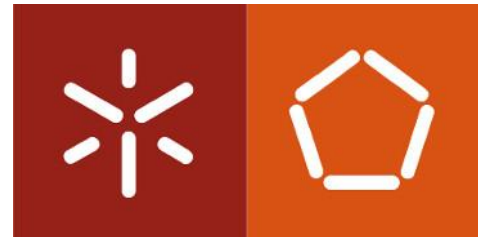


Cloud Computing Applications and Services

(Aplicações e Serviços de Computação em Nuvem)

Warm-up

University of Minho
2021/2022



VirtualBox

- Install VirtualBox 6.1 (<https://www.virtualbox.org>)
- Configure a host-only network
 - File -> Host Network Manager (Mac OSX)
 - create a host adapter for network 10.0.0.X

Adapter Creation (example)

The image shows a 'Host Network Manager' window. At the top, there are three buttons: 'Create' (green plus icon), 'Remove' (red minus icon), and 'Properties' (gear icon). Below these is a table with columns: 'Name', 'IPv4 Address/Mask', 'IPv6 Address/Mask', and 'DHCP Server'. The first row is highlighted in blue and contains 'vboxnet0', '10.0.0.1/24', and a checked checkbox with the text 'Enable'. Below the table, there are two tabs: 'Adapter' (selected) and 'DHCP Server'. Under the 'Adapter' tab, there are two radio buttons: 'Configure Adapter Automatically' (unselected) and 'Configure Adapter Manually' (selected). Below these are four text input fields: 'IPv4 Address' with value '10.0.0.1', 'IPv4 Network Mask' with value '255.255.255.0', 'IPv6 Address' (empty), and 'IPv6 Prefix Length' with value '0'. At the bottom, there are three buttons: 'Reset', 'Apply', and 'Close'.

Host Network Manager

Create Remove Properties

Name	IPv4 Address/Mask	IPv6 Address/Mask	DHCP Server
vboxnet0	10.0.0.1/24		<input checked="" type="checkbox"/> Enable

Adapter DHCP Server

☐ Configure Adapter Automatically

☒ Configure Adapter Manually

IPv4 Address: 10.0.0.1

IPv4 Network Mask: 255.255.255.0

IPv6 Address:

IPv6 Prefix Length: 0

Reset Apply Close

Adapter Creation (example)

The image shows a 'Host Network Manager' window. At the top, there are three buttons: 'Create' (green plus icon), 'Remove' (red minus icon), and 'Properties' (gear icon). Below these is a table with columns: 'Name', 'IPv4 Address/Mask', 'IPv6 Address/Mask', and 'DHCP Server'. The first row is highlighted in blue and contains 'vboxnet0', '10.0.0.1/24', and a checked checkbox with the text 'Enable'. Below the table, there are two tabs: 'Adapter' and 'DHCP Server', with the latter being selected. Under the 'DHCP Server' tab, there is a checked checkbox labeled 'Enable Server'. Below this are four text input fields: 'Server Address' with '10.0.0.2', 'Server Mask' with '255.255.255.0', 'Lower Address Bound' with '10.0.0.3', and 'Upper Address Bound' with '10.0.0.254'. At the bottom, there are three buttons: 'Reset', 'Apply', and 'Close'.

Host Network Manager

Create Remove Properties

Name	IPv4 Address/Mask	IPv6 Address/Mask	DHCP Server
vboxnet0	10.0.0.1/24		<input checked="" type="checkbox"/> Enable

Adapter DHCP Server

☒ Enable Server

Server Address: 10.0.0.2

Server Mask: 255.255.255.0

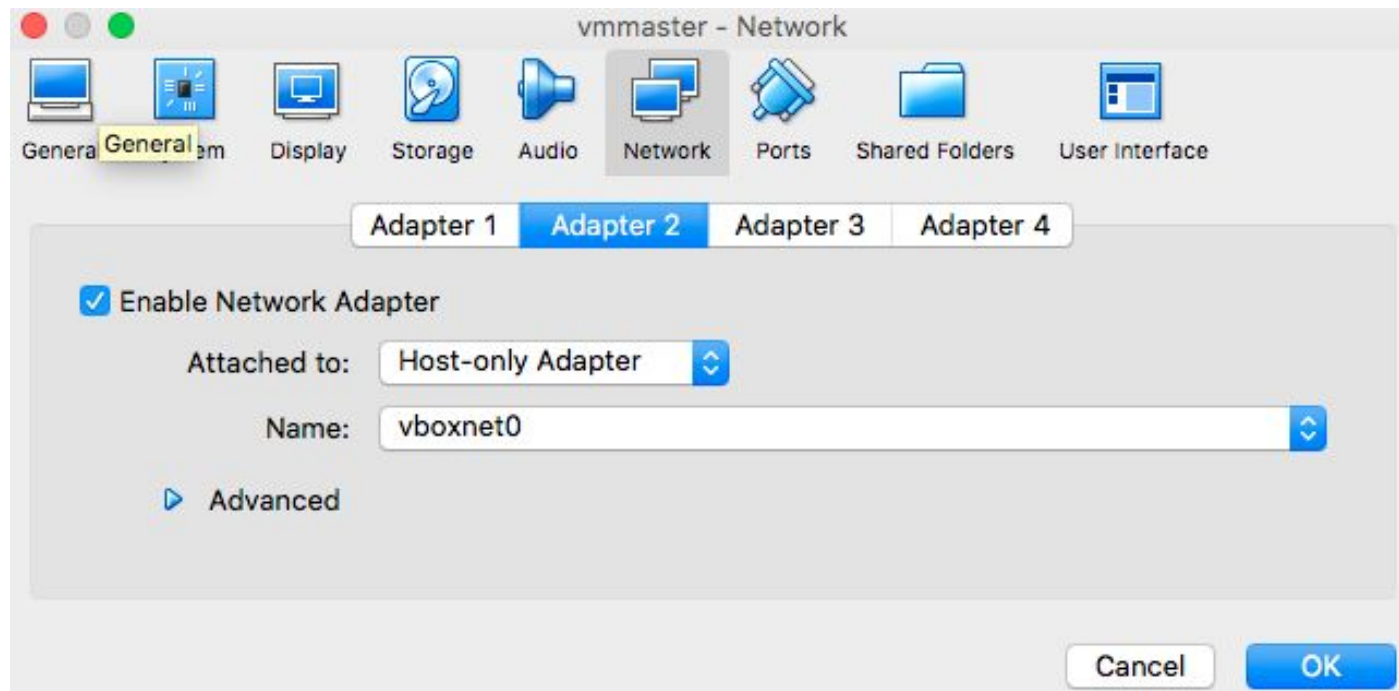
Lower Address Bound: 10.0.0.3

Upper Address Bound: 10.0.0.254

Reset Apply Close

VM Setup

- Setup one Ubuntu (64-bit) virtual machine
- Plan CPU, RAM (minimum: 512 MB) and Disk resources so that multiple VMs can be deployed within the same host
 - VDI disk with fixed size (minimum: 5 GB)
 - enable network adapter 2, and link it to the host network created previously (vboxnet0)



OS Install

- Install Ubuntu from ISO file (Ubuntu 20.04 server)
 - install OpenSSH server package
- Launch the VM and login using the Virtualbox console
 - “ip add” command lists the available network interfaces
 - **Configure networks (at /etc/netplan/*.yaml add)**
 - enp0s8:
 - addresses:
 - 10.0.0.3/24
 - run “sudo netplan apply”

SSH

- Test SSH from host to the VM
- Prepare the VM for SSH keys authentication (run at VM)
 - `mkdir -p ~/.ssh`
 - `chmod 700 ~/.ssh`
- Create and copy your ssh public key to the VM (run at host)
 - `ssh-keygen`
 - `ssh-copy-id username@VM_IP`
- Turn off password authentication (run at VM)
 - **at** `/etc/ssh/sshd_config` **add:**

PasswordAuthentication no
PubkeyAuthentication yes
 - **run** `“sudo systemctl restart sshd”`

Clone VM

- Clone the VM to create a new one
 - generate new MAC for the Network Adapters
 - create a full clone
- Launch the new VM and configure network (/etc/netplan -> addresses 10.0.0.4)
- Test connection between the two VMs and Host using the configured address
- [Optional] Change the new VM hostname
 - run "hostnamectl set-hostname new-hostname"
 - replace any occurrence of the existing hostname in /etc/hosts with the new one
 - reboot the VM

Automated Deployment (extra)

- Install Vagrant on your computer
 - <https://www.vagrantup.com>
- Use the VagrantFile provided in the class
 - Change the value for the following variables:
 - Number_VMs
 - PUBLIC_KEY_PATH
- Explore the commands:
 - `vagrant box add bento/ubuntu-20.04`
 - `vagrant up`
 - `vagrant halt`
 - `vagrant destroy`
 - The last three commands can be executed (without any additional arguments) at the folder where the VagrantFile is stored
- Check Virtualbox to see the new VMs
- Explore Vagrant's documentation