# Oracle VirtualBox Host-only Networking

This document contains the process and commands for creating a Host Only network in Oracle VirtualBox, and connecting a VM to the Host Only network.

1. Set up the host only network

    a. Shut down any running VMs

    b. Create a network that will only be seen by the VMs and the Host computer.

        i. In Virtual Box Manager select **File > Host Network Manager**

        ii. Click **Create**. This creates the network, and assigns it a name that will be Virtual Box Host-Only Ethernet Adapter for the first network. You used to be able to change this name, but in VB6 stuck with the assigned name. You only need to create 1 network at this point. But if you create a 2nd network it will be named Virtual Box Host-Only Ethernet Adapter #2, a 3rd network will be named Virtual Box Host-Only Ethernet Adapter #3, and so on.

        iii. Note the IPv4 Address assigned to this network. This is a non-routable IP address that starts with 192.168. This is actually the address assigned to the Host computer, to be an actual network number it would look more like 192.168.xxx.0. But in any case, you'll need to know the 3rd number because you must use the same network number when you assign an IP address to the network interface in the guest Virtual Machine.

        iv. Click **Apply** and **Close**

2. Add a new network interface to the guest Virtual Machine. This is like installing a new network card in the VM and connecting the network cable to the network you created in Step 1.

    a. Ensure that the VM is **NOT** running.

    b. In Virtual Box Manager select **Settings** for the guest VM

    c. Select **Network**

    d. Select the tab for **Adapter 2**. **(**Leave Adapter 1 set to NAT)

    e. Check the **Enable Network Adapter** box.

    f. Change the **Attached to:** setting to **Host-Only Adapter**

g. Ensure that the **Name:** setting is set to **Virtual Box Host-Only Ethernet Adapter**. If you only made one network in Step 1 this should be the only choice. But if you made more than one you must ensure that you've selected the correct network.

h. Expand the **Advanced** settings.

i. Click the **refresh** button to the right of the MAC Address: to get a new MAC Address for this network adapter. You should only do this once, when you initially set up the adapter in the VM.

j. Click the **OK** button to save the settings.

3. Restart the Linux VM and configure the new network card

a. Ensure you are in the root account.

b. Find out the name of the network interface for the new network. If this was a physical machine you would be looking for a new device with a name like `eth1`. Because this is a virtual computer and the new network interface was added virtually instead of physically Linux will give the new interface a different name. The first network interface is typically named `enp0s3` while the new interface is probably called `enp0s8`. There's also an interface named `lo` which stands for loopback, which is the interface used to connect to the 127.0.0.0 network.

The actual names can be found by using one of several commands.

i. The `/sys/class/net` directory holds a list of the network interfaces. These can be seen by simply using the `ls` command on the directory. (The items in the directory are actually shortcuts that point to the actual network devices)

```
ls /sys/class/net
enp0s3  enp0s8  lo
```

ii. The `nmcli device status` also provides fairly succinct output.

```
DEVICE  TYPE      STATE       CONNECTION enp0s3
ethernet  connected    enp0s3
enp0s8  ethernet  connecting  (getting IP configuration)
lo      loopback  unmanaged
```

iii. The `ip add` command can be used, but this returns much more information such as the IPv4 and IPv6 addresses, MAC address etc.

```
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue
state UNKNOWN qlen 1
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
inet 127.0.0.1/8 scope host lo        valid_lft forever
preferred_lft forever     inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever 2:
enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500
qdisc pfifo_fast state UP qlen 1000
    link/ether 08:00:27:50:23:27 brd ff:ff:ff:ff:ff:ff
inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic
enp0s3        valid_lft 83229sec preferred_lft 83229sec
inet6 fe80::f3d7:902a:d15:697a/64 scope link
valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500
qdisc pfifo_fast state UP qlen 1000
    link/ether 08:00:27:68:9b:b9 brd ff:ff:ff:ff:ff:ff
```

c. Once you know the name of the network interface (which is most likely `enp0s8`) you need to create the configuration file for the "network card". This file must be in the `/etc/sysconfig/network-scripts` directory and it must be named `ifcfg-`*`interfaceName`*. For example if the network interface is named "enp0s8" then the file name would be `ifcfg-enp0s8`

   i. Change to the `/etc/sysconfig/network-scripts` directory

   ii. Use `vi` or your favorite editor and create the file `ifcfg-enp0s8`

   iii. Add the following to the file:

```
TYPE="Ethernet"
BOOTPROTO="static"
IPADDR="192.168.NNN.HHH"
NETMASK="255.255.255.0"
NAME="enp0s8"
DEVICE="enp0s8"
ONBOOT="yes"
```

e. Note that in older versions of Centos the information for all the network interfaces was in one file named. The parameters were similar, but different.

4. Restart the network service by either using the `systemctl` command or restarting the virtual machine

```
systemctl restart network.service
```

5. Check the network interface by using one of the following commands:
   a. `nmcli device status`
   b. `ip add`

6. Test the network connection
   a. From inside the virtual machine
      i. `ping 192.168.nnn.hhh`
   b. From the Host computer, open a command window
      i. `ping 192.168.`*`nnn.hhh`* where *`nnn.hhh`* is the specific network and host number of the VM connection you're testing

      ii. `ssh `*`user`*`@192.168.nnn.hhh` where *`user`* is a valid username on the virtual machine.

7. [OPTIONAL] Add a host name for the virtual machine on the host-only network to Windows host file `C:\windows\system32\drivers\etc\host`

```
192.168.nnn.hhh  hostname
```