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

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Presented By :

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Mikrotikthai Co.,Ltd

# OBJECTIVE

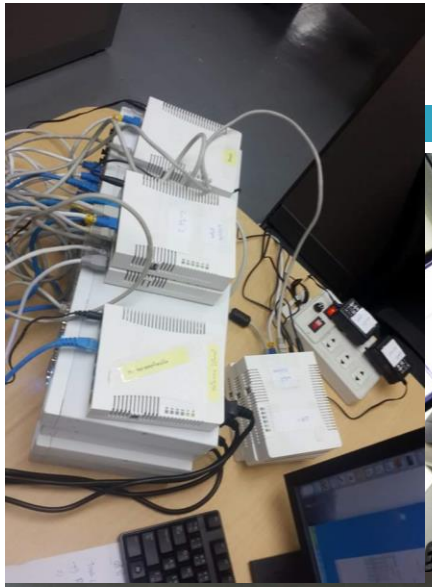
- **Network simulation**

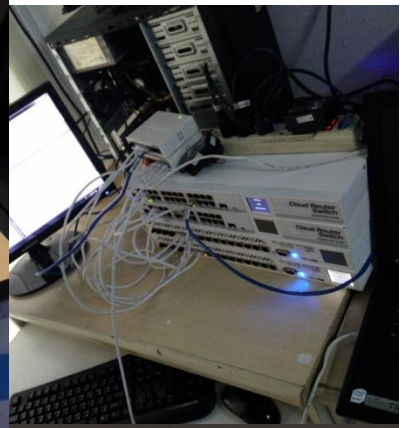
  เพื่อจำลองการทำงานของระบบเครือข่าย ทดสอบการทำงานต่างๆ ก่อนที่จะ ติดตั้งบนเครือข่ายจริง

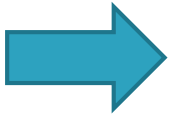
- **Learning**

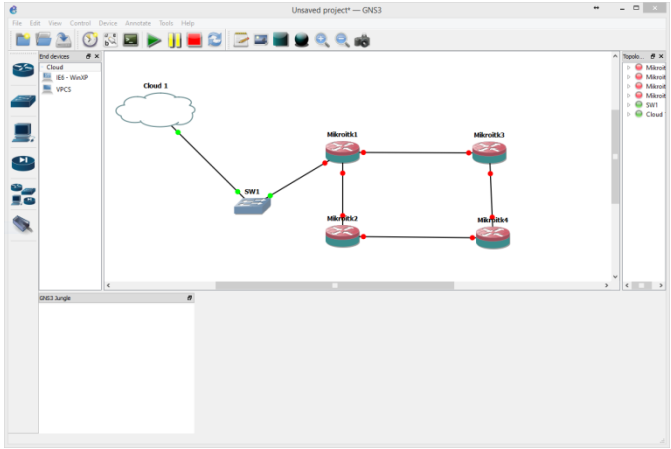
  สำหรับการเรียนรู้ฟีตเจอร์ของ **Mikrotik** ใช้ในการเรียนการสอนให้

# Concept








Unsaved project* — GNS3
Cloud 1
SW1
Mikrotik1
Mikrotik3
Mikrotik2
Mikrotik4

# 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)

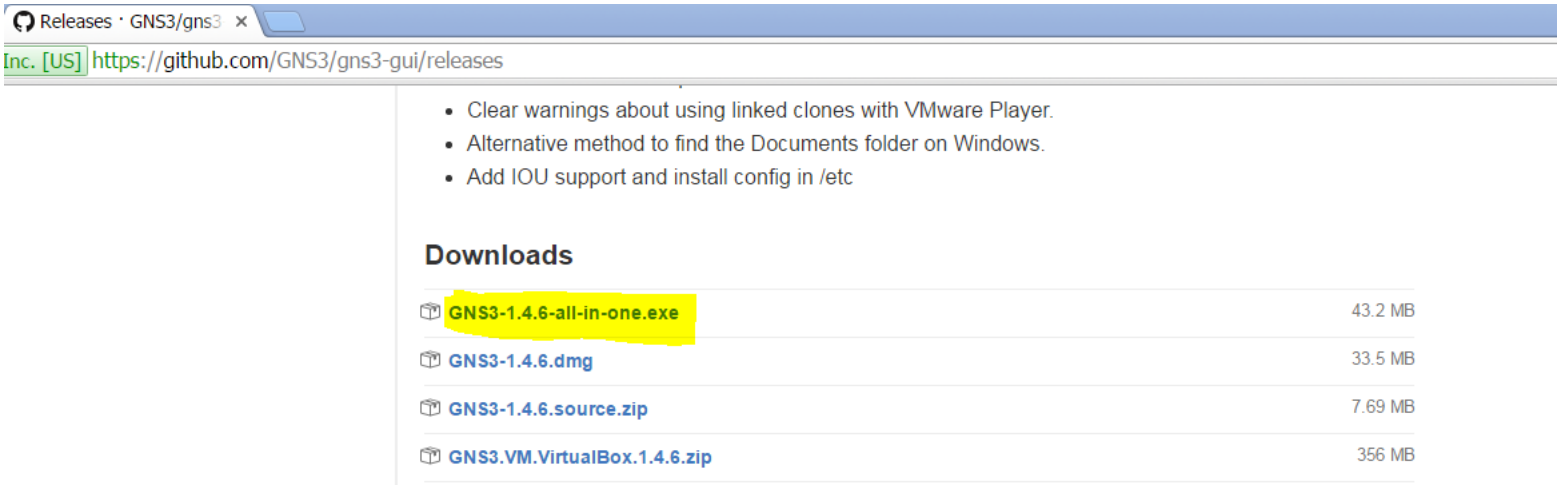
- RouterOS (Cloud Hosted Router) (ต่อ)
  - The CHR has 4 license levels:

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

# HOW TO

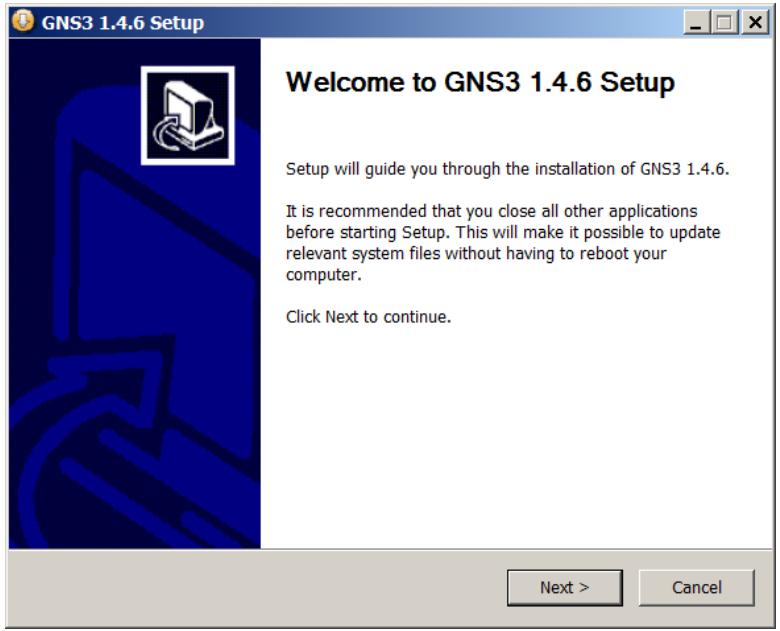
# 1.Download GNS3

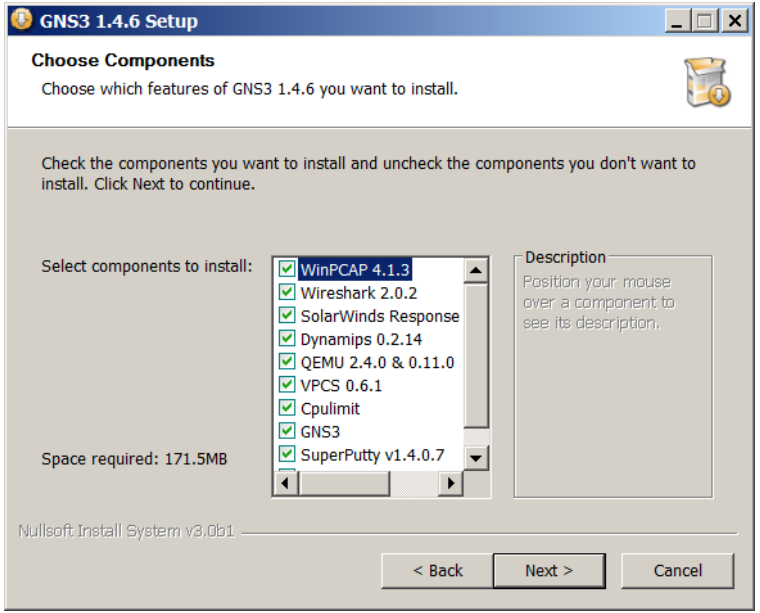
- ไปที่ https://github.com/GNS3/gns3-gui/releases
- ดาวน์โหลด **GNS3-x.x.x-all-in-one.exe**



# 2.Install GNS3

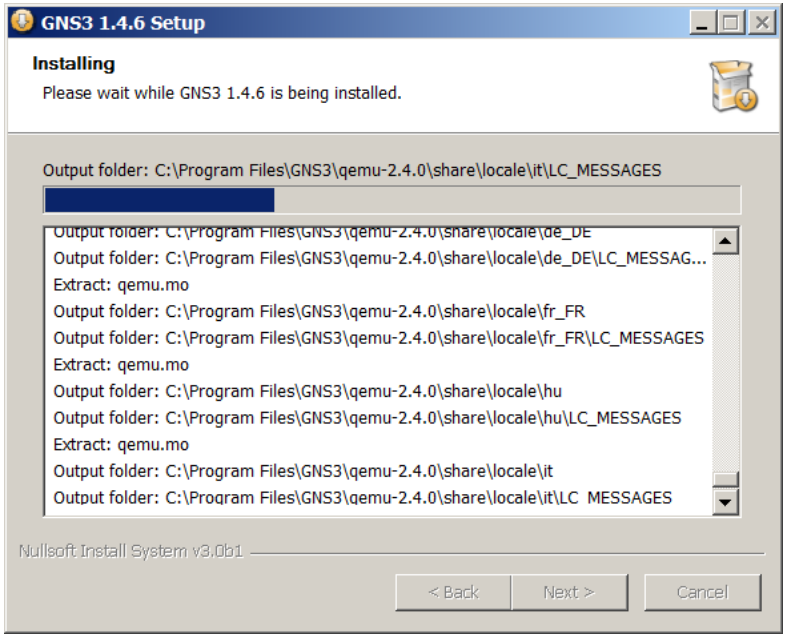
- ติดตั้งไฟล์ที่ดาวน์โหลดมา(ติดตั้งแบบ **default** โดยไม่ต้องปรับค่า)

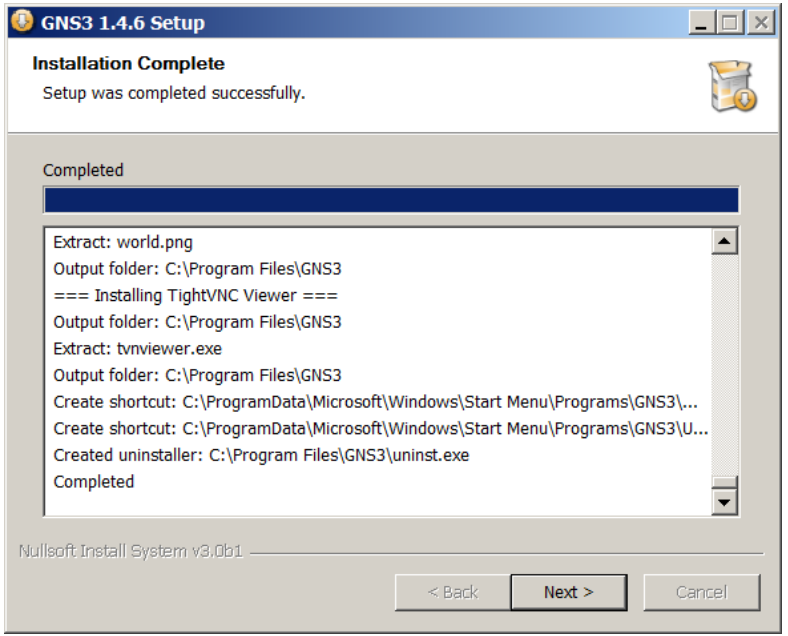


# 2.Install GNS3(ต่อ)

- รอจนเสร็จ



# 3.Download CHR Image

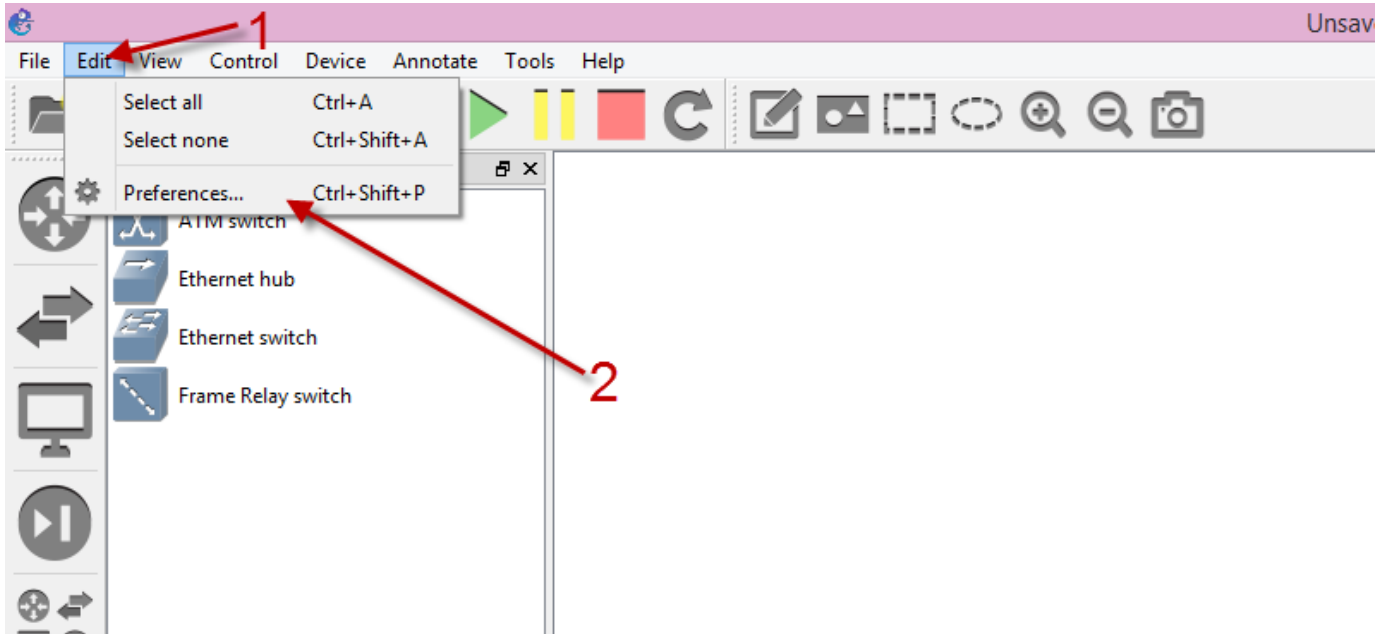
- ไปที่ http://www.mikrotik.com/download
- ดาวน์โหลด CHR แบบ Raw disk image และแตก zip

Cloud Hosted Router

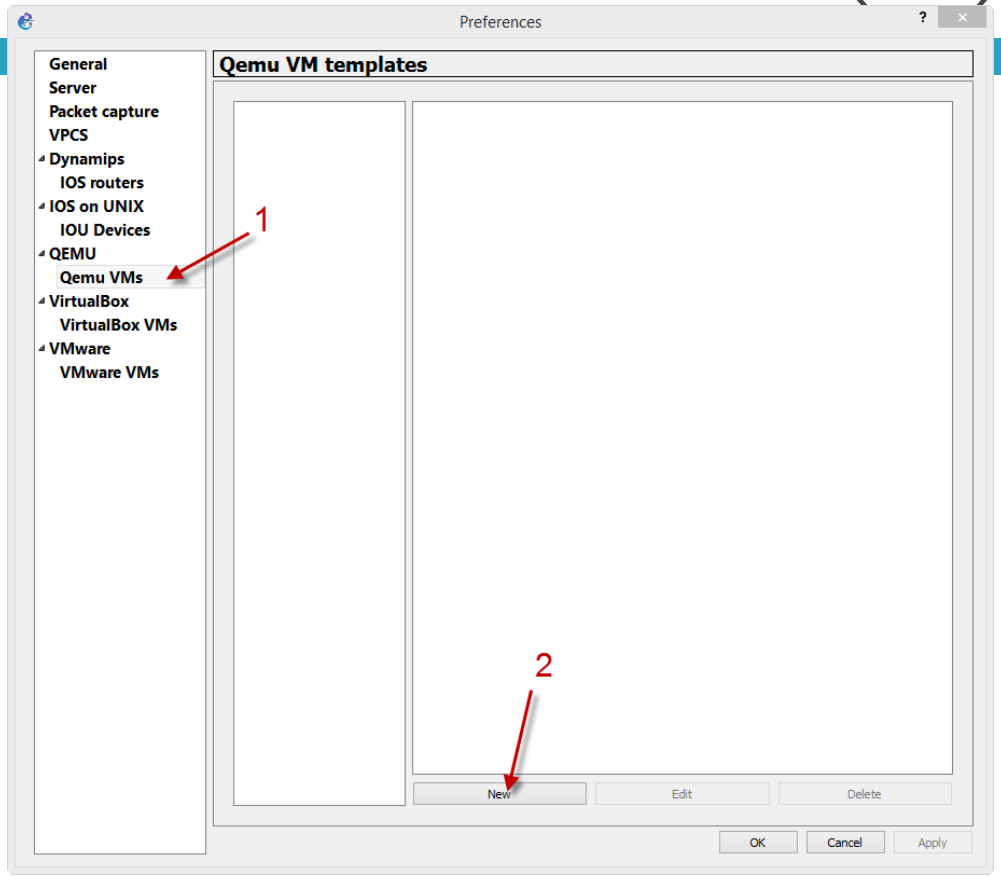
| | 6.32.4 (Bugfix only) | 6.35.2 (Current) | 5.26 (Legacy) | 6.36rc16 (Release candidate) |
|---|---|---|---|---|
| **images** | img, vmdk, vhd, vhdx, vdi | | | |
| The Dude server | - | ⬇ | - | ⬇ |
| VMDK image | - | ⬇ | - | ⬇ |
| VHDX image | - | ⬇ | - | ⬇ |
| VDI image | - | ⬇ | - | ⬇ |
| Raw disk 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)



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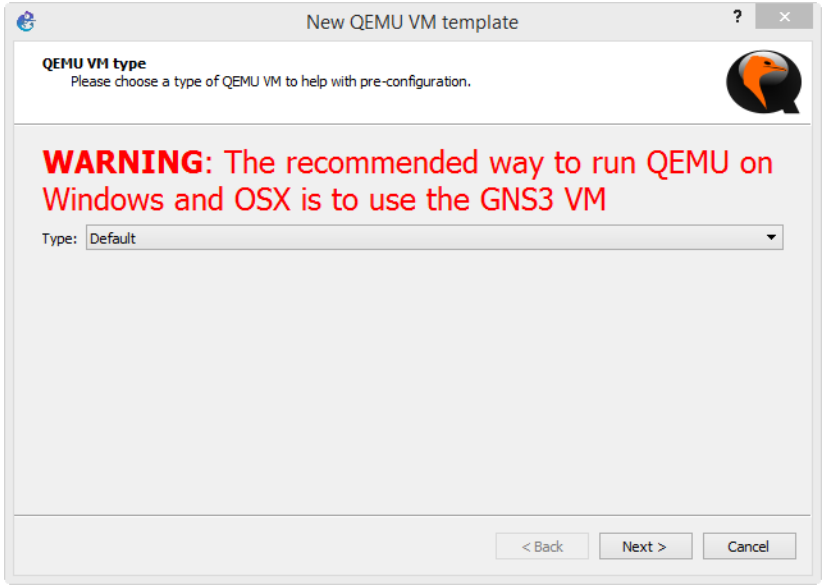


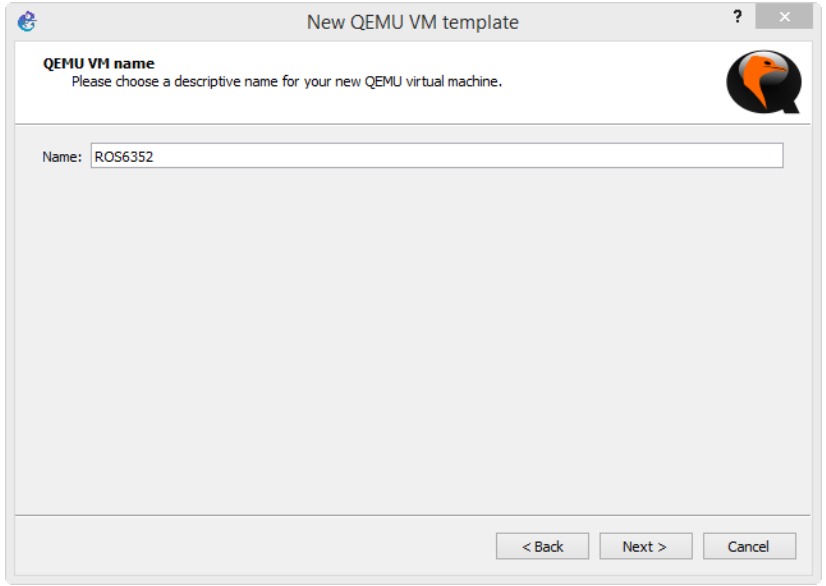

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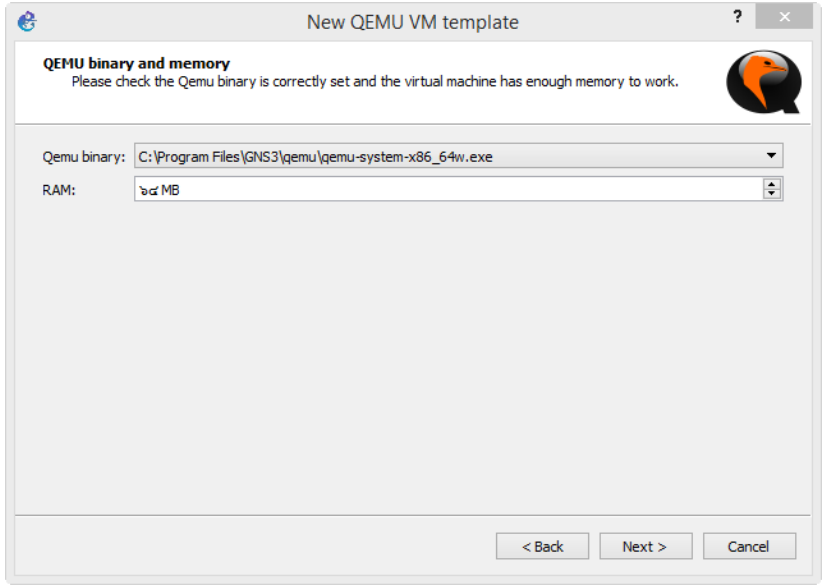


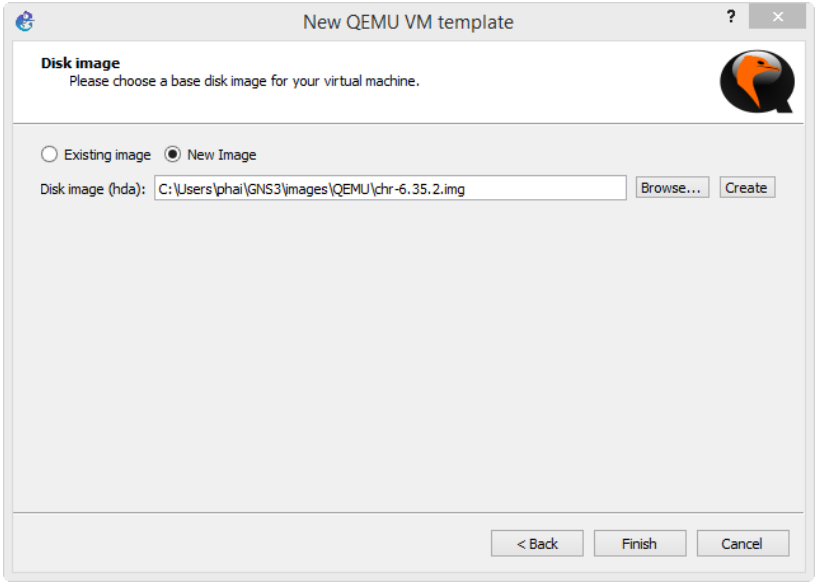

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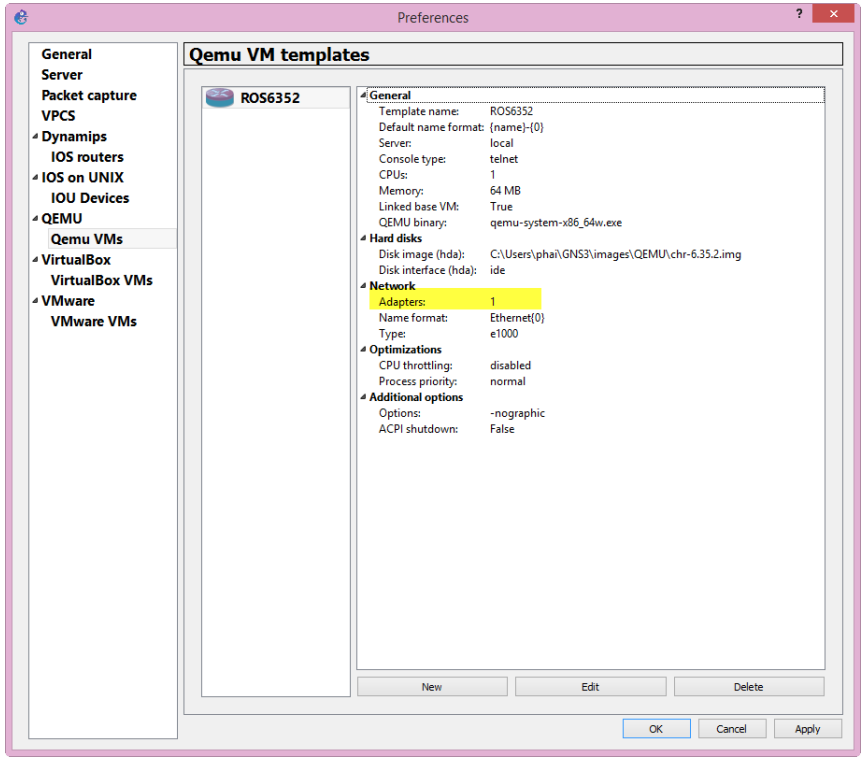
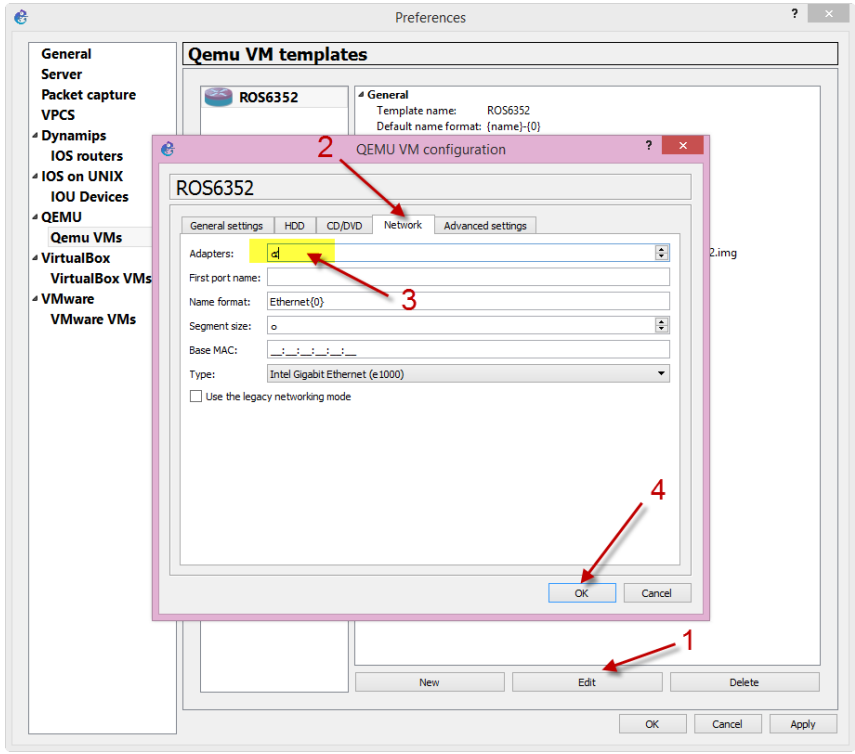
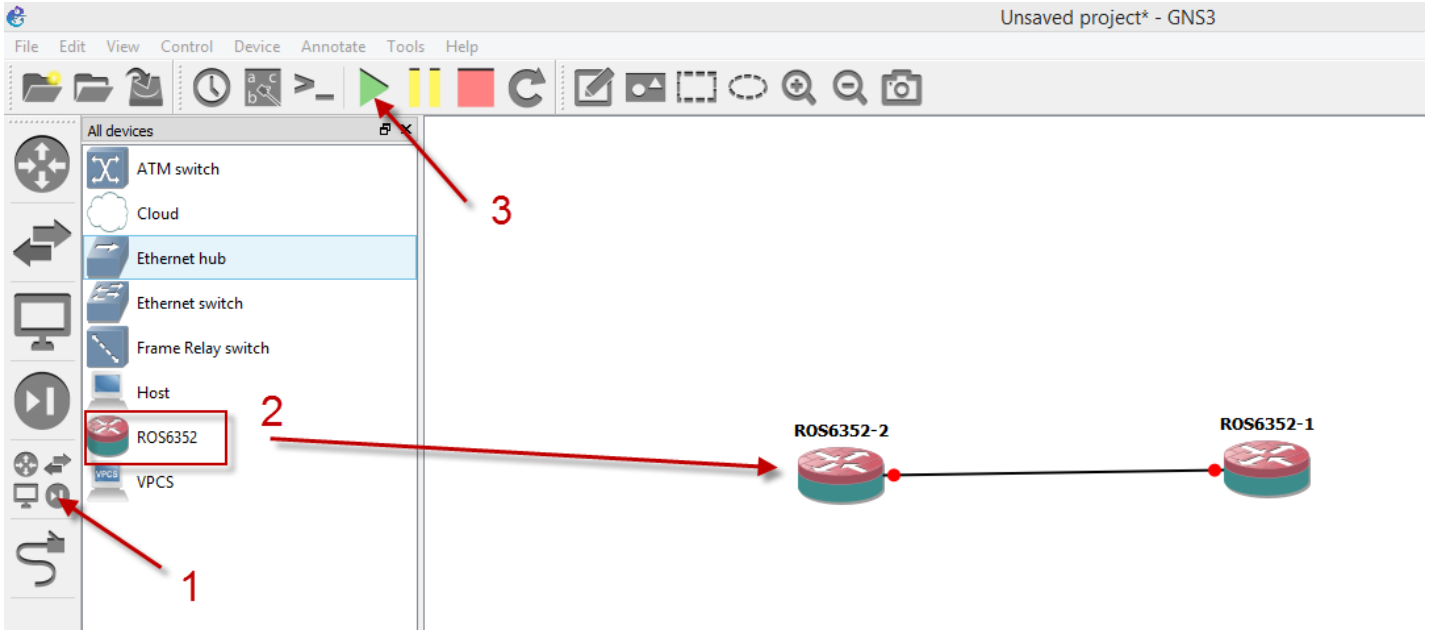


# 5.Mikrotik device is ready to use!!



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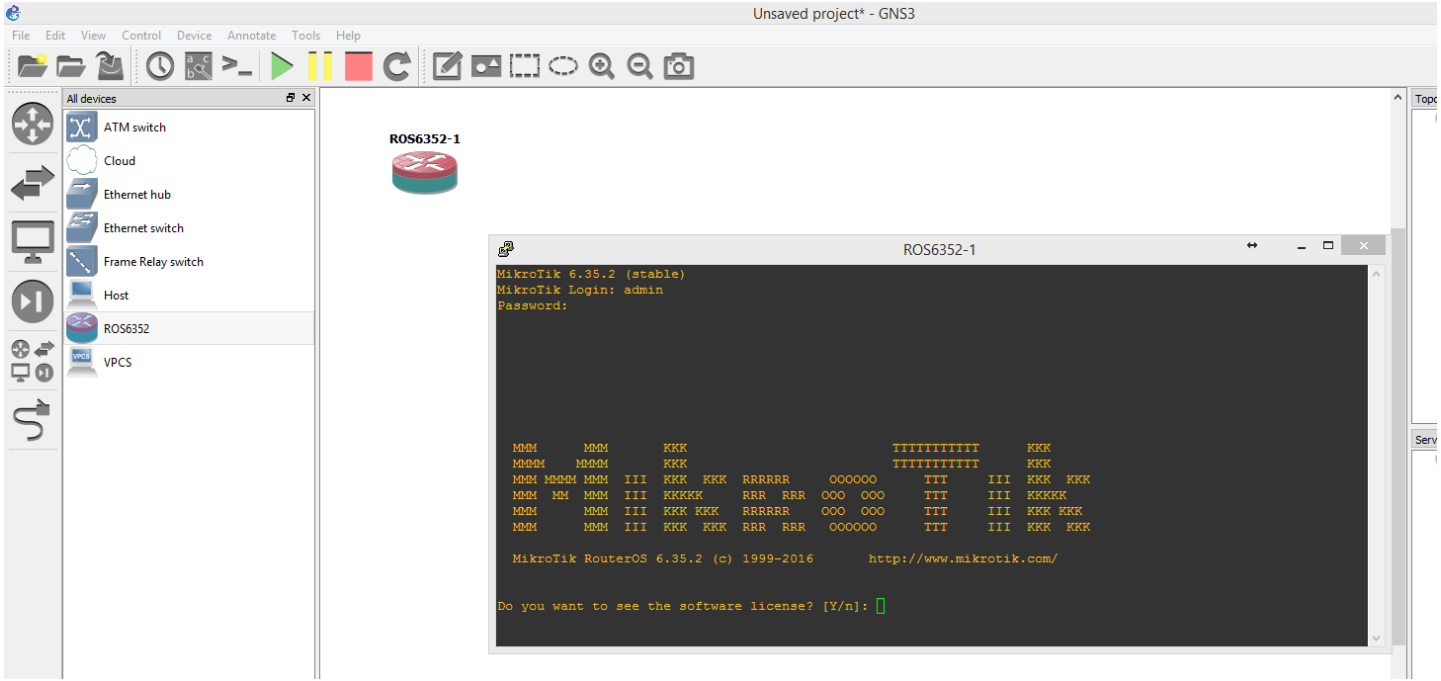
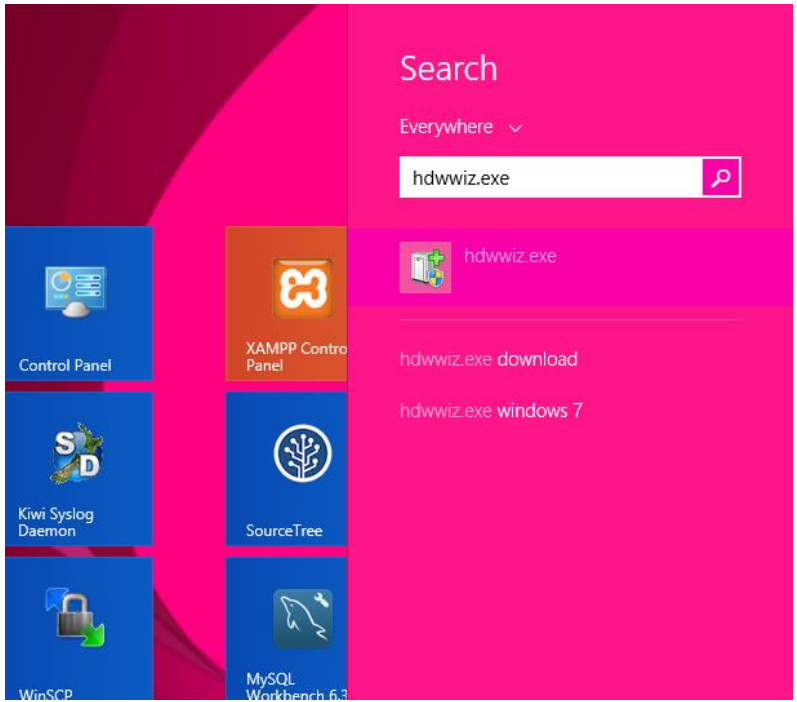


# MANAGE OUR VIRTUAL ROUTER VIA WINBOX

# Create loopback interface

- กด **start menu**
- พิมพ์ **hdwwiz.exe** แล้ว **enter**



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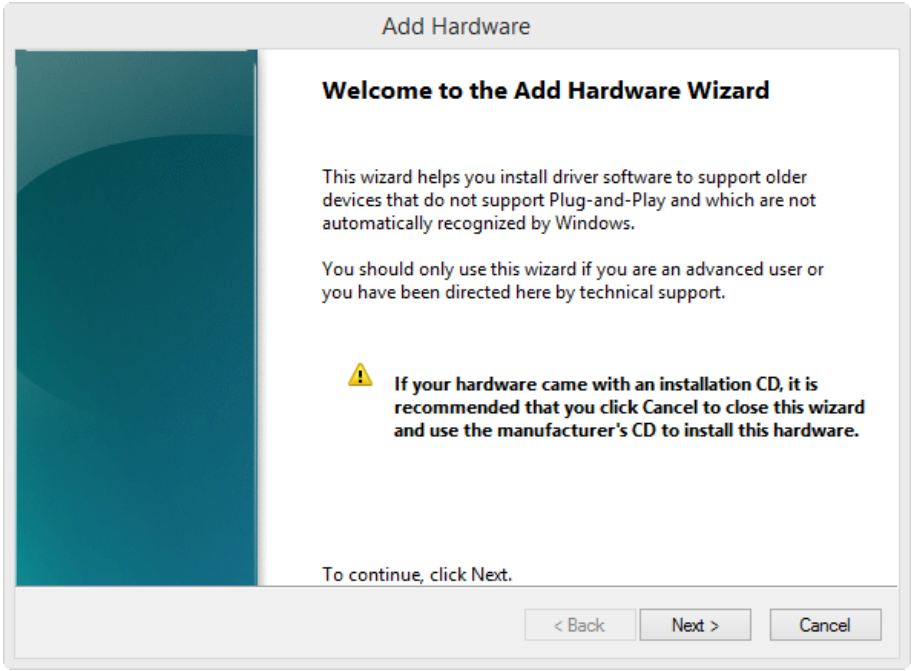


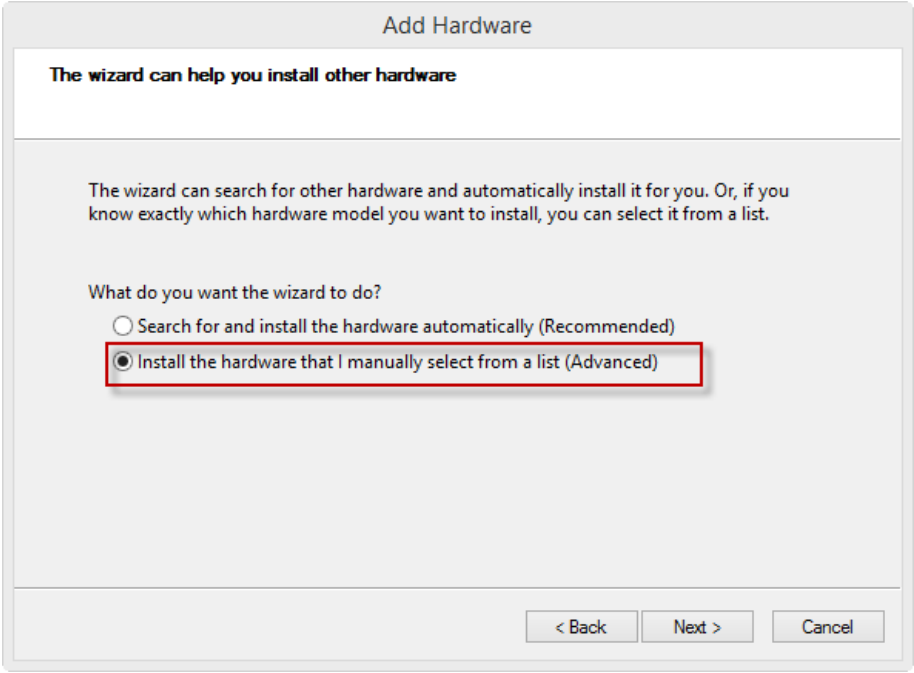

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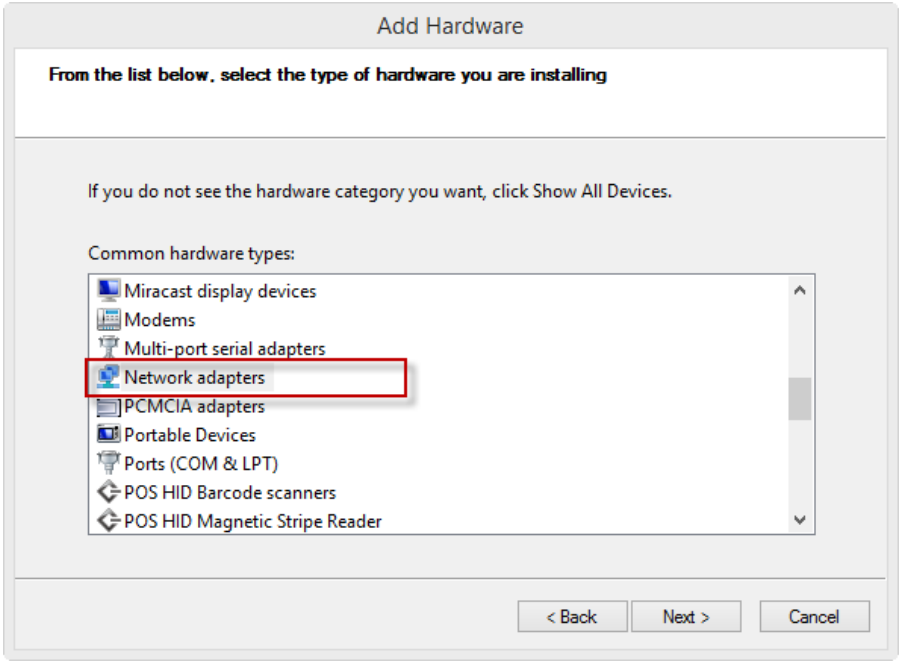


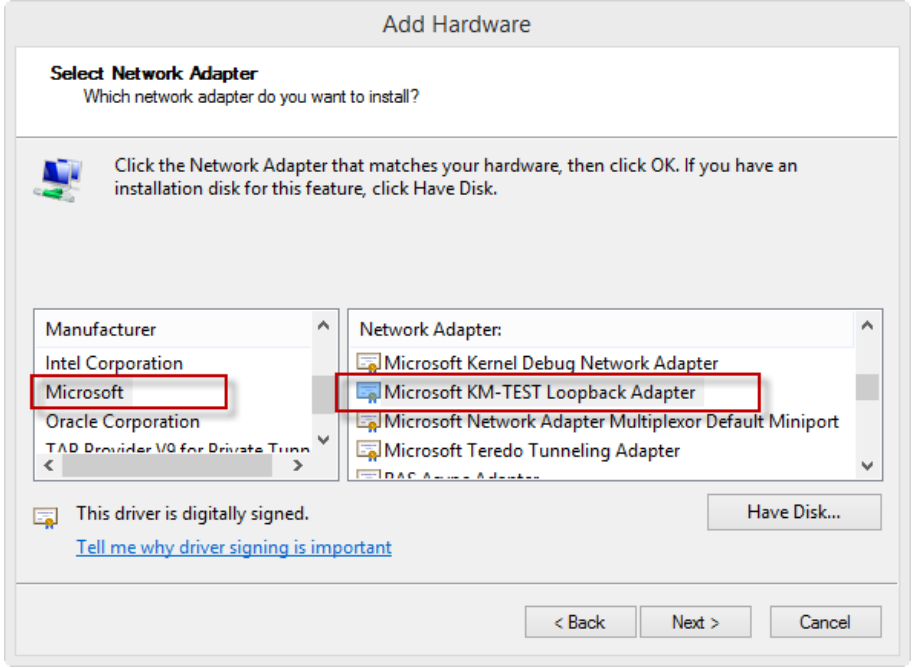

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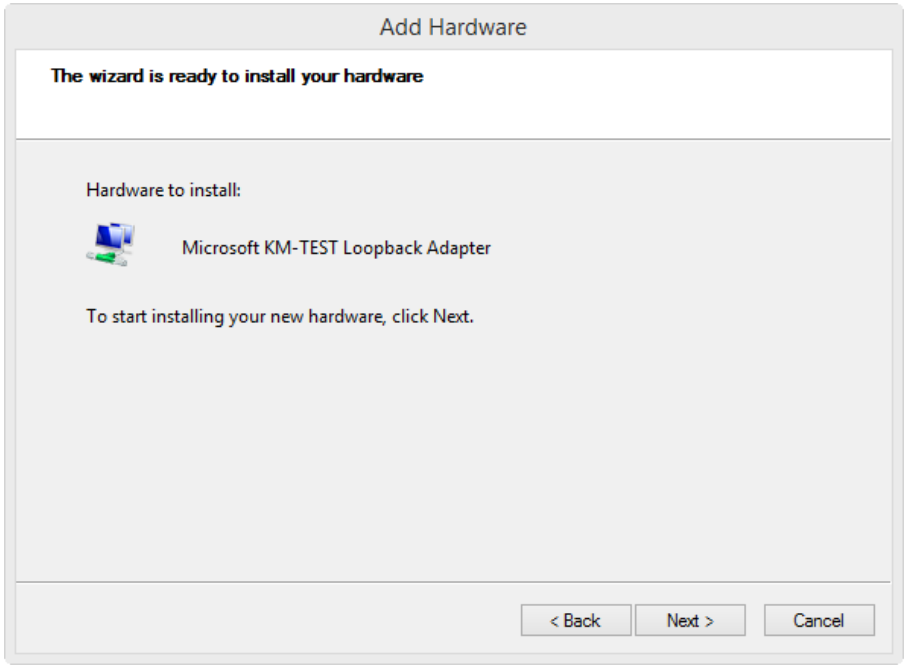
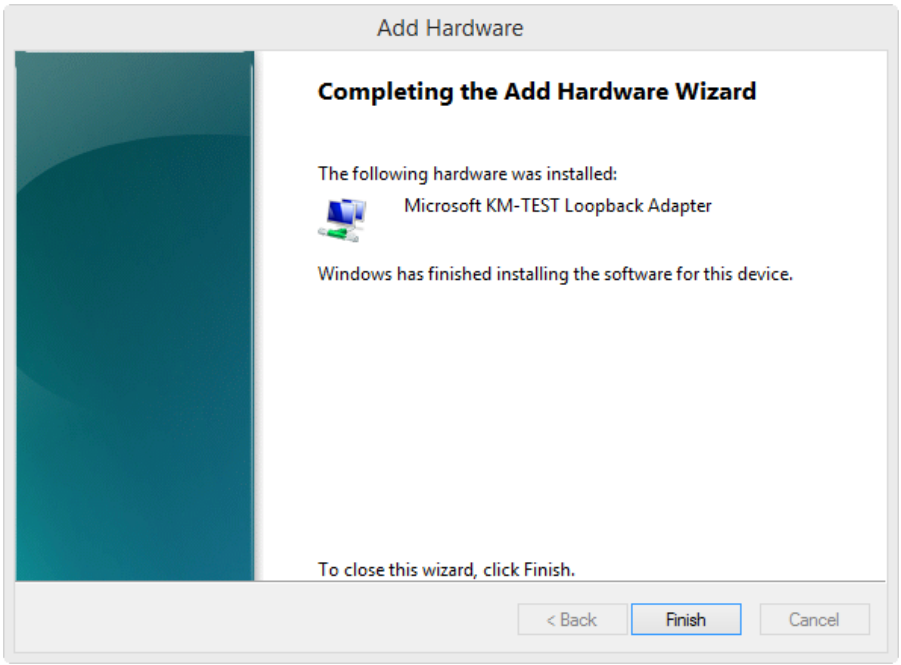
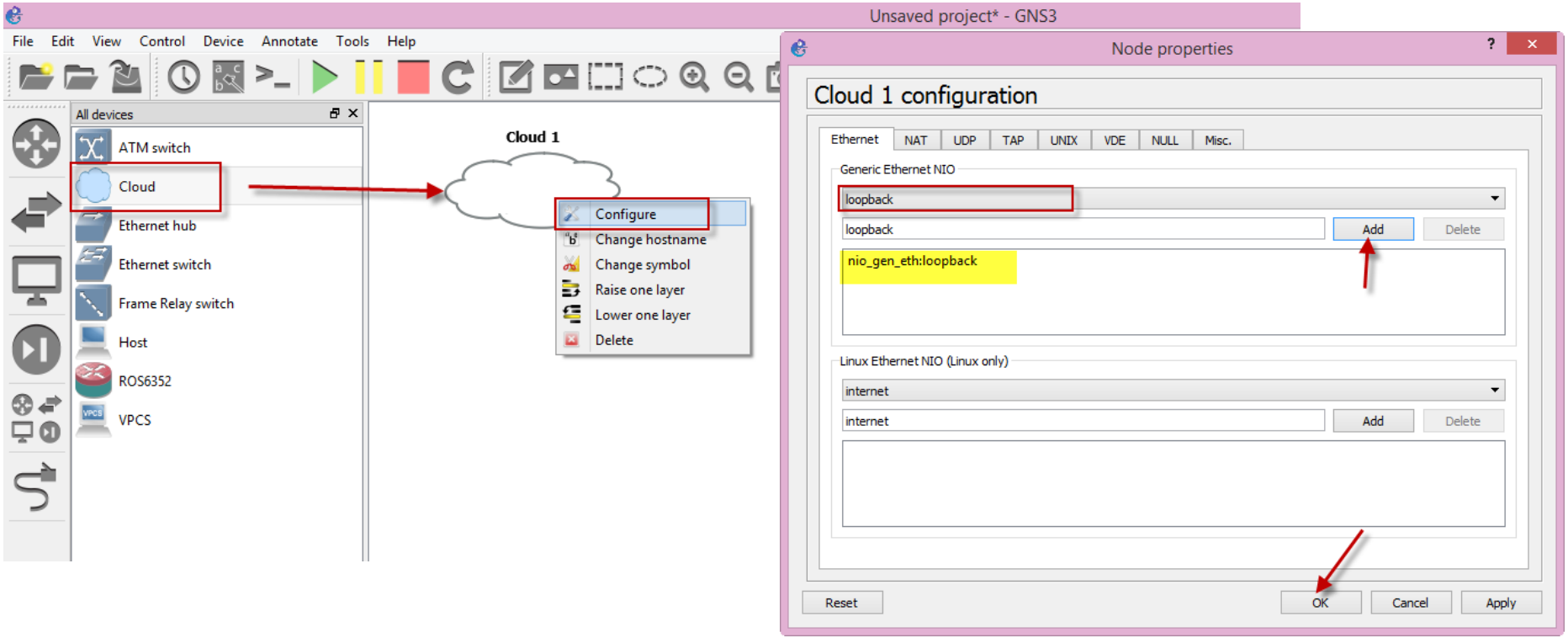
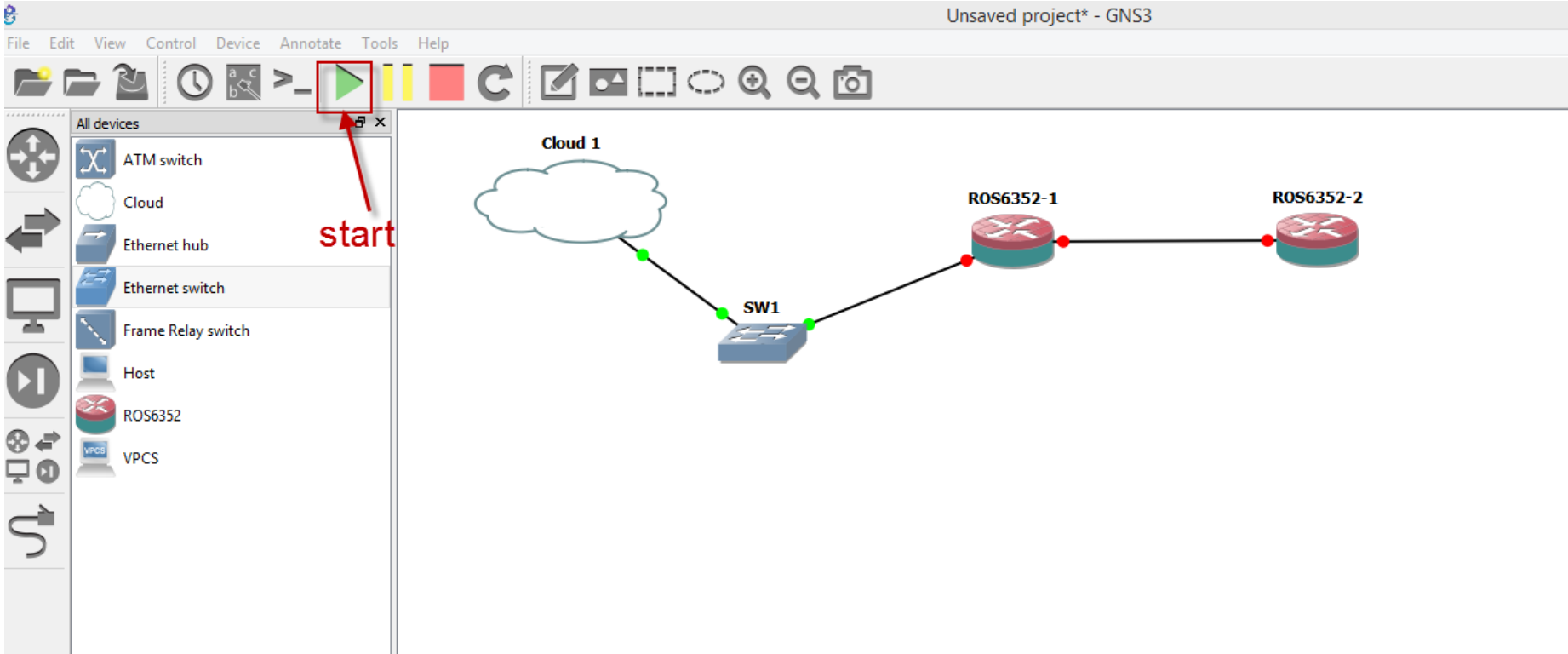


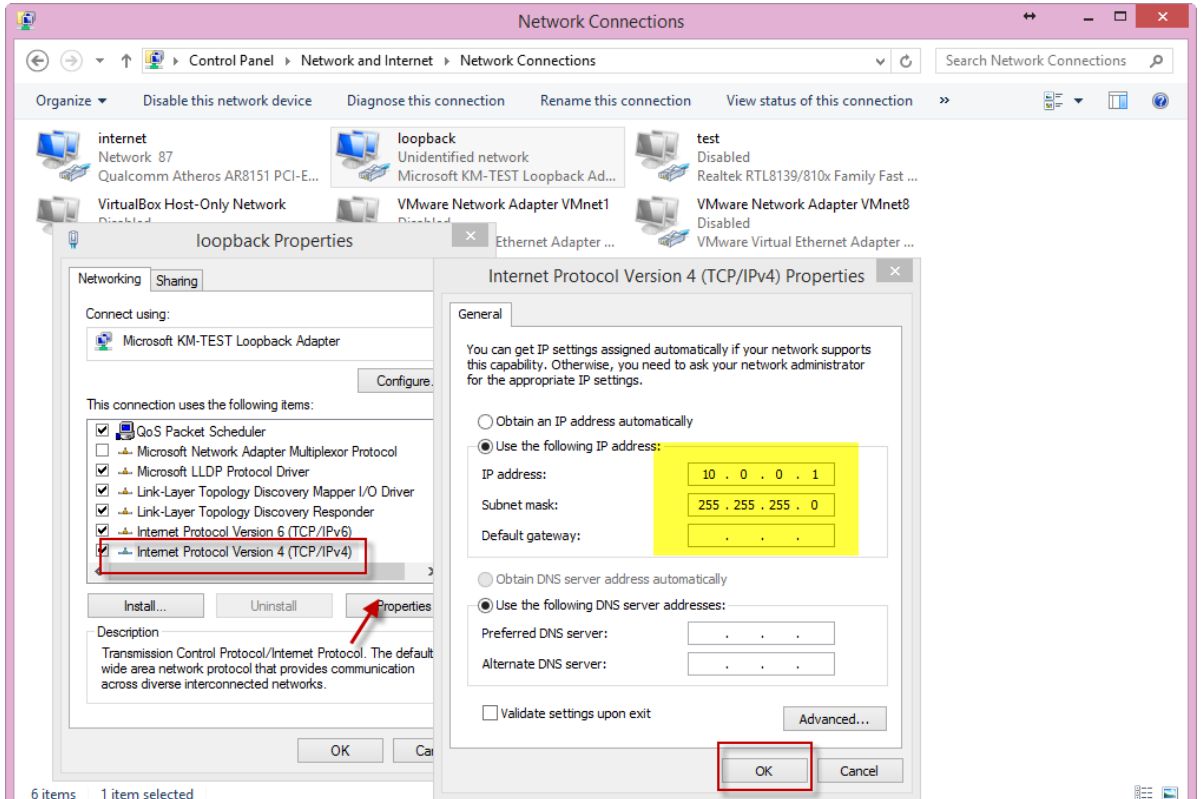
# Configure Cloud



# Connect cloud to our network

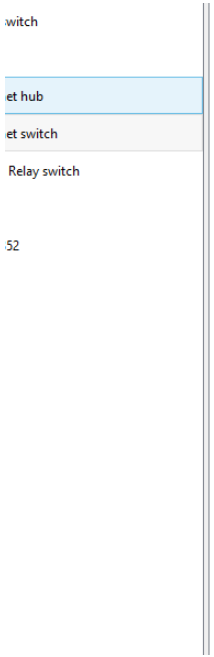


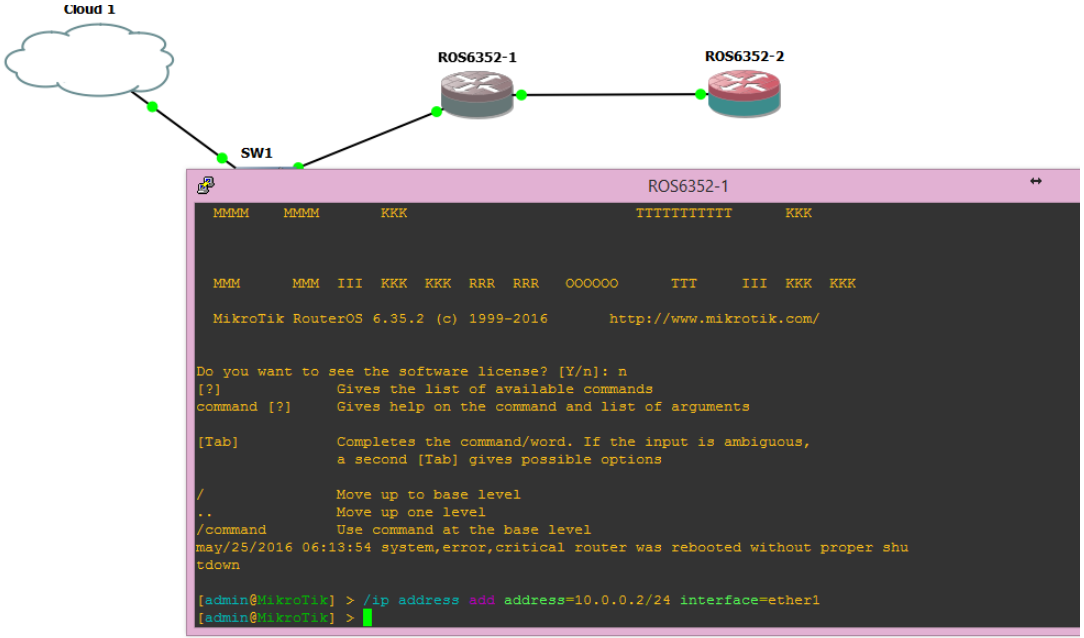
# Configure ip address



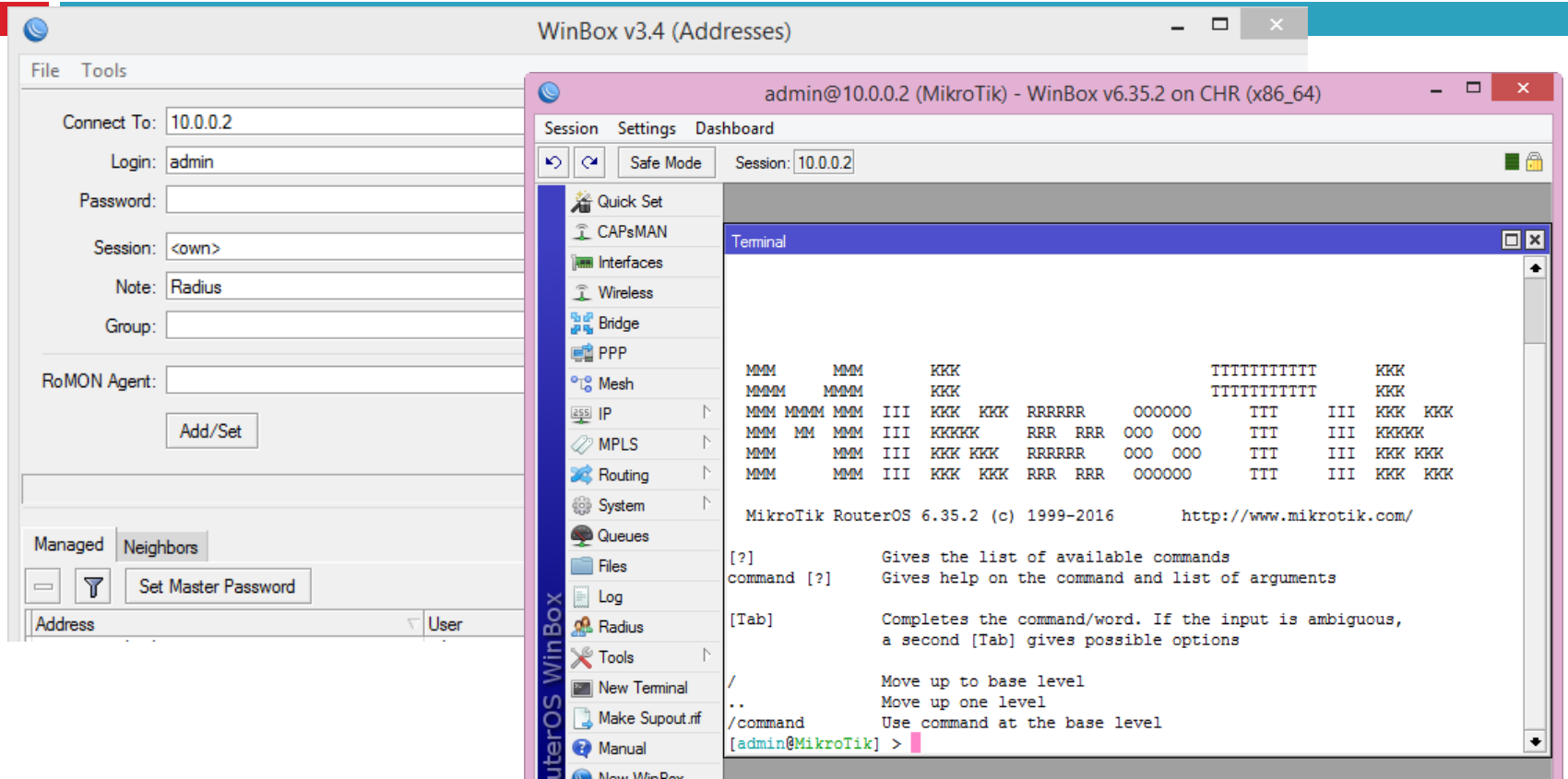
# Configure ip address

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



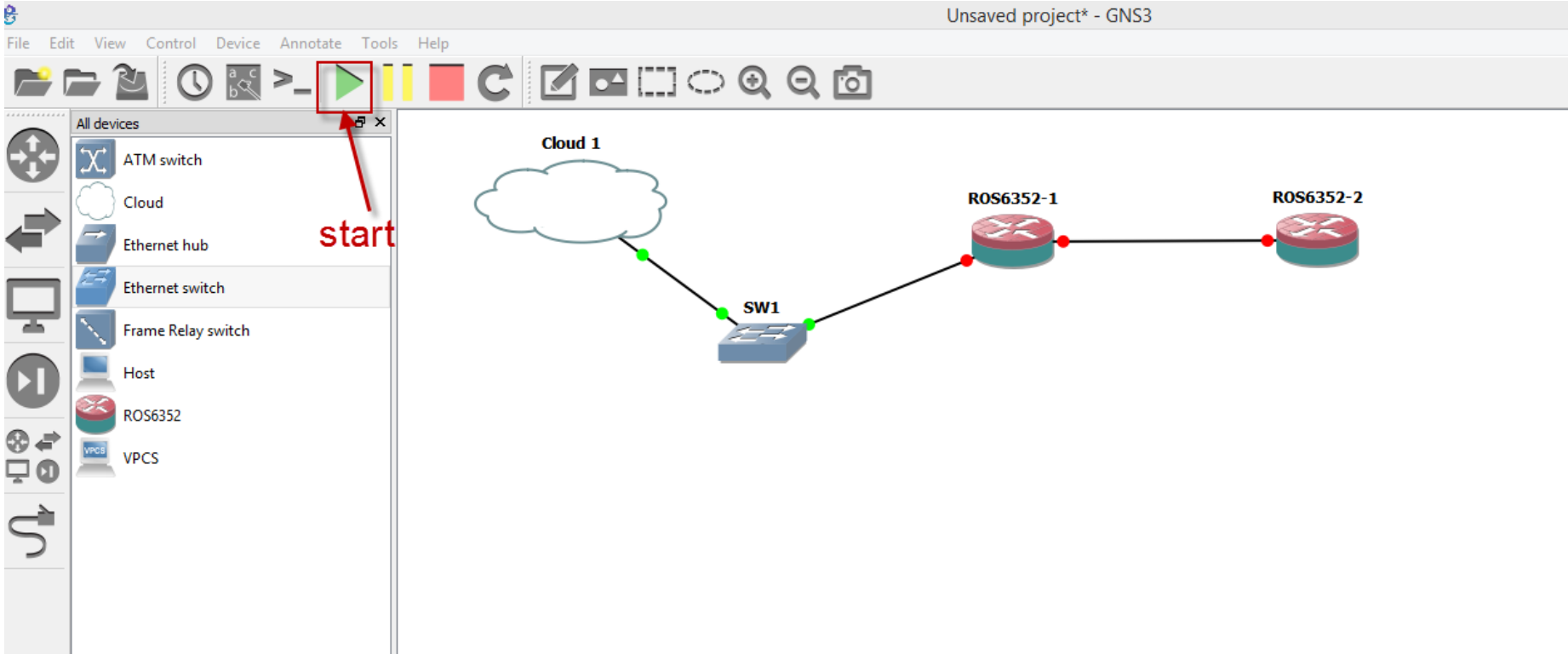



# Connect to router



# 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

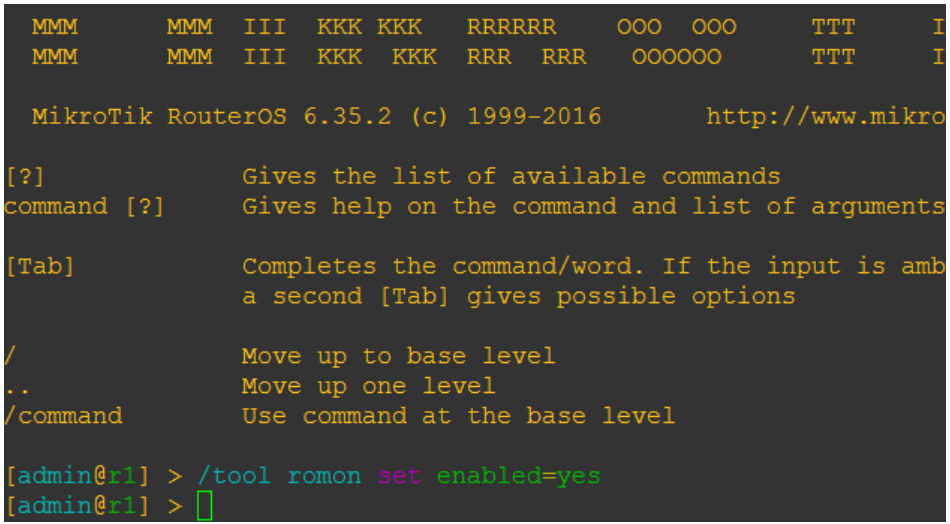
# RoMON feature

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

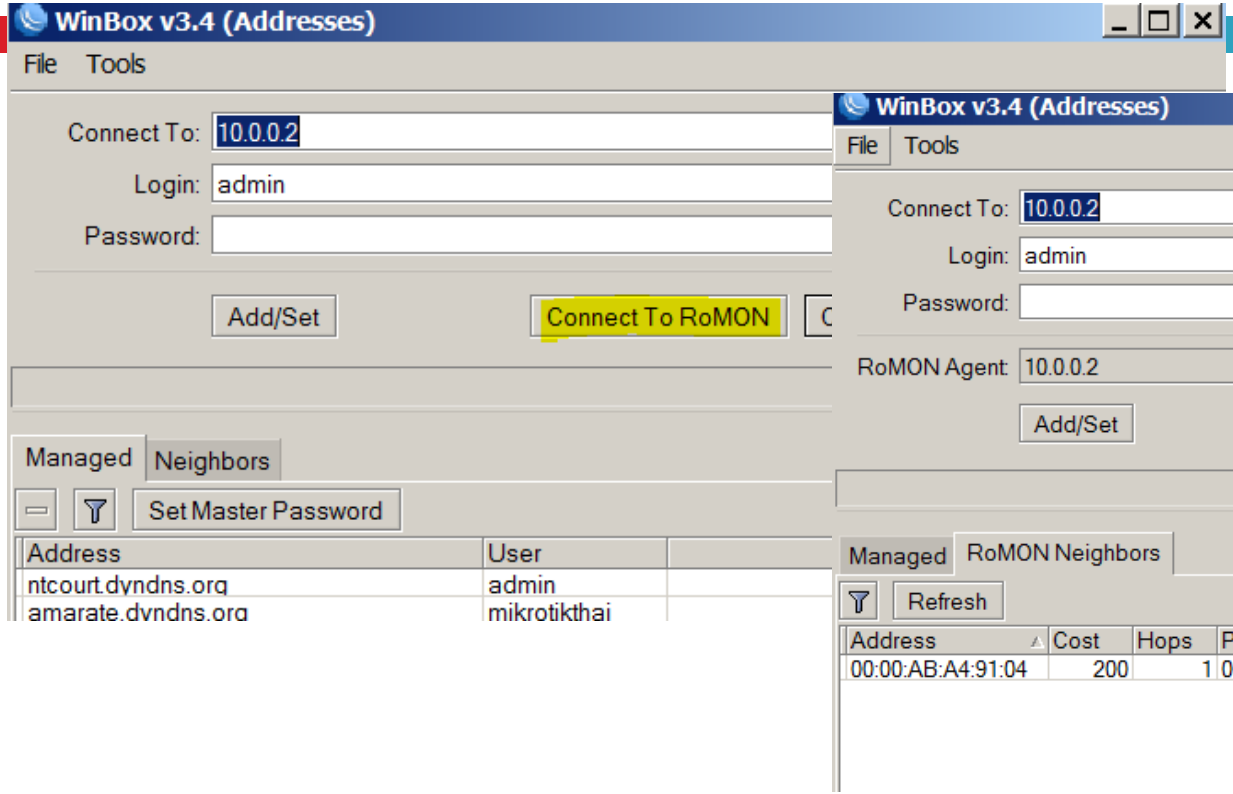
# Configuration

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

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

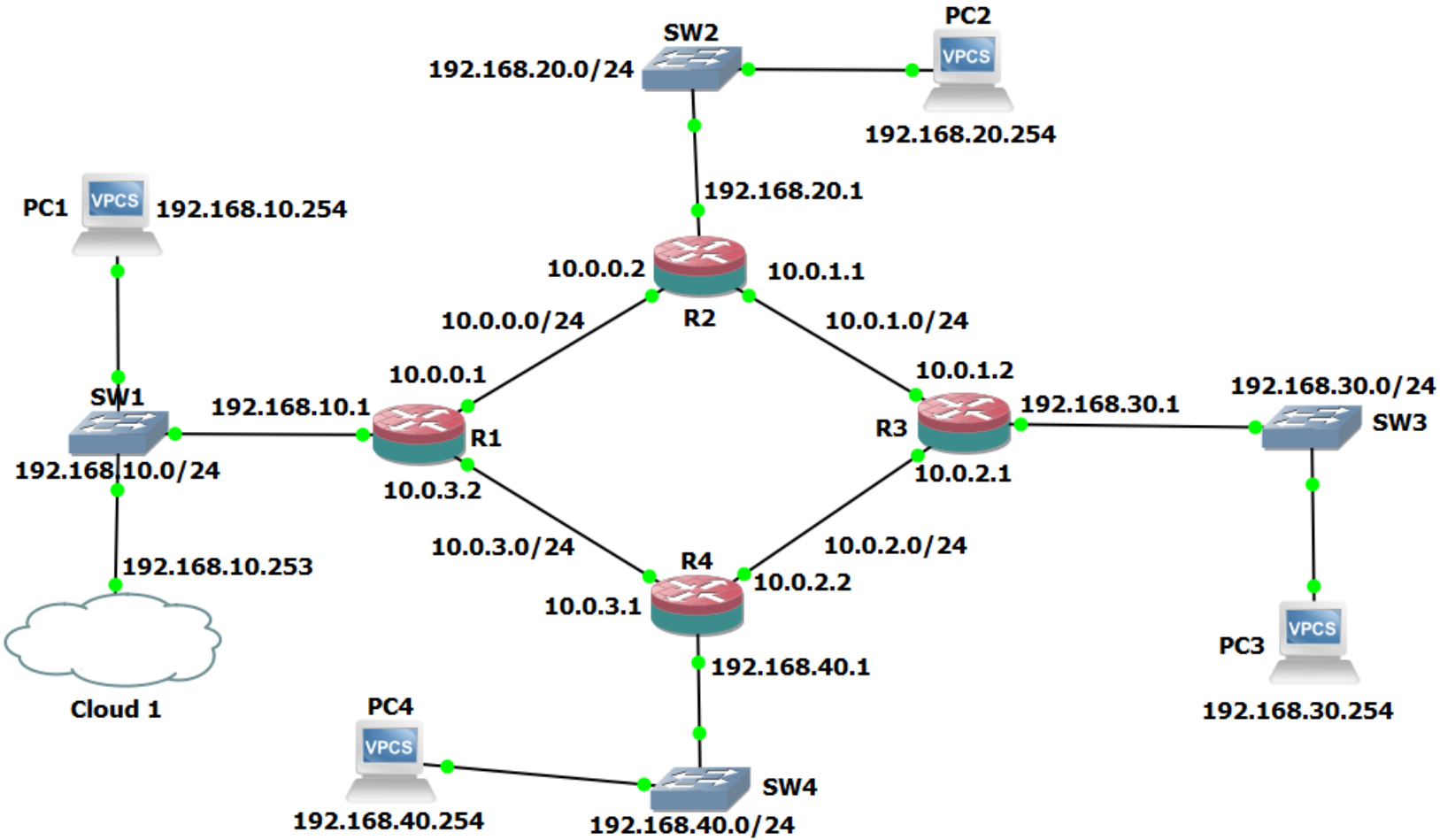


# Connect to RoMON



# 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

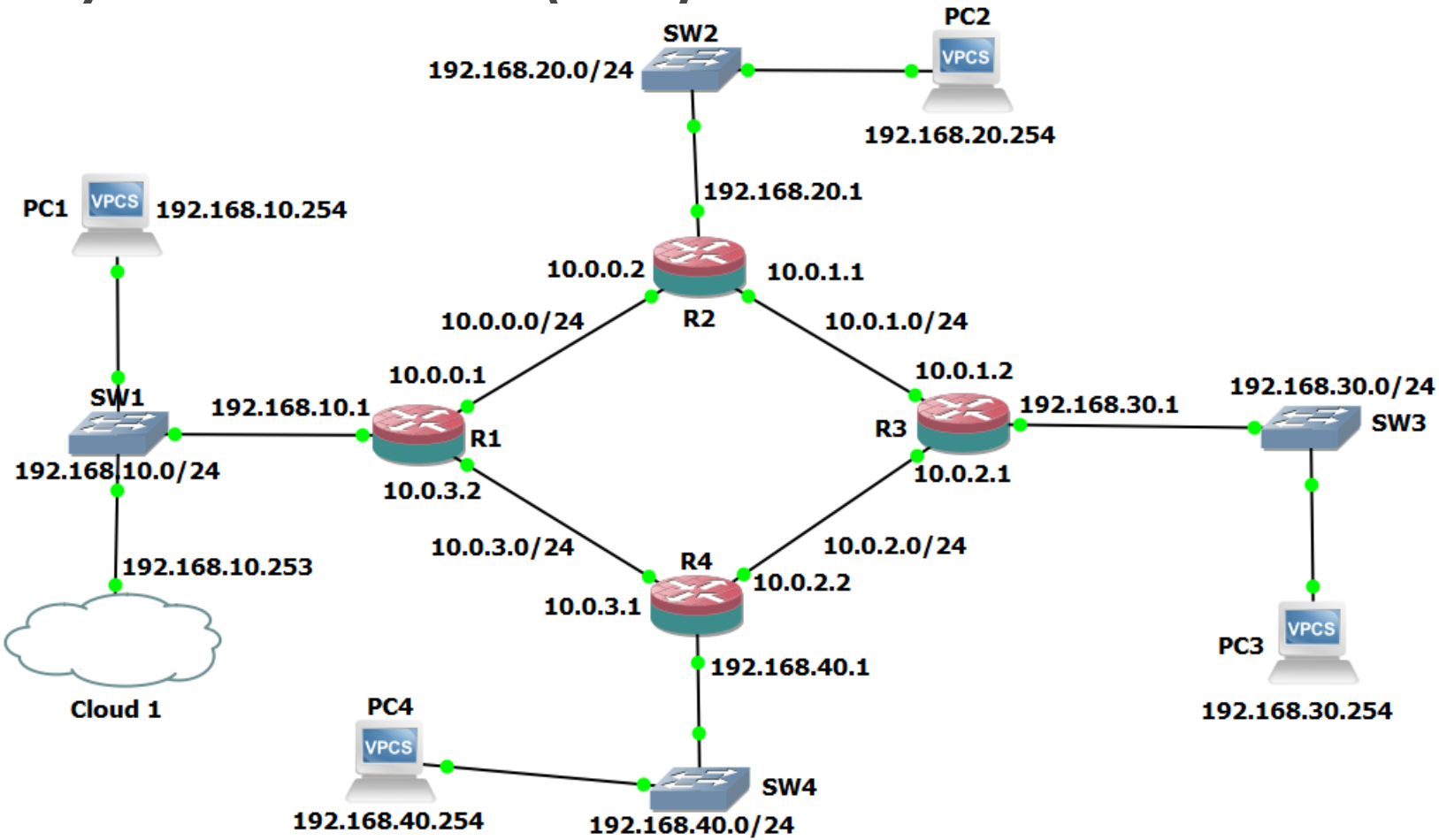
```
/ip address
add address=192.168.30.1/24 interface=ether3 network=192.168.30.0
add address=10.0.1.2/24 interface=ether2 network=10.0.1.0
add address=10.0.2.1/24 interface=ether1 network=10.0.2.0
/ip route
add distance=1 dst-address=192.168.10.0/24 gateway=10.0.1.1
add distance=1 dst-address=192.168.20.0/24 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/Manual:Routing/RIP

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MikroTik Thai

- สถาบันที่ได้การแต่งตั้งให้เป็นศูนย์อบรมของไมโครติ๊กแห่งแรกของเมืองไทย
- สอนด้วยอาจารย์ระดับมหาวิทยาลัยและทีมงานผู้ชำนาญงานพิเศษระดับ 8 และมีประสพการณ์มากกว่า 20 ปี
- อบรบตามมาตราฐานของไมโครติ๊กพร้อมสอบใบประกาศ
- สามารถเรียนซ้ำได้ไม่จำกัดจำนวนครั้ง
- มีที่ฝึกงานหลังจากเรียนจบพร้อมฝึกจนชำนาญ