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A virtual machine for the Internet of Things

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Motivations

- Many software are available for designing WSNs and IoT solutions
- No “standard” configuration is available
- Depending on the application, one solution may be preferable
- Even the installation of a programming environment itself is a time-consuming task

VM Contents

- MQTT broker & tools
- CoAP and HTTP server & tools
- Node-RED
- Command line tools
- TinyOS env + examples
- Thingspeak examples

IoT Virtual Machine

- A Virtual Machine is an emulation of a particular computer system
- For Windows or Mac with Intel:
 - Download VirtualBox: <https://www.virtualbox.org/wiki/Downloads>
 - Download the virtual machine here (**ova** format):
https://polimi365-my.sharepoint.com/:u:/g/personal/10692910_polimi_it/EavjJq-leCFMrlcB2ztgDwcBvO7LqYF7IS2MAmoLErkEsQ?e=x7P9s9
- For Mac with M1 or M2:
 - Download UTM: <https://mac.getutm.app/>
 - Download the VM here (**qcow2** format):
https://polimi365-my.sharepoint.com/:u:/g/personal/10692910_polimi_it/EdNX-6pCBRhPoPyvq8uwdIABwNqiL4wh09hu6N_kuLxGBg?e=xRhHHj

Follow the steps in next slides

Warning: The VM for VirtualBox does not work for UTM and viceversa!

How to run it (VirtualBox):

- Download Oracle VM VirtualBox or UTM (for Mac with M1 or M2)
- Download the **.ova** VM [here](#).
(make sure to have at least 10 GB of free space on your HDD)
- Open VirtualBox and go to
File->Import Appliance and import the file `iot_polimi_23.ova`
- Boot the VM:
 - user: user
 - password: user

How to run it (UTM for Mac with M1/M2)

- Download UTM <https://mac.getutm.app/>
- Download the **.qcow2** VM [here](#)
(make sure to have at least 10 GB of free space on your HDD)
- Follow the tutorial on this video: [here](#)
 - Remark: In case of high latency or if the UI do not show up, allocate more resources (CPU,Memory) to the VM during the configuration step
- Boot the VM:
 - user: user
 - password: user

Possible Problems

- Increase display video memory
- Set the graphic controller
- Enable/disable 3D acceleration
- Increase system base memory
- Look up on google/stack overflow
- Use WeBeep forum to share problems

Common Issues (VirtualBox)

Problems with the **copy/paste** integrations:

- Shutdown the VM
- In the VM Manager under Settings->Storage, under Controller: Right-click on VBoxGuestAdditions, and select "Remove Attachment." There will be a confirmation box: click "remove."
- Click the "+" icon next to "Controller," to add new optical drive. A dialog box will open. Choose "Leave Empty-> Okay"
- Start the VM. Select Devices->Insert Guest Additions. Power off the VM (not the VM Manager) and restart the VM.

Common Issues

Problems with **screen resolution**:

- Start the VM and Login
- Press the ubuntu Start button -> Preferences
-> monitor settings -> choose the resolution

If installing packages you have “**dpkg**” problems:

- Open terminal and run following commands:
 - “sudo rm /var/lib/dpkg/lock-frontend”
 - “sudo rm /var/lib/dpkg/lock”
 - “sudo dpkg --configure -a”

Common Issues

If you get this error on Mac OS (not M1 or M2 chips)



Follow this guide:

<https://medium.com/@Aenon/mac-virtualbox-kernel-driver-error-df39e7e10cd8>

Tested Versions

We tested the VM using the following VirtualBox versions:

- [macOS]
 - VirtualBox Version 6.1.32 r149290 (Qt5.6.3)
- [Windows]
 - VirtualBox Version 5.2.38 r136252 (Qt5.6.2)
 - VirtualBox Version 6.1.40 r154048 (Qt5.6.2)