**Basic Linux Commands**

**Install Swiff Player.**

Setup

cat /etc/issue --> this command will display the current version and type of linux.

cat /etc/redhat-release --> verify similar to the output of /etc/issue

dmidecode --> prints all the servers hardwar

e information.

ifdown: if in ifdown means Interface and down means to disable the network adapter

ifdown ethX

ifup: if in ifup means interface and up means to enable the network adapter

ifup ethX

Uptime: Displays how long the system is up and running

current time, system status, the duration server has been in up status, # of users logged in, cpu usage.

ethtool ethX

Supported link modes: 10000baseT/Full

Speed: 1000Mb/s

Link detected: yes

What is incorrect in the above scenario ?

ls: Lists all files in a folder

ls –l (Displays folder structure in a long list format)

-rw-------1rootroot901Sep 24 16:47anaconda-ks.cfg

Permissions of the File

# of inodes

Owner of the file

Group Owner of the file

File size in bytes

Date last modified

Filename

ls –a (Hidden files in the folder, A file in linux can be hidden by putting a “.” In front of the filename)

ls –t (Sort by time)

ls –r (Recursive/Reverse)

**touch** command creates a blank file.

**date** command prints the current date & time on your server

**cp** command is used to copy a file

cp –p (the –p flag is used to preserve attributes such as time stamp)

cp –r (the –r flag is used to copy folders or recursively copy every single file from folder)

**mv** command is used to move a file or rename a file. The move command is also similar to cut and paste in windows. The move command can cut, paste, and rename at the same time.

**history** command is used to print past historical commands and the history information is stored in /root/.bash\_history

**pwd** command is used to find out your Present Working Directory (PWD)

**rm** command is used to remove a file

rm –r (remove folders recursively)

rm –f (Remove with Force)

**ln** command is used to link a file or shortcut

ln –s (Creates a shortcut ln -s /root/install.log /root/install.log.shortcut)

**unlink** command is used to delete or break a shortcut

unlink/root/install.log.shortcut

cd command is used to change directory

cd /

cd command used alone will take you back to your home directory

cd – (will take you back to the previous working directory)

You have a directory structure as follows : /root/.gconfd/apps

Your pwd reports .gconfd

what is the parent directory for .gconfd ?

/root [..]

what is the current directory for .gconfd ?

/root/.gconfd [.]

what is the sub directory/child directory for .gconfd ?

/root/.gconfd/apps

mkdir command is used to create a directory

mkdir /root/1

mkdir –p (this flag is used to create the missing parent directories)

**inode** is a very simple concept, the concept is that every file has a file.

All inodes are stored in the superblock of the filesystem and cannot be accessed by a admin.

All inodes are 4KB by default and store the following attributes “stat filename”:

File: `install.log'

Size: 25629 Blocks: 64 IO Block: 4096 regular file

Device: 6802h/26626d Inode: 327682 Links: 1

Access: (0644/-rw-r--r--) Uid: ( 0/ root) Gid: ( 0/ root)

Access: 2011-09-25 14:50:41.000000000 -0400

Modify: 2011-09-24 16:47:26.000000000 -0400

Change: 2011-09-24 16:47:29.000000000 -0400

wc command is used to count number of lines, words and characters.

wc –c (Characters only)

wc –l (Lines only)

wc –w (Words only)

wc (Lines, Words, Characters)

du (disk usage) command is used to display size of an entire folder

du –sh (Display the entire folder size and displays it in human readable format)

-k

-m

-h

chown command is used to change ownership (user & group) of a file.

touch file1 file2 file3

chownadmin:games file1 (changes both owner and group)

chown root file1 (changes only owner)

chgrp root file1 (changes only group)

chown –R (have to use upper case R to modify the entire folder)

chmod command is used to change file permissions of a file.

chmod –R (have to use upper case R to modify the entire folder or recursively changes all the files and folders when u use this flag against a folder)

|  |  |  |
| --- | --- | --- |
| R | W | X |
| Read only | Modify & Delete | Execute allows you to run the program/application |

|  |  |  |
| --- | --- | --- |
| r | 4 |  |
| w | 2 |  |
| x | 1 |  |
| no perm | 0 |  |
|  |  |  |
| owner | 4 | r |
| group owner | 2 | w |
| others | 5 | r-x |

cat command is used to view the contents of a file

cat filename

head command displays the first 10 lines

head -15 (displays the first 15 lines)

tail commands displays the last 10 lines

tail -15 (displays the last 15 lines)

tail -f (follows a file will not MODIFY anything in the space, and it allows you to view any changes made to the file. VERY IMPORTANT WENT TRACKING LOGS IN LINUX)

find command is used to find files and folders

find / (location to search) –name (search by name) FILENAME/FOLDERNAME&WILDCARDS

find / -size +10M

Refer to this link for more info: <http://www.cyberciti.biz/faq/find-large-files-linux/>

**vi editor:**

Edit Mode

i insert

a append

x Delete

dd delete line

dw delete word

d$ delete till end of line from cursor

shift + g EOF (End of File)

shift + 4 ($) EOL (End of Line)

yy Copy a line where your cursor is at:

Nyy Replace N with the number of Lines. This will copy the number of lines including your current line.

u undo

. redo

Command Mode

/ Search for where your cursor is at for a string in your vi editor

? Reverse Search for where your cursor is at for a string in your vi editor

SED Search and Replace

catsedexample

/usr/local/scripts/today

sed -i 's/\/usr\/local\/scripts\/today/\/root\/scripts/g' sedexample

catsedexample

/root/scripts

:%s/ORIGINAL/REPLACEMENT

:%s/WORD1/WORD2

SED will replace everything that is WORD1 with WORD2.

:

w write

q quit

q! force quit

wq! write and force quit

Exercise:

echo "I store all my scripts in /usr/local/scripts"

echo "I store all my personal files in /home/prasad/files"

Using VI editor replace the following:

store --> save

/usr/local/scripts --> /home/prasad/scripts

Using sedcommand replace the following:

personal --> non sensitive

/home/prasad/files --> /tmp/files

tar command is used to compress a file(s) or folder(s) in to a tar ball.

-c Compress

-x Extract

-t View/Test

-v Verbose

-f File

-z Compress using gzip algorithm.

tar –czvf tarfile.tar.gz file(s)/folders(s) Compress

tar –tzvf tarfile.tar.gz View files/folders inside tar file

tar –xzvf tarfile.tar.gz Extract tar file

**User and Group Administration**

/etc/passwd: This file is where all the users and the default shell assigned to a user is stored.

Entries in /etc/passwd are as follows:

root:x:0:0:root:/root:/bin/bash

The user account or the username

The password which is encrypted and now stored in /etc/shadow

The uid or the userid this is a numeric number which defines the userid or uid

The gid or the groupid this is a numeric number which defines which group or gid the user belongs to.

The group which the user belongs to by default or in linux its called primary group.

The home directory or the default directory for the user root

The default shell the user gets when he logs in.

/etc/group: This file is where all the groups and the information regarding the users belonging to groups is stored.

Entries in /etc/group are as follows:

root:x:0:root

Group Name

Whether the group is activate or deactivated

The group ID

The users who belong to the group

useradd: This command is used to add user in to linux (useradd –u NUM –g GROUPNAME username)

groupadd: This command is used to add groups in to linux (groupadd -g GID groupname)

passwd: This command is used to change the current user password.

usermod: This command is used to modify attributes of a user (usermod –G group1,group2,group3, group4 user)

groupmod: This command is used to modify attributes of a group

userdel: This command is used to delete a user

groupdel: This command is used to delete a group

**Environmental Variables, Standard Input, Output and Pipes**

**Variable:** A variable has a value.

env: This command displays all the environmental variables in Linux.

set: Very similar to env displays all the environmental variables

export: This command is used to create any new environmental variables.

variables can be set without export but if you set a variable without export the variable will only be local (shell) and with export command the variable is global and will last till the system or os reboots.

unset: Removes a environmental Variable in memory.

echo: Displays the value of the variable.

PATH variable stores information regarding directories where all your commands reside for your shell.

**Standard Input and Output:** Both Standard output and Input are used to redirect

Standard Input is to redirect an input to a file or a command. >

cat emailmessage

*Hello from Linux,*

*If you can read this I am contacting from the Death Star in Star Wars. Darth Vader is a really cool Guy.*

*Prasad Out*

mail -s "Hello from Linux" ppotluri@vmpro.com < emailmessage

Standard output is used to redirect an output from a file or command. <

echo 100 > numbers

echo 200 >> numbers

Pipe is to redirect the output as an input to another command (Its stdin and stdout together).

Pipe is used when you want to pass the output from a command to another command in memory, unlike standard output the output is passed to the storage



**Resource Monitoring:**

Processes: Task Manager

CPU: Task Manager

MEMORY: Task Manager – Performance Tab

I/O (Disk): Task Manager -- Performance Tab -- Resource Monitor (Only Available Win 7)

NETWORK: Task Manager – Networking

Processes: ps –ef

UID PID PPID C STIME TTY TIME CMD

UID: User ID or Username the process is running under.

PID: Process ID for the process

PPID: Parent Process ID

C: Priority of the process (-19 to 19)

STIME: Start Time of the process

TTY: if it’s a ?then its running on the local server, if it has a TTY entry then its running on a shell.

CMD: The actual command or process or script

CPU: top, vmstat, sar

\*ANY OF THE BELOW COMMANDS USE “\* -d X –c Y” X = # OF SECONDS and Y = # OF TIMES or COUNT”

Top:

If you would like to view top information more frequently use “top –d X” X = # of seconds.

Hit the “1” key in top to view all the cpu’s and cpu resource utilization.

Vmstat:

|  |  |
| --- | --- |
| Procs | **Procs** |
| r b | r: The number of processes waiting for run time. |
| 0 0 | b: The number of processes in uninterruptible sleep. |
|  |  |
|  |  |
| -----------memory---------- | **Memory** |
| swpd free buff cache | swpd: the amount of virtual memory used. |
| 0 15911940 87152 281252 | free: the amount of idle memory in kilobytes |
|  | buff: the amount of memory used as buffers or any data written to disk is first written here then written to the storage to act as a buffer |
|  | cache: the amount of memory used as cache or the amount of memory used to store the most commonly accessed files. This cache really helps because the CPU can get the files from memory than from storage. If the data on the file changes in memory it is immediately sent to the buffer.  When a kernel detects a inode being constantly accessed (read) it copies the file from the storage space in to memory space for fast access. |
|  | inact: the amount of inactive memory. (-a option) |
|  | active: the amount of active memory. (-a option) |
|  |  |
|  |  |
| ---swap-- | **Swap** |
| si so | si: Amount of memory swapped in from disk (/s). |
| 0 0 | so: Amount of memory swapped to disk (/s). |
|  |  |
|  |  |
| ---io--- | **IO** |
| bi bo | bi: Blocks received from a block device (blocks/s). |
| 0 0 | bo: Blocks sent to a block device (blocks/s). |
|  |  |
|  |  |
| --system-- | **System** |
| in cs | in: The number of interrupts per second, including the clock. |
| 7 7 | cs: The number of context switches per second. |
|  |  |
| -----cpu------ | **CPU** |
| us sy id wast | These are percentages of total CPU time. |
| 0 0 100 0 0 | us: Time spent running non-kernel code. (user time, including nice time) |
|  | sy: Time spent running kernel code. (system time) |
|  | id: Time spent idle. Prior to Linux 2.5.41, this includes IO-wait time. |
|  | wa: Time spent waiting for IO. Prior to Linux 2.5.41, shown as zero. |
|  | st: Startup Defaults |

MEMORY: vmstat, free –m

Free: This command is used to display the free memory on your Linux servers you can use the –k (KB), -m (MB), -g (GB)

I/O (Disk): iostat

Device: Which Device ?

tps: Transaction per second.

Blk\_read/s: Blocks read per second

Blk\_wrtn/s: Blocks written per second

Blk\_read: Blocks read in total since the server is up

Blk\_wrtn: Blocks written in total since the server is up

\*BY DEFAULT IOSTAT IS NOT AVAILABLE IN LINUX, YOU HAVE TO INSTALL sysstat\*

Iostat: This command is used to display I/O statistics or Read and Write blocks per sec.

NETWORK: netstat–in

Netstat –in: This command is used to display Network/Interface Statistics in RX (Receive) and TX (Transmit)

netstat -tnlp: This command with tnlp flags prints just the listen ports so you can see the command pre service start and post service start.

watch: This command is used to a task repeatedly in a terminal session window every 2.0 secs by default. (watch vmstat)

Disks and Filesystems

**Windows Partition example:**

Add a new hard drive in your computer (possibly from best buy)

Bring the disk online

Initialize the Disk (assists windows to understand the type of disk and the size of disk)

Partition the drive (Allows you to allocate a part of the disk to Windows)

Assign a drive letter (Assigning drive letter allows a user to store files easily)

Format the Partition with NTFS (Will allow windows to manage the Filesystem and Journal)

Video: ["\\argos\labvideos\Videos\Linux\Basics of Linux\Windows-Partition-Example.html"](file://\\argos\labvideos\Videos\Linux\Basics%2520of%2520Linux\Windows-Partition-Example.html)

df: This command prints the Disk/Partition Free space that is mounted on your linux system.

-k (kb) –m (mb) –h (human readable)

mount: This command prints all the mounted file systems in your linux server.

LVM: Logical Volume Management





fdisk /dev/mapper/ALIASNAME

u --> convert cylinders to sectors

enter

n --> new partition

enter

p --> primary partition

enter

1024 --> leave 1 MB of data behind

enter

enter

w --> write changes to the partition table

enter

q --> quit

pv

vg

lv

mkfs.ext3

resize2fs

/etc/fstab

/dev/vg10/lvol1 /firstfs ext3 defaults 0 0

Fsck: Filesystem Check, checks for any corruption or bad inodes on your filesystem. The command is fsck –fy(-f = force, -y = auto yes). FSCK SHOULD ONLY BE RAN ON AN UNMOUNTED FILESYSTEM.

|  |  |
| --- | --- |
| pvcreate /dev/cciss/c0d0p4 | umount /firstfs |
| vgcreate vg10 /dev/cciss/c0d0p4 | rm -rf /firstfs |
| lvcreate -l 100%FREE --name=lvol1 vg10 | lvremove -f /dev/vg10/lvol1 |
| mkfs.ext3 /dev/vg10/lvol1 | vgremove vg10 |
| mkdir /firstfs | pvremove /dev/cciss/c0d0p4 |
| mount /dev/vg10/lvol1 /firstfs |  |
| df -h |  |

Grep command: Grep command is used to search contents in a file by string

grep –i (-i flag means ignore case)

nice: Nice command assigns a priority to a process before it begins.

Priorities in Linux range from: -19 to 19… The lower the priority number the higher the CPU priority.

nice –n “PRI” command

time nice -n -19 tar -cvf usrbackup.tar /usr

renice: Renice commands assigns a priority to a process while its running.

renice –“PRI” PID

ifconfig: Interface Configuration, prints the ip address of the Linux Network Interfaces.

ifconfig –a (-a = all interfaces)

|  |  |
| --- | --- |
| Link encapsulation | Type of Network |
| Hwaddr | MAC Address of the NIC PORT |
| inetaddr: | IP Address of the Interface |
| Bcast (Broadcast) | Broadcast address of Interface |
| UP BROADCAST  RUNNING MULTICAST | Connection is UP Connection is Broadcasting Connection is RUNNING Connection can also Multicast  for monitoring |
| MTU | Maximum Transmission Unit |
| RX Packets | Receive Packets, or the # of Packets received |
| TX Packets | Transmit Packets, or the # of Packets sent |
| RX Bytes | Receive Bytes, or the # of Bytes Received |
| TX Bytes | Transmit Bytes, or the # of Bytes Transmitted |

Diff: Diff command is used to check for differences between the content of two files.

Diff file1 file2

[root@c1b14lx14 ~]# cat file1

1

2

3

4

5

[root@c1b14lx14 ~]# cat file2

3

4

5

6

7

[root@c1b14lx14 ~]# diff file1 file2

1,2d0

< 1

< 2

5a4,5

> 6

> 7

gzip: Compress the size of the given files using Lempel-Ziv coding (LZ77).

tar –czvf filename.tar.gz files/folder

tar –xzvf filename.tar.gz

gzip filename.tar (ONLY NEEDED IF YOU ARE USING GZIP SEPERATELY).

bc: Calculator

w: w displays all the users that are currently logged in

whoami: whoami displays the user account which you are logged in as…

last: last displays the last users that were logged in to your server

kill: Kill command is used to destroy a process for example “kill PID” or “kill -9 PID”. -9 is a SIGKILL to the CPU which means instant kill.

ssh: ssh is used to Remotely login from one server to another.

ssh hostname

scp: secure copy is used to transfer a file from one server to another

scp localfile hostname:/remotedir/remotefile

scp /root/usrbackup.tar c1b1lx1:/root/usrbackup.tar

-p and -r can be used here just like cp command.

sort: sort command is used to sort an output or the contents of file.

# cat file1

5

3

4

2

1

e

c

d

a

b

# sort file1

1

2

3

4

5

a

b

c

d

e

cal: Prints the calendar of this month

cal 1752 -- sep

&&: If you place && after command 1 and type in a command 2, the post event will be that command 1 will execute if command is successful with no errors it will continue and run command 2.

; : very similar to && but it will run command 2 regardless whether command 1 error’ed out or not.

Nohup: nohup command is used to run a command or task post exit or when you close your putty if you have nohup in front of the command such as tar, the command will continue to run till it completes.

Example: rm –rf usrbackup.tar

nohup tar –cvf usrbackup.tar / &

exit

yum: yum command is used to install/upgrade packages or software on your linux server.

Example: yum install PACKAGENAM

yum install firefox

login to remote console and run firefox.

If you want to see all the packages available through yum “yum list”

yum groupinstall “X Window System”

startx

yum remove firefox

yum groupremove "X Window System"

rpm --import /etc/pki/rpm-gpg/RPM-GPG-KEY-redhat-release Running this command will import the GPG Key required to associate your satellite server to your linux server.

wget: Is a text based download utility or command, its objective is the ability to download from the internet/intranet.

wget [http://downloads.sourceforge.net/project/webadmin/webmin/1.580/webmin-1.580-1.noarch.rpm?r=http%3A%2F%2Fwww.webmin.com%2Fdownload.html HYPERLINK "http://downloads.sourceforge.net/project/webadmin/webmin/1.580/webmin-1.580-1.noarch.rpm?r=http%3A%2F%2Fwww.webmin.com%2Fdownload.html&ts=1332011411&use\_mirror=superb-sea2"& HYPERLINK "http://downloads.sourceforge.net/project/webadmin/webmin/1.580/webmin-1.580-1.noarch.rpm?r=http%3A%2F%2Fwww.webmin.com%2Fdownload.html&ts=1332011411&use\_mirror=superb-sea2"ts=1332011411 HYPERLINK "http://downloads.sourceforge.net/project/webadmin/webmin/1.580/webmin-1.580-1.noarch.rpm?r=http%3A%2F%2Fwww.webmin.com%2Fdownload.html&ts=1332011411&use\_mirror=superb-sea2"& HYPERLINK "http://downloads.sourceforge.net/project/webadmin/webmin/1.580/webmin-1.580-1.noarch.rpm?r=http%3A%2F%2Fwww.webmin.com%2Fdownload.html&ts=1332011411&use\_mirror=superb-sea2"use\_mirror=superb-sea2](http://downloads.sourceforge.net/project/webadmin/webmin/1.580/webmin-1.580-1.noarch.rpm?r=http%3A%2F%2Fwww.webmin.com%2Fdownload.html&ts=1332011411&use_mirror=superb-sea2)

rpm -ivh webmin-1.560-1.noarch.rpm

rpm -qa | grepwebmin

rpm -e webmin-1.560-1

webmin: in a nutshell it is nothing but a Web Interface to administer linux.

RPM: Redhat Package Manager is a Redhat based Installer Utility.

IF YOUR WEBMIN DOES NOT WORK RUN "service iptables stop" <-- stops firewall in linux.

|  |  |  |
| --- | --- | --- |
| rpm flags |  |  |
|  | i | install |
|  | U | Upgrade |
|  | e | erase |
|  | v | Verbose |
|  | h | hash |
|  |  |  |
| to install | rpm -ivh filename.rpm |  |
| to upgrade | rpm -Uvh filename.rpm |  |
| to erase | rpm -e rpmname |  |
| To view installed rpms | rpm -qa | | grep RPM |

To view the change log of a RPM rpm –q webmin-1.560-1 --changelog and to view the rpm details PRE-INSTALL rpm –qpilwebmin-1.560-1.noarch.rpm

/proc filesystem: /proc filesystem is proc and it stores all the kernel runtime information in user readable language.

cat /proc/cpuinfo | more

The above command displays all the CPU information, including the number of processors and cores.

cat /proc/meminfo | more

The above command displays all the memory information, including total physical memory.

runlevel: Run Levels determine whether your system will be in rescue mode, maintenance mode or running normally with or without X

runlevel command display the current and post reboot runlevel.

Init command is used to change the run level on the fly but the runlevel is lost after a reboot.

vi /etc/inittab file needs to be modified to change the runlevel permanently and the changes will only take effect after a reboot

id:5:initdefault: (Replace 5 with 3)

init 5

|  |  |
| --- | --- |
| Windows | Runlevel |
| Repair mode | 1 |
| safe mode | 2 |
| safe mode with networking | 3 |
| safe mode with command prompt | 3 |
| Disable VGA Driver | 4 |
| Normal | 5 |
| Linux |  |
| X = graphical session in Linux |  |
| Shutdown | 0 |
| Single User (reset root password) | 1 |
| Multi User with no networking | 2 |
| Multi User with networking but no X | 3 |
| Unused | 4 |
| Multi User with networking with X | 5 |
| Reboot | 6 |

How do you boot in to run level 1?

init 1

vi /etc/inittab

Bootloader (MBR, NTLDR) in linux is called Grub. Grub configuration file is in /etc/grub.conf.

Install flash adobe flash player

install swiff player

Open File with Mozilla Firefox



**EMC and Storage Systems and Luns:**







Initiator Name: Initiator name is like a MAC address in LAN. An initiator name or WWPN (world wide port number) is assigned to every single port in your FC HBA.

**Bind LUN ----- > Rename the LUN ----- > Storage Group ----- > Assign a Host to the Storage Group ----- > Assign a LUN to the Storage Group**

wwid: **3**6006016027FA1400F2E507ECE3EAE011

Multipath: Multipath allows you to take devices coming from multiple paths (2 PORTS to 8 SP PORTS).

Multipath notifies the linux kernel multiple paths to a single storage device for ex: sdX

Opensource: Multipath

PaidSource: EMC PowerPath, NetApp MPIO

/etc/multipath.conf and multipath –ll (list)

* Retrieve the HBA WWPN
* Register the HBA WWPN in EMC so EMC can acknowledge and allow this HBA to get access to LUNs.
* Bind a LUN and save the WWID and the LUN.
* Create Storage Group and attach the registered HBA WWPN.
* Attach the LUN to the Storage Group which has the registered HBA WWPN that you want to provide the access to the LUN.

|  |
| --- |
| Bind LUN |
| Grab LUN WWID |
| Add entry to /etc/multipath.conf DO NOT REMOVE OLD MULTIPATH ENTRY |
| Go back to EMC attach LUN to STORAGE GROUP |
| run the following command "echo 1 > /sys/class/fc\_host/host0/issue\_lip" |
| multipath –ll |

If you want to rescan for a new lun that you attached, configure multipath and then “echo 1 > /sys/class/fc\_host/hostX/issue\_lip”

Services &Chkconfig

service: the service can be used to start, stop and restart a service.

serviceservicename start (stop/restart)

Windows Services: A service is nothing but an application that runs in the background of the operating system. A Service can bestarted, stopped, restarted, enabled and/or disabled. (services.msc)

chkconfig: the chkconfig command can be used to enable/disable during a system startup/reboot.

chkconfig –list (is used to list all services)

chkconfig servicename on (off to disable at reboot).

chkconfig sendmail --level X on

chkconfig network off

Reboot

Remote console chkconfig network on service network start and test ssh in to your server from your laptop using putty

chkconfig --list

chkconfig SERVICENAME off

chkconfig SERVICENAME on

service SERVICENAME stop

service SERVICENAME start

service SERVICENAME restart

service SERVICENAME status

NFS (Network File System):

Network File System, is a UNIX/Linux/Windows based common file system and is used to share files/folders across a Network Path. It is based off of TCP/IP and NFS is also the name of the protocol.

NFS is file-based file system and NOT like a block-based file system (ext3, ntfs, jfs)

NFS is very similar to CIFS but NOT CIFS (Windows File sharing protocol, for example argos).

NFS is a service in linux (nfs).

NFS is based off of Server – Client Relationship.

mkdir /opt/backup

Edit /etc/exports and add the entry to share a folder on the NFS server

/opt/backup \*(rw,no\_root\_squash) #The \* means all hosts, rw means read and write permissions, no\_root\_squash means that client can have root permissions to the share folder

service nfs start (restart) (DO NOT RUN THIS AT WORK)

IF YOU NEED TO ADD ANOTHER SHARED FOLDER THAN THE ONE YOU ADDED PREVIOUSLY FOLLOW THE STEPS BELOW DO NOT RESTART THE NFS SERVICE. IF YOU RESTART/STOP NFS ALL CLIENTS WILL GET DISCONNECTED.

mkdir /opt/backup1

Add a second entry (/opt/backup1) to share a folder on the NFS server in /etc/exports and run “exportfs –a”

The exportfs command allows you to share the folders without restarting NFS daemon, if you restart NFS daemon constantly for every new addition of share you will cause the older shares to freeze. To get around this problem you run exportfs–a

mkdir /LOCALMOUNTPOINT

mount -t nfs SERVERNAME:/REMOTEMOUNTLOCATION /LOCALMOUNTPOINT

Bonding (Networking), traceroute

traceroute: traceroute command can be used to display hops from your server to the destination.

Networking:   
/etc/hosts:

This file contains IP Address and Host Name for Local Name Resolution, it is better to put the IP Address and the hostname of the server you connect to the most because it avoids your server contacting DNS every time it has to contact the server that was supposed to be in /etc/hosts.

c:\Windows\System32\drivers\etc\hosts < -- WINDOWS

IPADDRESS FQDN ALIAS

10.10.3.100 sonicwall.vmpro.com sonicwall

FQDN = Fully Qualified Domain Name

/etc/resolv.conf

This file is used to configure your name servers (ie: DNS Servers). The changes are LIVE no need to restart network.

*search vmpro.com*

*nameserver 10.30.1.5*

/etc/sysconfig/network-scripts/ifcfg-ethX

|  |  |  |
| --- | --- | --- |
| Network Settings | Filename |  |
| IP | cat /etc/sysconfig/network-scripts/ifcfg-ethX |  |
| SUBNET MASK | cat /etc/sysconfig/network-scripts/ifcfg-ethX |  |
| GATEWAY | cat /etc/sysconfig/network-scripts/ifcfg-ethX |  |
| DNS | cat /etc/resolv.conf |  |
| HOSTNAME | cat /etc/sysconfig/network |  |

ethtool eth2 (Record the Link Detected Status)

ifconfig eth2 (Note that there is no IP)

vi /etc/sysconfig/network-scripts/ifcfg-eth2

Edit the following lines:

BOOTPROTO=dhcp (change to none)

ONBOOT=no (change to yes)

Add the following lines:

NETMASK=255.255.255.0

IPADDR=172.30.0.X

ifup eth2

ifconfig eth2 (Note now the new ip takes effect)

ethtool eth2 (Record the Link Detected Status)

ssh using the new ip of your clients address.

/etc/sysconfig/network

This file is used to configure the hostname for your linux server. (CHANGE AFFECTIVE INSTANTENOUSLY)

cat /proc/sys/kernel/hostname

/etc/nsswitch.conf

/etc/nsswitch.conf can be modified to ensure the system uses either /etc/hosts as **primary**/secondary and DNS (BIND) as primary/**secondary**.

hosts files dns

Bonding:

What are the four types of bonding?

Mode 1 – Mode 4

Either in /etc/modprobe.conf

/etc/sysconfig/network-scripts/ifcfg-bondX

MTU: Maximum Transmission Unit - 1490 - 1500

<1501 -- Multicast Broadcast Storm.

Mode 1 is Active / Standby

Mode 2 is XoR (Tx and Rx)

Mode 3 is broadcast (mostly used in UDP configurations)

Mode 4 it switches the MAC Address (Mac Address Spoofing) or also Active / Active.



**Configure Networking**

|  |
| --- |
| **WARNING:** Beware of Baseboard Management Controllers (BMCs) |
| Baseboard Management Controllers (BMC) are increasingly shipped on rackmount servers. While these can be a great management tool, the versions that share the system's ethernet ports often don't react well with bonded interfaces. With the Broadcom NetXtreme II, you **must** disable the management firmware in order to enable bonding, less a broadcast storm occur on the connected switch.  In the Broadcom case, a DOS utility "xdiag" is provided on the firmware update disk which can disable the management firmware (MF) code. If "xdiag -ver" shows "MF" active on a controller, you need to run "xdiag -c <controller#> -mfw 0" to disable it. |

see: [Network Switch Configuration- bonding and HYPERLINK "http://wiki.oracle.com/page/Network+Switch+Configuration-+bonding+and+trunking" HYPERLINK "http://wiki.oracle.com/page/Network+Switch+Configuration-+bonding+and+trunking" HYPERLINK "http://wiki.oracle.com/page/Network+Switch+Configuration-+bonding+and+trunking"trunking](http://wiki.oracle.com/page/Network+Switch+Configuration-+bonding+and+trunking)  
  
With the switch configured, the VM host systems can now be configured. These steps are valid for all RHEL derivatives (Oracle EL, Oracle VM Server, CentOS, etc). All relevant files are in the **/etc/sysconfig/network-scripts/** directory.  
  
Debian Linux and derivative (Ubuntu) users will want to look into the format of their distribution's /etc/network/interfaces file.  
  
The end result is that the system will end up with a large group of interfaces:

* the physical interfaces (ethX: eth0, eth1, ...)
* bonding interfaces to aggregate the physical interfaces (bondX: bond0, bond1, ...) - also a VLAN trunk!
* interfaces for each individual VLAN on the bonded trunk (bondX.**vlan#**: bond0.1, bond0.50)
* per-vlan bridges, these are the bridges that virtual machines will attach their native virtual interfaces (vifs) to, I have used the vlan# convention for the bridge names (vlan1, vlan50, vlan51...) where interface vlan50 particilates in vlan ID 50 placed on the trunk.

**Load Bonding Module**

By default, the bonding module only supports the creation of one bonding interface. The "options bonding max\_bonds=#" is used to increase this value to whatever # is required, which will generally be between 1 and 4 depending on your site and needs.  
  
Add the bonding module or Append the below lines to /etc/modprobe.conf  
  
alias bond0 bonding  
alias bond1 bonding  
options bonding max\_bonds=2

**Configure the bonding interface**

* bond0 via /etc/sysconfig/network-scripts/ifcfg-bond0

# 802.3ad bonded link  
# switch po1: Gi1/1, Gi1/2  
DEVICE=bond0  
BOOTPROTO=none  
ONBOOT=yes  
BONDING\_OPTS="mode=4 miimon=100"

IPADDR=*IPADDR\_SAME\_AS\_INTERFACE\_ETH0*

NETMASK=255.0.0.0

GATEWAY=10.10.3.100

**Configure the physical interfaces (eth0 and eth1) that are part of bond0:**

* /etc/sysconfig/network-scripts/ifcfg-eth0
* When you are done the the ifcfg-eth0 needs to look EXACTLY like below

# First interface in bond0  
**DEVICE=eth0**  
BOOTPROTO=static  
**#HWADDR=INTERFACE MAC ADDRESS**  
TYPE=Ethernet  
ONBOOT=yes  
MASTER=bond0  
SLAVE=yes

/etc/sysconfig/network-scripts/ifcfg-eth1

# Second interface in bond0

**DEVICE=eth1**  
BOOTPROTO=static  
**#HWADDR=INTERFACE MAC ADDRESS**  
TYPE=Ethernet  
ONBOOT=yes  
MASTER=bond0  
SLAVE=yes

**Configuration Complete once completed DO NOT “service network restart”, to activate the bond0 reboot the server.**

A series of "ifup" commands will bring the above configuration into production without a reboot. Nevertheless, a reboot is strongly recommended to ensure that the network configuration restores itself properly  
  
The following interfaces should be seen when running an "**ifconfig**":  
  
bond0 Link encap:EthernetHWaddr 00:14:5E:C0:FF:EE  
UP BROADCAST RUNNING MASTER MULTICAST MTU:1500 Metric:1  
RX packets:33617546 errors:0 dropped:0 overruns:0 frame:0  
TX packets:12192931 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:0  
RX bytes:4023299390 (3.7 GiB) TX bytes:1022184796 (974.8 MiB)  
  
eth0 Link encap:EthernetHWaddr 00:14:5E:C0:FF:EE  
UP BROADCAST RUNNING SLAVE MULTICAST MTU:1500 Metric:1  
RX packets:6783365 errors:0 dropped:0 overruns:0 frame:0  
TX packets:2132508 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1000  
RX bytes:731753941 (697.8 MiB) TX bytes:226889202 (216.3 MiB)  
Interrupt:23 Memory:ce000000-ce011100  
  
eth1 Link encap:EthernetHWaddr 00:14:5E:C0:FF:EE  
UP BROADCAST RUNNING SLAVE MULTICAST MTU:1500 Metric:1  
RX packets:26834181 errors:0 dropped:0 overruns:0 frame:0  
TX packets:10060423 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:1000  
RX bytes:3291545449 (3.0 GiB) TX bytes:795295594 (758.4 MiB)  
Interrupt:16 Memory:ca000000-ca011100  
  
lo Link encap:Local Loopback  
inet addr:127.0.0.1 Mask:255.0.0.0  
UP LOOPBACK RUNNING MTU:16436 Metric:1  
RX packets:59021 errors:0 dropped:0 overruns:0 frame:0  
TX packets:59021 errors:0 dropped:0 overruns:0 carrier:0  
collisions:0 txqueuelen:0  
RX bytes:14567768 (13.8 MiB) TX bytes:14567768 (13.8 MiB)  
  
The status of the bonded interface can be seen by using the procfs and sysfs:

* /proc/net/bonding/bond0
* /sys/class/net/bonding\_masters
* the /sys/class/net/bond0/ directory

**cat /proc/net/bonding/bond0**

Ethernet Channel Bonding Driver: v3.0.3 (March 23, 2006)  
  
Bonding Mode: IEEE 802.3ad Dynamic link aggregation  
Transmit Hash Policy: layer2 (0)  
MII Status: up  
MII Polling Interval (ms): 100  
Up Delay (ms): 0  
Down Delay (ms): 0  
  
802.3ad info  
LACP rate: slow  
Active Aggregator Info:  
Aggregator ID: 1  
Number of ports: 2  
Actor Key: 17  
Partner Key: 101  
Partner Mac Address: C0:FF:EE:25:60:00  
  
Slave Interface: eth0  
MII Status: up  
Link Failure Count: 0  
Permanent HW addr: 00:14:5e:C0:FF:EE  
Aggregator ID: 1  
  
Slave Interface: eth1  
MII Status: up  
Link Failure Count: 0  
Permanent HW addr: 00:14:5e:C0:FF:EF  
Aggregator ID: 1

**cat /sys/class/net/bonding\_masters**

bond0 bond1

**cat /sys/class/net/bond0/operstate**

up

/etc/sysconfig/network-scripts/ifcfg-ethX

/etc/sysconfig/network-scripts/ifcfg-bondX

/etc/modprobe.conf

NTP:

Modify /etc/ntp.conf and add the Time Servers in the following scenario

COMMENT TWO SERVER ENTRIES RELATED TO CENTOS POOL

server SERVERNAME

server SERVERNAME

chkconfig ntpd on

service ntpd start

ntpq–p

yum install ntp

To test the time server:

Run date command

Run date 01011330 command

ntpdate –u TIMESERVER

Run date command again and record the time.

At command example:

[root@c1b14lx14 ~]# at 1314

at> vmstat | mail -s "vmstat output at `date`" xxxxxxxxxx@vtext.com

at> <EOT> or CTRL+D

job 9 at 2011-10-04 13:14

Crontab:

Crontab is used to schedule tasks like the at command, unlike the at command which only runs at single instance of time, crontab is used to repeat multiple instances in different periods of time.

The file to configure or to edit crontab is "crontab -e"



I want to run a backup script to backup /home every saturday at 6:30 PM in the month of January.

30 18 \* 1 6 /bin/tar -czvf /opt/backup/homebackup.tar.gz /home

I want to run a backup script to backup /usr monday, wednesday, saturday at 8:30 PM from the months of July through December.

30 20 \* 7-12 1,3,6 /bin/tar -czvf /opt/backup/usrbackup.tar.gz /usr

I want you to run a backup script to backup /etc every hour of the day on the 2nd day of any month.

59 \* 2 \* \* /bin/tar -czvf /opt/backup/etcbackup.tar.gz /etc

# The below entry will backup /etc/ every hour on the 2nd day of the month

59 \* 2 \* \* /bin/tar -czvf /opt/backup/etcbackup.tar.gz /etc

# The below entry will email you every 15 minutes with annoying message

\*/15 \* \* \* \* /bin/mail -s "Annoying email every 15 minutes" ppotluri@vmpro.com < /tmp/emailmessage

**Send your self a email or text message every 5 minutes between the hours 4:30 PM – 5:30 PM on the current day of the month**

**\*/5,30 16-17 15 \* \* /bin/mail -s "Text Message"** [**edsprasad@gmail.com**](mailto:edsprasad@gmail.com) **< /tmp/message**

**Backup /etc or compress /etc file to /opt/backup every 20 minutes between the hours of 8:00 AM - 5:00 PM on the current day of the month and also only on the current day of the week.**

**\*/20 8-17 2 \* 1 /bin/tar -czvf /opt/backup/etcbackup.tar /etc**

find command by size example:

find -size +10M -exec mv {} largerthan10MB \;

dd if=/dev/zero of=ddfile3 bs=4k count=10000

sambacifs:

yum install samba-client

mkdir /labvideos

mount -t cifs //argos/backup /labvideos

umount /labvideos

SSH KEYGEN and authentication

**ssh-keygen –t *rsaORdsa*<enter>**

**Enter file in which to save the key: <enter>**

**password: <enter>**

**reenter password: <enter>**

**scp /root/.ssh/id\_*rsaORdsa*.pub *CLIENTHOST:*/root/.ssh/authorized\_keys**

**ssh *CLIENTHOST df –h***

***ssh CLIENTHOST hostname***

Boot from SAN

and configure the LVM at boot using the following image:



HTTPD Install  
yum install httpd

vi /var/www/html/index.html Server name is c1b14lx14

vi /etc/hosts Add entry for your host

service httpd restart

Open a web browser and access your server by entering your host name

SUDO

ALL =(ALL) ALL

Execute Execute Execute

in all as any any commands

terminals user

useradd dcadmin01

useradd dcadmin02

groupadd datacenteradmins

Add both the users to the group datacenteradmins

Change password for dcadmin\*\*

scp /etc/sudoers YOURSERVER:/etc/sudoers

visudo

Users are represented with their name

Groups are represented with "%" in front of them

dcadmin01 $ sudo wall system shutting down in 30 seconds

&& sleep 30 &&sudo wall `date` &&sudo reboot

For those who are completed with the above lab please create two help desk users and a helpdesk group which allows them to change passwords of any user and create any new user accounts.

export PATH=$PATH:/usr/sbin This is how you increment or add extra values to the variable PATH.

Syslogd: Controls which type of log entries end up in log files

Klogd: Captures kernel messages from Syslogd

Logrotated: Controls the size and # of iterations of log files

The entries in /etc/logrotate.conf are used by default if the minsize and rotate are not defined in the /etc/logrotate.d/syslog

*/etc/syslog.conf*

*/var/log/secure it displays any sudo commands used by other users and also any ssh session logins. Great for user auditing.*

*/var/log/messages Displays the error messages from a software/kernel perspective.*

*dmesg or /var/log/dmesg DMESG displays any issues related to the hardware or physical server (for example any lan cable disconnects or san cable disconnects).*

*/etc/logrotate.conf*

*/etc/logrotate.d/syslog*

Grub.conf:

title CentOS (2.6.18-274.3.1.el5)

root (hd0,0) # Master Boot Device or where /boot is located at

kernel /vmlinuz-2.6.18-274.3.1.el5 ro root=/dev/vg00/lvol00 rhgb quiet # This is the actual kernel line which loads the kernel

initrd /initrd-2.6.18-274.3.1.el5.img # Initialize the RAMDISK, or create a small space in RAM so kernel can go reside there.

SWAP Space:

To create a swap file or extend your system swap use the commands below

dd if=/dev/zero of=swapfilebs=1024k count=2000 # Creates a 2GB swap file

mkswap /tmp/swapfile #Lets the linux know there is a 2GB swap space for your use

swapon /tmp/swapfile # Activates the swap space in the linux kernel

To figure out the process

ps –ef

To figure out the network port

netstat –an

To figure out both

netstat–atnp

SYSCTL (/etc/sysctl.conf)

sysctl –a (Displays all current kernel parameters)

Kernel Tuning for Oracle 11G Enterprise Database for Linux.

kernel.shmall = 2097152

kernel.shmmax = 2147483648

kernel.shmmni = 4096

# semaphores: semmsl, semmns, semopm, semmni

kernel.sem = 250 32000 100 128

net.ipv4.ip\_local\_port\_range = 1024 65000

net.core.rmem\_default=4194304

net.core.rmem\_max=4194304

net.core.wmem\_default=262144

net.core.wmem\_max=262144

sysctl –p (Tells the kernel to read the new /etc/sysctl.conf and acknowledges the new changes)

reboot (activates all the new kernel changes at boot)

IPTABLES (LINUX FIREWALL)

iptables controls or filters network traffic, very similar to your windows firewall.

packet, packet filtering, packet direction.

*Traffic (Packets) is determined in three formats:*

MAC Address

IP Address

Port No.

*Traffic (Packets) can be filter in three formats as well:*

Accept

Reject: Notifies the client that the packet was rejected

Drop: Client is notified the packet is dropped so the client will assume there is a network loss or total silence.

*Traffic (Packets) Direction:*

INPUT (RX)

FORWARD

OUTPUT (TX)

vi /etc/sysconfig/iptables

service iptables start

Sample IPTABLES:

# Generated by iptables-save v1.3.5 on Wed Oct 12 06:55:49 2011

\*filter

:INPUT ACCEPT [0:0]

:FORWARD ACCEPT [0:0]

:OUTPUT ACCEPT [198:23220]

:RH-Firewall-1-INPUT - [0:0]

-A INPUT -j RH-Firewall-1-INPUT

-A FORWARD -j RH-Firewall-1-INPUT

-A RH-Firewall-1-INPUT -i lo -j ACCEPT

-A RH-Firewall-1-INPUT -p icmp -m icmp --icmp-type any -j ACCEPT

-A RH-Firewall-1-INPUT -p esp -j ACCEPT

-A RH-Firewall-1-INPUT -p ah -j ACCEPT

-A RH-Firewall-1-INPUT -s 10.40.40.40 -p tcp --dport 80 -j ACCEPT

#-A RH-Firewall-1-OUTPUT -d 10.40.40.40 -p tcp -j ACCEPT

-A RH-Firewall-1-INPUT -d 224.0.0.251 -p udp -m udp --dport 5353 -j ACCEPT

-A RH-Firewall-1-INPUT -p udp -m udp --dport 631 -j ACCEPT

-A RH-Firewall-1-INPUT -p tcp -m tcp --dport 631 -j ACCEPT

-A RH-Firewall-1-INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT

-A RH-Firewall-1-INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT

-A RH-Firewall-1-INPUT -j REJECT --reject-with icmp-host-prohibited

COMMIT

# Completed on Wed Oct 12 06:55:49 2011

A good way to check if a port is open, simply “telnet hostname PORTNO"

Please install Webmin and get webmin to work on your browser for all users.

Verify whether firewall is up and running: service iptables status

Verify rules of firewall: service iptables status

iptables -l

Turn off firewall: service iptables stop

Turn on firewall: service iptables start

Restart firewall: service iptables restart

TCPDUMP

TCPDUMP dumps TCP Packet information based on interval and/or a certain port, you can use the dump and import it in to Wireshark which will let you analyze the TCP Packet Data. So you can see when the packet was either sent or received, what type of packet and what is inside the packet.

tcpdump -vvs 65535 -w /tmp/tcpdump.pcap

press ctrl+c if the above command does not stop after 2 minutes.

Download Filezilla client on your view machine

sftp to your host using filezilla, browse to /tmp and copy and paste the tcpdump.pcap on to your view machine.

Download Wireshark its free on your view machine.

In Wireshark click on file --> open --> select the tcpdump.pcap

Vgdisplay: command output

VG Name vg10

VG Name: Volume Group Name

System ID

System ID: If the VG is being shared you would have a defined System ID for ex: GFS (Global File System)

Format lvm2

Format: Since the VG is based out of LVM family, and lvm family is divided in to lvm and lvm2 we are using the latest version of lvm which is lvm2.

Metadata Areas 1

Metadata: This is an area used for iNodes to avoid Double writes.

Metadata Sequence No 1

Read Above related to Metadata

VG Access read/write

VG Access: Can you read only or can you read and write.

VG Status resizable

VG Status: It defines whether you can add more PVs to the current VG if it is not resizable only the PVs used during the VG creation get used

MAX LV 0

Cur LV 0

Open LV 0

Max PV 0

The above underlined are predefined set rules to prevent admins from creating more than set limit LVs.

Cur PV 1

Act PV 1

The PV defines how many PVs or Partitions are residing inside the VG. Current means how many added to the VG and Active means how many are being used by the VG.

VG Size 10.00 GB

The size of all the PVs put together defines the VG size

PE Size 4.00 MB

Physical Extent size which describes the smallest Logical Volume you can create, so in the value above that means you can create Logical Volume with as little as 4MB in size.

Total PE 2559

VG Size = PE Size X Total PE

Alloc PE / Size 0 / 0

Alloc PE = How many PEs are currently in use or allocated

Free PE / Size 2559 / 10.00 GB

Free PE = How many PEs are still available for you to create a LV.

VG UUID fmc7Bj-2Y2A-tYEd-XldU-9UAL-2SeE-kgUOP2

VG UUID = Kernel refers to this UUID as the Volume Group, VG Name variable above is just for you to understand or to make it easily human readable.

E2label

e2label /dev/mapper/T2\_LXLUN02p1 T2\_LXLUN02

entry in /etc/fstab: LABEL=T2\_LXLUN02 /emclun ext3 defaults 0 0

SWAP Entry in /etc/fstab:

/emclun/ddfile1 swap swap defaults 0 0

Tunnel X sessions or X based application on to your desktop:

• yum install firefox

• install xming from [\\argos\labvideos](file://\\argos\labvideos) on your vmware view machine

• make sure xming is not running, open xlaunch or search for xlaunch on your windows machine.

• click next, next, select or check no access control

• on your linux machine run "export DISPLAY=YOUR\_VMWARE\_VIEW\_MACHINE\_IP:0.0"

• firefox

SUDO Scenario: You have over 2000 servers in a datacenter and you need to provide your data center admins the ability to shutdown the server so that they can perform maintenance at 3 A.M. without distrubing you or other system administrators.

Create a Data Center Group Admins

groupadd dcadmin

Create users called Prasad and Asif and add them to the Data Center Admins Group.

useradd -g dcadmin Prasad

useradd -g dcadmin Asif

passwd Prasad/Asif

visudo and add permissions for the Data Center Admins Group to execute shutdown command as root.

visudo, and Setup Cmnd\_Alias (is like a variable which holds values/commands that other users can run)

or Add the below entries in visudo:

*Cmnd\_Alias SHUTDOWN = /sbin/shutdown, /sbin/init*

*%dcadmin ALL=(root) NOPASSWD: SHUTDOWN*

Provide access to the Cmnd\_Alias with the dcadmin group

Login as Prasad/Asif and Test sudo.

Private Yum Repository:

NFS mount e3b3lx35:/mnt/centos5.7/media to /mnt folder.

mount e3b3lx35:/mnt/centos5.7/media /mnt

remove all files in /etc/yum.repos.d

rm -rf /etc/yum.repos.d/\*

yum install xclock

create a new file with a extension of .repo under /etc/yum.repos.d and add the below information:

[CentOS5.7] ### This the section or the category that print when you run yum list

name=CentOS5.7 ## This is name of the repository

baseurl=file:///mnt ### This is the location where the media is stored

enabled=1 ### 0 = no and 1 = yes

gpgcheck=0 ### if you are a strict organization this is required it performs a GNU Privacy Guard check.

yum install xclock

:wq /etc/yum.repos.d/FILENAME.repo

To verify selinux

getenforce

to disable selinux modify /etc/selinux/config and change the enforced to disabled and reboot.