# Improove your competency with MikroTik and Network Emulators A "fast track" presentation about setting up your personal lab



### About me

### Marco Boschini

- MikroTik Trainer
- Founder Corsi MikroTik











### About me

#### I live in Desenzano, at Garda Lake, Italy.







## Agenda

- What is an Network Emulator
- A complete Open Source (and free) solution
- How GNS3 works?
- Usage cases study with MikroTik and GNS3
- Install GNS3 on your personal computer with VirtualBox
- Export and import project
- Tools (Console & Wireshark)



# **Speech Objectives**

- Know how GNS3 works
- Will be able to setting up GNS3 with MikroTik CHR instances
- Will be able to run a network lab
- Will be able to export their labs
- Will be able to import labs from other users
- Will be able to test configuration e new RouterOS releases
- Will be able to studying and improove their network skills everywhere!



## Background

At school I studied electronics and telecommunications.

From 2009 I work in a Home & Building Automation Systems.

I automatize lighting, shutters, HVAC thermoregolation, security systems, TVCC and many more.









## Background

All of these systems are going to be connected by IP network.

Now these systems (e.g. IoT) requires Network Security and new competency about troubleshooting.





## Why am I here?

In 2017 a Cisco technician assigned to my Webserver an IP address.

#### 192.168.10.223/24

#### WHAT? What does «/24» mean?





## Why I am here

When I asked them «What does /24 mean?» they laughed and told me:

#### «It is a subnet mask and it simply means 255.255.255.0»

#### At that precise moment I realized that I had to study networks and routers.







### The booster

In 2018 a gynecologist told me: «there are two!»

It's a beautiful news but I realized that in future, for a certain period of my life, I wouldn't be able to travel for technical assistance.

It's OK.

I wondered «What can i do?»

Can VPNs help me? YES!

And I started using (and studying) MikroTik.





## Where did I start from

MikroTik has a very powerful training program.

# The devices are very accessible to all kinds of budget,

and are very important for granting access for everyone.

# There is so much information around the internet,

Books, YouTube, MUM presentation.

#### MikroTik Certified Courses













## Where did I start from

#### Furthermore,

the functions you learn on a budget device

#### are the same as you find on a high-end device.

#### It's fantastic!









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			+ 172.16.70.1/30	172.16.70.0	vian70	
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More						





# The booster (part 2)

In January 2021, the manufacturer that I used for Home and Building automation told me that they **shut down their factory and closed**.

I lost 90% of my business.

#### It was difficult a moment in my life. But I wondered «What can I do?»







#### Restart

And most important:

«What can I do with what I have?»

I already had experience with MikroTik, so I decided to start my career as a **MikroTik Certified Consultant.** 









# Helping people

I decided that I would do something so that other technicians similar to me wouldn't go through that same experience.

For a technician outside the world of telecommunications (e.g. an electrician) it is not easy to acquire network skills.













## Telegram Channel

In February 2021 I opened a telegram channel and started responding with voice messages to the questions I was asked from students and other technicians.

I recorded more than 600 vocal messages or videos.

One by day, every day. (for free)







#### From 2024 January 1st I started making videos on my YouTube Cannel.







Come caricare più immagini CHR MikroTik RouterOS su GNS3

49 visualizzazioni · 12 ore fa



Videorisposta Mark Routing. Dove sono finite le tabelle di routing?

96 visualizzazioni · 1 giorno fa



Videorisposta a VRF, Mangle e ping tra due PC.

144 visualizzazioni · 2 giorni fa



191 visualizzazioni • 3 giorni fa

VRF: caso studio. Due subnet con lo stesso indirizzo. Episodio 1

327 visualizzazioni · 4 giorni fa



VLAN vs VRF. Episodio 2 VRF. Corso MikroTik MTCRE Routing e corso...

217 visualizzazioni • 6 giorni fa



VLAN vs VRF. Episodio 1. Corso MikroTik MTCRE Routing e corso... 343 visualizzazioni • 6 giorni fa



Wireless lento? è matematica! MikroTik Wireless e MCS index.

346 visualizzazioni • 7 giorni fa

#### https://youtube.com/corsimikrotik



### Results

- This journey taught me that certain results are not achieved in a day.
- It takes time.







### **Network Emulators**

- Nothing of this can not be done without network emulators.
- For me.
- For my students.



## Simple Lab



https://www.youtube.com/watch?v=s8vFFX7WWhA&t=15s&ab\_channel=CorsiMikroTik



## **Dynamic Routing OSPF**



0.1.2.0/30						
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Mo 10.5.6.0/30	10.14.15.1%ether1	110				
Ao 10.5.7.0/30	10.14.15.1%ether1	110				
A0 10.7.8.0/30	10.14.15.1%ether1	110				
A0 10.0.9.10 0/30	10.14.15.1%ether1	110				
Ao 10.10.11.0/30	10.14.15.1%ether1	110				
Ao 10.11.12.0/30	10.14.15.1%ether1	110				
Ao 10.12.13.0/30	10.14.15.1%ether1	110				
Ao 10.13.14.0/30	10.14.15.1%ether1	110				-
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Ac 10.15.16.0/30	ether2	0				
Ao 192.168.255.1/32	10.14.15.1%ether1	110				
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Mo 192.168.255.3/32	10.14.15.1%ether1	110				
Mo 192.168.255.5/32	10.14.15.1%ether1	110				
Ao 192.168.255.6/32	10.14.15.1%ether1	110				
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solarwinds	ee tool		© 2019 Solar	Winds Worldwide, LLC.	All rights reserved.	

#### https://www.youtube.com/watch?v=Jm9oAQXO6MQ&t=178s&ab\_channel=CorsiMikroTik



# VLAN (on the train)



#### https://www.youtube.com/watch?v=dErNP-oalWk&t=359s&ab\_channel=CorsiMikroTik

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## VLAN (on the airplane)



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## **DHCP deep with Wireshark**

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2 0.124339	0c:43:34:d6:00 v1	Broadcast	ARP	60 Who has
3 0.143220	00:43:34:06:00:01	Broadcast	ARP	60 Who has
5 0.713343	0.0.0.0	255.255.255.255	DHCP	342 DHCP R
6 0.719172	10.0.0.1	255.255.255.255	DHCP	342 DHCP AC
7 1.154109	0c:43:34:d6:00:01	Broadcast	ARP	60 Who has
8 1.158082	0c:e8:49:f3:00:01	0c:43:34:d6:00:01	ARP	60 10.0.0.
9 1.160174	10.0.0.1	10.0.254	ICMP	70 Echo (p
10 1.167525	10.0.254	10.0.0.1	ICMP	70 Echo (p
11 6,191890	0c:e8:49:13:00:01	0c:43:34:d6:00:01	ARP	60 Who has
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MikroTik DHCP Server e DHCP Client - Analisi approfondita del processo DORA a Layer2 con Wireshark

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### MikroTik + FlashStart CloudBox



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enter the option you want:	
	Flash&Start®







# Have you got a PC?

Today I will speaking about how to create your personal lab on a PC with GNS3.







# EVE-NG and GNS3 is «only» a tool. The main goal is YOUR SKILL, not the tool. Don't waste your time.









#### **Community edition:**

- free, but with some limitations
- only one lab at time

- to connect/disconnect links you must shutdown the router

- you can not simulate link trouble

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#### GNS3 2.2.45:

- free, no limitations
- multiple lab at time

- you can connect/disconnect links without shutdown the router

- you can simulate link trouble







#### **Community edition:**

- no wireshark integrated
- no docker support
- no cluster support

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#### GNS3 2.2.45:

- wireshark integrated
- docker supported
- cluster supported





#### **Community edition:**

- web login with user and password max 2 account

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#### GNS3 2.2.45:

- web login with only 1 account

- starting from version 3.0.0 login with multiple account and groups





#### **Community edition:**

- QEMU virtualization
- connecting the VM with «linux bridge»



#### GNS3 2.2.45:

- QEMU virtualization

- connecting the VM with uBridge (UDP Tunnels)



# GNS3 VM – Ready to use solution

- GNS3 VM run as virtual machine
- It's "ready to use"
- Just download, import on hypervisor and run.
- We need an hypervisor!





# Hypervisor Type

- There are 2 main types of hypervisor
- Type 1 (bare-metal)
- Type 2 (hosted)

#### Hypervisor Types







# Hypervisor Type 1

- Type 1 hypervisors run directly on the hardware without the need for a host operating system.
- They have direct access to the underlying hardware resources
- Providing better performance and efficiency
- Examples: VMWare ESXi, Micorsoft Hyper-V, KVM (Proxmox)



Hypervisor Types



# Hypervisor Type 2

- Type 2 hypervisors run on top of a host operating system.
- They leverage the host OS to access hardware resources and manage VMs
- Often used for development, testing, desktop virtualization
- Example: VMWare Workstation, Oracle VirtualBox, Parallels, Microsoft Hyper-V (installed on a Windows Desktop)

#### Hypervisor Types



35



## VirtualBox

- I use VirtualBox as Hypervisor.
- Hypervisor Type 2
- Open Source
- License GNU General Public License, version2.
- Available almost on all platform (Windows, Linux, MacOS Intel)
- No support on MacOS with Apple Silicon (M1/M2 CPU) for now (sorry).




### Hardware

- If you don't have a PC a solution is:
- use a small computer like HP EliteDesk, Dell OptiPlex, Lenovo ThinkCentre MiniPC Tiny.
- For my homelab I use an HP EliteDesk 800 G2 i5-6500 with 8GB Ram, Windows 10.
- Purchased refurbished for less than 200 euros.







### How to check if my PC support the virtualization?

	Gestione attività			- 0 ×	
≡		Prestazioni	E Ese	gui nuova attività •••	
₽	Processi	CPU	CPU 11th Gen Intel(B) Core(TM) i5-	1135G7 @ 2.40GHz	
-	Prestazioni	12% 2,64 GHz	% utilizzo	100%	
Ð	Cronologia applicazioni	Memoria 6,9/7,7 GB (90%)			
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		Inviati: 0 Ricevuti: 0 I	319 4209 190427 Virtualizzazione: Abilitato		
		Wi-Fi	Tempo di attività Cache L1: 320 KB		
ŝ	Impostazioni	Wi-Fi Inviati: 6,3 Ricevuti: (	6:07:40:47 Cache L2: 5,0 MB		
3	Impostazioni				

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### If not?

 Go to BIOS the settings and set VT-x = ENABLED

### Intel VT-d

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Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.





### GNS3 works on a web browser (or with a GUI)

- You can configure and use GNS3 via web browser.
- To start you don't need to install the GUI.
- To import image (MikroTik CHR) you don't need to open SSH.





# How to get GNS3 VM

- You can obtain the GNS3-VM in several ways.
- You can download it via **GNS3** website (registration request).
- <u>https://gns3.com/software/download-</u>
   <u>vm</u>

### Download GNS3 VM

The GNS3 VM is recommended for most situations when you are using Windows or Mac OS. The GNS3 development team have worked hard to create a lightweight, robust way of creating GNS3 topologies that avoids multiple common issues experienced when using a local install of GNS3.



)	VirtualBox Version 2.2.45	Download
)	VMware Workstation and Fusion Version 2.2.45	Download
)	VMware ESXi Version 2.2.45	Download
	Microsoft Hyper-V Version 2.2.45	Download

<u>Learn more about the GNS3 VM</u> GNS3 is a Free and Open Source software under GPL v3 licensing





# How to get GNS3 VM

- The second option is to browse to the GNS3 release page on github.
- <u>https://github.com/GNS3/gns3-gui/releases</u>
- Download the VirtualBox Version

### last week

Grossmj
 v2.2.45
 -∞ bbc5b3e Ø

Compare \*

### Version 2.2.45 (Latest)

### GUI

- Add missing console\_type values in appliance\_v8.json. Ref GNS3/gns3-registry#849
- Handle moved project notifications on controller stream
- Add debug for PATH env variable
- Add custom executable paths on Windows
- Add --suppressApplicationTitle for Windows terminal. Fixes #3544
- Upgrade sentry-sdk and aiohttp

### Server

- Bundle web-ui v2.2.45
- Fix mouse offset issues with VNC in Qemu. Fixes #2335
- Add project.created, project.opened and project.deleted controller notification stream. Move project.updated and project.closed from project notification to controller notification stream.
- Do not stop searching for Qemu binaries if one binary cannot be executed. Ref #2306
- Fix Ethernet switch and Ethernet hub port validations. Fixes #2334
- Update CORS policy
- Add custom executable paths on Windows
- Upgrade sentry-sdk and aiohttp

### Assets 20

@GNS3-2.2.45-all-in-one.exe	99 MB	last week
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@GNS3.VM.ARM64.2.2.45.zip.sha256	91 Bytes	last week
@GNS3.VM.Hyper-V.2.2.45.zip	1.05 GB	last week
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Source code (tar.gz)		last week
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### VirtualBox

Download:

https://www.virtualbox.org/wiki/Downloads

My download link

https://download.virtualbox.org/virtualbox/ 7.0.10/VirtualBox-7.0.10-158379-Win.exe

SHA256: 62545b8eb17ddf27d5954ac5f8904814e12c5790d73daf545ef60bd97f4f2e12

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### $\leftarrow \rightarrow$ С virtualbox.org/wiki/Downloads



### VirtualBox

### **Download VirtualBox**

Here you will find links to VirtualBox binaries and its source code.

### VirtualBox binaries

By downloading, you agree to the terms and conditions of the resp

If you're looking for the latest VirtualBox 6.1 packages, see Virtual remain supported until December 2023.

### VirtualBox 7.0.10 platform packages

- ➡Windows hosts
- ➡macOS / Intel hosts
- Linux distributions
- ➡Solaris hosts
- ➡Solaris 11 IPS hosts

The binaries are released under the terms of the GPL version 3.



About Screenshots Downloads Documentation End-user docs Technical docs Contribute

Community





### Visual C++

If the libraries are not present on your PC

Visual C++ Redistributable you need to install them.

You can download here:

https://learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170#visual-studio-2015-2017-2019-and-2022

Direct link:

https://aka.ms/vs/17/release/vc\_redist.x64.exe

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### learn.microsoft.com/en-us/cpp/windows/latest-supported-vc-redist?view=msvc-170#visual-studio-2015-2017-2019-and-2022 С $\mathbf{\Omega}$

### Version

Visual Studio 2022	~
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Modules	
Redistribute Visual C++ ActiveX Controls	
Redistribute the MFC Library	
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### Visual Studio 2015, 2017, 2019, and 2022

This table lists the latest supported English (en-US) Microsoft Visual C++ Redistributable packages for Visual Studio 2015, 2017, 2019, and 2022. The latest supported version has the most recently implemented C++ features, security, reliability, and performance improvements. It also includes the latest C++ standard language and library standards conformance updates. We recommend that you install this version for all applications created using Visual Studio 2015, 2017, 2019, or 2022.

Unlike older versions of Visual Studio, which have infrequent redist updates, the version number isn't listed in the following table for Visual Studio 2015-2022 because the redist is updated frequently. To find the version number of the latest redist, download the redist you're interested in using one of the following links. Then, look at its properties using Windows File Explorer. In the Details pane, the File and the second second

Architecture	Link	Notes
ARM64	https://aka.ms/vs/17/release/vc_redist.arm64.exe &	Permalink for latest supported ARM64 version
X86	https://aka.ms/vs/17/release/vc_redist.x86.exe 며	Permalink for latest supported x86 version
X64	https://aka.ms/vs/17/release/vc_redist.x64.exe ₪	Permalink for latest supported x64 version. The X64 Redistributable package contains both ARM64 and X64 binaries. This package makes it easy to install required Visual C++ ARM64 binaries when the X64 Redistributable is installed on an ARM64 device



Run the setup file you downloaded.

You can find it in the Downloads folder of your browser.

Press Next.

### Oracle VM VirtualBox 7.0.10 Setup



### Welcome to the Oracle VM VirtualBox 7.0.10 Setup Wizard

The Setup Wizard will install Oracle VM VirtualBox 7.0.10 on your computer. Click Next to continue or Cancel to exit the Setup Wizard.

Version 7.0.10







Don't change anything and press Next.

Oracle VM VirtualBox 7.0.10 Setup	>	×
Custom Setup Select the way you want features to be installed.		
Click on the icons in the tree below to change the wa	ay features will be installed.	
<ul> <li>VirtualBox Application</li> <li>VirtualBox USB Support</li> <li>VirtualBox Networking</li> <li>VirtualBox Bridged Networking</li> <li>VirtualBox Host-Only Net</li> <li>VirtualBox Python Support</li> </ul>	Oracle VM VirtualBox 7.0.10 application. This feature requires 210MB on your hard drive. It has 3 of 3 subfeatures	
	selected. The subfeatures require 992KB on your hard drive.	
Location: C:\Program Files\Oracle\VirtualBox\	Br <u>o</u> wse	
Version 7.0.10 Disk <u>U</u> sage < I	<u>B</u> ack <u>N</u> ext > <u>C</u> ancel	]



Setup the virtual network interfaces

Select Yes.

### Oracle VM VirtualBox 7.0.10



### Warning: Network Interfaces

Installing the Oracle VM VirtualBox 7.0.10 Networking feature will reset your network connection and temporarily disconnect you from the network.

Proceed with installation now?





Version 7.0.10



Install the dependency

Select Yes.

### Oracle VM VirtualBox 7.0.10



### **Missing Dependencies** Python Core / win32api

Installing the Oracle VM VirtualBox 7.0.10 Python bindings requires the Python Core package and the win32api bindings to be installed first.

When continuing the installation of the Oracle VM VirtualBox 7.0.10 Python bindings now, those need to be set up manually later. Refer to the Oracle VM VirtualBox 7.0.10 SDK manual for more information.

Proceed with installation now?





Version 7.0.10

Go forward with the setup.

Press Install.

Oracle VM VirtualBox 7.0.10 Setup
Ready to Install
The Setup Wizard is ready to begin the Custom installation.
Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
1
Version 7.0.10 < <u>B</u> ack <u>Install</u> <u>C</u> ance





Setup is completed!

Press end to start VirtualBox.

### Oracle VM VirtualBox 7.0.10 Setup Oracle VM VirtualBox 7.0.10 installation is complete. Click the Finish button to exit the Setup Wizard. Start Oracle VM VirtualBox 7.0.10 after installation Version 7.0.10 < Back <u>Finish</u> Cancel





### **Configure VirtualBox**



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The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using

You can press the **F1** key to get instant help, or visit <u>www.virtualbox.org</u> for more information



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 $\times$ 



# **Configure VirtualBox**



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### **Network Interface**

- GNS3 installed on VirtualBox require 2 network interfaces
- One to manage (Web interface / GUI / WinBox)
- One to NAT for the lab (es. to give internet access to the router)



### **Network Interface**





# **Configure VirtualBox**

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		Host-only Networks N/	AT Networks Cloud Networks					
		Name	^	IPv4	Prefix	IPv6 Prefix	DHCP Sen	ver
		VirtualBox Host-Only Ether	rnet Adapter	192.	168.56.1/2	4	Disabled	
		Adapter DHCP Server						
		Configure Adapter Auto	omatically					
		O Configure Adapter Mar	nually					
		<u>I</u> Pv4 Address: 1	92.168.56.1					
		IPv4 Network <u>M</u> ask: 2	55.255.255.0					
		I <u>P</u> v6 Address: fe	e80::550d:bf39:bc56:64ea					
		IPv6 Prefix Length: 6	i4					
						Apply	Reset	



# **Configure VirtualBox**



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ess:	192.168.56.2					
lask:	255.255.255.0					
und:	192.168.56.3					
und:	192.168.56.25	4				
				Apply	Reset	t





# Host Only

**Host-Only** is a virtual interface and works like a switch.

It's a local connection only between your PC and the VM.

VMs are connected at layer2 with your PC.







# Host Only

You MUST use this interface to connect with WinBox to the router inside the lab

(also via MAC address or RoMON).



# Host Only

You MUST use this interface to connect with GNS3 web browser or GUI.







### NAT

- It works like a Router (masquerade)
- If you need internet access to your lab, you have to use this interface.
- It's not possible using this interface to have access to the lab via winbox.

### Ping 8.8.8.8







# Import GNS3 VM

• Extract the .zip file



# Import GNS3 VM

• Double click on the .ova file



### Import GNS3 VM



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NAT Networks Cloud Networks			_			
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nachines contained in the appliance and the su x machines. You can change many of the prop items and disable others using the check boxe	uggested setting erties shown by s below.	ıs of /				
GNS3 VM		11				
e 🎽 Ubuntu (64-bit)						
1		1				
2048 MB						
ICH AC97						
oter 🛛 🔽 Intel PRO/1000 MT Desktop	(82540EM)					
oter 🛛 🗹 Intel PRO/1000 MT Desktop	(82540EM)					
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Include only NAT network adapter MAC addre	sses	~				
Import hard drives as VDI						
Expert Mode Back Finish	Can	cel				
sk: 255.255.255.0						
ss: fe80::550d:bf39:bc56:64ea						
h: 64						
				Apply	Reset	



### Set the parameter

🜍 Oracle VM VirtualBox Manager		- 🗆 X
<u>F</u> ile <u>M</u> achine <u>H</u> elp		
Tools	New Add Settings Discard Start	
GNS3 VM	General Name: GNS3 VM Operating System: Ubuntu (64-bit)	Preview
	System         Base Memory:       2048 MB         Boot Order:       Hard Disk, Optical         Acceleration:       Nested Paging, PAE/NX, KVI	GNS3 VM
	DisplayVideo Memory:8 MBGraphics Controller:VBoxVGARemote Desktop Server Port:5967Recording:Disabled	
	Storage         Controller: IDE Controller         IDE Primary Device 0:       GNS3 VM-disk001.vdi (Normal, 19.53 GB)         Controller: SATA Controller         SATA Port 2:       GNS3 VM-disk002.vdi (Normal, 488.28 GB)	
	Audio Host Driver: Windows Audio Session Controller: ICH AC97	
	Network     Adapter 1: Intel PRO/1000 MT Desktop (Host-only Adapter, 'vboxnet0')     Adapter 2: Intel PRO/1000 MT Desktop (NAT)	
	Solution USB Disabled	
	Shared folders None	
e	Description	

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### Run GNS3 VM

- Start GNS3 VM
- Check the IP address assigned from VirtualBox DHCP Server
- Open a Web browser



### GNS3 is ready!

🏏 GN	NS3 VM	[Runn	ing] - (	Dracle VN	1 VirtualB	lox	
File M	lachine	View	Input	Devices	Help		
	GNS3	2.2.4	2				
							GNS3 server version Release channel: 2 VM version: 0.15.0 Ubuntu version: for Qemu version: 4.2.3 Virtualization: vir kvm KVM support availab Uptime: up 0 minute IP: 192.168.56.3 PC To log in using SSB Password: gns3 To launch the Web-D



# Login to GNS3 web page

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Search by	name							
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GNS3 Web U	I © 2020 - v2.2.	.42						

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# **Download the MikroTik CHR image (raw)**



	6.49.10 Long-term
Images	vmdk, vhdx, vdi, ova, ir
Main package	
VHDX image	
VMDK image	
VDI image	
VirtualPC image	
OVA template	
Raw disk image	
Extra packages	
The Dude client	

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### Extract MikroTik CHR image (raw)



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Open in new window			108,300 KB					
Extract All								
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Pin to Start								
Add to Favourites								
Compress to ZIP file								
Copy as path	Ctrl+Shift+C							
Properties	Alt+Enter							
Show more options								



### Create a new QEMU instance





### Create a new QEMU instance



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### Create a new QEMU instance

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Back	
Add QEMU VM template	
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GNS3 Web UI © 2020 - v2.2.42	


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New QEMU VM template	
Server type	
2 QEMU VM Name Please choose a descriptive name for your MikroTik CHR 7.14	
QEMU binary and memory	
Console type	
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New Q	EMU VM template
	Server type
	QEMU VM Name
3	QEMU binary and memory Qemu binary /usr/bin/qemu-system-x86_64-spice
	RAM 256
	Console type
5	Disk image

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#### IMPORTANT: Select /usr/bin/qemu-system-x86\_64 (without «-spice»)







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Back				
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MikroTik CHR 7.14			:	
GNS3 Web UI © 2020 - v2.2.42				

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QEMU VM configuration		
General settings	~	
HDD	~	
CD/DVD	~	
Network	~	
Advanced	~	
Usage	~	
CNS2 Web UI @ 2020 1/2 2.42	Save	

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#### **General settings**

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	(	QEMU VM configuration
		General settings Template name CHR 7.14
		Default name format <b>R{0}</b>
		Symbol :/symbols/qemu_guest.svg
		Category Default
		RAM 256
		vCPUs 1
		Qemu binary /bin/qemu-system-x86_64
Confe		

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### Choose symbol



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### Network - name format: eth{port1}

SNS3 Web UI × +
C ▲ Non sicuro 192.168.56.4/static/web-ui/server/1/p
HDD
CD/DVD
Network
Adapters 4
First port name
Name format eth{port1}
Segment size O
Base MAC
Type Paravirtualized Network I/O (virtio-net-pci)
Config
<ul> <li>Use the legacy networking mode</li> <li>Replicate network connection state</li> </ul>
Advanced

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			0
			Process priority normal
			Additional settings Options -nographic -machine accel=tcg
			<ul> <li>Use as a linked base VM</li> <li>Enable the Trusted Platform Module (TPM)</li> <li>Enable the UEFI boot mode</li> </ul>
		U	sage

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### **Nested Virtualization**

- VirtualBox support Nested Virtualization only for the host (GNS3 VM)
- The VM inside GNS3 (run with QEMU) can not use the Virtualization itself.
- This means that MikroTik CHR need to be set with software emulation and not KVM hardware emulations.
- It's not a problem for a small labs (in my PC I run a lab with 18 router without problem).
- add this parameter in the QEMU template option: -machine accel=tcg



#### Finish!

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			Optimization
			Activate CPU throttling Perecentage of CPU allowed 0
			Process priority normal
			Additional settings
			Options -nographic -machine accel=tcg
			Use as a linked base VM
			Enable the Trusted Platform Module (TPM)
			Enable the UEFI boot mode
		U	sage

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#### **Back Home**

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Servers	:	
QEMU VM configuration		
General settings	~	
HDD	~	
CD/DVD	~	
Network	~	
Advanced	~	
Usage	~	
Cancel	Save	

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#### First lab: MTPC

· @	GNS3 Web UI	× +
$\leftarrow \rightarrow$	C A Non sicuro 1	92.168.56.4/static/web-ui/server/1/pro
<b>e</b> s	Servers	
	Projects	Go to system status Go
	Search by name	
	Name ↑	Create new pr
		Please enter name MTPC
		Cancel Add
	/	

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### Add object



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### Add link



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#### Add note





#### Grid and snap



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### Add object



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### Add links



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### Enable show grid and snap to grid



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#### Add links



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#### Start the router



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### **Open the Web console**



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#### It works!



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#### WinBox

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File Tools								
Connect To:	0C:62:10:57:00:01					✓ Kee	p Passwo	rd
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#### It works!

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### Keep planting your seeds, because you will never know which ones will grow. Maybe, everyone will do it.

#### - Albert Einstein

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# The day **you plant** the seed is not the day **you eat** the fruit.

# It tak Don't quit.

Marco Boschini MikroTik Professionals Conference – Praha 2024 It takes time.

Don't quit. Keep Going.



# Thankyou

Marco Boschini marco@corsimikrotik.it

