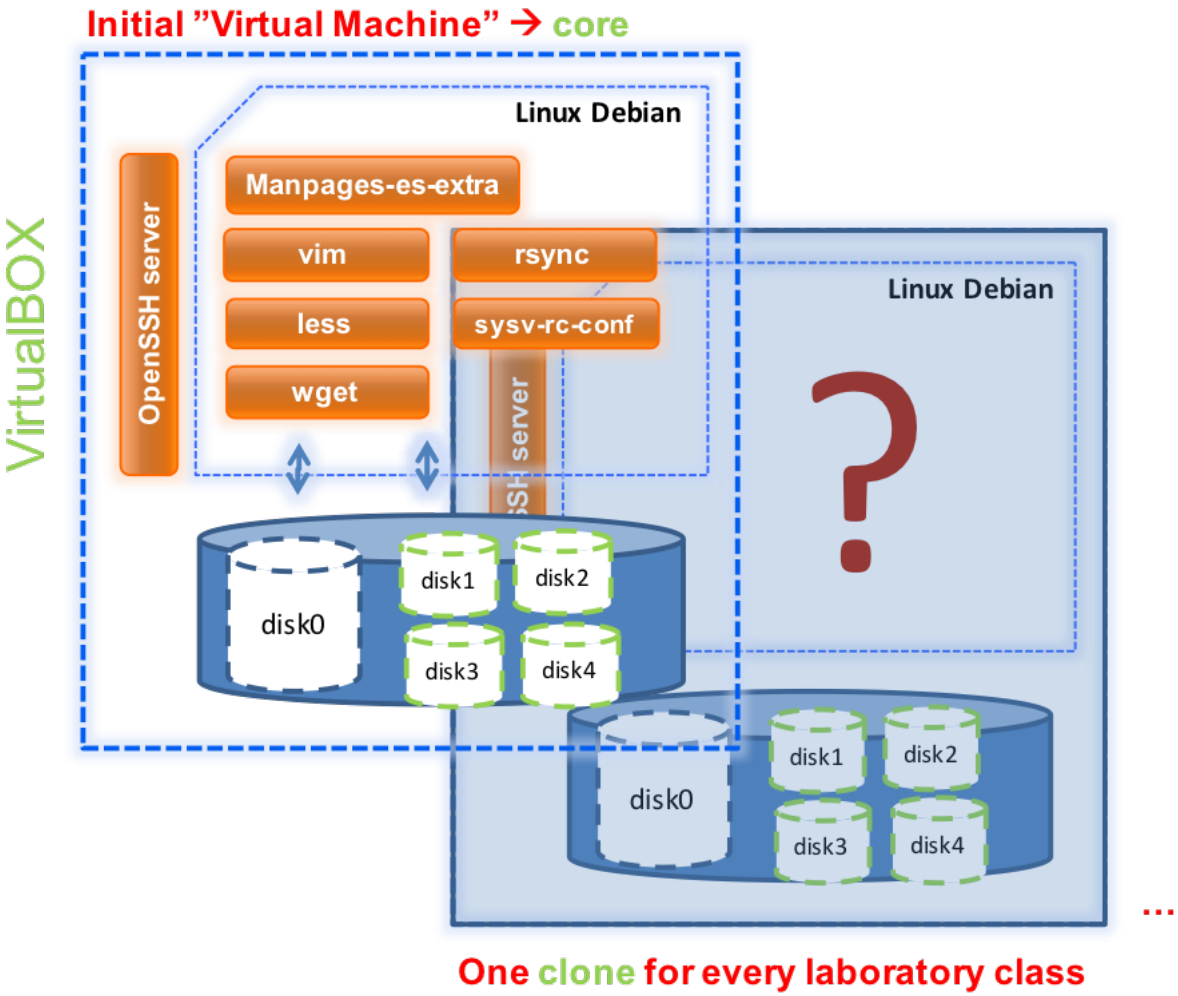
Computer Engineering Degree *Computer Engineering* Year 2017/18	Practical classes **Lab 0**	**CSDA** **UNIT I**

Introduction to the LAB environment



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Main goals

- To become familiar with the facilities available in the CSDA Laboratory.
- To create and configure the **base system** on which we will work in the practical classes.
  - Creation of the Virtual Machine (Virtualbox) “core”
  - Installation and updating of Debian 7.11 (Wheezy)
  - Software and tools configuration.
- To establish strategies to be followed for the proper functioning of laboratory and personal work.

Assignment 1: The core

VM creation

1. Create a personal work directory in your PC in which we locate all of our lab work, especially VMs.
2. Define and create the base VM in VirtualBOX:
    a. Name: **core**
        - Type: Linux
        - Version: Debian (64 bits)
    b. Memory: Recommended (**4 GB**)
    c. Processor:
        - Same as the host
            1. Number of cores: 2 (if possible)
            2. Execution limit: 100%
        - Enable PAE
        - Acceleration:
            1. Enable *VT-x/AMD-v*
            2. Enable *nested paging*
3. Storage (**SATA controller**):
    a. Primary (System) disk → 1 disk of 10 GB (operating system), type VMDK
        - Dynamically reserved space
        - "*split*" mode
        - `/dev/sda (10 GB) ← Disk0`
    b. Secondary disks → 4 disks of 2 GB each; type VMDK
        - … they will be used in lab 3
            1. `/dev/sdb (2 GB) ← Disk1`
            2. `/dev/sdc (2 GB) ← Disk2`
            3. `/dev/sdd (2 GB) ← Disk3`
            4. `/dev/sde (2 GB) ← Disk4`
4. Network:
    a. Build a "custom" NAT VIRTUAL NETWORK on VirtualBox:
        - **`network_1`** → `192.168.0.0/24 (eth0/eth1)`
    b. Enable 2 NAT network interfaces
        - Integrate one of them in the **network_1** network.
5. Disable those devices that you are not going to use:
    a. Floppy, sound, USB …

6. Configure the virtual CD/DVD device as debian-7.11.0-{amd64/i386}-netinst.iso:
    a. Debian Wheeze, netinst ISO is available at:
        - https://www.debian.org

Assignment 2: Installation of `core.localdomain`

1. Boot the new VM and install Debian 7.11 (wheezy):
    a. System name: **core.localdomain**
    b. Networking:
        1. By default, use only **eth0**
        2. Dynamic configuration mode (DHCP)
    c. Create users (installation process):
        1. root: “root”
        2. test: “temporal”
    d. Storage: Manual configuration (10 GB)
        1. `/dev/sda1` (512 MB) (boot mark)→ `/boot` (ext4)
        2. `/dev/sda2` (2 GB) → `swap`
        3. `/dev/sda3` (≈8,2 GB)→ `/` (ext4)
    e. System: standard installation (minimum)
        1. Use local software repositories (Spain)
            a) Local *mirrors* (.es)
            b) Recommended: **cdn.debian.net** (No proxies)
            c) Add *security* repositories
        2. Install the base system (minimum)
            a) System standard tools only
            b) Don’t install desktop environment X

2. After that, make sure that your new system is fully updated. Then, install these tools:
    a. Text editor: `vim`
    b. Text paginator: `less`
    c. Sync tool: `rsync`
    d. Web download tool: `wget`
    e. Service (client/server) SSH: `ssh`
    f. *run-levels* config tool: `sysv-rc-conf`
    g. Additional (extra) system manuals: `manpages-es-extra`

Assignment 3: Work methodology

To begin with the work methodology, we will follow the following steps:

1. Previously, you must create an initial SnapShot of the VM (core). Call it **snapshot_BASE.**
    a. Make sure your VM is OFF.
2. Create a "FULL" clone of the VM "core":
    a. Shut down the VM "core"
    b. To create the clone:
        i. Clone name: **client_LINUX**
        ii. Check the option "**Reiniciar dirección MAC**"
        iii. Type: **Full**
        iv. Snapshots "tree": Todo
    c. **Re-configuration:**
        i. Change to 1 the number of cores of the VM.

3. Start the new (cloned) VM "**client_LINUX**"
    a. Re-configure the VM hostname:
        i. Hostname: **client.localdomain**
    b. Re-configure the VM network:
        i. Fix the network interface in "static" work mode using the following params:
            1. *Host IP*: 192.168.0.**20**
            2. *Network mask:* 255.255.255.0
            3. *Network IP*: 192.168.0.0
            4. *Broadcast*: 192.168.0.255
            5. *Gateway*: 192.168.0.1
            6. *DNS*: 8.8.8.8
        ii. Modify the `/etc/hosts` file so the IP is appropriate.

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4. Add "port forwarding" in VirtualBox; It is about linking the "pairs" <IP of the VM: port of the service> with <IP of the host: auxiliary port>. This will make it possible for us to connect to a particular service of the VM, through the "virtual" ethernet network, from our host (PC or laptop):
    a. **IP[1] of the host:: 2220 ←→ IP of the client VM:: 22**

[1] Any operative IP of the host: **0.0.0.0**

5. Check that you are able to connect to the VM from the host (using ssh). You can use the “Bitvise SSH client”.