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. This was easily achieved in VMware if you use the "NAT Networking" 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, 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, 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, due to the lack of NAT, the VMs cannot reach out to the outside.

Therefore, in order to achieve all these 2 goals, we have to use a new network adapter introduced by VirtualBox called "NAT Network". The improved Network Address Translation (NAT Network) adapter works in a similar way to "local area network" or LAN. It enable VMs communication within same local network as well as the communication to the internet. All the communications go through this single adapter. As show in Figure 1, gateway router transfers the packets among the VMs and transfers the packets from local network to Internet.

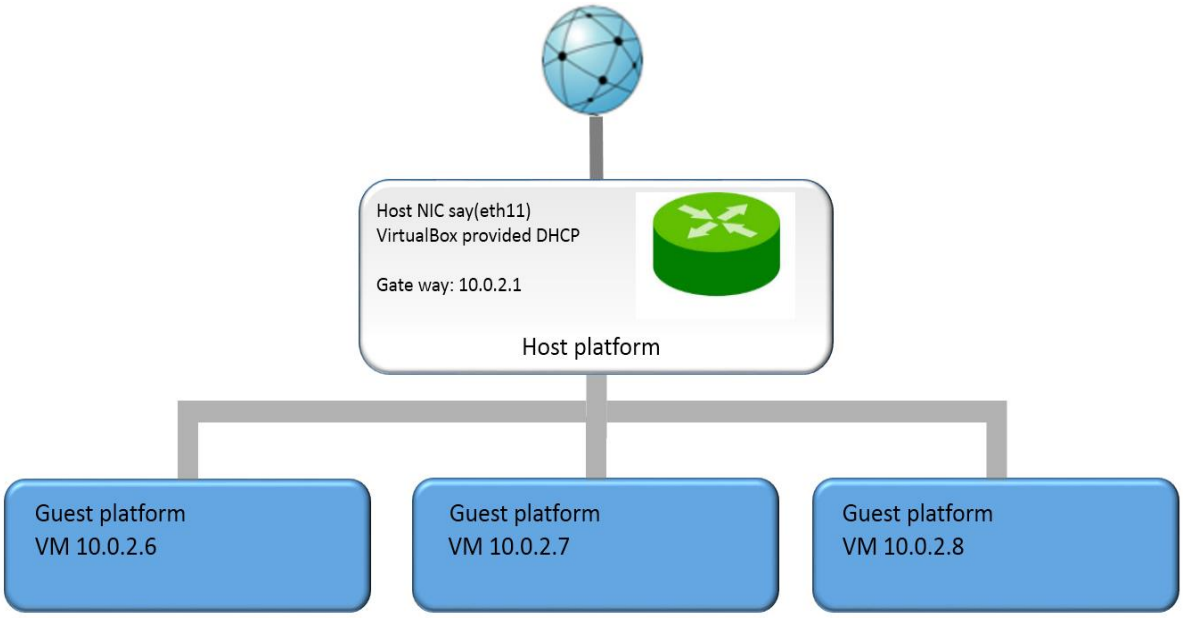

Figure 1

Configuration Instruction:

Step 1: Make sure you are using the most up-to-date VirtualBox. As show in Figure 2, click the "File" on the top left of the VirtualBox main UI. Then choose "Preferences…" option.

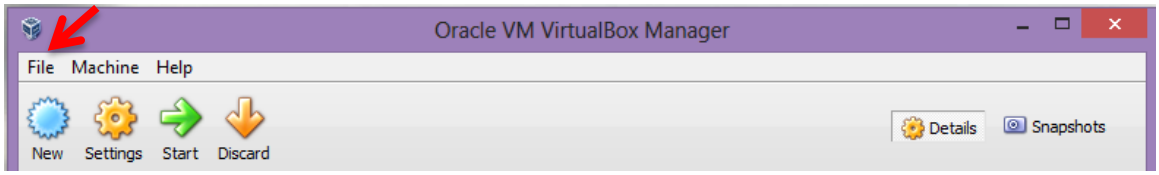

Figure 2

Step 2: In Figure 3, click the "Network" tab on left panel.

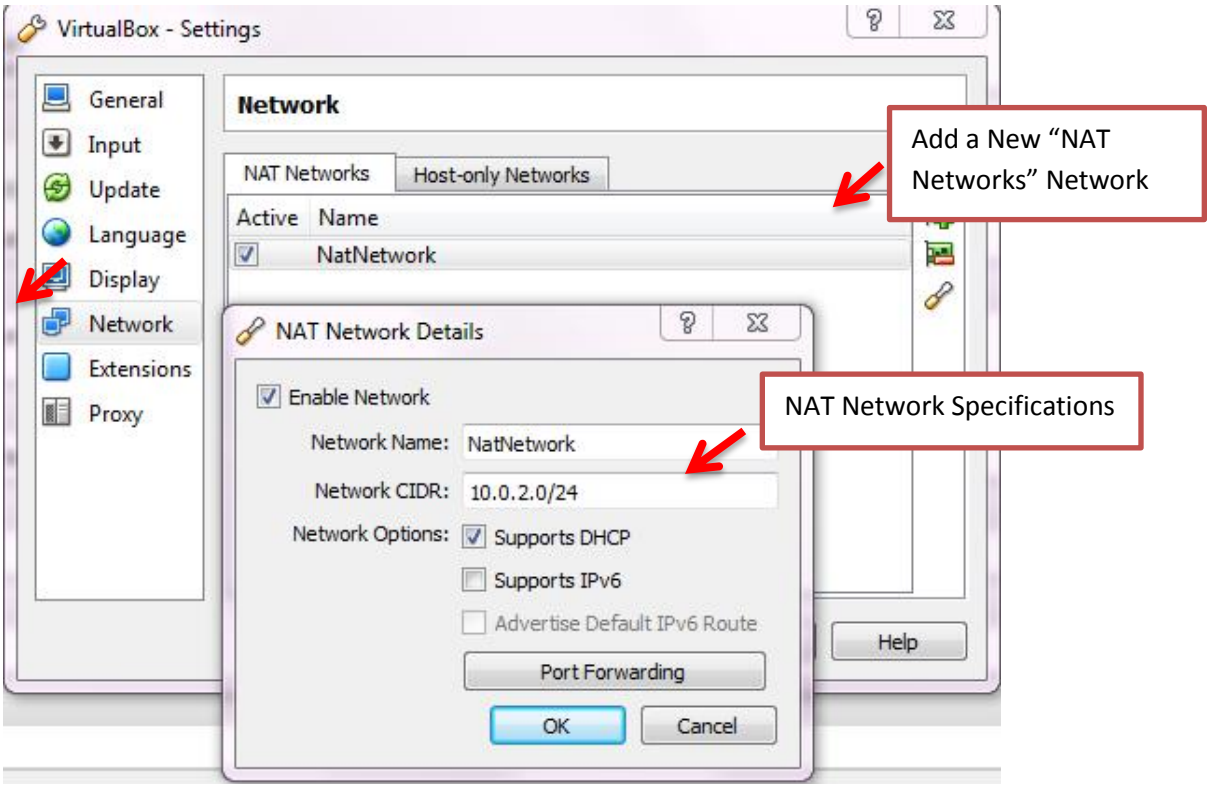

Figure 3

Step 3: In Figure 3, click the "+" button to create new NAT Networks (NatNetwork). Double click on the NatNetwork, and look at its specifications. Set the specifications as same as the Figure 3.

Step 4: Go VM setting, you need to power off the VM before making the following changes. In Figure 4, enable Adapter 1(at the same time, disable the other adapters), and choose "NAT Network".

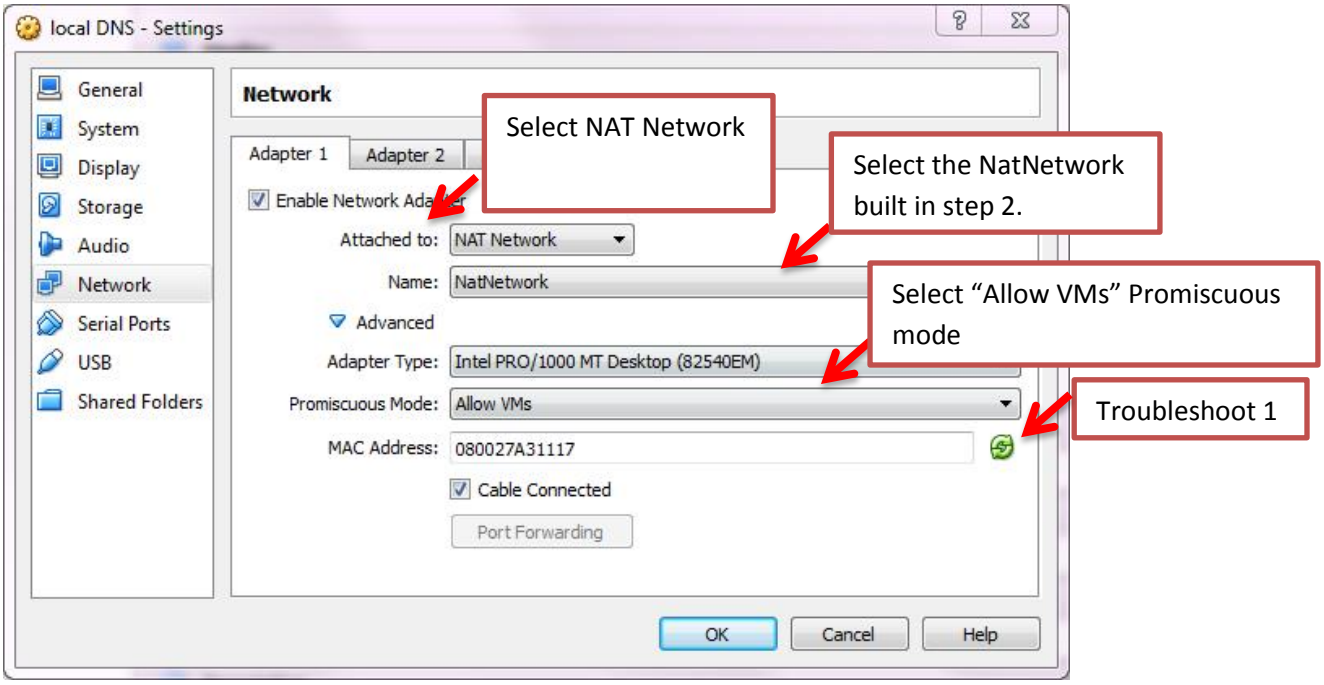

Figure 4

Step 5: Now power on the VM, and check IP address (the IP may varies from different machines).

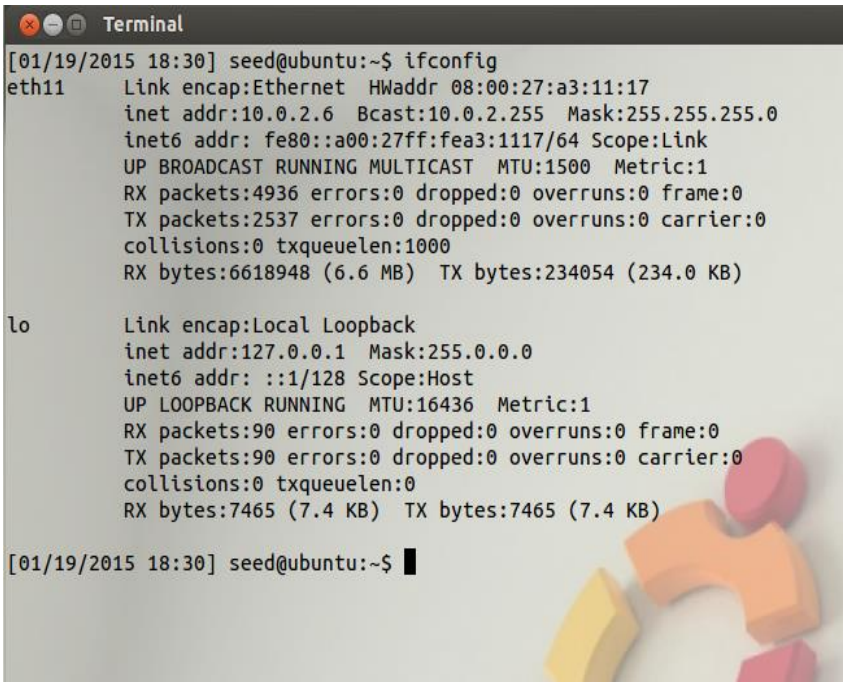

Figure 5

Troubleshooting:

1. If VMs cannot ping each other, refresh the MAC Address can resolve the issue. The way to resolve the issue is shown in figure 4, troubleshoot 1.

Reference:

https://www.virtualbox.org/manual/ch06.html

https://jekewa.com/blogs/index.php/weBlog/2014/01/09/virtualbox-4-3-adds-nat