MIKROTIK
NETWORK SIMULATOR

PRESENTED BY ROFIQ FAUZI

MUM Nov 2013 - Indonesia

ABOUT ROFIQ FAUZI

- Using MikroTik (v.2.97) since 2005, as Network Engineer at WISP.
- 2007, Network & Wireless Engineer at INDOSAT Central Java Area
- 2008, Network & Telco Procurement at INDOSAT Head Quarter
- 2012-Now, MikroTik Consultant & Certified Trainer (MTCNA, MTCRE, MTCTCE, MTCWE, MTCINE, Certified Trainer) at ID-Networkers.
- 2013-Now, Network Manager at WISP Indomedianet, Indonesia

CONSULTANT	http://www.mikrotik.com/consultants/asia/indonesia
CERTIFIED TRAINER	http://www.mikrotik.com/training/partners/asia/indonesia

ABOUT ID-NETWORKERS

EXPERT LEVEL TRAINERS & CONSULTANS

In the Most Prestigious Networking Certification

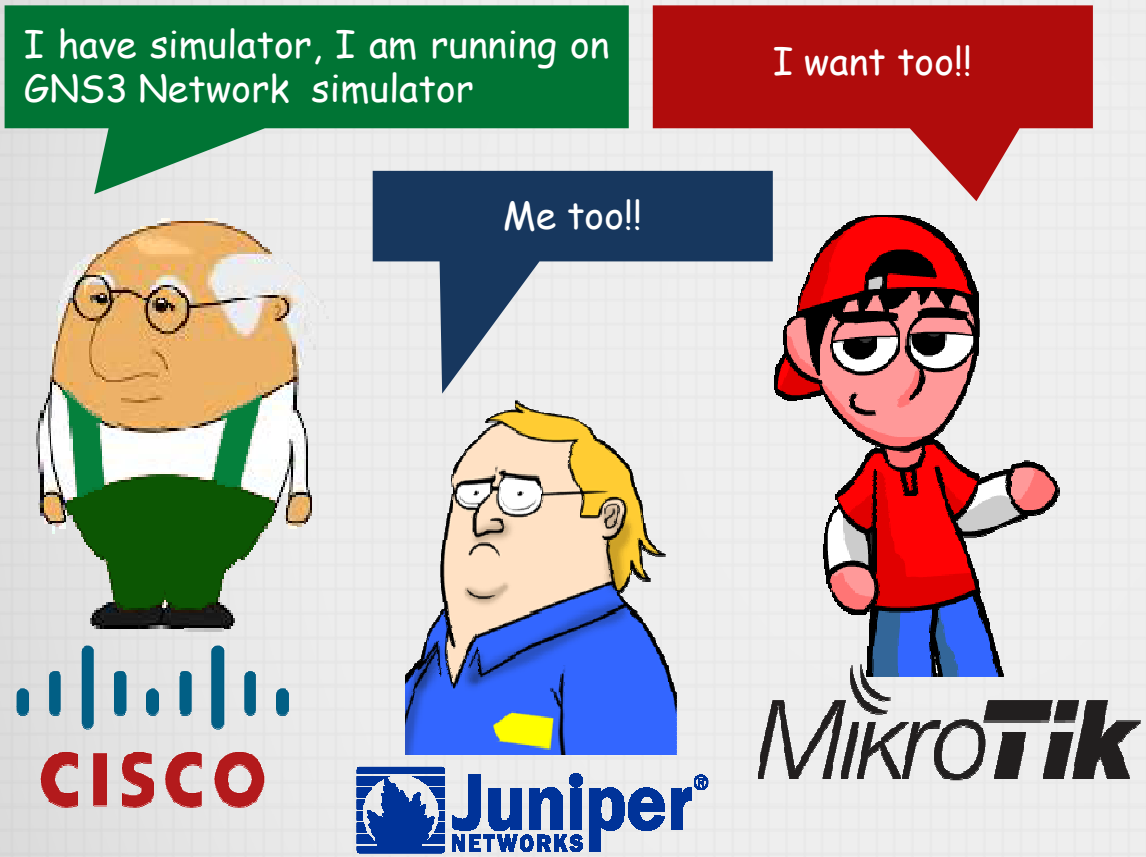
OVERVIEW

We are young entrepreneurs, we are only one training partner & consultant who has expert level trainers in the most prestigious networking certification, CCIE Guru , JNCIE Guru and MTCINE guru, which very limited number in Indonesia even Asia. Proven that hundred of our students pass the certification exam every year. We are the biggest certification factory in Indonesia.

WEBSITE

www.id-networkers.com

TOPIC BACKGROUND



MAIN REASON

Another network device can running on simulator, make easy to learn and develop network topology

Sometime, we want to create some mikrotik network topology and test how it works, for example, we want to make some test with 4-8 routers to simulate real network and with real routerboard. We need a lt of money to make real lab.

MIKROTIK SIMULATOR OBJECTIVE

01. LEARN MIKROTIK FEATURES

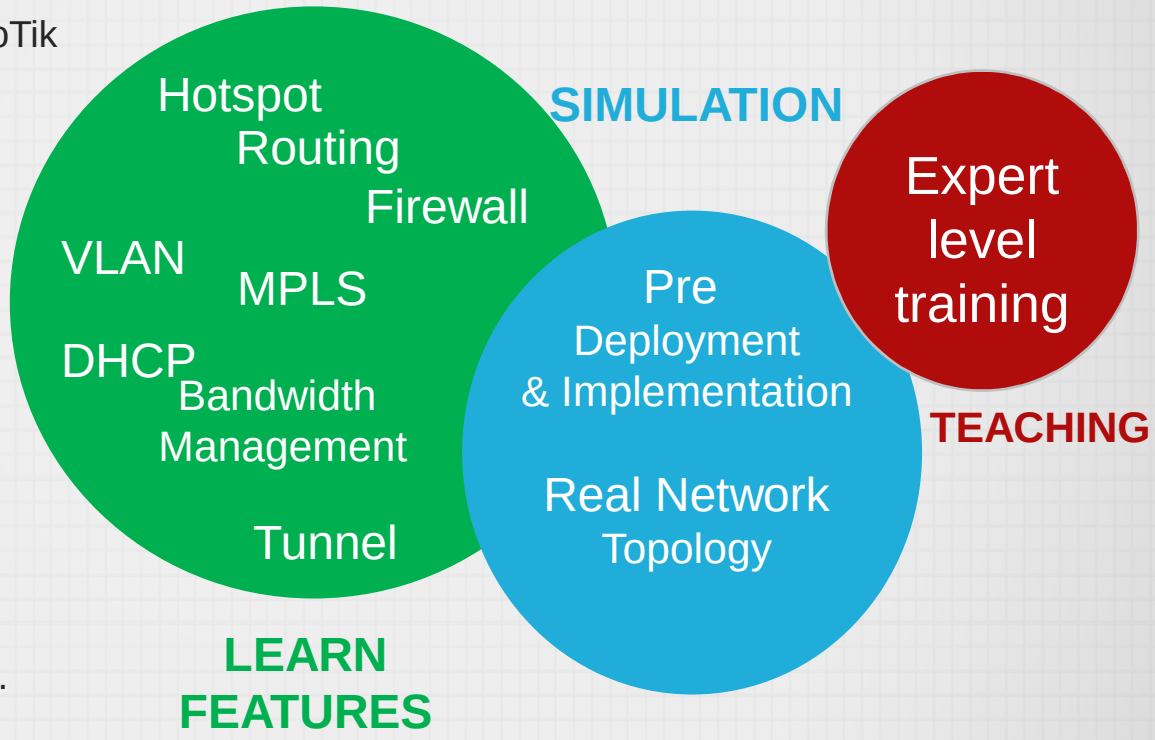
Easy to learn and practice more of MikroTik features, anytime anywhere

02. NETWORK SIMULATION

We can try some features in simulation network lab with any topology before its will deploy or implement in the real network.

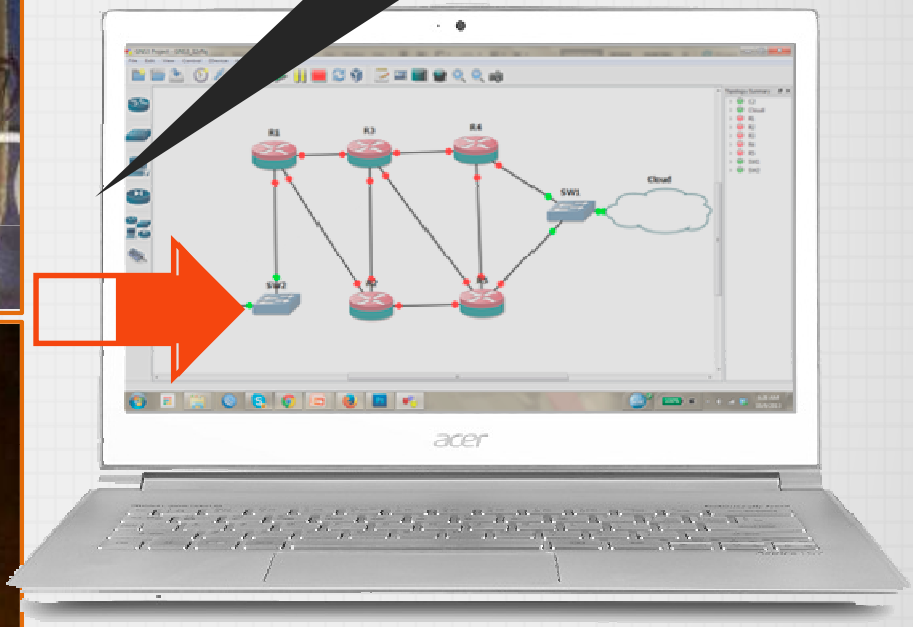
03. TEACHING

Teaching someone, In **ID-Networkers**, we use to teach MikroTik expert training.



THE CONCEPT

Put all your devices in your
POCKET



TOOLS & INGREDIENTS

GNS3

- Graphic Network Simulator
- Open Source Software
- Running on Windows, Linux
- Simulate complex network topologies
- Running multi vendor devices
- See detail at www.gns3.net

QEMU

- Known as Quick EMUlator
- **Open source** software
- Emulates full system (usually a PC).
- Launch a different OS
- As alternative: VMware, Virtual Box, KVM, etc
- See detail at www.qemu.org

MikroTik ISO file

- Has Mikrotik license level 0
- Made for x86 hardware architecture
- Usually burn in to CD
- To install MikroTik in to PC or power PC
- Download at www.mikrotik.com/download

MIKROTIK VIRTUALIZATION PROGRAM

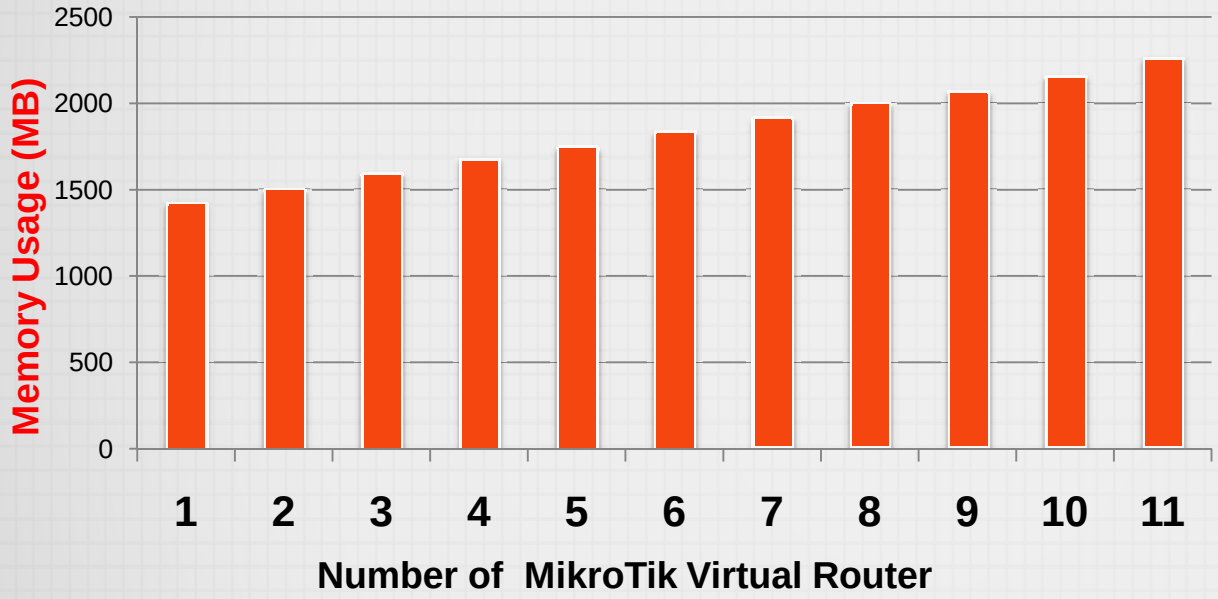
Comparing between VMWare, VirtualBox and Qemu

COMPANY	Possible Put in GNS3 (GUI)	License	Memory Load	Remark
VMWare	Only connect	Free, commerce	High	1 image for 1 router
Virtual Box	Yes	Free	High	1 image for 1 router
Qemu	Yes	Free	Low	1 image for all router

Qemu is the best emulator to run MikroTik routeros and put on GNS3 Network simulator (GUI)

PERFORMANCE GRAPH

This graph represents how if we are using windows 7 and add some Mikrotik-Qemu device (virtual mikrotik router) in GNS3 , how it will affect performance of our Laptop or PC, especially in memory usage.



UTILISATION

Run Mikrotik with Qemu (mikrotik virtual router) will only increase Memory/RAM usage, CPU usage will not affected

Every add one Mikrotik-Qemu on GNS3 will consume memory/RAM usage approximately **80Mb** each router

Mean that if for example we have 4GB memory, we can calculate:
(4000MB – 1500MB) / 80 = 31 routers

HOW TO DO IT

Download MikroTik ISO file

Install ISO to **Image file**

Run image in Virtual Machine

Put virtual machine on **Network Simulator**

LAB DEMO

1. After download All tool & ISO file, move ISO file to the folder where the GNS3 program located. Go to command line and move to GNS3 folder.

```
C:\Users\admin>cd C:\Program Files\GNS3
C:\Program Files\GNS3>
```

2. Then run the command to make the image file, for example named mikrotik.img

```
C:\Program Files\GNS3>qemu-img.exe create -f qcow2 mikrotik.img 256M
```

   Until a successful image-making information

```
Formatting 'mikrotik.img', fmt=qcow2 size=268435456 encryption=off
cluster_size=0
```

3. Install ISO file to the current image, I assume that the ISO file name is “mikrotik.iso”, you can adjust file name to match with the following command

```
C:\Program Files\GNS3> qemu.exe mikrotik.img -boot d -cdrom
"mikrotik.iso"
```

LAB DEMO

4. Qemu will show MikroTik installation process similar to when we install it using CD-room

Just follow the
INSTALLATION WIZARD

LAB DEMO

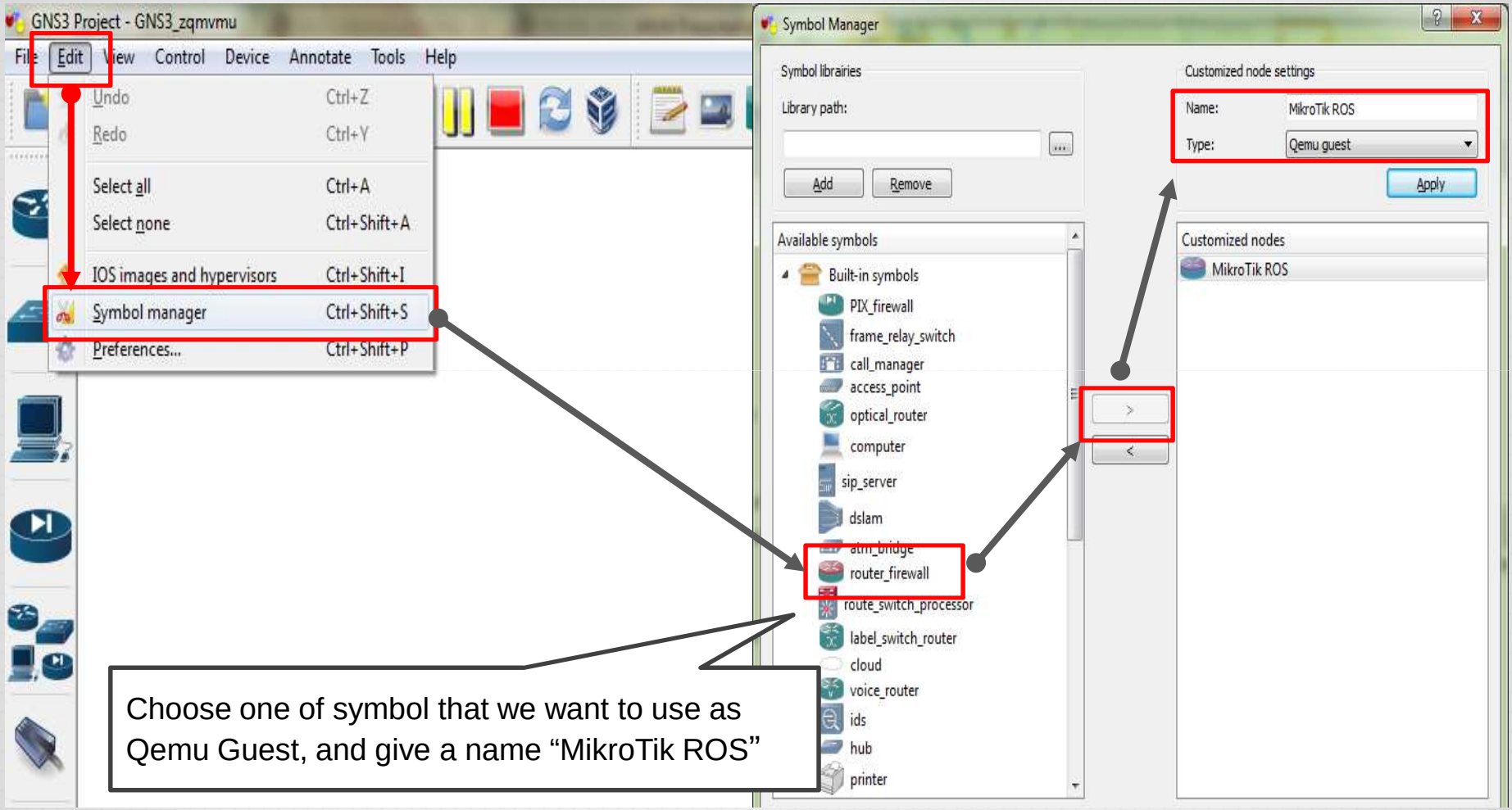
5. After the installation is complete (indicated by RouterOS reboot), close the window and try boot from image

```
C:\Program Files\GNS3>qemu.exe mikrotik.img -boot c
```

Qemu will boot and run routeros until see the login promt MiroTik routeros

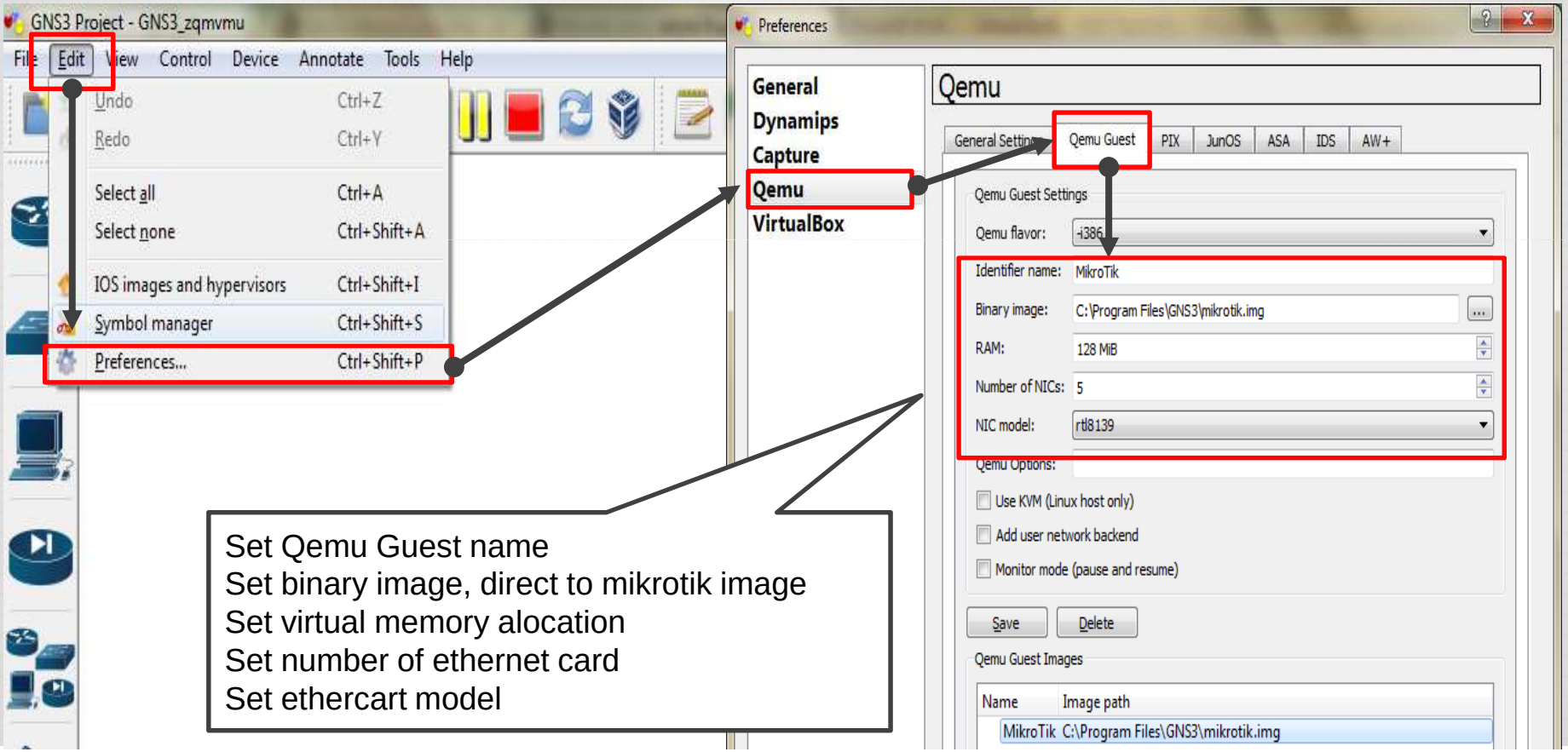
6. Put Mikrotik image to the Qemu Guest in GNS3
   - Open GNS3 program
   - Make a symbol for mikrotik device, click Edit > Symbol Manager

LAB DEMO


GNS3 Project - GNS3_zqmvmu
File Edit View Control Device Annotate Tools Help
Undo Ctrl+Z
Redo Ctrl+Y
Select all Ctrl+A
Select none Ctrl+Shift+A
IOS images and hypervisors Ctrl+Shift+I
Symbol manager Ctrl+Shift+S
Preferences... Ctrl+Shift+P
Symbol Manager
Symbol librairies
Library path:
Add
Remove
Customized node settings
Name: MikroTik ROS
Type: Qemu guest
Apply
Available symbols
Built-in symbols
PIX_firewall
frame_relay_switch
call_manager
access_point
optical_router
computer
sip_server
dslam
atm_bridge
router_firewall
route_switch_processor
label_switch_router
cloud
voice_router
ids
hub
printer
Customized nodes
MikroTik ROS
Choose one of symbol that we want to use as Qemu Guest, and give a name “MikroTik ROS”

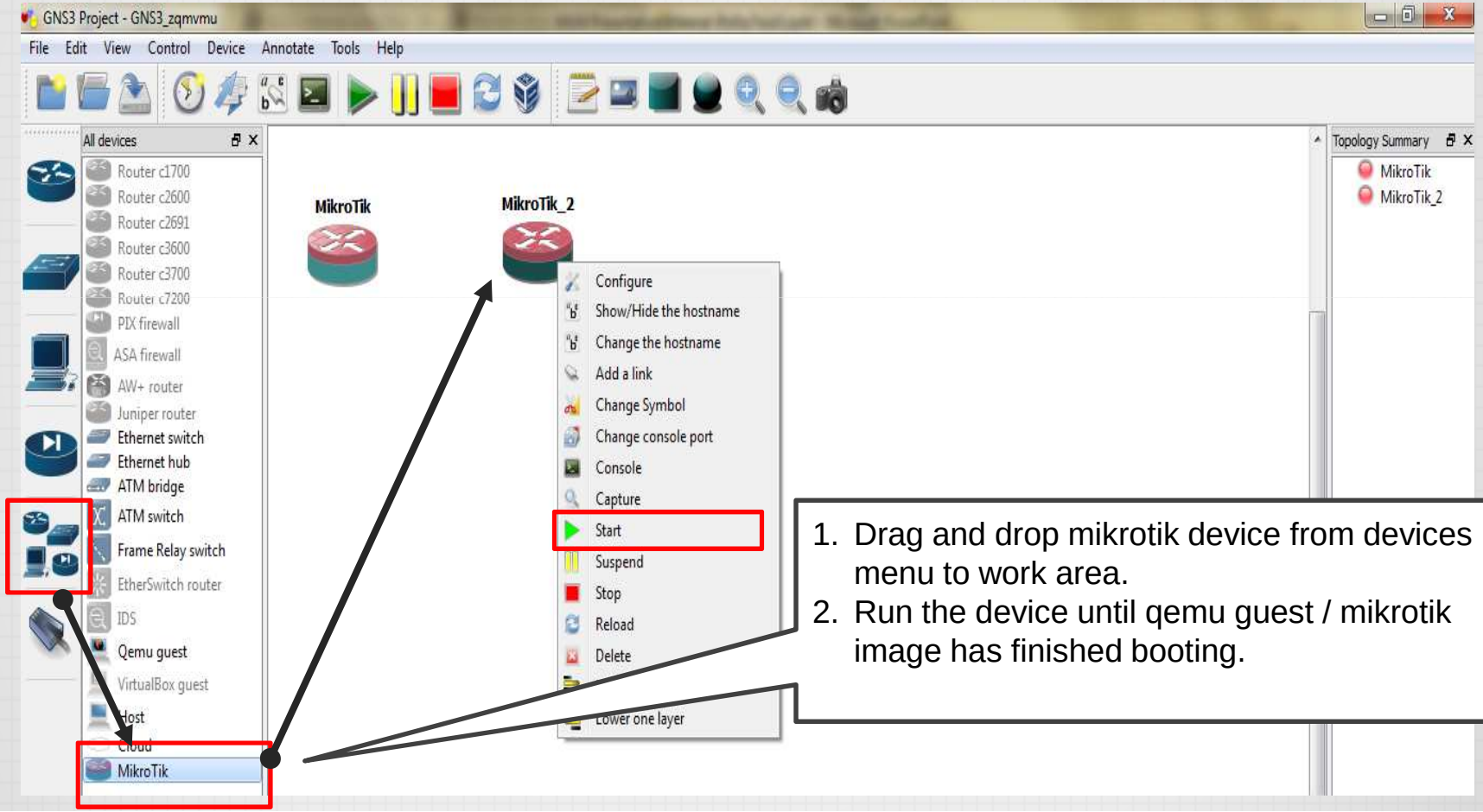
LAB DEMO

7. Make Qemu Guest in order to load mikrotik image that we create before, in GNS3 menu, go to Edit > Preferences > and go to Qemu Guest tab:



LAB DEMO

8. Mikrotik in GNS3 device is ready to use.



BREAK, its time to QUIZ

Answer the question, and get free MikroTik **RB951Ui-2HnD**

Powered by

Free! MikroTik

dari MU untuk MU

How to use winbox to remote our virtual router?

INSTALL LOOPBACK INTERFACE

HARDWARE WIZARD

Find the Hardware Wizard command:

1. Click the Start menu.
2. Search for “cmd".
3. Right-click on “cmd” and select “Run as Administrator”
4. Enter “hdwwiz.exe”

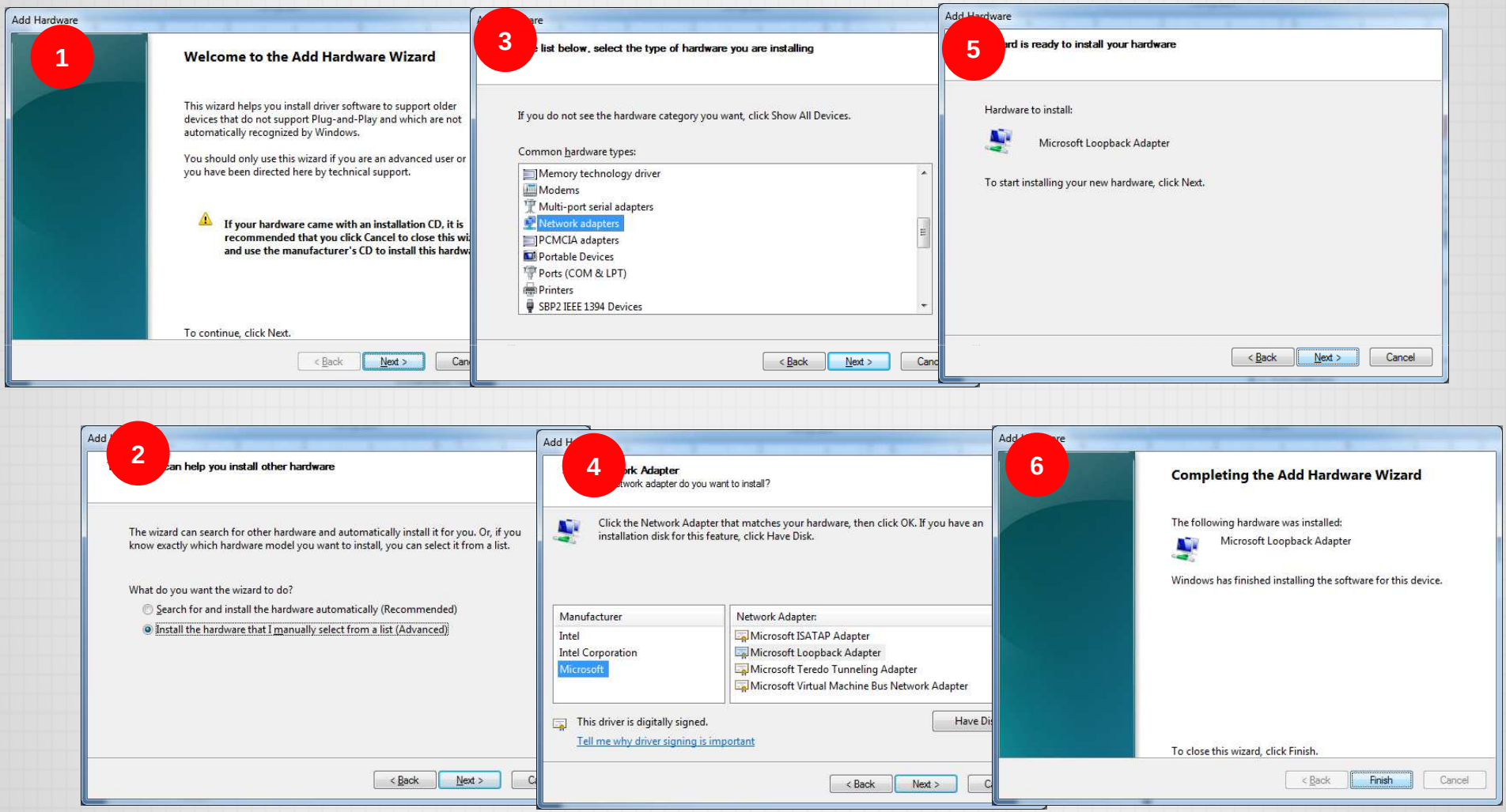
MICROSOFT LOOPBACK ADAPTER

Then follow this step:

1. In the "Welcome to the Add Hardware Wizard", click Next.
2. Select "Install the hardware, manually select from a list (Advanced)" and click Next.
3. Scroll down and select "Network adapters" and click Next.
4. Select under Manufacturer "Microsoft" and then under Network Adapter "Microsoft Loopback Adapter" and click Next.

We also possible to create loopback interface in your PC/laptop using GNS3, in menu Tool>Loopback Manager

PROCESS SCREENSHOT



CONNECT LOOPBACK INTERFACE TO GNS3

CONFIGURE CLOUD IN GNS3

To connect between loopback interface & GNS3 we need to do following steps:

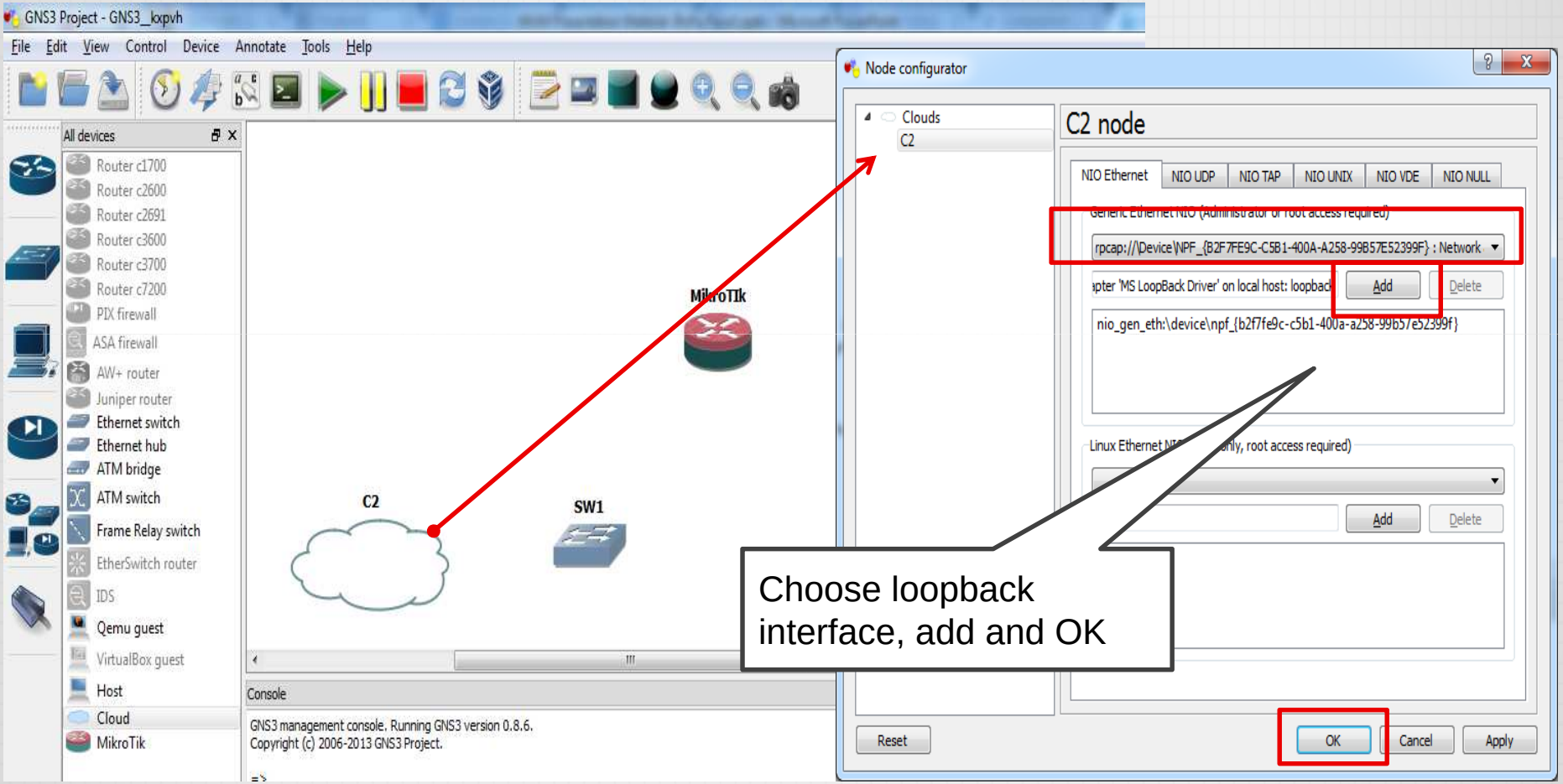
1. In GNS3 choose device type cloud and drag and drop to work area,.
2. Right click twice on the device to configure it.
3. Go to “C1” menu and tab “NIO Ethernet”
4. Point “Generic Ethernet NIO” to loopback interface that we created previously, if not yet detected you need to reboot your laptop.
5. Choose, add, apply and OK

CONNECT LAPTOP TO ROUTER DEVICE

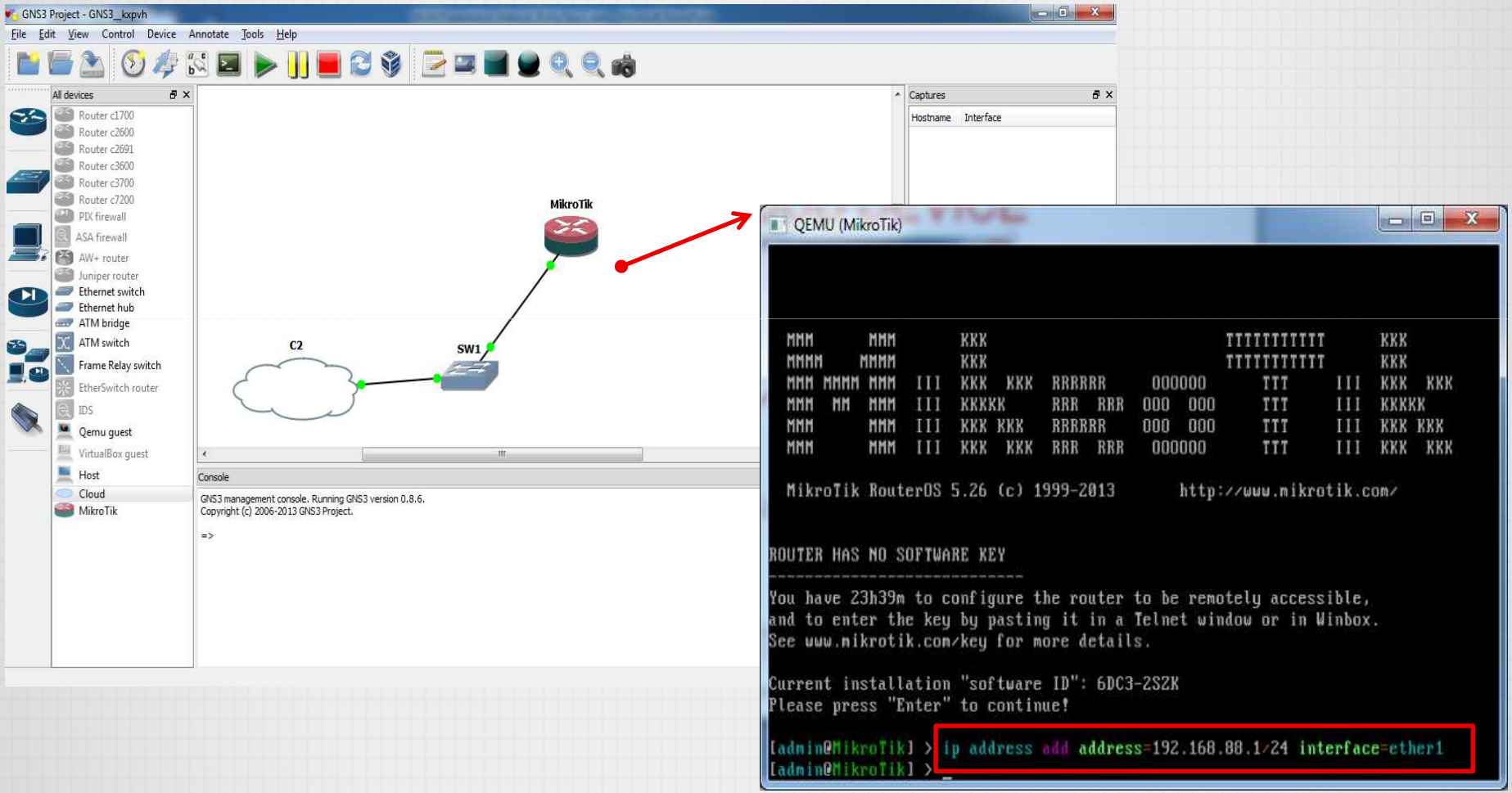
To connect between laptop and MikrotTik virtual router device, we need to do following steps:

1. After cloud had been configured, add mikrotik device and Ethernet switch device on work area.
2. Connect between three of them using link device.
3. Configure IP address on MikroTik device one subnet with loopback interface, now you can ping and remote it via laptop

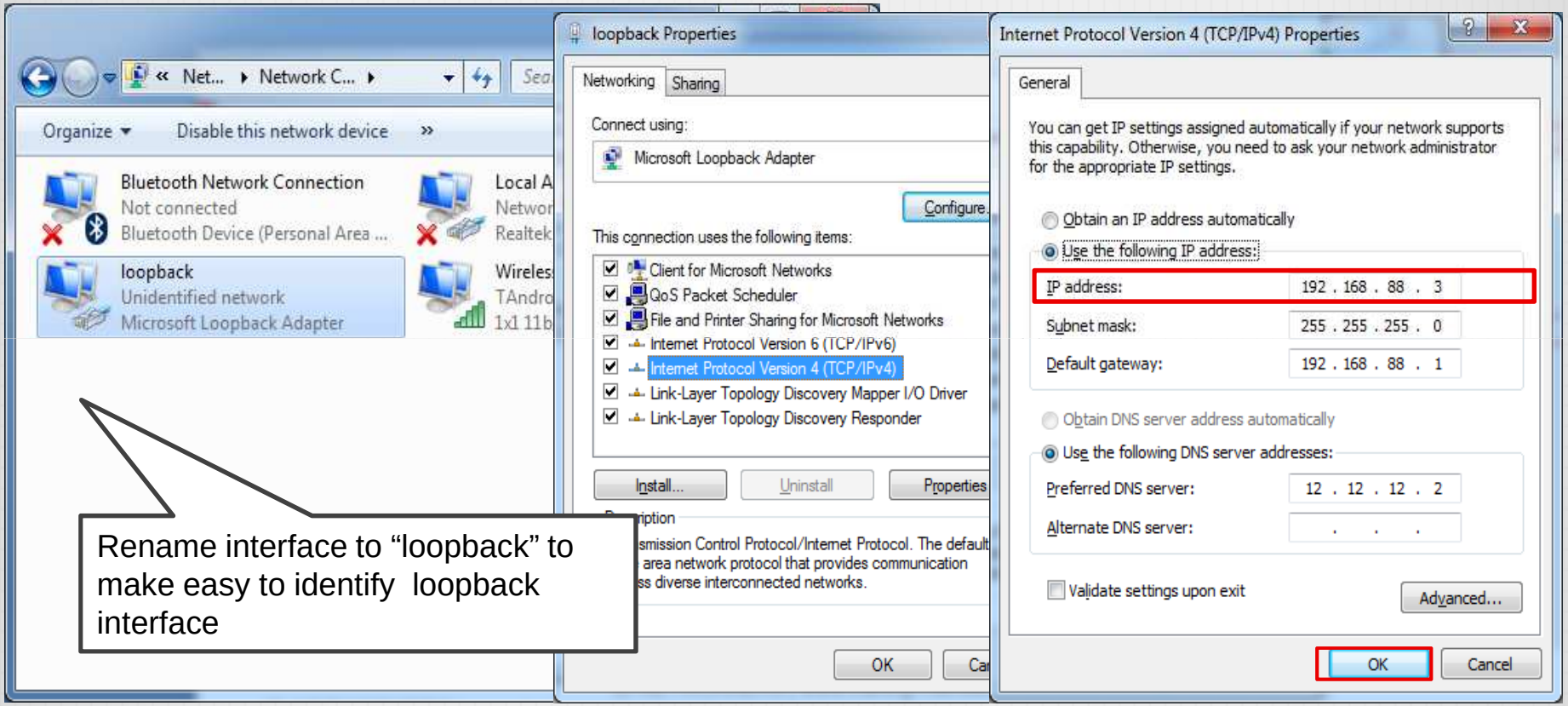
CONFIGURE CLOUD DEVICE



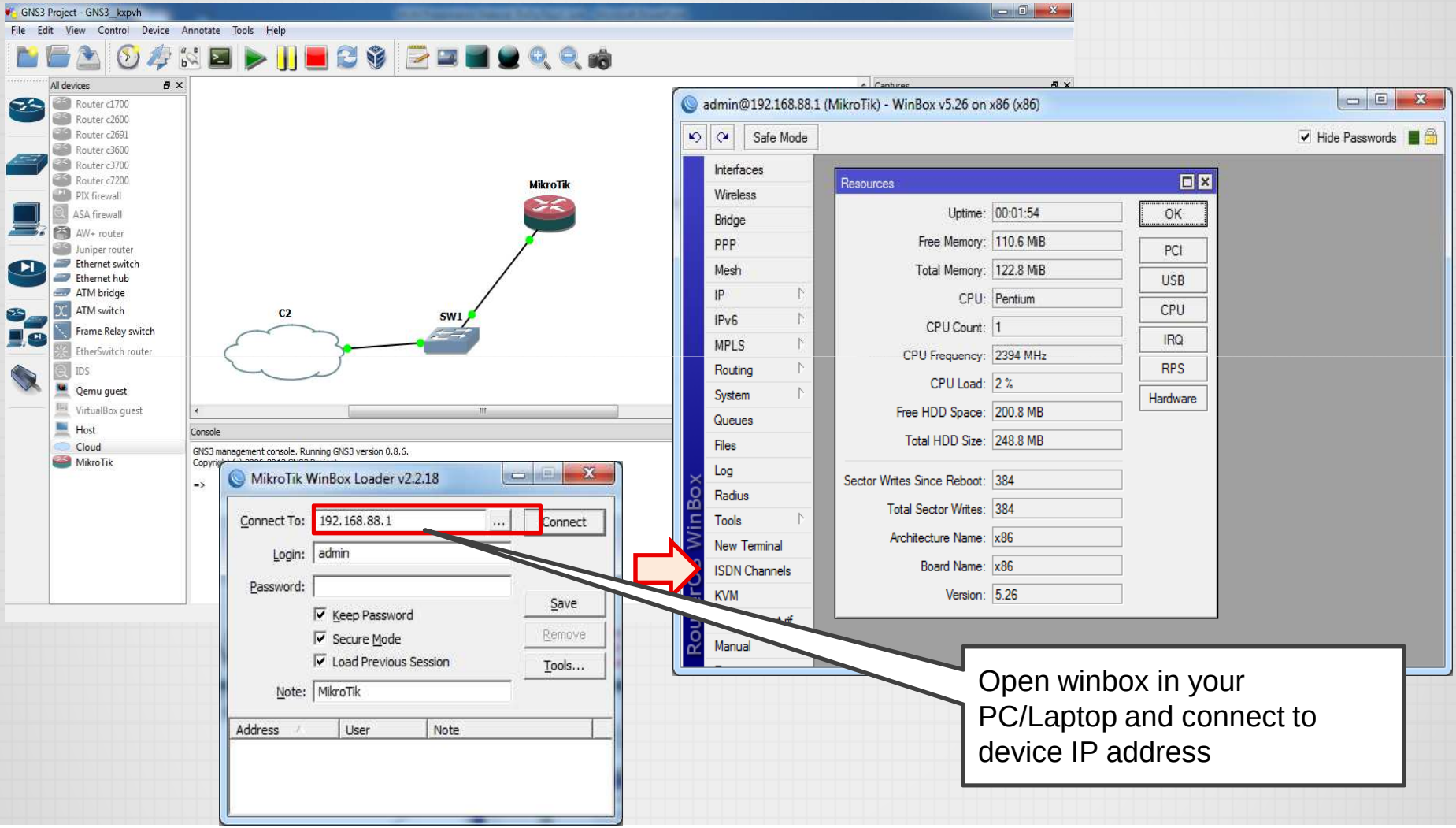
CONFIGURE DEVICE IP ADDRESS

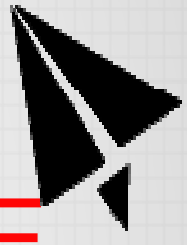


CONFIGURE IP LOOPBACK INTERFACE



REMOTE DEVICE USING WINBOX





THANK YOU FOR YOUR TIME

And see u in the next MUM

This slide also can be found at www.training-mikrotik.com and www.freemikrotik.com.

"If you cannot survive in the tired of learning, then you will be suffering by the pain of stupidity" *(Imam Syafi'i)*

MY CONTACT DETAILS

If you have any other questions or would like me to clarify anything else, please, let me know. I am always glad to help in any way I can

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