

Debugging and Troubleshooting NFS Setup

If you get to the end of the NFS installation process and have problems you've obviously made a mistake somewhere. But figuring out exactly the exact problem(s) will be difficult if not impossible if you don't take a structured approach to debugging. When you're having problems setting up clients and servers I suggest that the best thing to do is debug it one step at a time, starting with the simple things and working up towards final steps where the NFS mounting is configured to happen automatically. Using this process should narrow down where the problem lies:

1. **Check the Networking** - You will need two VMs, one that will act as the NFS server and another that will act as the NFS client. Both the NFS server and the NFS client VMs will need the Host-Only network working. Ensure that you have both VMs created, and that they can communicate on the Host-Only network. If you have problems with this, you can check the Host-Only Troubleshooting document in the Host-Only network section for complete details, or use these steps:
 - A. Check to make sure both client and server are plugged in to the network. In the real world you'd check the network cables. In the VMs, you need to check that the Host Only network is set up in Virtual Box and make sure you know the correct subnet number, the xxx in 192.168.xxx. Then check each VM and make sure they are both connected to the Host Only network. You can just inspect this visually for now, but you'll test it in a later step. Note - you need to make sure the VMs are shut down when you make any changes to the VirtualBox settings. If you make changes while a VM is running, you'll probably have to delete the VM and start over.
 - B. Ensure that the 2nd network interface in each VM has been "turned on" and is connected to the Host Only Network. You can do this with a variety of commands listed in the PDF. Remember the network interface will be named enp0s8 on both VMs, but they need to have different IP addresses. Ensure that their IP addresses are in the 192.168.xxx range. Also, make sure you know what the last number is for the server. That is, it will be 192.168.xxx.hhh. Make sure you know what the hhh part is on the server. You can use almost any number in the 2-254 range. I suggest you use something easy to remember like 10 for the server and 20 for the client.
 - C. Ensure you can connect to the Host-Only network from your VMs by using the ping command. First, ping the VM's own IP address. If this doesn't work you need to go back and redo the network setup for that VM. Next, ping the IP address for the "other" VM. That is, ping the server from the client, and ping the client from the server. If this doesn't work you need to go back and check all of the Host Only network setup, and the network interface setup. Remember that you need to make sure the VMs are shut down when you make any changes to the VirtualBox settings for the Host Only Network or the Network Interfaces on the VMs in VirtualBox. If you make changes while a VM is running, you'll probably have to delete the VM and start over.
2. If you are having trouble using yum to install the NFS packages one of the first things to check is to ensure the NAT network is running. Remember the VMs can NOT use the Host-Only network to

communicate with the Internet. The Host-Only network is only used for the VMs to communicate with each other. The NAT network is the one that allows the VMs to talk to the Internet.

- A. Use the `nmcli device status` command to check `enp0s3`. It should be green and be in the connected state. If `enp0s3` is red and shows the state as disconnected then you forgot to turn on that network interface. You can do this during install, or if you're running a distribution with a desktop. You can also turn it on by editing `/etc/sysconfig/network-scripts/enp0s3` and setting `ONBOOT` to `YES`.
 - B. If you change the `ONBOOT` setting, restart the network service using:
`systemctl restart network`.
 - C. Verify that the network has started using the `nmcli device status` command.
 - D. You should now be able to use `yum` to install the NFS packages. If this fails, I suggest deleting the VM and starting over. Before you install the VM pay special attention to the network settings, and also remember to turn on the network(s) during the install.
3. If you can ping the NFS server from the NFS client, and vice versa, and download packages using `yum`, you have the networks configured correctly and can start with the NFS configuration.
- A. Ensure that the NFS service is installed and enabled on the NFS server VM. This typically done using `systemctl`. Double check the configuration files if any exist. Take great care as you do this checking as it's easy to miss mistakes.
 - B. Ensure any file or folder permissions on the NFS server are correct. If you change any of these you will need to restart the service.
 - C. Ensure the services are being allowed through the firewall on the NFS server VM.
 - D. Move to the client and ensure the client software has been installed. You can do this using the package manager.
 - E. On the client check connecting to the server. If you're checking the web server you can test this using the web browser, if you're checking NFS you can use the `mount` command, etc. If you have problems you know it's not the basic network connection, because you checked this in step 1. This means it's either in the command(s) you're using on the client, or the server configuration, which includes the configuration files and permissions. Check any error messages you may receive as they may help you narrow down the source of the problem. Also, double check the command(s) you type on the client, the configuration files on the server, and the permissions on files or folders on the server. The problem must lie in one of these.

- F. If you can connect from the client using manual commands, next test the configuration files for setting up an automatic connection. If everything else worked up to this point, but you can't get the client to connect automatically the problem must be in the configuration files.

- G. If you can't find the problem at this point, my only suggestion is to delete your VMs and start over. Follow the process to the letter taking extra care to check everything you type, and ensuring you know exactly what the IP addresses are being used for the NFS client and NFS server.