that.
  - 2.3. 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?
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- 2.4. Which file contains network configuration?
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- 2.5. Open the file above using “vi filename”.
  - 2.6. Notice that “auto eth1” line is commented out. Uncomment it and save the file. What was the problem that you encountered?
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- 2.7. How can you fix it?
- 
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- 2.8. Now we have reconfigured out networks 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`
- 2.9.

2.10. Describe the problem that appears just after executing the command above.

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2.11. Now, check the `ifconfig` man page. Find an option that displays all available network interfaces. Execute `ifconfig` with that option. Write down the complete command.

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2.12. Which ethernet interfaces are available?

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2.13. Fix the file from 2.3. Describe the change you had to make.

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2.14. Restart the networking system.

2.15. Verify that the internet connection is working.

Hint: You might need to know how to perform these operation in the next laboration.

### 3. Installing, updating and upgrading

3.1. 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
```

3.2. How many packages are there installed?

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3.3. We are interested in upgrading two of the packages in the system, `upstart` 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 “`grep`”, searching for `nano` (pipe to a command) using a technique you learned in lab 1. Repeat for `upstart`.

3.4. What version is `nano` \_\_\_\_\_ `upstart` \_\_\_\_\_

Now we have to synchronize with the Internet based repositories and check what new files are available.

3.5. This is done with `apt-get update`. Did it succeed? Is there any problem? Remember that some commands cannot be executed by the user so you will have to execute it as administrator.

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After the synchronization is performed we can upgrade our packages. To upgrade a single package you use the option `install`.

3.6. Do this for `upstart` (`apt-get install upstart`). Did it succeed? Is there any problem? Remember that some commands cannot be executed by the user so you will have to execute it as administrator.

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3.7. Do this for `nano` (`apt-get install nano`). Did it succeed? Is there any problem? Remember that some commands cannot be executed by the user so you will have to execute it as administrator.

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Now we are going to upgrade the rest of the system, that is, all packages that have a more recent version in the repository.

3.8. This is done using `apt-get upgrade`. Did it succeed? Is there any problem? Did it succeed? Is there any problem? Is there any problem? Try to execute the command as administrator?

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3.9. Re-check versions of `nano` \_\_\_\_\_ and `upstart` \_\_\_\_\_

#### 4. Processes

4.1. What does the command `ps` do?

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4.2. What process `id` does the process `init` have? \_\_\_\_\_

4.3. Execute the command

```
sleep 15
```

The terminal locks up and waits for the command to finish. Wait until the terminal prompt gets back.

4.4. Execute

```
sleep 15
```

Press `<CTRL>-Z`. The process will be suspended and you can use the terminal.

4.5. Execute

```
ps -f
```

Is there any command called `sleep 15` in the list? What does this mean?

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4.6. "What does `-f` option for `ps` mean?"

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4.7. If you want the process to continue you give the command `fg` (foreground). Let the process complete and start it once more. Execute `fg`.

4.8. Execute

`sleep 15`

Press <CTRL>-Z. This time you restart the process using `bg` (background).

4.9. Execute

`bg`

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.

4.10. 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 `vi`.

4.11. Start the command `sleep 3000` as a background process (&). Write down the complete command.

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4.12. Find the process id of the above command using `ps`.

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4.13. Find the job id of that command.

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4.14. Kill the process and make sure the process is gone. Write down the complete command.

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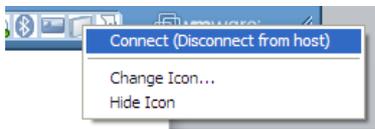
## 5. Mounting

5.1. 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

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Connect

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Correct

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5.2. Find the device that represents your usb stick. This can be done using `sfdisk -l`. Did it succeed? Is there any problem? Is there any problem? Try to execute the command as administrator?

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The devices `/dev/sdaX` are the hard drive and should be ignored.

5.3. The devices representing the usb stick

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5.4. Create a folder `/mnt/usb` where we are going to mount the usb stick. This must be done as super user, i.e., administrator.

5.5. Check the content of the folder `/mnt/usb`.

5.6. Mount the usb stick in the folder `/mnt/usb`. In my case this was done using  
`mount /dev/sdb1 /mnt/usb`

This might vary. Did it succeed? Is there any problem? Try to execute the command as administrator?

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5.7. Check the content of the folder `/mnt/usb`.

5.8. 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  
`umount /mnt/usb`

Did it succeed? Is there any problem? Try to execute the command as administrator?

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## 6. Backup and compression

6.1. Create a backup of your home directory using tar. Execute

```
tar cvf /tmp/backup1.tar /home/ide
```

6.2. Explain the parts of the command:

```
tar _____ cvf _____  
/tmp/backup1.tar _____ /home/ide _____
```

6.3. Create a copy of the file `/tmp/backup1.tar` named `/tmp/backup2.tar`.

6.4. Move to the folder `/tmp`. Compress the files in the following way:

```
gzip -9 backup1.tar  
bzip2 backup2.tar
```

6.5. Compare the size of the file `/tmp/backup1.tar` and `/tmp/backup2.tar`.

```
/tmp/backup1.tar _____ /tmp/backup2.tar _____
```

6.6. Extract the file `/tmp/backup1.tar.gz` to the folder `/tmp` using `tar` only. Refer to the manual for correct switches. Check the result.

## 7. Identifying hardware and drivers

7.1. Which command can you use to list all connected PCI-devices?

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7.2. Execute the command with no arguments or `v`, `-vv`, `-vvv` ... To pipe through a filter might be a good idea.

7.3. What is the name of the sound card?

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7.4. Find the name of the driver (kernel module) for the sound card.

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7.5. To list usb devices you give the command lsusb. Try it out with different number of v arguments as well.

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7.6. To list drivers (kernel modules) you use the command lsmod. Make sure you can find the driver used by the sound card.

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## 8. Finishing the exercise

8.1. Ask laboration assistant to check your work.

8.2. Shut down your virtual machine. Which command do you use to shut down?

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8.3. Did it succeed? Is there any problem? Remember, the command shutdown cannot be executed by the user so you will have to execute it as administrator.

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**9. After the virtual machine is closed down, REMOVE it from the host.**

**Congratulations**