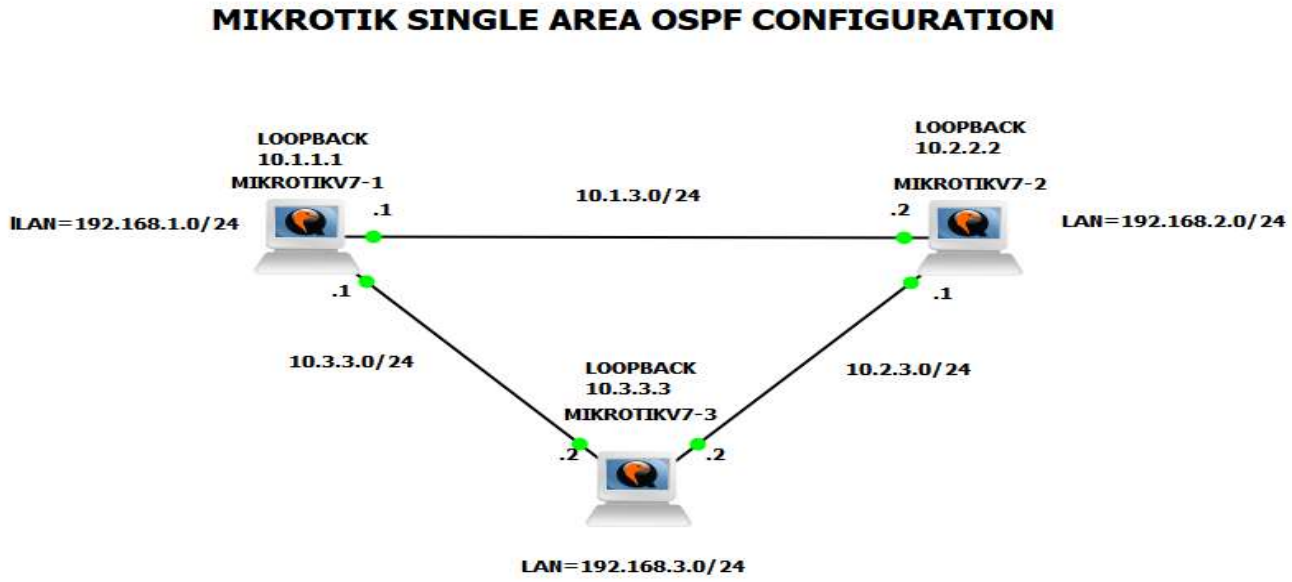
MIKROTIK SINGLE AREA OSPF CONFIGURATION LAB

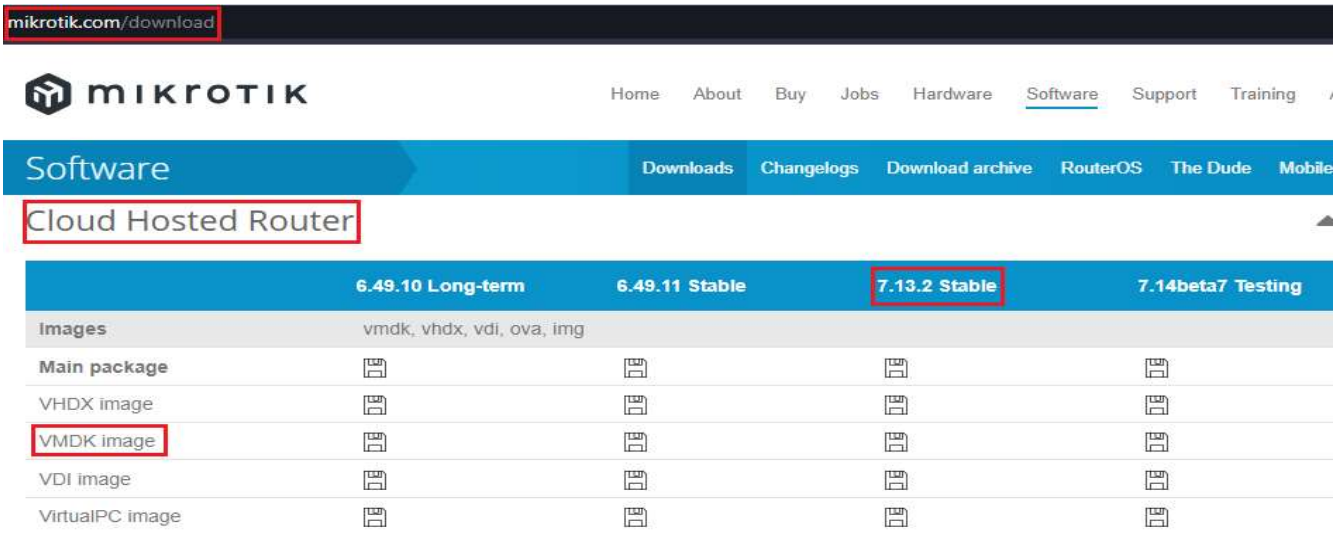
OBJECTIVE

On this lab, We will simulate and configure Single Area OSPF in Mikrotik V7 on GNS3 Emulator. We will be tackling single area OSPF and some basic device setup. Please take note that we will be using RouterOS terminal in configuring the following devices.

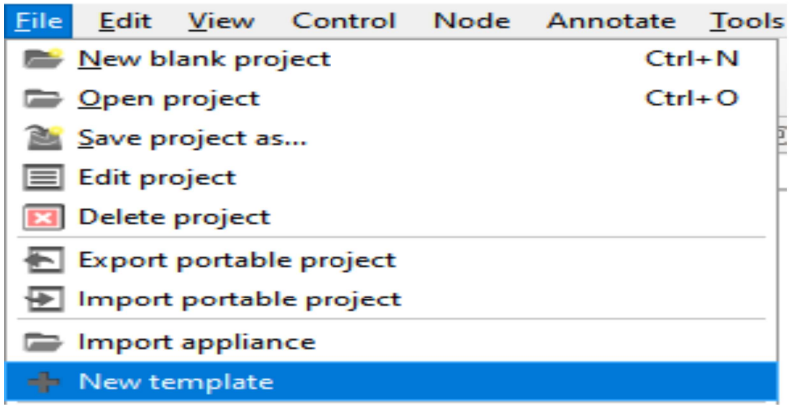


I – GNS3 SETUP

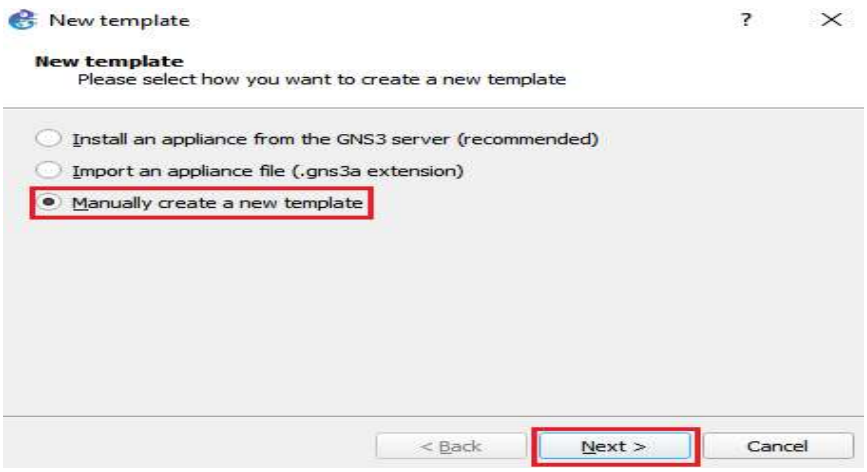
First, you must download the Router OS that will be use on this Environment. Visit **https://mikrotik.com/download** go to the **Cloud Host Router**, select the **VMDK Image** column and your desired ISO Image. On this lab, We will be using version **7.13.2**



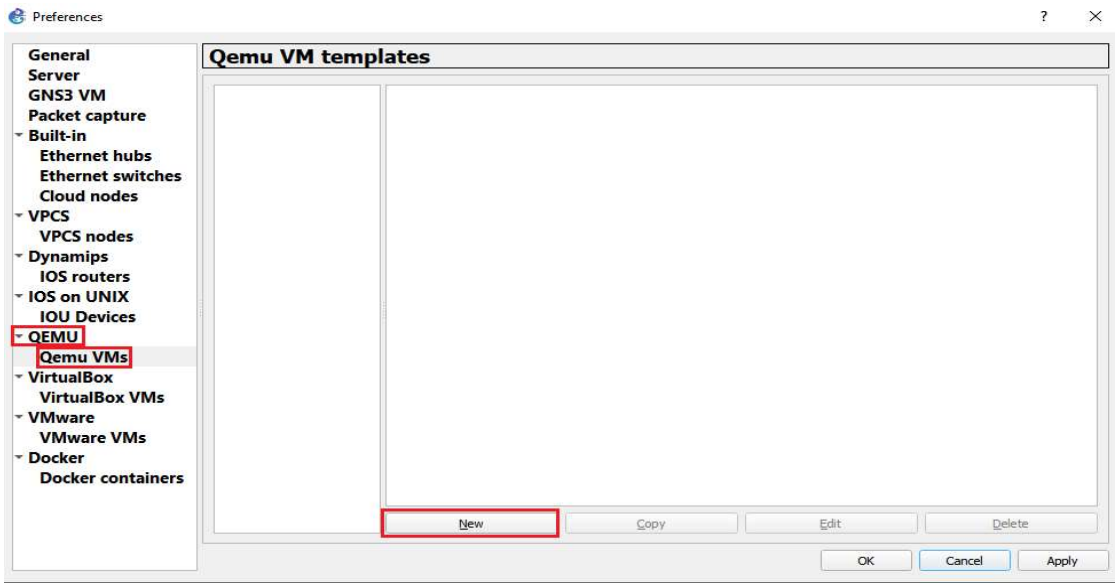
Open **GNS3**. Under **File**, select **New Template**.



Select **Manually create a new template** and click on **Next**.

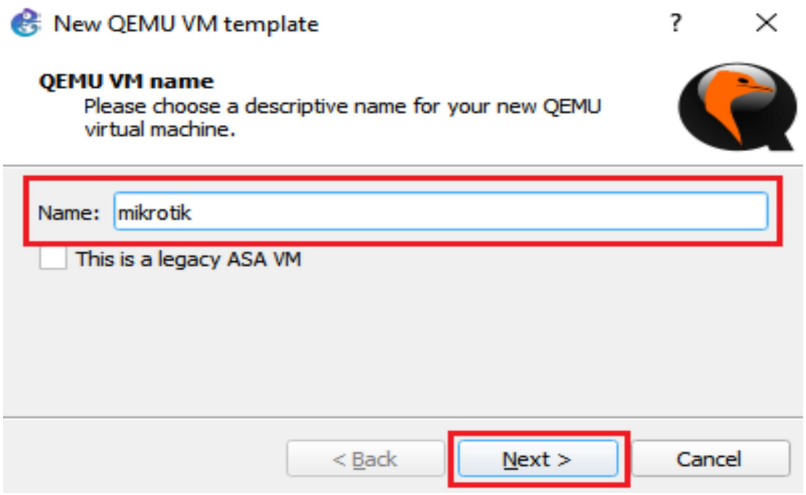


On this section, select **QEMU>Qemu VMs** and click on **New**.

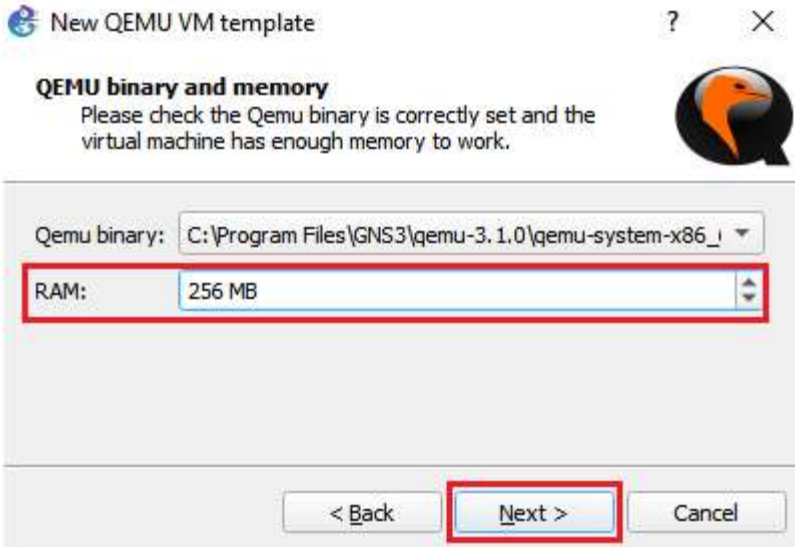


A message box will appear. Just click on **Next**.

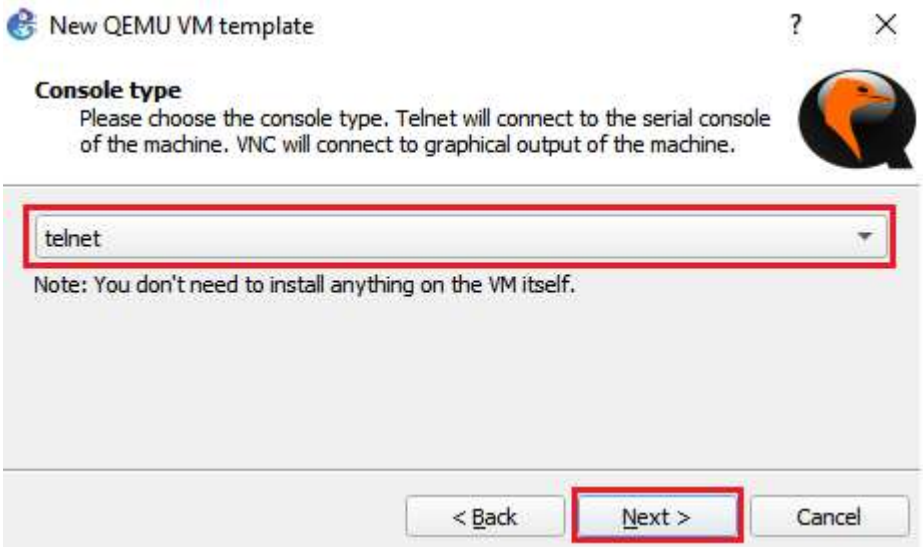
On this section, type the name of the QEMU VM that you will create and click on **Next**.



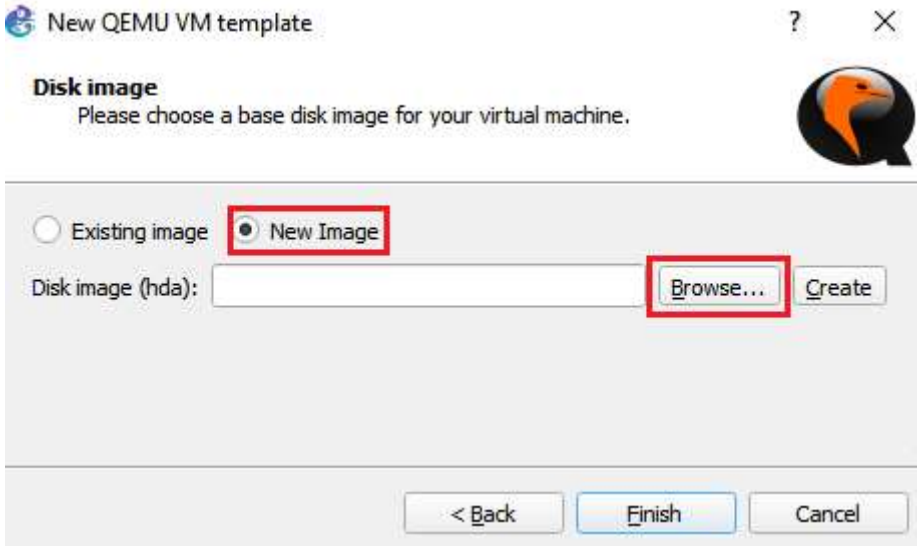
On the next section, you can set your desired memory or set is as default. Click on **Next** once done.



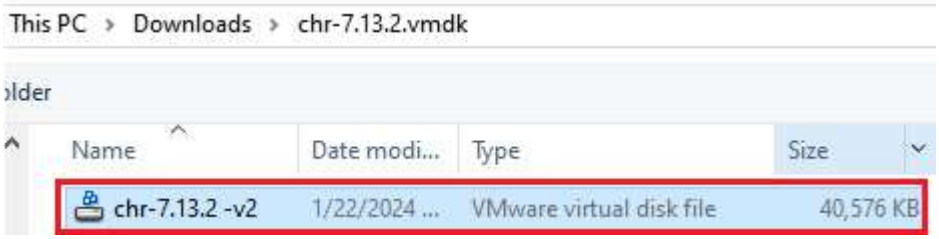
On the **Console Type** setion, select **Telnet** and click on **Next**.



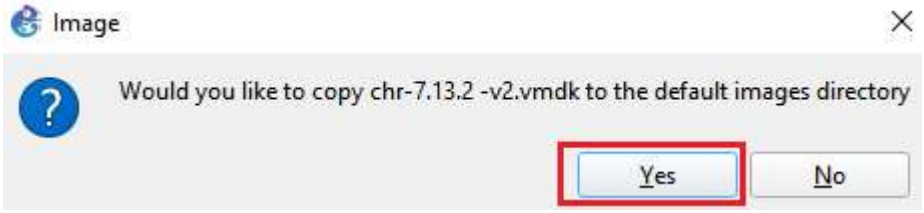
On the **Disk Image** section, select **New Image** and click on **Browse**.



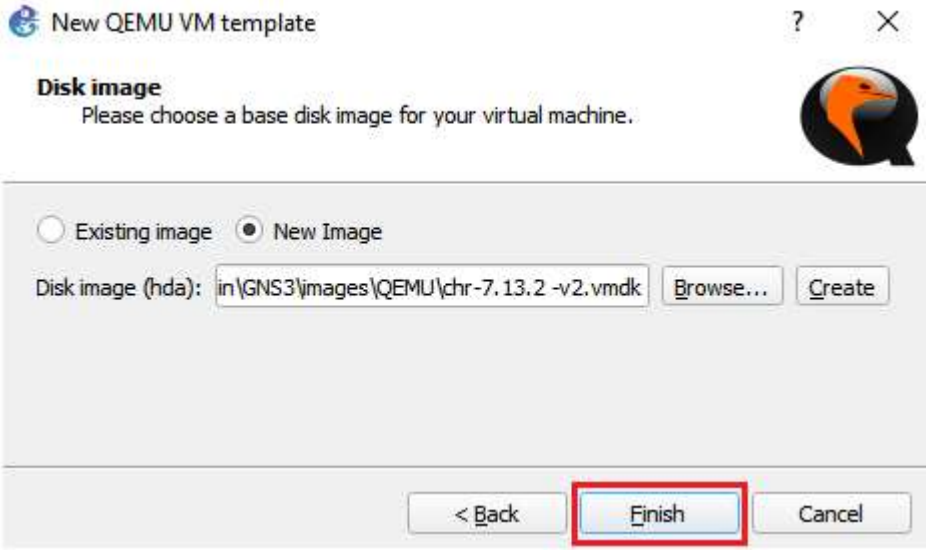
Select the CHR file.



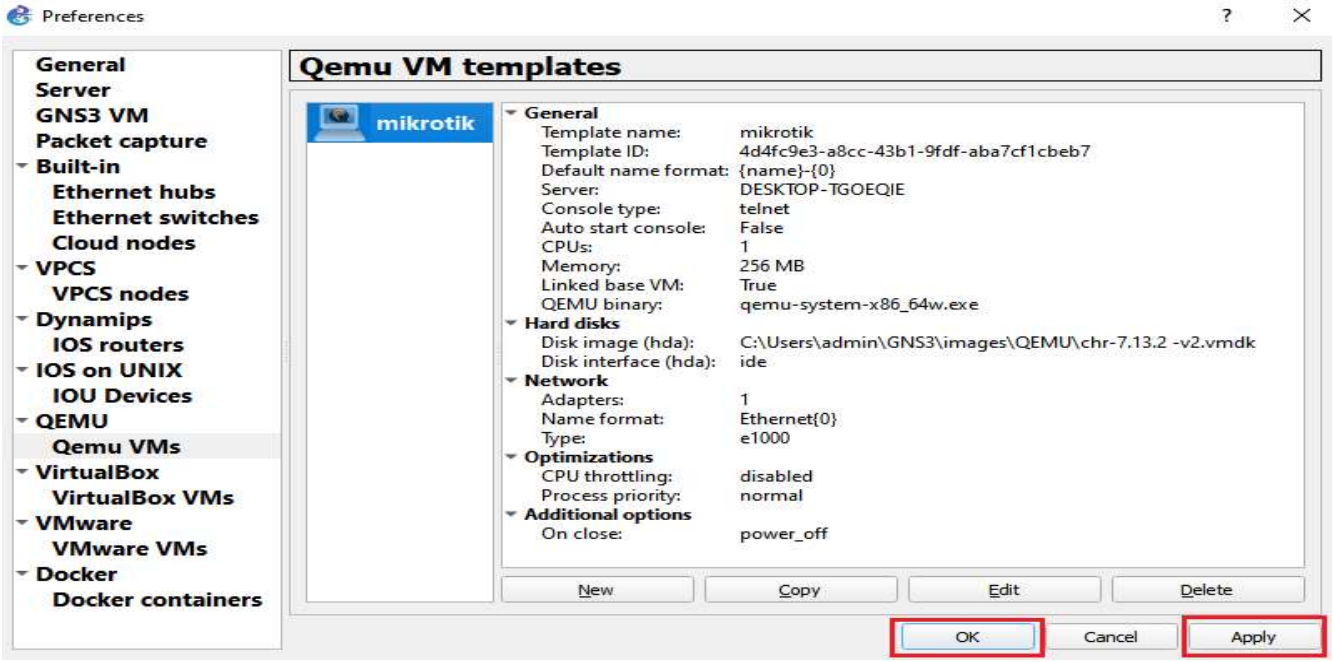
A message box will appear asking if you would like to copy sa CHR file to the default directory. Click on **Yes.**



Once done, click on **Finish**.

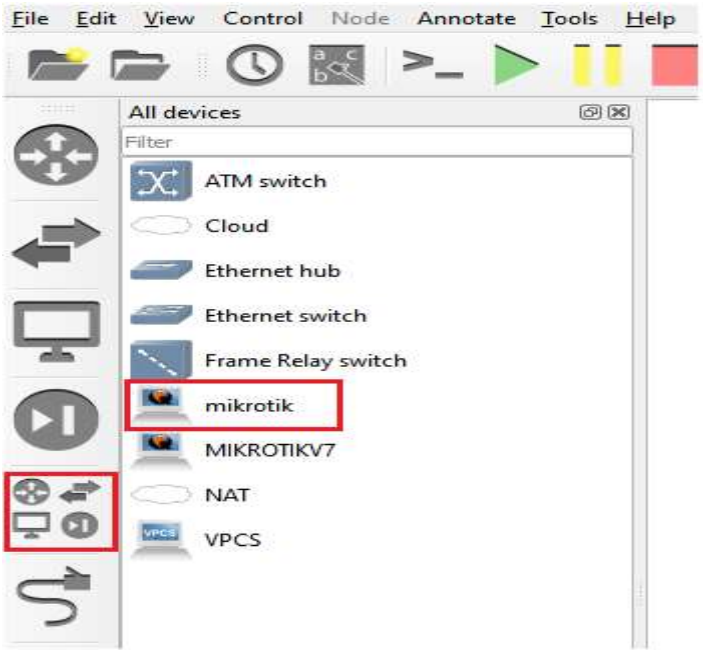


Once Finish, click on **Apply** and **Ok**.

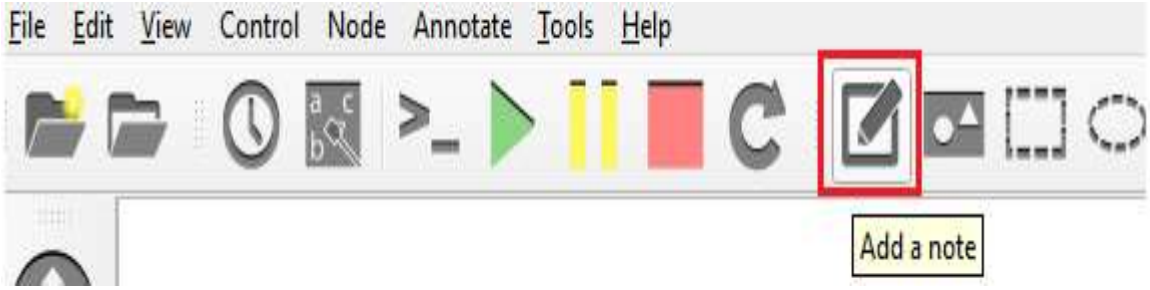


II – Device Setup

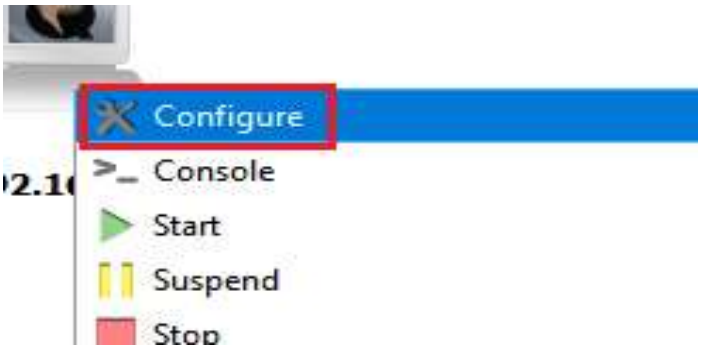
The newly created can now be seen on the left and panel and can be use.



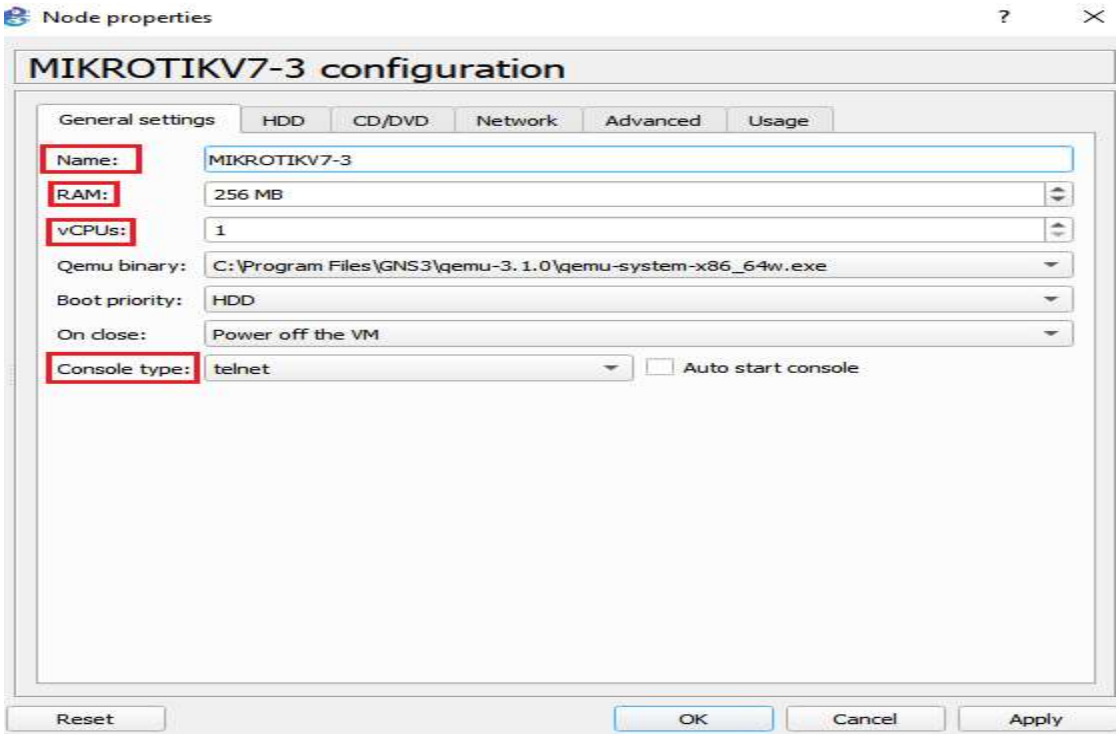
Once the template has been created, continue to create the topology that is provided above. You can add a text on the diagram by clicking on the add note that can be seen on the upper panel.



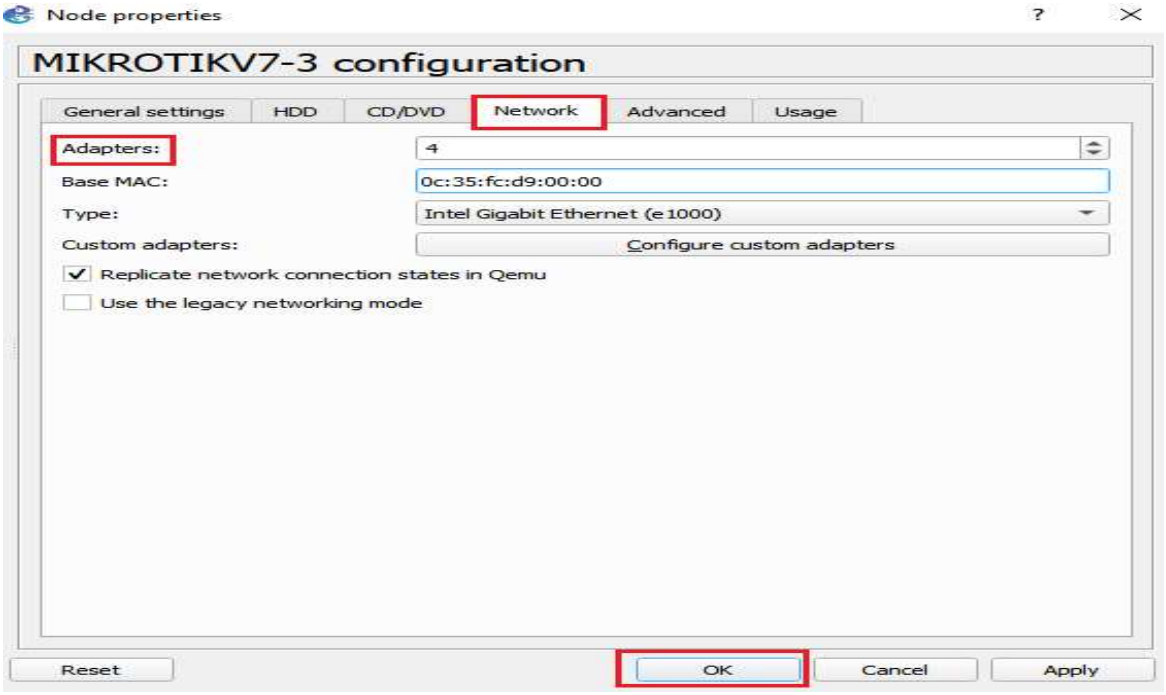
Once everything has been labeled, **Right Click** on the machine and select **Configure**.



It will redirect you on this section where you can edit the **Name, RAM, number of CPUs, Console Type** and many more.

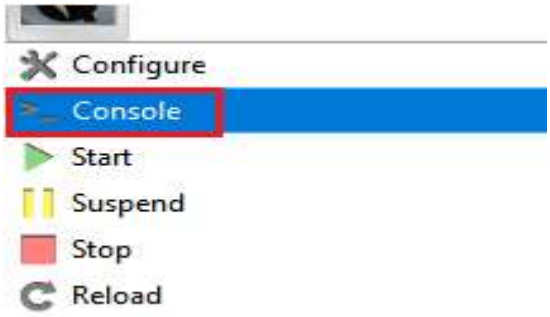


Next, Go to the **Network** tab and input your desired number of **Adapters.** Once done, click **OK** to save.

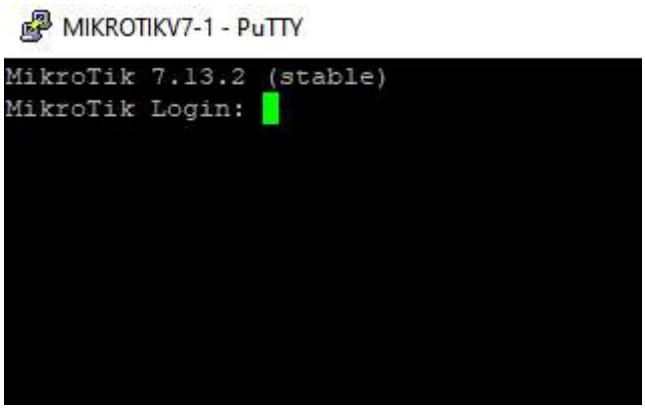


Follow these same steps on the other network emulators. Next, Add a connection on each device by choosing **Add a link** that can be seen on left panel.

After this, **Right Click** on one of the device and select **Console**.



A telnet session will appear. For the default credentials, type **admin** for the username and leave the password **Blank.**



First, change the name of the device to **MKR2** using the following commands:

```
[admin@MikroTik] > system/identity/set name=MKR2
```

Next, add a new user on the device using the following commands:
user add name=(name of the user) password=(password of the user) group=(user privilege ex. Full, read, write)

You can check your newly created user using the **user print** command.

```
[admin@MKR2] > user print
Flags: E - EXPIRED
Columns: NAME, GROUP
#    NAME    GROUP
;;; system default user
0  E admin   full
1    test    full
```

Next step, create a bridge interface for the **LAN** and **LOOPBACK**. To do this, you can type the following commands:

```
interface/bridge/ add name=LAN
interface/bridge/ add name=LOOPBACK
```

To view the created bridge interface, you can type:

```
[admin@MKR2] > interface/bridge/print
Flags: X - disabled, R - running
 0 R name="LAN" mtu=auto actual-mtu=1500 l2mtu=65535 arp=enabled
     arp-timeout=auto mac-address=82:5C:26:4A:BF:FE protocol-mode=rstp
     fast-forward=yes igmp-snooping=no auto-mac=yes ageing-time=5m
     priority=0x8000 max-message-age=20s forward-delay=15s
     transmit-hold-count=6 vlan-filtering=no dhcp-snooping=no
     port-cost-mode=long

 1 R name="LOOPBACK" mtu=auto actual-mtu=1500 l2mtu=65535 arp=enabled
     arp-timeout=auto mac-address=92:5D:7C:08:83:B5 protocol-mode=rstp
     fast-forward=yes igmp-snooping=no auto-mac=yes ageing-time=5m
     priority=0x8000 max-message-age=20s forward-delay=15s
     transmit-hold-count=6 vlan-filtering=no dhcp-snooping=no
     port-cost-mode=long
```

Next, assign the IP Addresses on the **MKR2** using the following commands:

```
ip address/add address=192.168.2.1/24 interface=LAN
ip address/add address=10.2.2.2 interface=LOOPBACK
ip address/add address=10.1.3.2/24 interface=ether1
ip address/add address=10.2.2.2 interface=ether2
```

To view the assigned IP address, type following command:

```
[admin@MKR2] > ip address/print
Columns: ADDRESS, NETWORK, INTERFACE
# ADDRESS            NETWORK         INTERFACE
0 192.168.2.1/24     192.168.2.0     LAN
1 10.2.2.2/32        10.2.2.2        LOOPBACK
2 10.1.3.2/24        10.1.3.0        ether1
3 10.2.2.2/32        10.2.2.2        ether2
```

Once done, continue to do the same steps on the other devices as follows.

III – OSPF SETUP

Once the device setup has been completed, Create a **Router-Id** on the device. In this case, we will be using **MKR3**. To start, use the following commands:

```
[admin@MKR3] > routing/id/ add id=10.3.3.3 name=L3
```

To view the created **Router-Id**, you can use the following commands:

```
admin@MKR3] > routing/id print
lags: D - DYNAMIC
olumns: NAME, ID, DYNAMIC-ID, SELECT-DYNAMIC-ID, SELECT-FROM-VRF
   NAME  ID         DYNAMIC-ID   SELECT-DYNAMIC-ID  SELECT-FROM-VRF
 D main             192.168.3.1  only-vrf           main
   L3    10.3.3.3
```

Next, Create an **OSPF Instance** using **Version 2** for IPv4 addresses and select the **Router-Id** that was just created and name it as **L3Instance**. Use the commands as follows:

```
[admin@MKR3] > routing/ospf/instance/ add name=L3Instance router-id=L3 version=2
```

Next, Create an **OSPF Area.** Name the area as **Backbone**, select the instance **L3Instance** and set the **area-id** to **0.0.0.0** input the commands as follows:

```
[admin@MKR3] > routing/ospf/area/ add area-id=0.0.0.0 name=backbone instance=L3Instance
```

Next, Create an **OSPF Template**. For the neighboring devices, choose **ptp** as **Network Type,** for the **Area**, select the are that has been created (**backbone**), and for the **interfaces**, select the interface of the other neighboring devices (**Ether1** and **Ether2**). Use the following commands as follows:

```
[admin@MKR3] > routing/ospf/interface-template/ add interfaces=ether1 type=ptp area=backbone
[admin@MKR3] > routing/ospf/interface-template/ add interfaces=ether2 type=ptp area=backbone
```

Finally, for the remaining interfaces and LAN side, set the **Network Type** to **Broadcast,** and the area to **backbone**.

```
[admin@MKR3] > routing ospf/interface-template/ add interfaces=all type=broadcast area=backbone
```

Check if the LAN IP addresses of the neighboring are now reachable.

```
admin@MKR3] > ping 192.168.2.1
 SEQ HOST                                     SIZE TTL TIME       STATUS
   0 192.168.2.1                                56  64 14ms293us
   1 192.168.2.1                                56  64 31ms128us
   2 192.168.2.1                                56  64 44ms921us
   3 192.168.2.1                                56  64 121ms72us
   4 192.168.2.1                                56  64 76ms29us
   sent=5 received=5 packet-loss=0% min-rtt=14ms293us avg-rtt=57ms488us max-rtt=121ms72us

admin@MKR3] > ping 192.168.1.1
 SEQ HOST                                     SIZE TTL TIME       STATUS
   0 192.168.1.1                                56  64 75ms388us
   1 192.168.1.1                                56  64 77ms229us
   2 192.168.1.1                                56  64 59ms936us
   3 192.168.1.1                                56  64 62ms102us
   4 192.168.1.1                                56  64 29ms742us
   sent=5 received=5 packet-loss=0% min-rtt=29ms742us avg-rtt=60ms879us max-rtt=77ms229us
```

You can also check all the routes that is learned via OSPF.

```
[admin@MKR3] > ip route/print
Flags: D - DYNAMIC; A - ACTIVE; c - CONNECT, o - OSPF; + - ECMP
Columns: DST-ADDRESS, GATEWAY, DISTANCE
     DST-ADDRESS      GATEWAY           DISTANCE
DAo  10.1.1.1/32      10.3.3.1%ether1        110
DAo+ 10.1.3.0/24      10.3.3.1%ether1        110
DAo+ 10.1.3.0/24      10.2.3.1%ether2        110
DAo  10.2.2.2/32      10.2.3.1%ether2        110
DAc  10.2.3.0/24      ether2                   0
DAc  10.3.3.0/24      ether1                   0
DAc  10.3.3.3/32      LOOPBACK                 0
DAo  192.168.1.0/24   10.3.3.1%ether1        110
DAo  192.168.2.0/24   10.2.3.1%ether2        110
DAc  192.168.3.0/24   LAN                      0
```