# Network Configuration in VirtualBox for SEED Labs

In many of the SEED labs, we need to run multiple guest VMs, and these VMs should be able to (1) reach out to the Internet, (2) communicate with each other, and (3) communicate with the host. This was easily achieved in VMware if you use the "NAT" setting for each VM, but in VirtualBox, things are different: if we use the "NAT" setting for each VM, we can achieve 1, but not 2 or 3, because each VM will be placed in its own private network, not on a common one; they even have the same IP address, which is not a problem because each VM is the only computer on its own private network. On the other hand, if we use the "Host-only" setting for each VM, we can achieve 2 and 3, but not 1. Using this setting, all the VMs and the host will be put on a common network, so they can communicate with each other; however, because of the lack of NAT, the VMs cannot reach out to the outside.

Therefore, in order to achieve all these 3 goals, we have to use both "NAT" and "Host-only". Namely, each VM should have two network adapters, one configured to "NAT" and the other configured to "Host-only". Each VM will basically connect to two virtual networks, one through the "NAT" adapter, and the other through the "Host-only" adapter. Therefore, each VM has two IP addresses. If you want to reach another VM, you need to use that VM's IP address that is associated with the "Host-only" adapter. See the following diagram.
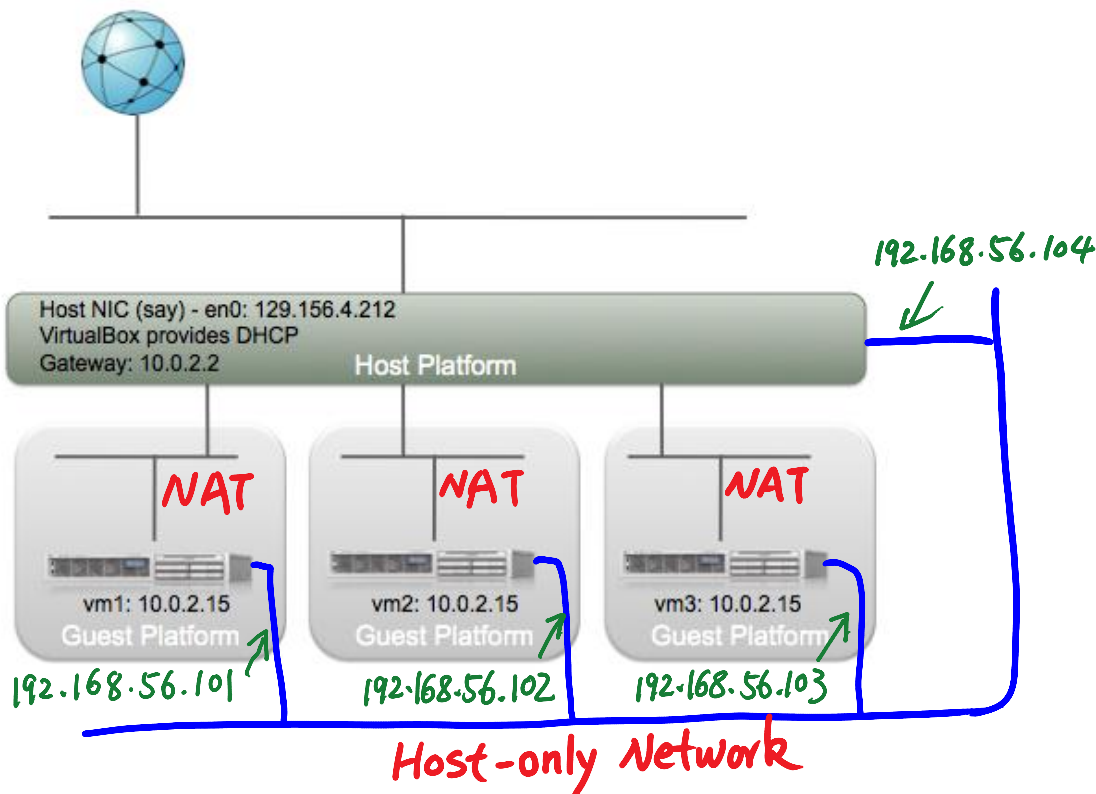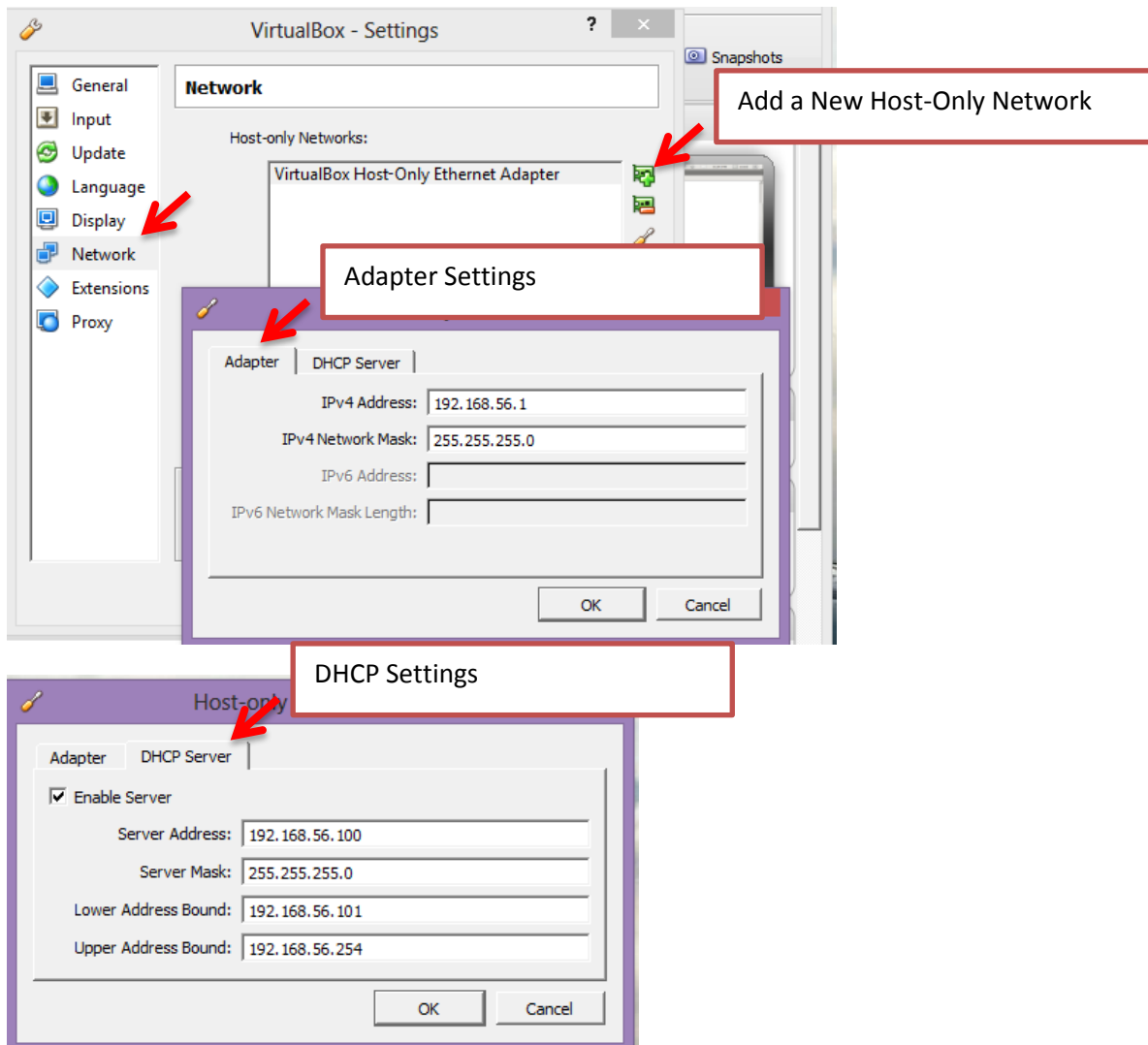
Instructions

**Step 1**: In Virtual Box main UI, click the file on the top left.
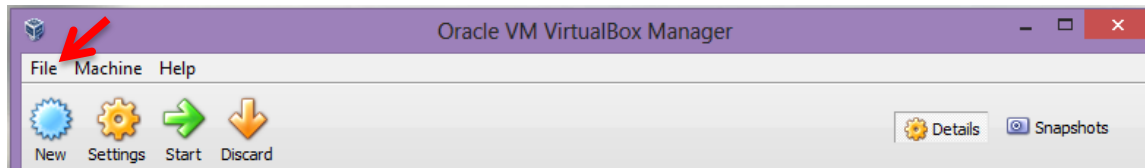
Step 2: Choose "Preferences…" option, and then click the "Network" tab on left panel.


Step 3: Make sure you have Host-only Network listed there. If not, click the "+" button to create one. Double click on the Host-only network, and look at its specifications. Set the specifications same as the picture above.

Step 4: Now set up the network of the two VMs, the setting is the same for both of them. You need to power off the VM in order to make the following the changes.

1> Enable Adapter 1 , and choose "NAT".
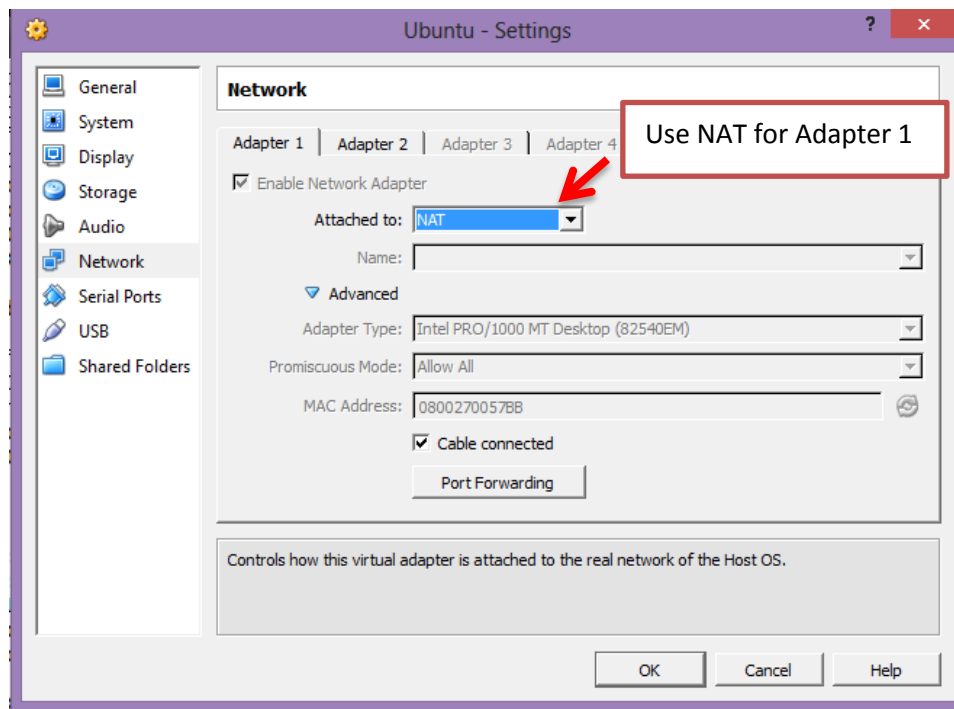
2> Enable Adapter 2 , and choose "Host-only".
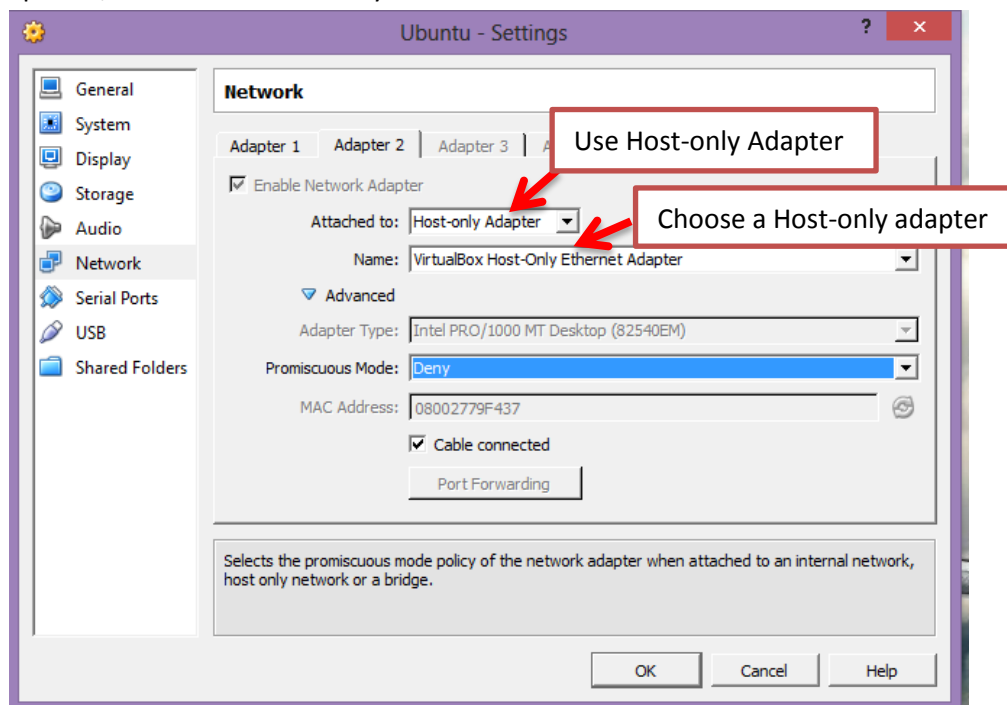
Step 5: Now power on the two VMs, and check their IPs (the actual addresses may be different).

      VM_A: NAT Adapter: 10.0.2.14   Host-only Adapter: 192.168.56.101

      VM_B: NAT Adapter: 10.0.2.15   Host-only Adapter: 192.168.56.102

```
seed@ubuntu:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 08:00:27:00:57:bb
          inet addr:10.0.2.14  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe00:57bb/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:16 errors:0 dropped:0 overruns:0 frame:0
          TX packets:87 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3765 (3.7 KB)  TX bytes:

eth3      Link encap:Ethernet  HWaddr 08:0
          inet addr:192.168.56.101  Bcast:192.168.56.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe79:f437/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:281 errors:0 dropped:0 overruns:0 frame:0
          TX packets:69 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:48604 (48.6 KB)  TX bytes:14243 (14.2 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:86 errors:0 dropped:0 overruns:0 frame:0
          TX packets:86 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:7869 (7.8 KB)  TX bytes:7869 (7.8 KB)

seed@ubuntu:~$ sudo service openbsd-inet start
```

VM_A: for NAT
VM_A: for Host-only

```
           RX bytes:920 (920.0 B)  TX
seed@ubuntu:~$ ifconfig
eth1      Link encap:Ethernet  HWaddr
          inet addr:192.168.56.102  Bcast:192.168.56.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:feb2:2b6b/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:41 errors:0 dropped:0 overruns:0 frame:0
          TX packets:59 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:10224 (10.2

eth0-eth1 Link encap:Ethernet
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe3f:90ab/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:25 errors:0 dropped:0 overruns:0 frame:0
          TX packets:116 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:4206 (4.2 KB)  TX bytes:20153 (20.1 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:53 errors:0 dropped:0 overruns:0 frame:0
          TX packets:53 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:4944 (4.9 KB)  TX bytes:4944 (4.9 KB)
```

VM_B: for Host-only
VM_B: for NAT

Step 6: Use their 192.168.56/ typed IP to ping to each other.

```
seed@ubuntu: ~
File  Edit  View  Search  Terminal  Help
seed@ubuntu:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 08:00:27:00:57:bb
          inet addr:10.0.2.14  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe00:57bb/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:101 errors:0 dropped:0 overruns:0 frame:0
          TX packets:189 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:53031 (53.0 KB)  TX byte

eth3      Link encap:Ethernet  HWaddr 08:00
          inet addr:192.168.56.101  Bcast:192.168.56.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe79:f437/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:372 errors:0 dropped:0 overruns:0 frame:0
          TX packets:122 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:67517 (67.5 KB)  TX bytes:29950 (29.9 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:142 errors:0 dropped:0 overruns:0 frame:0
          TX packets:142 errors:0 dropped
          collisions:0 txqueuelen:0
          RX bytes:13942 (13.9 K    TX b

seed@ubuntu:~$ ping 192.168.56.102
PING 192.168.56.102 (192.168.56.102) 56(84) bytes of data.
64 bytes from 192.168.56.102: icmp_req=1 ttl=64 time=5.03 ms
64 bytes from 192.168.56.102: icmp_req=2 ttl=64 time=1.11 ms
^C
--- 192.168.56.102 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1003ms
rtt min/avg/max/mdev = 1.118/3.076/5.034/1.958 ms
seed@ubuntu:~$
```

VM_A
ping VM_B

```
seed@ubuntu: ~
File  Edit  View  Search  Terminal  Help
seed@ubuntu:~$ ifconfig
eth1      Link encap:Ethernet  HWaddr 08
          inet addr:192.168.56.102  Bcast:192.168.56.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:feb2:2b6b/64 Scope:Link
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:221 errors:0 dropped:0 overruns:0 frame:0
          TX packets:77 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:38916 (38.9 KB)  TX bytes:16248 (16.2 KB)

eth0-eth1 Link encap:Ethernet  HWaddr 08:00:27:3f:90:ab
          inet addr:10.0.2.15  Bcast:10.0.2.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe3f:90ab/64 Scope:Link
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:35 errors:0 dropped:0 overruns:0 frame:0
          TX packets:132 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:5211 (5.2 KB)  TX bytes:22118 (22.1 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:53 errors:0 dropped:0 overruns:0 frame:0
          TX packets:53 errors:0 dro
          collisions:0 txqueue
          RX bytes:4944 (4.9    TX

seed@ubuntu:~$ ping 192.168.56.101
PING 192.168.56.101 (192.168.56.101) 56(84) bytes of data.
64 bytes from 192.168.56.101: icmp_req=1 ttl=64 time=1.44 ms
64 bytes from 192.168.56.101: icmp_req=2 ttl=64 time=0.779 ms
^C
--- 192.168.56.101 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1001ms
rtt min/avg/max/mdev = 0.779/1.112/1.445/0.333 ms
seed@ubuntu:~$
```

VM_B
ping VM_A

Step 7: From host machine, you can use the 192.168.56.x IP address to ping the VMs. You can also FTP to these VMs.

Reference:

http://www.coding4streetcred.com/blog/post/VirtualBox-Configuring-Static-IPs-for-VMs.aspx