

How to simulated Mikrotik by using GNS3 for study and design your networks

MUM Thailand in Sep 5, 2016

Presented By :

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Mikrotikthai Co.,Ltd

OBJECTIVE

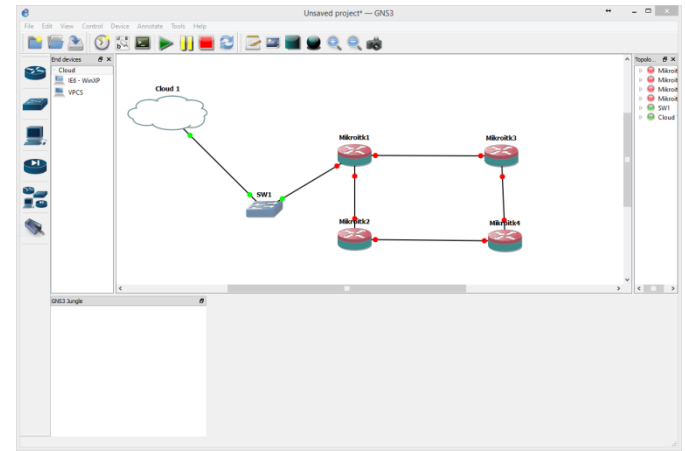
□ Network simulation

เพื่อจำลองการทำงานของระบบ
เครือข่าย ทดสอบการทำงาน
ต่างๆ ก่อนที่จะ ติดตั้งบน
เครือข่ายจริง

□ Learning

สำหรับการเรียนรู้ฟีเจอร์ของ
Mikrotik ใช้ในการเรียนการสอนให้

Concept



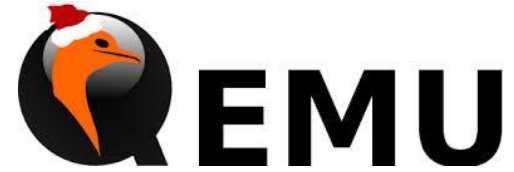
Simulation Tools



□ GNS3

- Real-time network simulation
- Multi platform and Multi vendors devices
- Create dynamic network maps for troubleshooting and proof of concept
- Connect GNS3 to any real network
- Free (Open Source)

Simulation Tools(ต่อ)



- QEMU
 - Known as Quick EMUlator
 - Multi platform
 - Open source software

Simulation Tools(ต่อ)



❑ RouterOS (Cloud Hosted Router)

- intended for running as a virtual machine
- supports the x86 64-bit architecture
- As alternative VMWare, Hyper-V, VirtualBox, KVM and others
- CHR has full RouterOS features enabled by default

Simulation Tools(ต่อ)



❑ RouterOS (Cloud Hosted Router) (ต่อ)

- The CHR has 4 license levels:

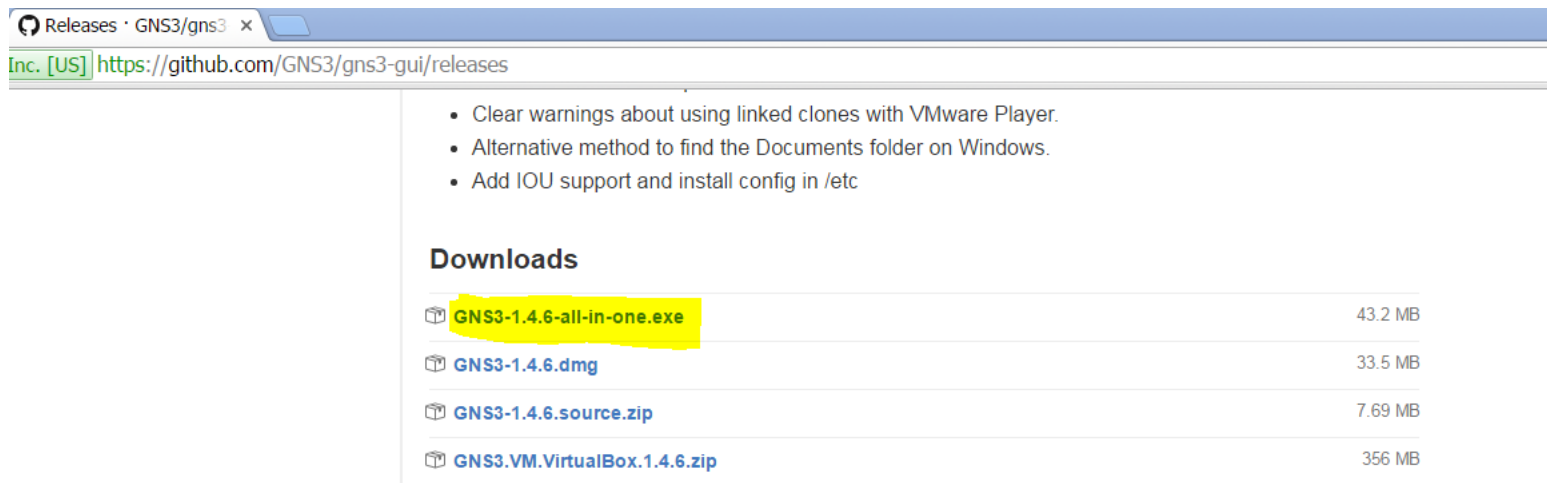
License	Speed limit	Price
Free	1Mbit	FREE
P1	1Gbit	\$45
P10	10Gbit	\$95
P-Unlimited	Unlimited	\$250

HOW TO



1.Download GNS3

- ไปที่ <https://github.com/GNS3/gns3-gui/releases>
- ดาวน์โหลด [GNS3-x.x.x-all-in-one.exe](#)

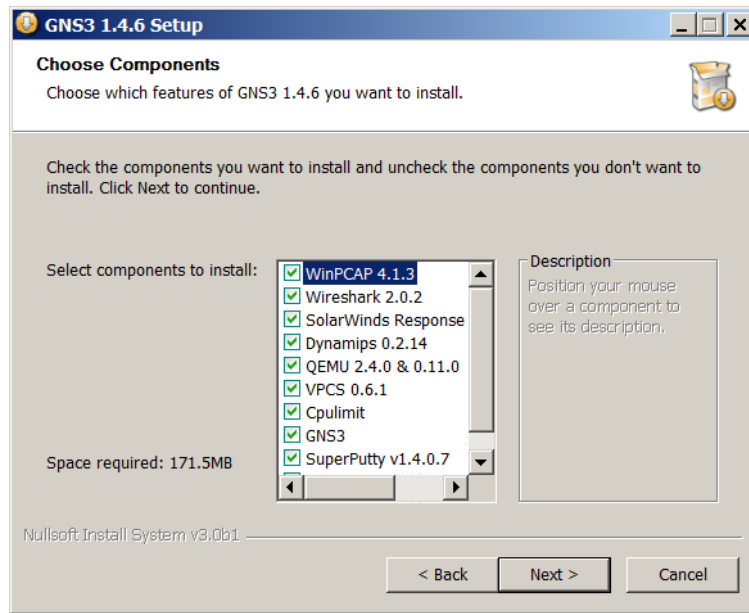


The screenshot shows the GitHub releases page for GNS3/gns3-gui. The browser tab is titled 'Releases · GNS3/gns3'. The address bar shows the URL 'https://github.com/GNS3/gns3-gui/releases'. The page content includes a list of instructions for using linked clones with VMware Player, an alternative method to find the Documents folder on Windows, and adding IOU support. Below this is a 'Downloads' section with a table of available releases.

Downloads	
 GNS3-1.4.6-all-in-one.exe	43.2 MB
 GNS3-1.4.6.dmg	33.5 MB
 GNS3-1.4.6.source.zip	7.69 MB
 GNS3.VM.VirtualBox.1.4.6.zip	356 MB

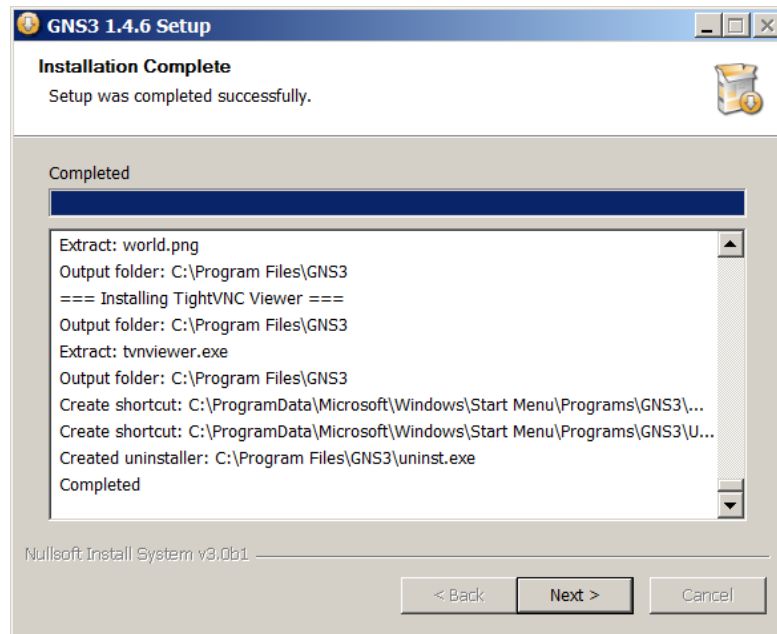
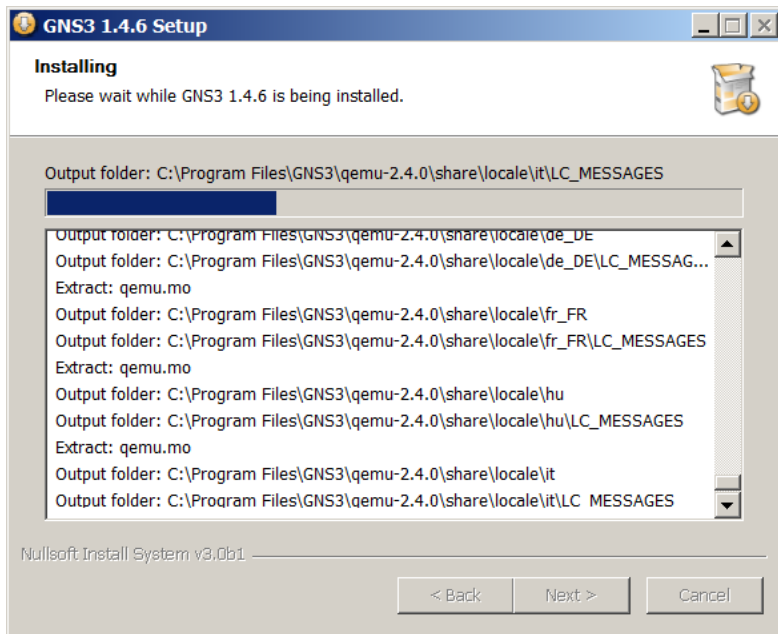
2.Install GNS3

- ❑ ติดตั้งไฟล์ที่ดาวน์โหลดมา(ติดตั้งแบบ **default** โดยไม่ต้องปรับค่า)



2.Install GNS3(ต่อ)

☐ รวบรวมเสร็จ



3.Download CHR Image

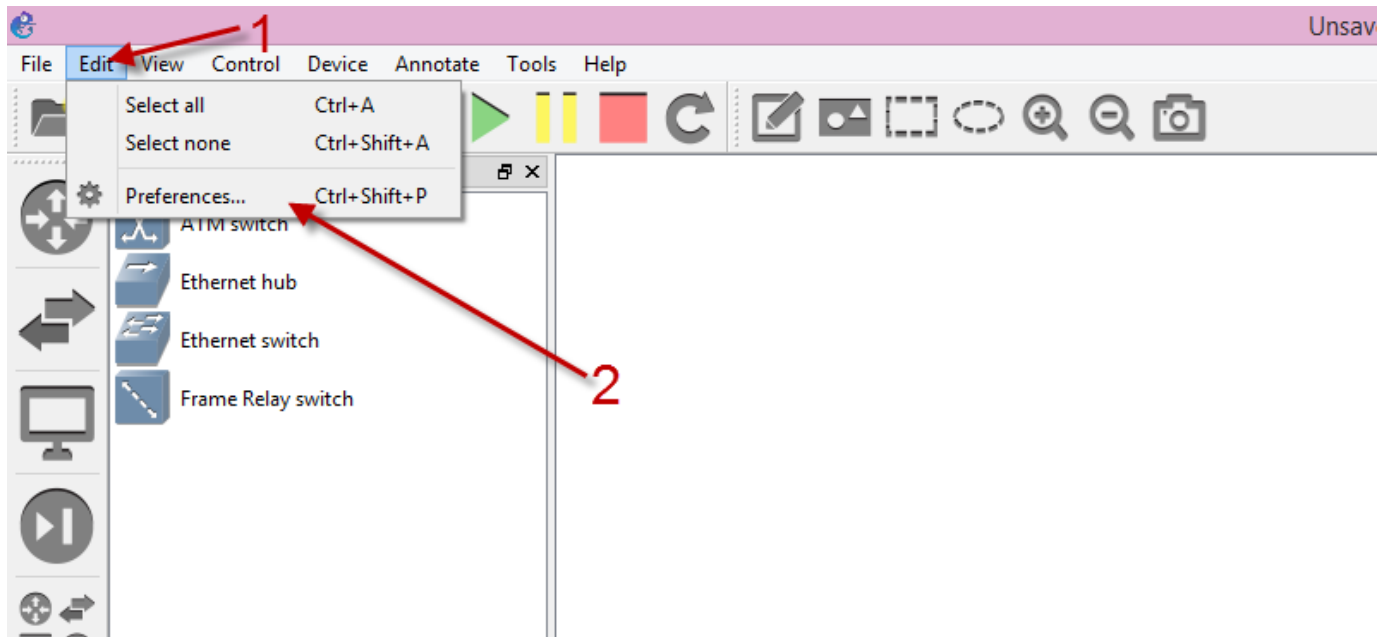
- ไปที่ <http://www.mikrotik.com/download>
- ดาวน์โหลด CHR แบบ Raw disk image และแตก zip

Cloud Hosted Router

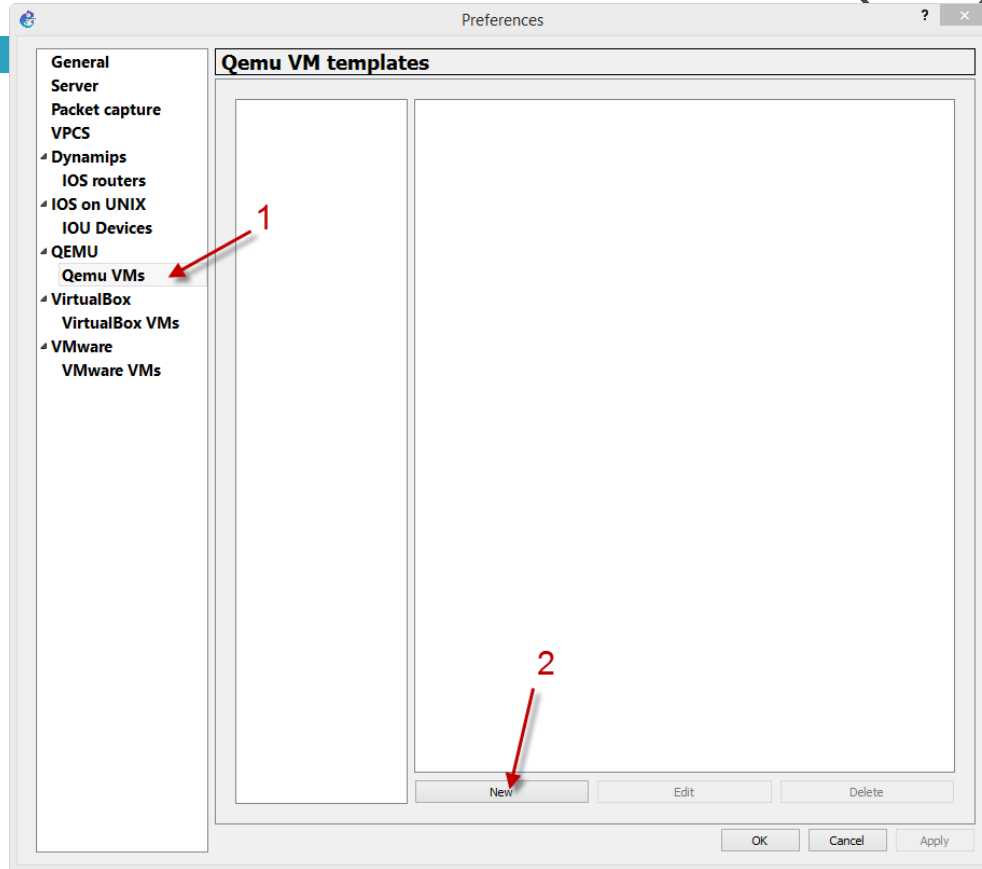
	6.32.4 (Bugfix only)	6.35.2 (Current)	5.26 (Legacy)	6.36rc16 (Release candidate)
images	img, vmdk, vhd, vhdx, vdi			
The Dude server	-	↓	-	↓
VMDK image	-	↓	-	↓
VHDX image	-	↓	-	↓
VDI image	-	↓	-	↓
Raw disk image	-	↓	-	↓
Extra packages	-	↓	-	↓
The Dude client	-	↓	-	-
Changelog	-	📄	-	📄
MD5	-	Σ	-	Σ

4.Add Mikrotik to GNS3

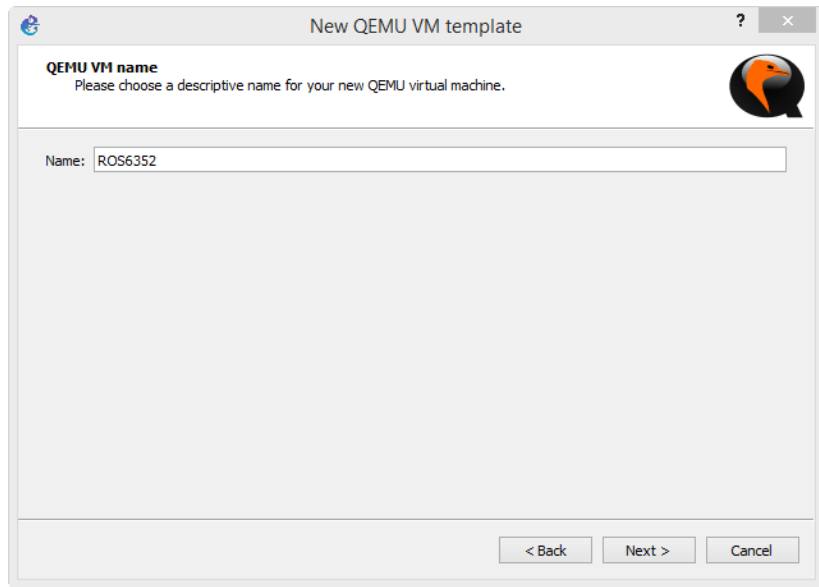
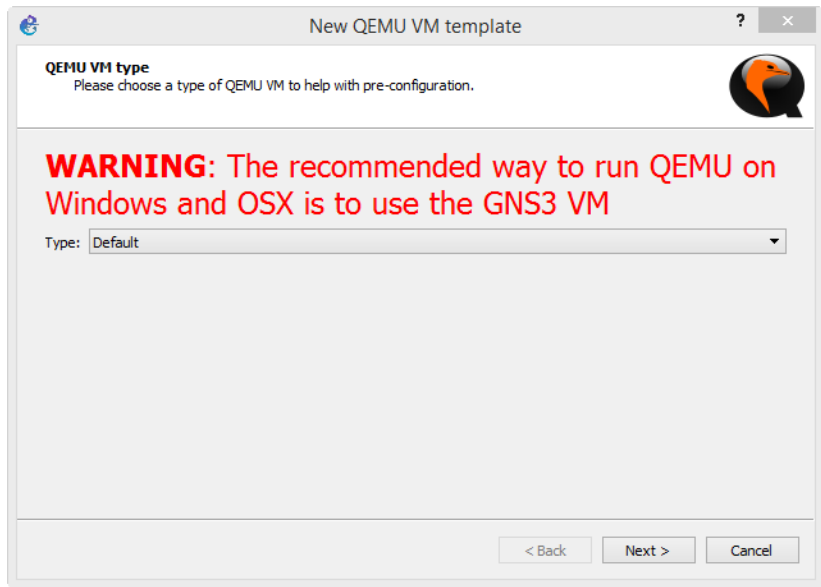
□ เปิด GNS3 แล้วไปที่ edit > preferences



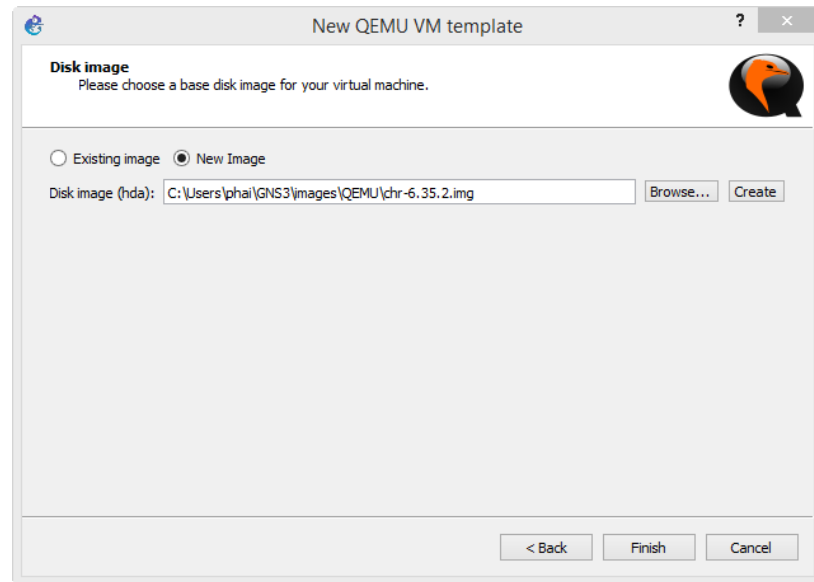
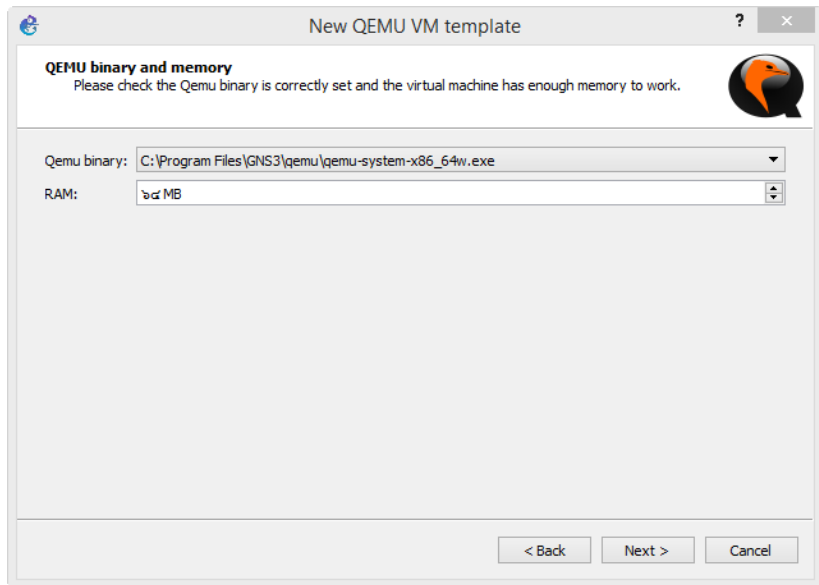
4.Add Mikrotik to GNS3(ต่อ)



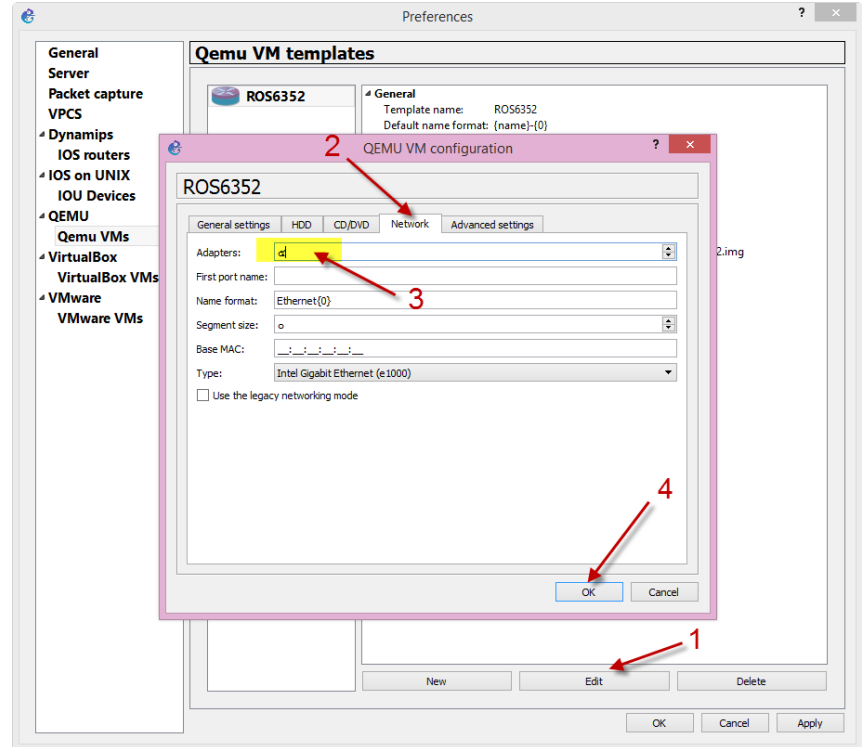
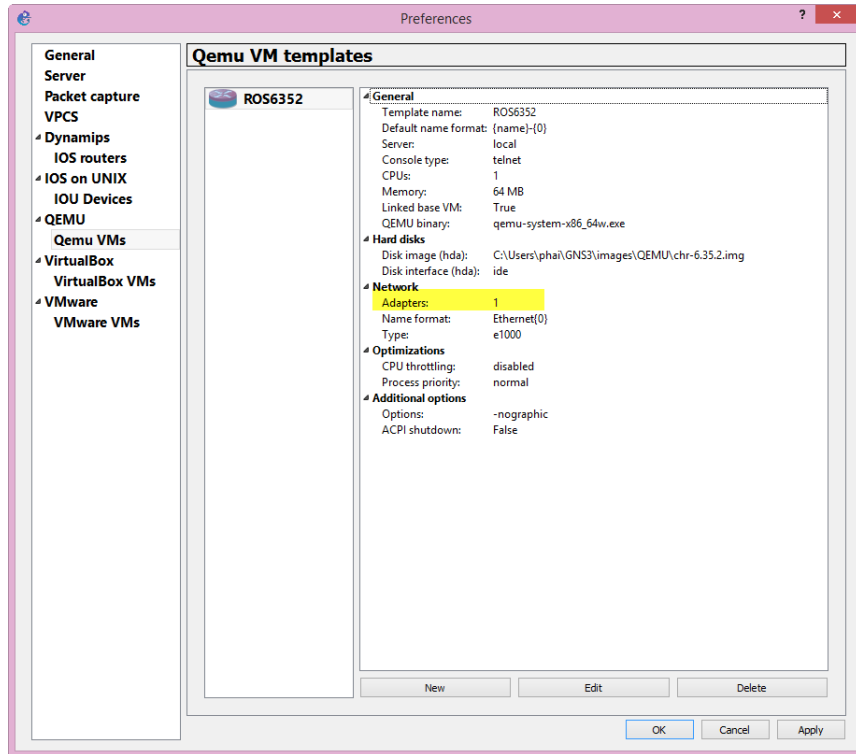
4.Add Mikrotik to GNS3(ต่อ)



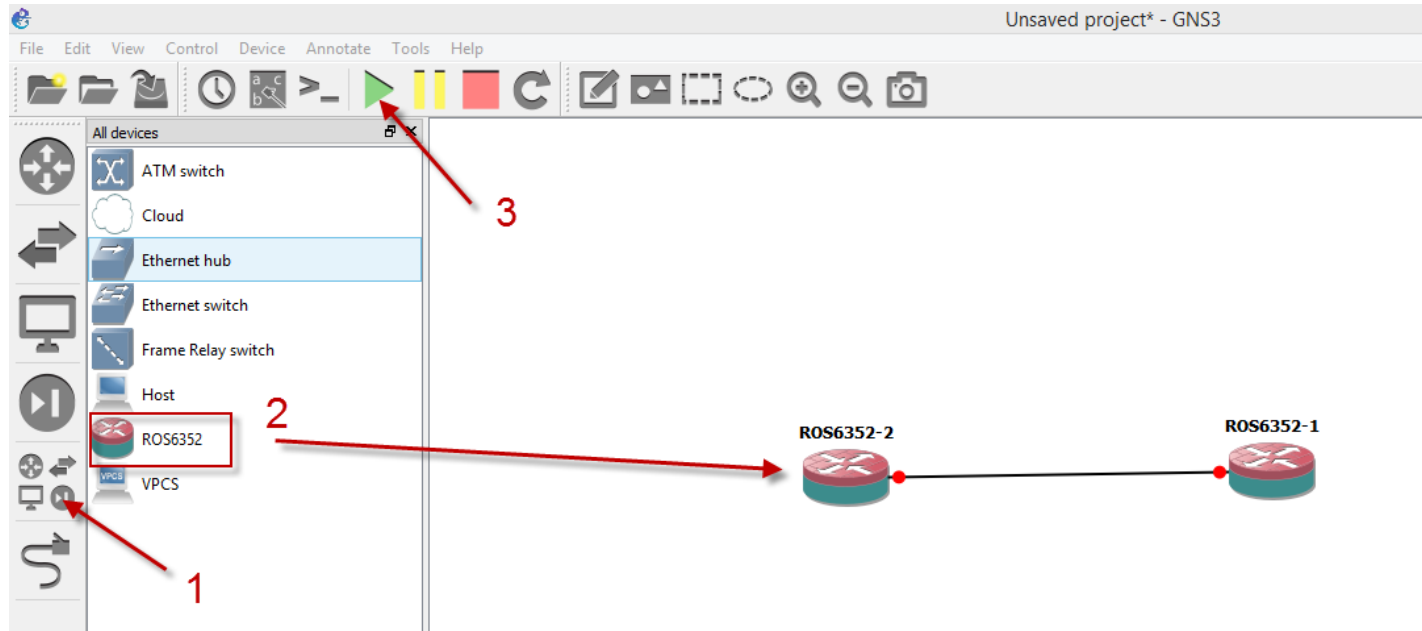
4.Add Mikrotik to GNS3(ต่อ)



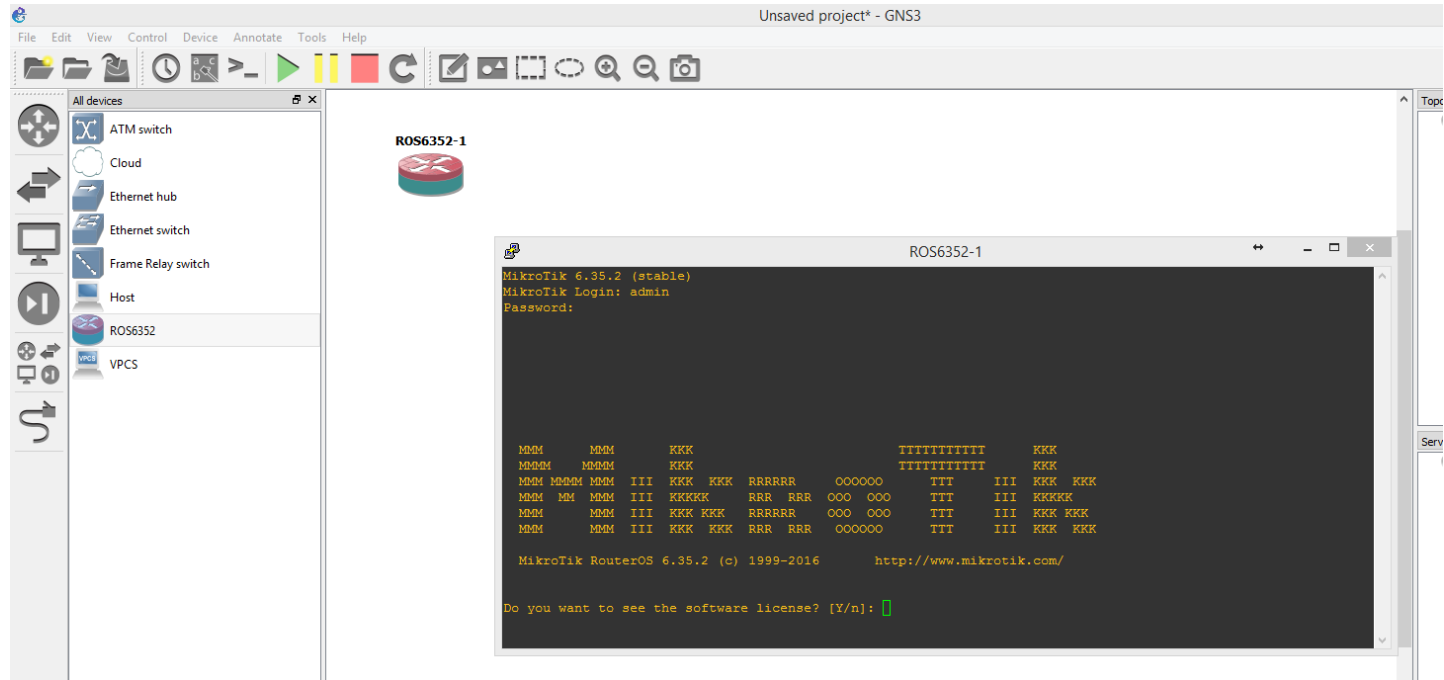
4. Add Mikrotik to GNS3(ต่อ)



5. Mikrotik device is ready to use!!



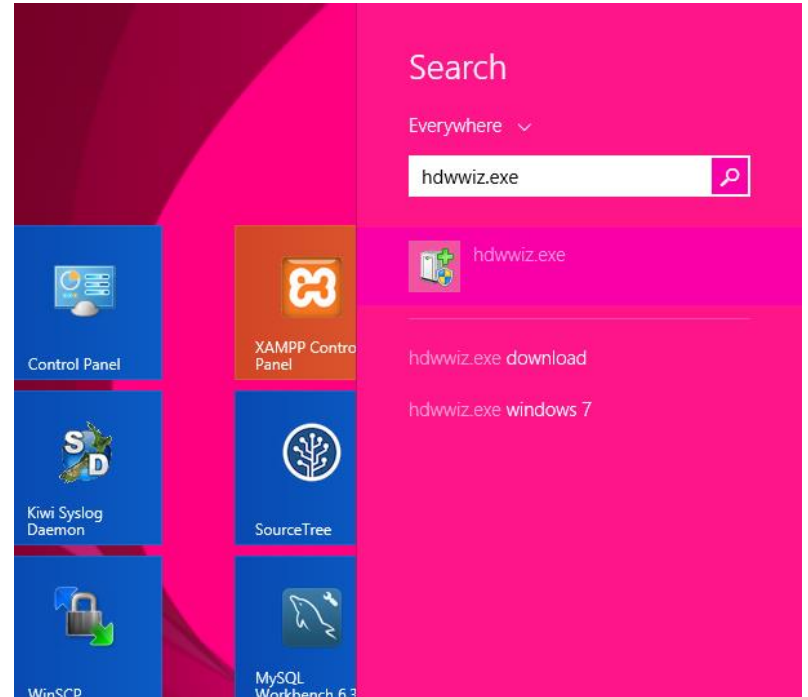
5. Mikrotik device is ready to use!!



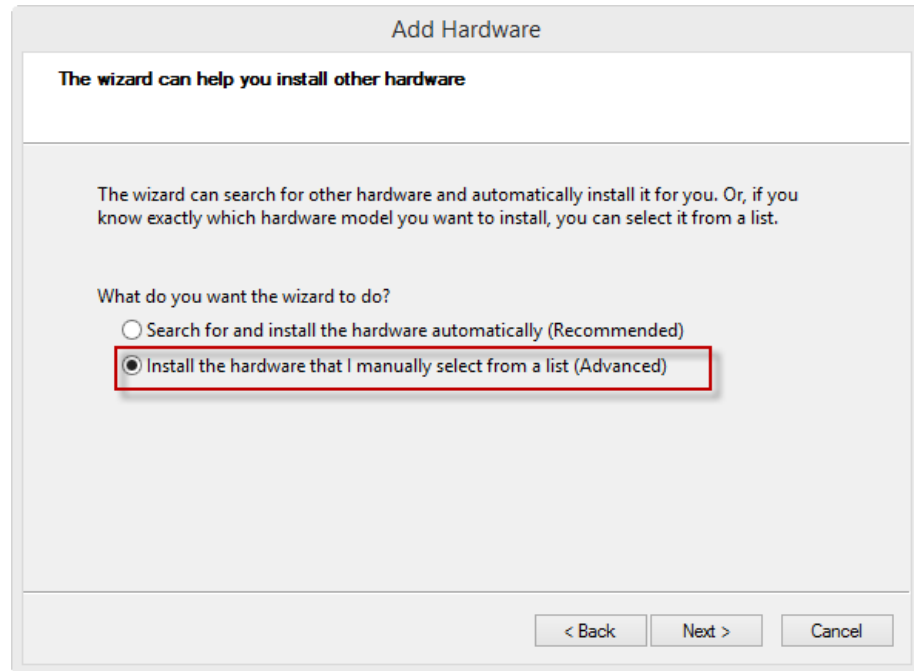
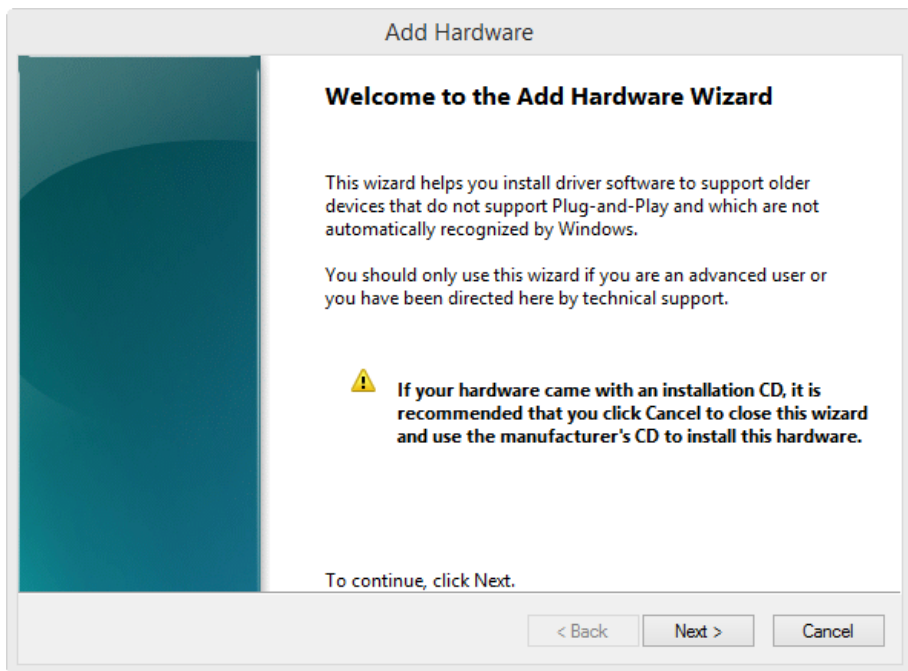
MANAGE OUR VIRTUAL
ROUTER VIA WINBOX

Create loopback interface

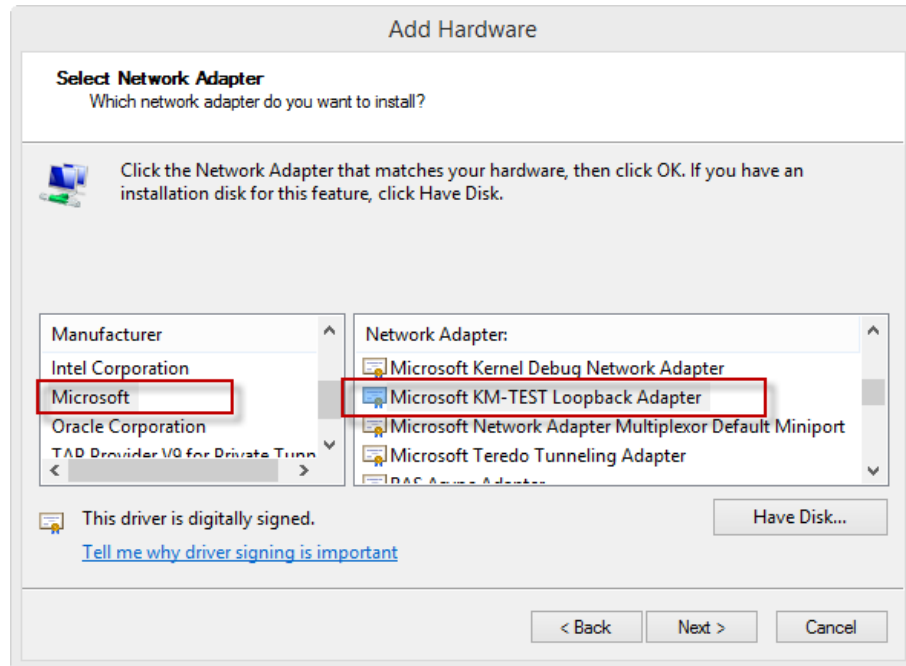
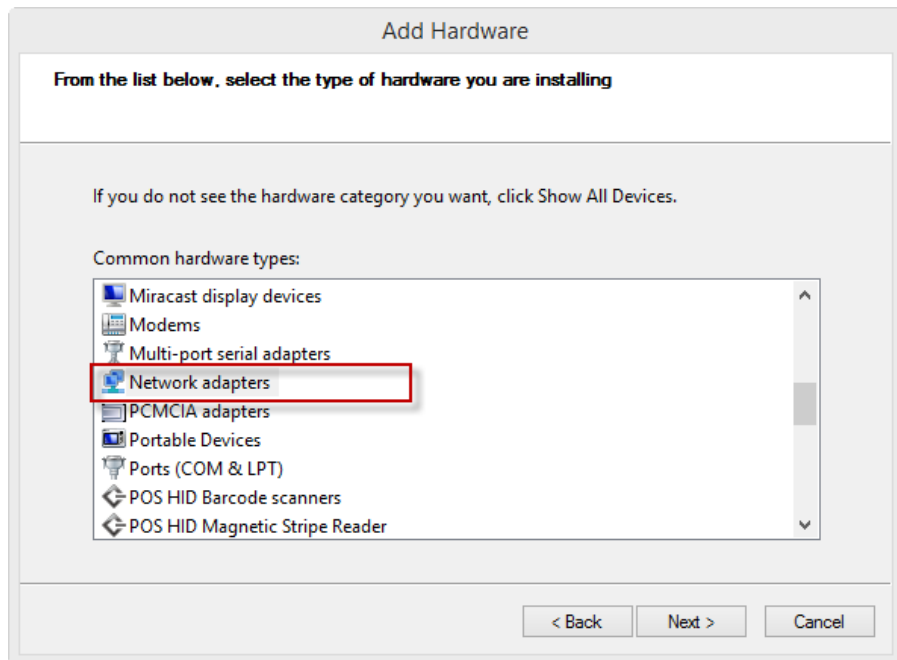
- ❑ กด start menu
- ❑ พิมพ์ `hdwwiz.exe` แล้ว enter



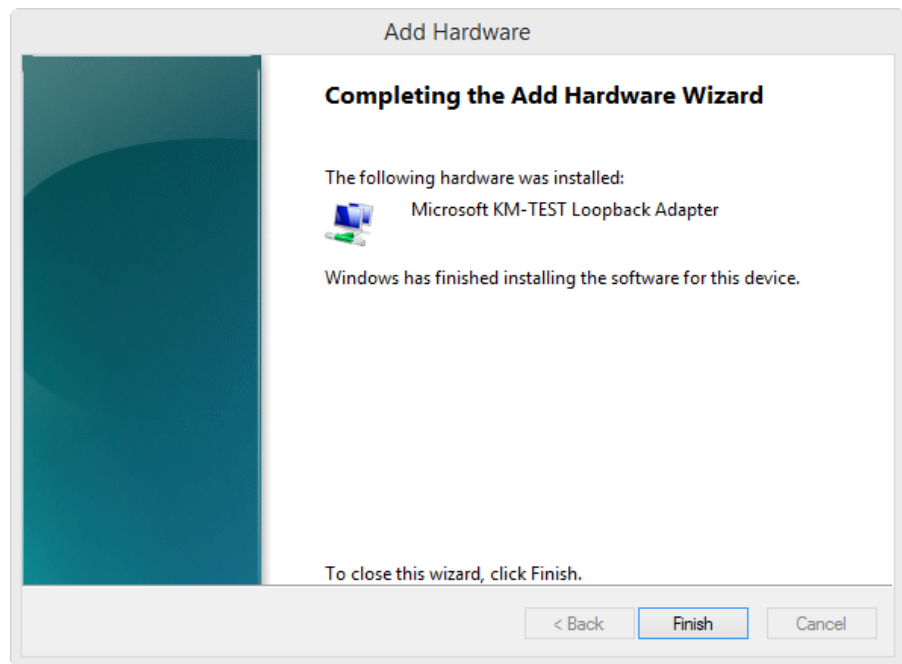
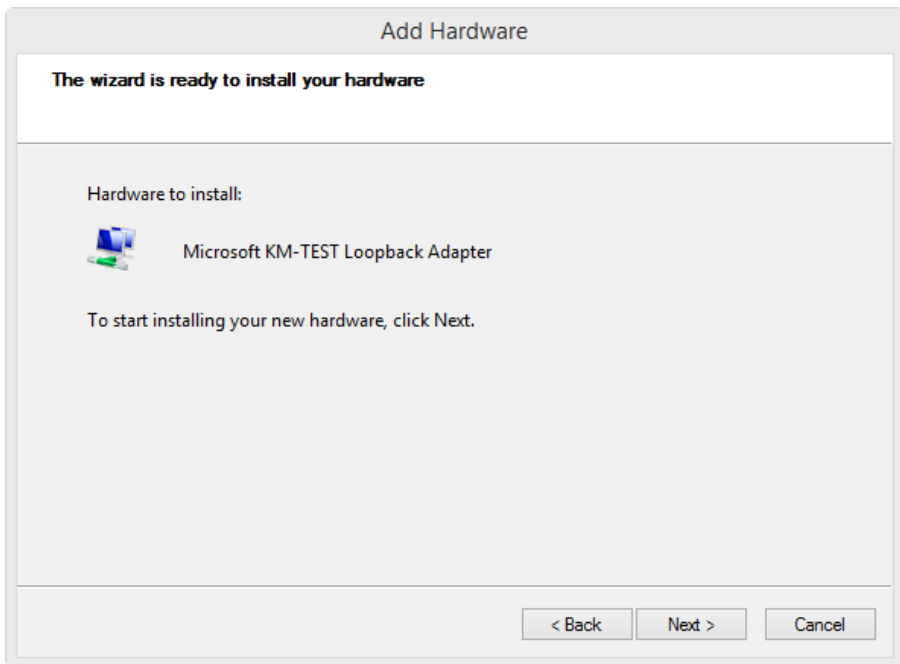
Create loopback interface



Create loopback interface



Create loopback interface

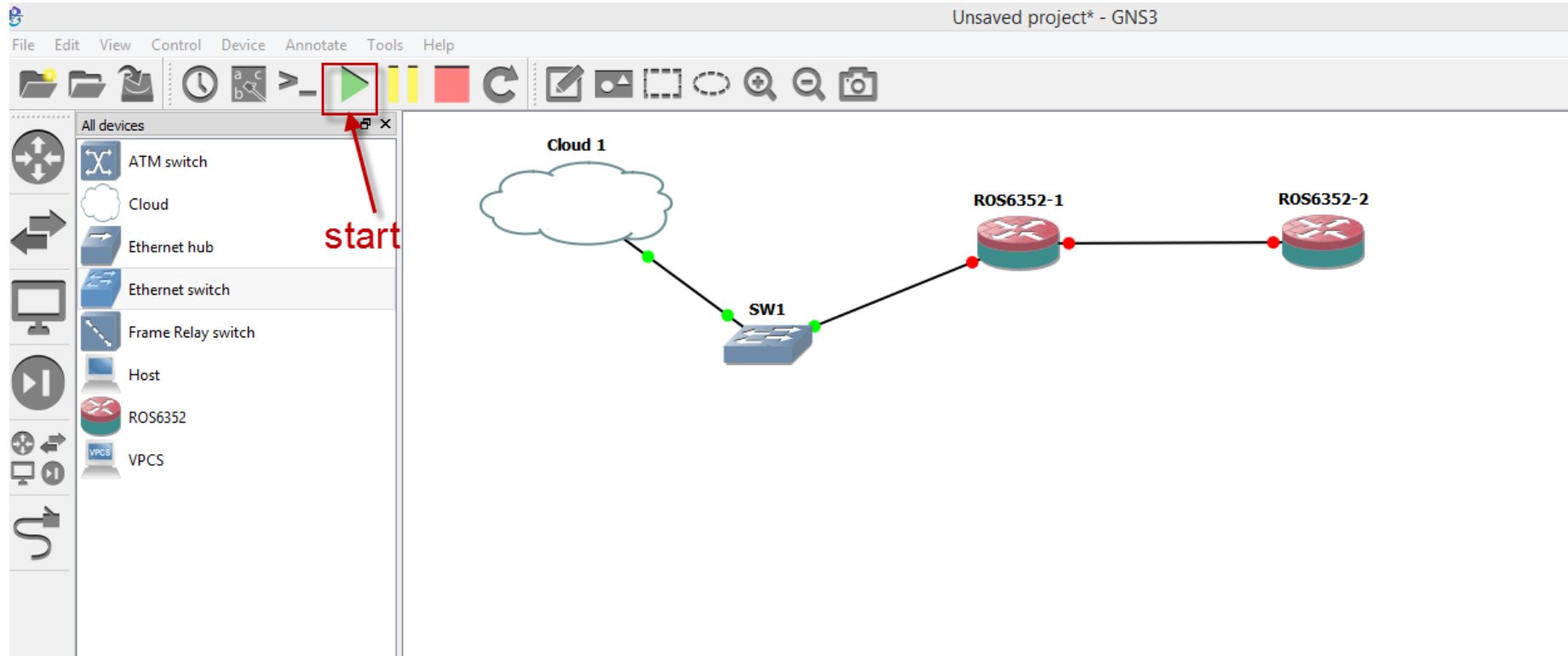


Configure Cloud

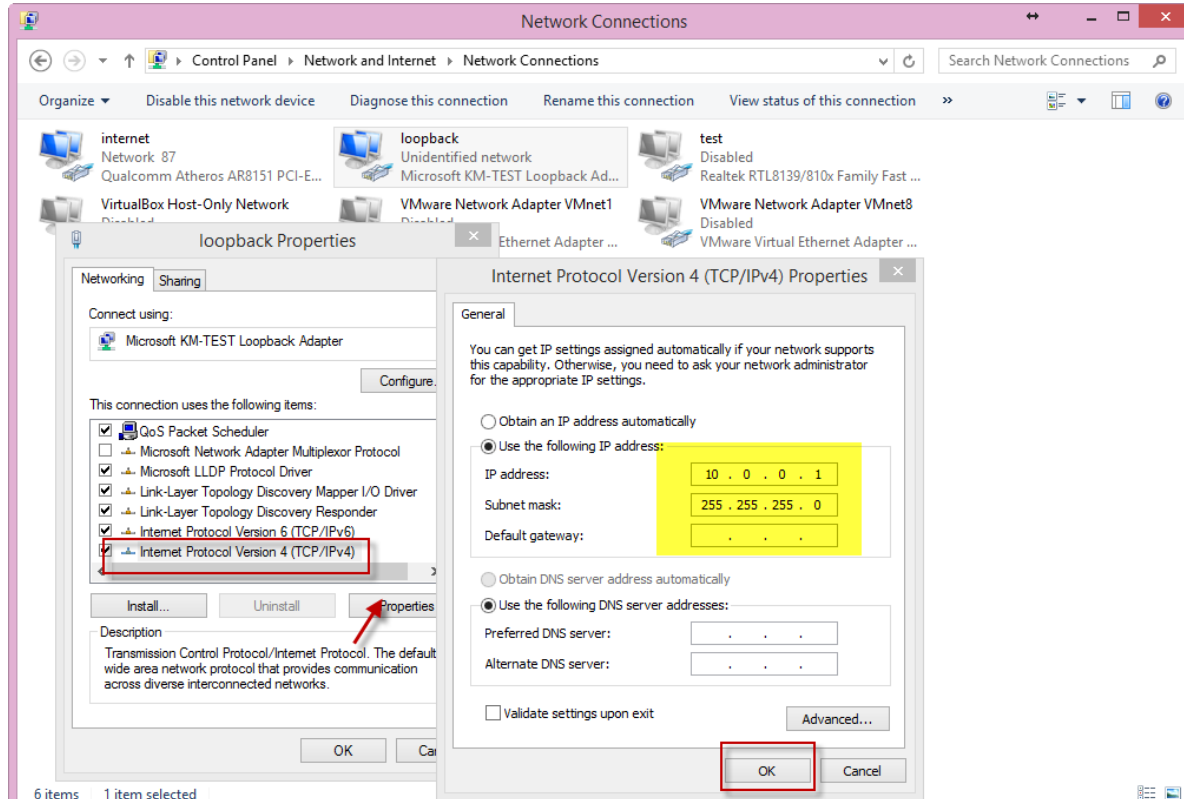
The image shows the GNS3 interface with a project titled "Unsaved project* - GNS3". The "All devices" panel on the left lists various network components. The "Cloud" component is highlighted with a red box, and a red arrow points from it to a cloud icon labeled "Cloud 1" in the main workspace. A context menu is open over the "Cloud 1" icon, with the "Configure" option highlighted. A red arrow points from the "Configure" option to the "Node properties" dialog box.

The "Node properties" dialog box is titled "Cloud 1 configuration". It has tabs for "Ethernet", "NAT", "UDP", "TAP", "UNIX", "VDE", "NULL", and "Misc.". The "Ethernet" tab is selected. Under "Generic Ethernet NIO", the "loopback" option is selected in the dropdown menu. Below the dropdown, the text "loopback" is displayed, and a red arrow points to the "Add" button. The text "nio_gen_eth:loopback" is highlighted in yellow. Under "Linux Ethernet NIO (Linux only)", the "internet" option is selected in the dropdown menu. Below the dropdown, the text "internet" is displayed, and a red arrow points to the "Add" button. At the bottom of the dialog, there are buttons for "Reset", "OK", "Cancel", and "Apply". A red arrow points to the "OK" button.

Connect cloud to our network



Configure ip address



Configure ip address

□ /ip address add address=10.0.0.2/24 interface=ether1

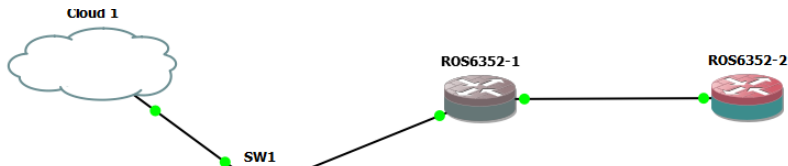
switch

et hub

et switch

Relay switch

52



```
ROS6352-1
MMMM  MMM  KKK  TTTTTTTTTT  KKK

MMM  MMM  III  KKK  KKK  RRR  RRR  OOOOOO  TTT  III  KKK  KKK

MikroTik RouterOS 6.35.2 (c) 1999-2016      http://www.mikrotik.com/

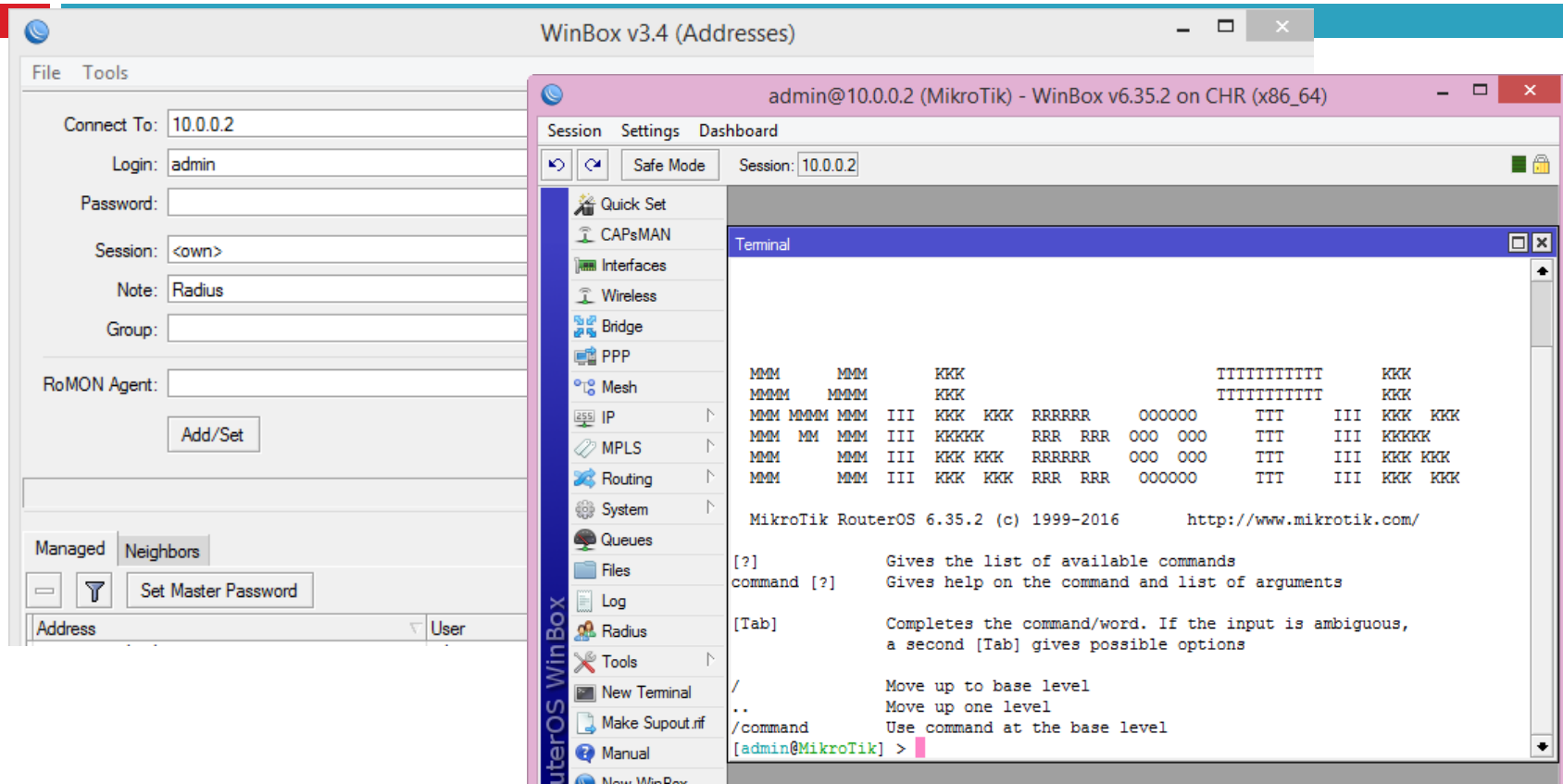
Do you want to see the software license? [Y/n]: n
[?]      Gives the list of available commands
command [?]  Gives help on the command and list of arguments

[Tab]      Completes the command/word. If the input is ambiguous,
           a second [Tab] gives possible options

/          Move up to base level
..         Move up one level
/command   Use command at the base level
may/25/2016 06:13:54 system,error,critical router was rebooted without proper shutdown

[admin@MikroTik] > /ip address add address=10.0.0.2/24 interface=ether1
[admin@MikroTik] >
```

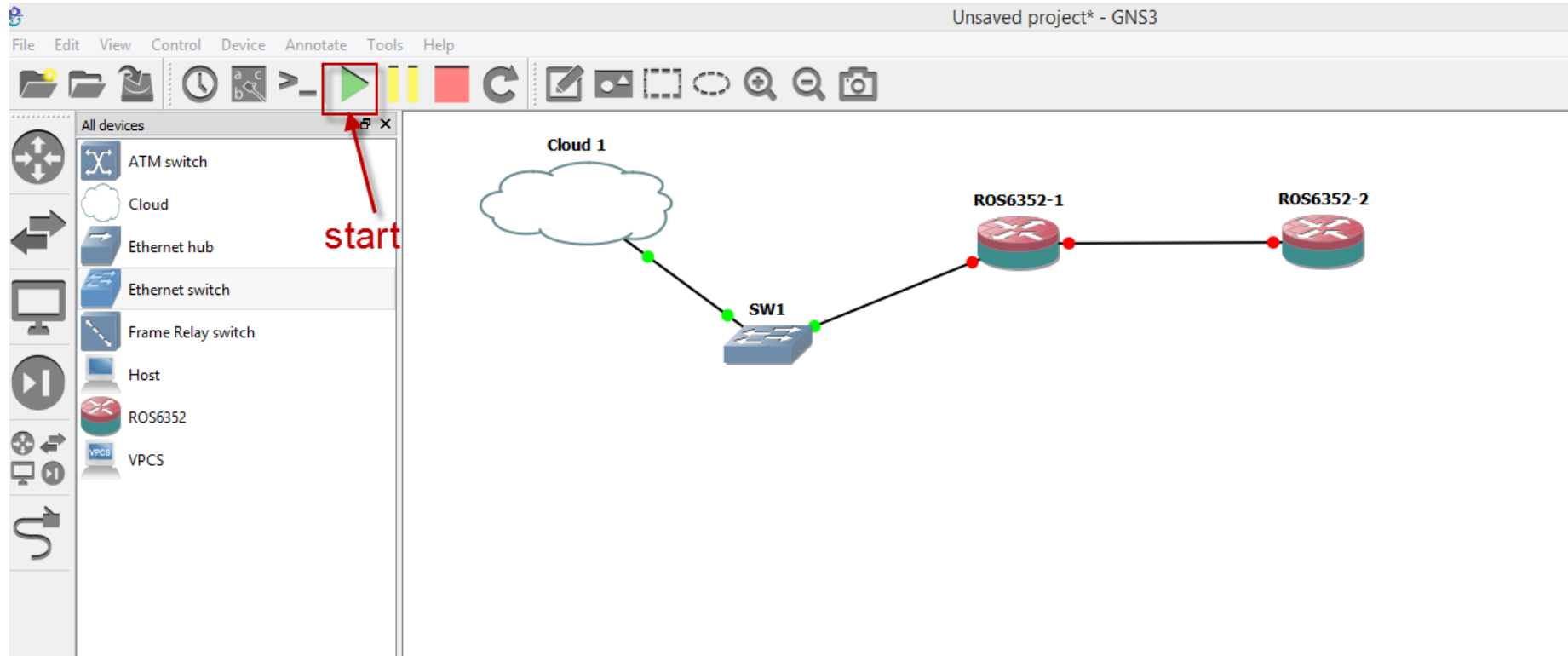
Connect to router



SUGGESTION



Connect cloud to our network



RoMON

RoMON คืออะไร

RoMON feature in RouterOS. RoMON stands for "Router Management Overlay Network". RoMON works by establishing independent MAC layer peer discovery and data forwarding network. RoMON network operates independently from L2 or L3 forwarding configuration.

Each router on RoMON network is assigned its RoMON ID. RoMON ID can be selected from port MAC address or specified by user.

RoMON protocol does not provide encryption services. Encryption is provided at "application" level, by e.g. using ssh or by using secure winbox

RoMON feature

- ❑ Built In RouterOS
- ❑ Peer discovery
- ❑ specific port
- ❑ Secrets
- ❑ Applications (ping,ssh)

Configuration

- ❑ เข้าไป **enable romon** ใน **router** ทุกตัว โดยใช้คำสั่ง

```
/tool romon set enabled=yes
```

```
MMM      MMM  III  KKK KKK  RRRRRR  OOO  OOO  TTT  I
MMM      MMM  III  KKK  KKK  RRR  RRR  OOOOOO  TTT  I

MikroTik RouterOS 6.35.2 (c) 1999-2016      http://www.mikro

[?]          Gives the list of available commands
command [?]  Gives help on the command and list of arguments

[Tab]        Completes the command/word. If the input is amb
              a second [Tab] gives possible options

/            Move up to base level
..          Move up one level
/command     Use command at the base level

[admin@r1] > /tool romon set enabled=yes
[admin@r1] > 
```

Connect to RoMON

WinBox v3.4 (Addresses)

File Tools

Connect To: 10.0.0.2

Login: admin

Password:

Add/Set

Connect To RoMON

Managed

Neighbors



Set Master Password

Address

User

ntcourt.dyndns.org

admin

amarate.dyndns.org

mikrotikthai

WinBox v3.4 (Addresses)

File Tools

Connect To: 10.0.0.2

Login: admin

Password:

☒ Keep Password

☐ Open In New W

RoMON Agent: 10.0.0.2

Add/Set

Disconnect From RoMON

Connect

Managed

RoMON Neighbors



Refresh

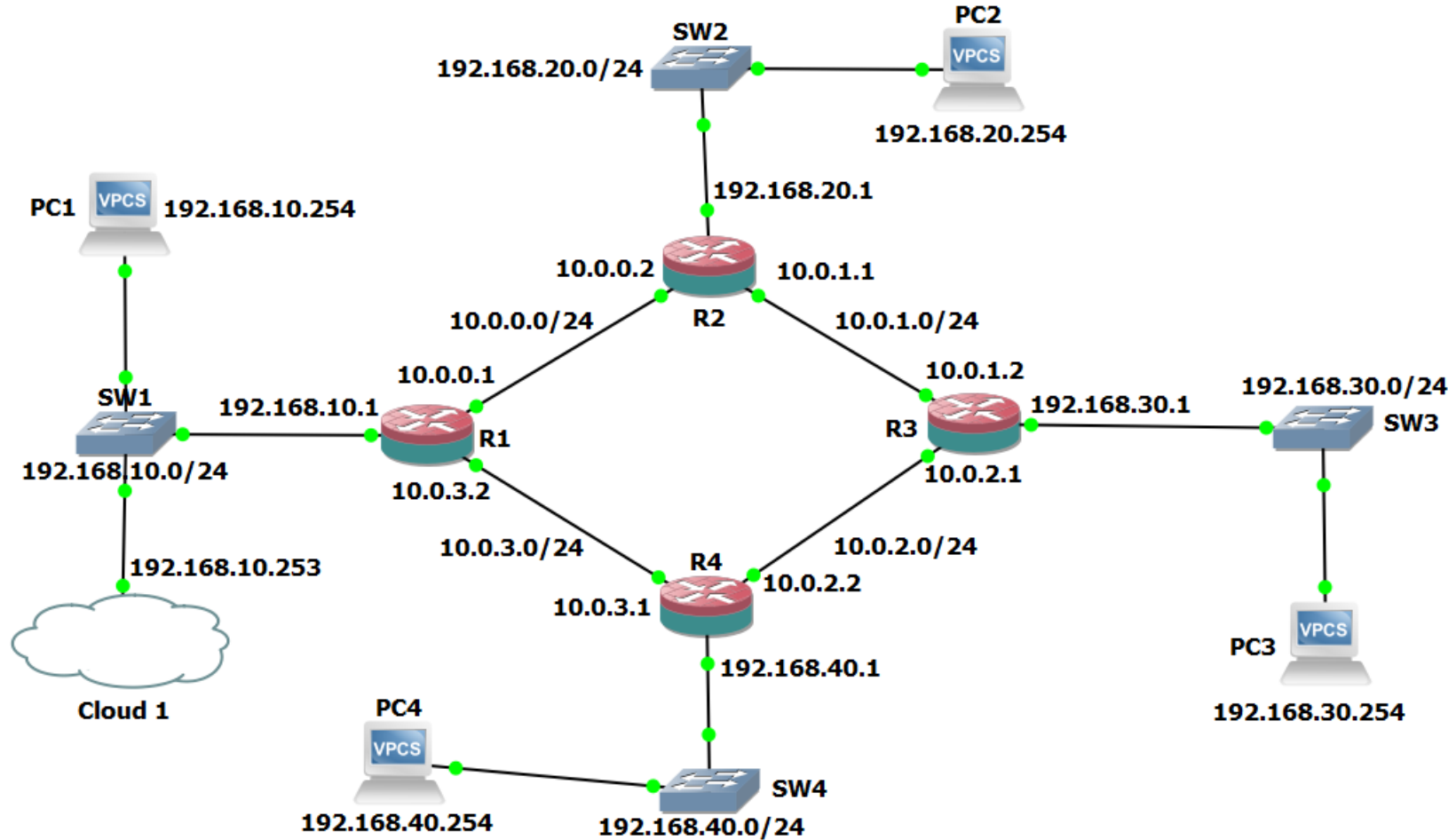
Find

Address	Cost	Hops	Path	L2MTU	Identity	Version	Board
00:00:AB:A4:91:04	200	1	00:00:AB:A4:91:04	1500	r2	6.35.2	CHR

LIVE DEMO



Static Route



Static Route

□ R1

/ip address

add address=192.168.10.1/24 interface=ether3 network=192.168.10.0

add address=10.0.0.1/24 interface=ether1 network=10.0.0.0

add address=10.0.3.2/24 interface=ether2 network=10.0.3.0

/ip route

add distance=1 dst-address=192.168.20.0/24 gateway=10.0.0.2

add distance=1 dst-address=192.168.30.0/24 gateway=10.0.0.2

add distance=1 dst-address=192.168.40.0/24 gateway=10.0.3.1

Static Route

□ R2

/ip address

add address=192.168.20.1/24 interface=ether3 network=192.168.20.0

add address=10.0.1.1/24 interface=ether1 network=10.0.1.0

add address=10.0.0.2/24 interface=ether2 network=10.0.0.0

/ip route

add distance=1 dst-address=192.168.10.0/24 gateway=10.0.0.1

add distance=1 dst-address=192.168.30.0/24 gateway=10.0.1.2

add distance=1 dst-address=192.168.40.0/24 gateway=10.0.1.2

Static Route

□ R3

/ip address

add address=192.168.30.1/24 interface=ether3 network=192.168.30.0

add address=10.0.1.2/24 interface=ether2 network=10.0.1.0

add address=10.0.2.1/24 interface=ether1 network=10.0.2.0

/ip route

add distance=1 dst-address=192.168.10.0/24 gateway=10.0.1.1

add distance=1 dst-address=192.168.20.0/24 gateway=10.0.1.1

add distance=1 dst-address=192.168.40.0/24 gateway=10.0.2.2

Static Route

□ R4

/ip address

add address=192.168.40.1/24 interface=ether3 network=192.168.40.0

add address=10.0.2.2/24 interface=ether2 network=10.0.2.0

add address=10.0.3.1/24 interface=ether1 network=10.0.3.0

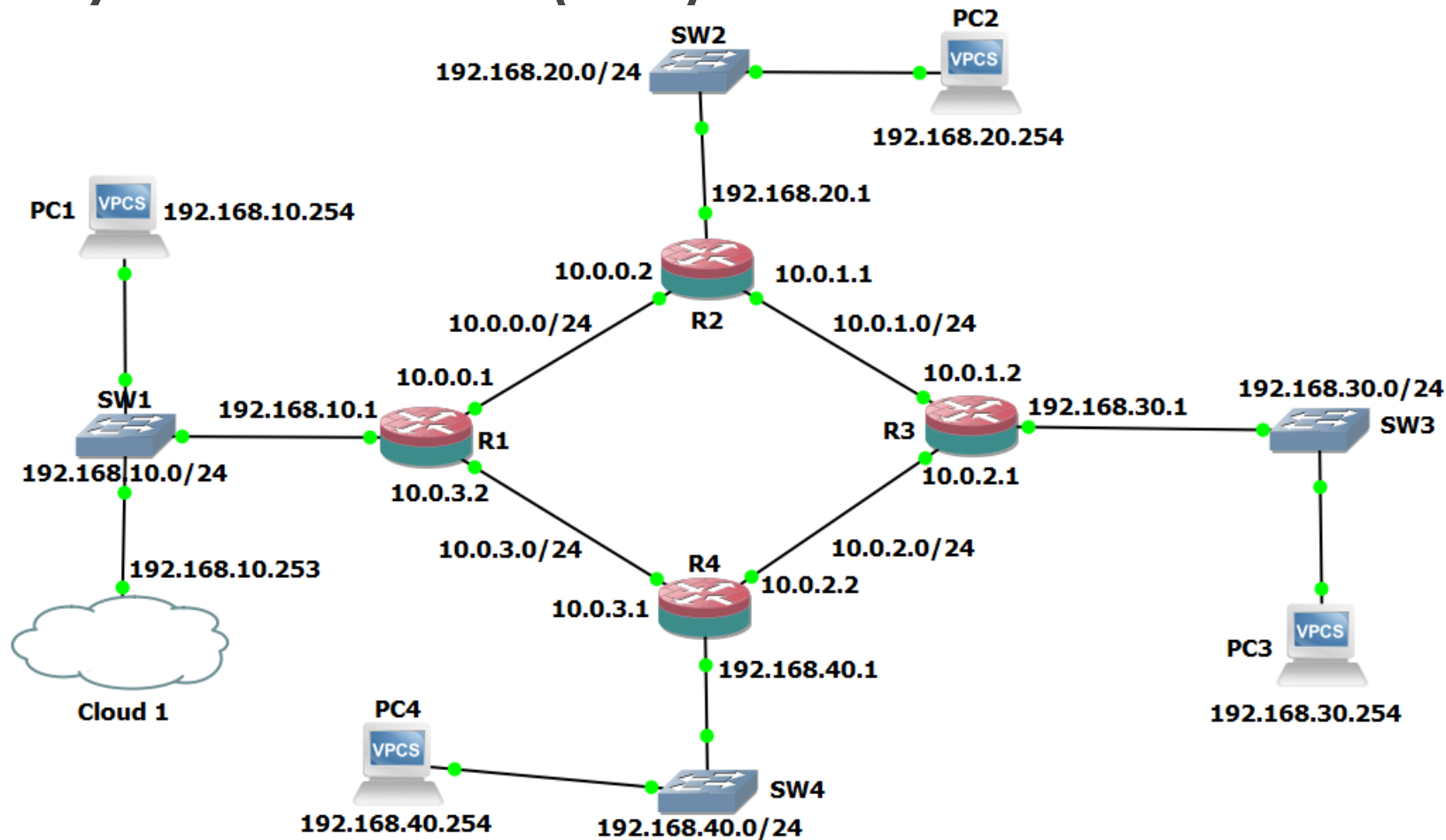
/ip route

add distance=1 dst-address=192.168.10.0/24 gateway=10.0.3.2

add distance=1 dst-address=192.168.20.0/24 gateway=10.0.3.2

add distance=1 dst-address=192.168.30.0/24 gateway=10.0.2.1

Dynamic Route(RIP)



Dynamic Route(RIP)

□ R1

/ip address

add address=192.168.10.1/24 interface=ether3 network=192.168.10.0

add address=10.0.0.1/24 interface=ether1 network=10.0.0.0

add address=10.0.3.2/24 interface=ether2 network=10.0.3.0

/routing rip interface

add send=v1-2

/routing rip network

add network=10.0.0.0/24

add network=10.0.3.0/24

add network=192.168.10.0/24

Dynamic Route(RIP)

□ R2

/ip address

add address=192.168.20.1/24 interface=ether3 network=192.168.20.0

add address=10.0.1.1/24 interface=ether1 network=10.0.1.0

add address=10.0.0.2/24 interface=ether2 network=10.0.0.0

/routing rip interface

add send=v1-2

/routing rip network

add network=192.168.20.0/24

add network=10.0.0.0/24

add network=10.0.1.0/24

Dynamic Route(RIP)

□ R3

/ip address

add address=192.168.30.1/24 interface=ether3 network=192.168.30.0

add address=10.0.1.2/24 interface=ether2 network=10.0.1.0

add address=10.0.2.1/24 interface=ether1 network=10.0.2.0

/routing rip interface

add send=v1-2

/routing rip network

add network=192.168.30.0/24

add network=10.0.1.0/24

add network=10.0.2.0/24

Dynamic Route(RIP)

□ R4

/ip address

add address=192.168.40.1/24 interface=ether3 network=192.168.40.0

add address=10.0.2.2/24 interface=ether2 network=10.0.2.0

add address=10.0.3.1/24 interface=ether1 network=10.0.3.0

/routing rip interface

add send=v1-2

/routing rip network

add network=192.168.40.0/24

add network=10.0.2.0/24

add network=10.0.3.0/24

VPC

- PC1

ip 192.168.10.254/24 192.168.10.1

- PC2

ip 192.168.20.254/24 192.168.20.1

- PC3

ip 192.168.30.254/24 192.168.30.1

- PC4

ip 192.168.40.254/24 192.168.40.1

THANK YOU



Reference:

- ❑ <https://github.com/GNS3/gns3-gui/releases>
- ❑ <http://mum.mikrotik.com/presentations/ID13/rofiq.pdf>
- ❑ <http://wiki.mikrotik.com/wiki/Manual:CHR>
- ❑ <http://wiki.mikrotik.com/wiki/Manual:RoMON>
- ❑ [http://wiki.mikrotik.com/wiki/Simple Static Routes Example](http://wiki.mikrotik.com/wiki/Simple_Static_Routes_Example)
- ❑ <http://wiki.mikrotik.com/wiki/Manual:Routing/RIP>

About ME



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- ❑ Line : @mikrotikthai
- ❑ Facebook Group : <http://goo.gl/7ohPRT>

- ❑ สถาบันที่ได้การแต่งตั้งให้เป็นศูนย์อบรมของไมโครติกแห่งแรกของเมืองไทย
- ❑ สอนด้วยอาจารย์ระดับมหาวิทยาลัยและทีมงานผู้ชำนาญงานพิเศษระดับ 8 และมีประสบการณ์มากกว่า 20 ปี
- ❑ อบรมตามมาตรฐานของไมโครติกพร้อมสอบใบประกาศ
- ❑ สามารถเรียนซ้ำได้ไม่จำกัดจำนวนครั้ง
- ❑ มีที่พักงานหลังจากเรียนจบพร้อมฝึกงานชำนาญ