**Title: Lustre Setup**

**Author: Aaron Valoroso**

**Date: August 30th, 2017**

**OS: CentOS 7**

**Setup:**

To get started on being able to ping two different virtual machines with VirtualBox then go ahead and download the latest version from this url: <https://www.virtualbox.org/wiki/Downloads> . Make sure that everything has been downloaded correctly. For this tutorial, I will be using a Windows host machine with enough resources for two virtual machines. There will be four virtual machines for this Lustre File System demonstration Each will have 2 x 10 GB in storage and 2 GB in RAM. Do the following:

* Go to settings->General->Advanced
  + And change the Shared Clipboard to: Bidirectional
  + And change Drag’n’Drop to: Bidirectional
* Go to settings->System
  + Uncheck the floppy and move it down below hard disk.
* Go to settings->System->Processor
  + Make sure that the Enable PAE/NX is unchecked.
* Go to settings->Storage
  + Click the cd under Controller: IDE, and on the far right click the other cd and pick your virtual optical disk drive. This is where you can add your OS image.
  + Click on the Controller: SATA, and hit the add hard disk. Click on “create a new hard disk”, and then hit enter until asked for how much storage and make it 10 GB. Name it anything you want.
* Go to settings->Network
  + Go to Adapter 2, click the checkbox next “Enable Network Adapter”.
  + Next switch the Attached to from Not Attached to Host-Only Adapter.
  + Next, change the Promiscuous Mode under the Advanced settings to Allow VMs.
  + Then click the “ok” button at the bottom.

**Part 1:**

* Click on the start button for each of the virtual machines and proceed with the installation. Make sure that the internet was setup correctly during the install or you will have to make sure that you have an internet connection every time your reboot!

Once the installation has finished, power down the machines and go back into the settings to change the boot order in the “System” option. Un-check the optical option and move it below the hard disk.

* Do the following for two virtual machines, these will be our servers. One is the MGS/MDS, the other will be our OST/OSS. This part is just going to be our setup for the servers.
* It is a smart idea to snapshot the virtual machines after install, and updating the operating system. I highly…. highly recommend that you snapshot or clone your machines. I would also download my script for the following instructions as well before the snapshot / clone.
* Just a heads up if you see the /dev/sdb that is our second hard disk that we configured to mount our system too, instead of messing with the operating system hard drive.

**Part 2 ( mds/mdt and ost/oss setup):**

* Lets do the following in root:
* Type: su
* Type: yum update
* Type: reboot
* Type: yum install epel-release
* Type: yum install iptables-services
* Type: systemctl stop firewalld
* Type: systemctl disable firewalld
* Type: systemctl start iptables
* Type: systemctl stop firewalld
* Type: systemctl disable firewalld
* Type: nano /etc/sysconfig/selinux
  + Edit Selinux to disabled.
* Type: ifup enp0s8
* Type: ifup enp0s3
* Type: hostnamectl set-hostname node#
  + This can be node1, -> node4
* So one thing to be aware is that the url are always changing for rpm file locations so lets go to here: <https://wiki.hpdd.intel.com/display/PUB/Lustre+Releases>. If this url changes then just do a google search on Lustre rpm downloads. I provided the correct urls for the following but they may go out of date.

[lustre-server]

name=CentOS-$releasever - Lustre

baseurl= <https://downloads.hpdd.intel.com/public/lustre/latest-release/el7/server/>

gpgcheck=0

[e2fsprogs]

name=CentOS-$releasever - Ldiskfs

baseurl= <https://downloads.hpdd.intel.com/public/e2fsprogs/1.42.13.wc6/el7/>

gpgcheck=0

* Type: cd /home/node#/Downloads

Type: wget <http://download.zfsonlinux.org/epel/zfs-release.el7_4.noarch.rpm>

* Type: yum localinstall zfs-release.el7\_4.noarch.rpm
* Type: yum upgrade e2fsprogs
* Type: yum localinstall lustre-tests
* Type: reboot
* Any errors after this part might require a restart of the machine. And by restart, I mean restart from the beginning because there is no way of going backwards. There may be a way of going backwards but I have not found out how after any of these commands.
* Type: su
* Type: ifup enp0s8
* Type: nano /etc/modprobe.d/lnet.conf
  + Type: options lnet networks=”tcp0(enp0s8)”
* Type: modprobe lnet
* Type: lctl network up
  + Should get back “Configured” of some sort.
* Type: lctl list\_nids
  + You should get back the enp0s8 IP address and if you don’t then something went wrong.
* MDT setup:
  + Type: mkfs.lustre --fsname=home --mgs --mdt --index=0 /dev/sdb
  + Type: mkdir /mnt/mdt
  + Type: mount -t lustre /dev/sdb /mnt/mdt
  + Type: mount
    - You will get output back from this, should be no errors.
* OST setup:
  + Type: mkfs.lustre --ost --fsname=home --mgsnode=192.168.X.X@tcp0 --index=0 /dev/sdb
  + Type: mkdir /mnt/ost
  + Type: mount -t lustre /dev/sdb /mnt/ost
  + Type: mount
    - You will get output back from this, should be no errors.
* Type: df -h you should see the servers mounted.

**Part (client setup):**

* Type: su
* Type: yum update
* Type: ifup enp0s8
* Type: wget <https://downloads.hpdd.intel.com/public/lustre/lustre-2.10.1/el7/client/RPMS/x86_64/kmod-lustre-client-2.10.1-1.el7.x86_64.rpm>
* Type: wget <https://downloads.hpdd.intel.com/public/lustre/lustre-2.10.1/el7/client/RPMS/x86_64/lustre-client-2.10.1-1.el7.x86_64.rpm>
* Type: yum localinstall kmod-lustre-client-2.10.1-1.el7.x86\_64.rpm
* Type: yum localinstall lustre-client-2.10.1-1.el7.x86\_64.rpm
* Type: reboot
* Type: ifup enp0s8
* Type: modprobe lustre
* Type: mkdir /mnt/lustre
* Type: mount -t lustre (mgsnode enp0s8 IP address)@tcp0:/home /mnt/lustre
* Type: mount
* Type: df -h
  + You should be able to see the mount location at the bottom.
  + This mount does not show up in the file manager. Still trying to figure out how to go about this.
  + If you go into terminal and create a file, then create another client and do the same thing. Once you mount the share and use terminal to go into the share, you should see the file that was put there from the other client.

**Other:**

It helps to learn more about the capabilities of the file system and that can be done at: <http://lustre.org/>. You can also go to my GitHub account and in the documentation to get the setup scripts for both the servers and clients.

**Goals:**

* Try and setup a system that has a separate mgs/mgt and mds/mdt.
* Try and setup a system that has two dependent oss’s connected to one ost
* Try and setup the system so that each dependent server can be rebooted and restored.
  + Turn of kernel and lustre updates.
  + Have scripts in place so that the servers can be rebooted.

**Websites:**

* <http://lustre.org/>
* <https://gist.github.com/joshuar/4e283308c932ec62fc05>
* <https://wiki.hpdd.intel.com/display/PUB/Create+and+Mount+a+Lustre+Filesystem>
* <https://wiki.hpdd.intel.com/display/PUB/Lustre+Releases>

**Errors:**

Modprobe lnet – If you get an error for this command then lustre was not installed correctly.

Modprobe lustre – If you get an error for this command when setting up the client you might want to check your lustre-client version. If you are running the latest version of RHEL then Lustre might not support it.

lctl list\_nids – If you get the wrong IP address that you were looking for then make sure that you entered the correct network device in the modprobe.d directory and just do a simple reboot. Then repeat the second part.