­­­­Red Hat Certified System Administrator

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| Command | Description |
| stdout | Is what we see outputted on the screen |
| ­­­cat | output content on stdout |
| cat filename filename1 | Output content of multiple files on stdout |
| cat filename filename1 > file | Redirect output of multiple files to single file |
| echo “ Txt” > file | Redirect output to file and overwrite it if it exists |
| echo “more text” > file | Redirect output to file and do not overwrite it if it exists just append the new text to it |
| stderr | When an error is reported on your terminal |
| 2> file | Redirect error to a file |
| 2> /dev/null | Redirect to no place where the error is not stored |
| &> file | Redirect stdout and stderr to a file |
| 2>&1 | grep “error” > file | Redirect stderr to stdout in order to filter data and redirect the final result to a file |
| head filename | Output the first ten lines of the file |
| head -n 20 filename | Output the first twenty lines of the file |
| less filename | Output from the oldest to most recent from top to bottom |
| tail filename | Output most recent ten lines of the file from bottom to top |
| tail -n 20 filename | Output the most recent twenty lines of the file |
| Grep | Used to filter data |
| grep ‘^#’ filename | Get all the lines that start with # |
| grep -i ‘text’ filename | Get all the lines with the specified text and ignore case sensitive of the text |
| grep -v ‘^#’ filename | Get all the lines that do not start with # |
| grep ‘text$’ filename | Get all the lines that end with the specified text |
| grep ‘^text$’ filename | Get all the lines that start and end with the specified text |
| grep [Tt]ext filename | Get all the lines that start with lower or capital t letter of the specified text |
| grep ‘[^text]’ filename | get all words without the specified word |
| grep -E ‘(Chr)+’ filename | Get all lines with letter Chr or more than one |
| grep ‘Chr…Chr’filename | Get all which start with Chr and three letters between them and end with Chr |
| ssh user@ipaddress/hostname | To connect to server |
| ssh user@ipaddress/hostname command | Issue command remotely |
| scp filename user@ipaddress/hostname:~/path | Move file from one directory to another directory |
| sftp user@ipadress/hostname | to connect to server to upload or download files |
| Sftp:  get filename (will download file)  put filename(will upload file)  ls (will list files/directories)  etc |  |
| systemctl get-defaults | To check terminal mode , single or multiple users |
| ls | List files/directories |
| ls -al | Long listing hidden which start with dot & regular files/directories |
| tar -cvf archiveName directoryName filename fileaname1 | To archive all files and directories into archiveName |
| tar –tf archiveName.tar | To show archive files |
| gzip archiveName.tar | To compress the archive file |
| tar -cvzf archiveName.tar.gz directoryName filename filename1 | To archive and compress all files and directories into archiveName.tar.gz relatively close to gzip command |
| gzip -d archiveName.tar.gz | Uncompress archive |
| tar -xvf archiveName.tar | Uncompress archive |
| tar -xzvf archiveName.tar | Uncompress archive will overwrite existing files |
| tar -dvf archiveName.tar.gz | Will check if files differs |
| Vi text editors  -------------------------------  vi filename  press i for insert mode  ESC to exit from insert mode  press shift & : to enter command mode  To exit immediate q! in command mode  Navigate {  h:left  j:down  k:up  l:right  }  shift & y : copy  p:past  u:undo changes  dd:cut  5 dd:to cut five lines from cursor and same command can be used for copy  12 shift & g : to go to specific line  1 shift & g : to go to first line  shift & g : to go to last line  cw: to change one word  cc: to replace line with new line  shift & : ?keyword:to look for a word in the file  shift & :/keyword:to look for a word  shift & r:to replace text in the line  shift & : %s/oldword/newword/g : to replace old word with new word globally (all occurrences )  shift & : wq : to save changes and quit  shift & : !ls :to execute command in vi editor | |
| touch {filename,filename1,filename2} | To create multiple files |
| mv filename newfilename | Rename it |
| mv filename /directoryName/filename | Move it to directory |
| mkdir -p directoryName/subdirectoryName/subdirectoryName | Create and directory and subdirectory as needed if not exists |
| rm -rf \* | Remove everything recursively |
| rmdir directoryName | Will remove directory if it is empty |
| rm –rf directoryName | Will remove everything in directory then the directory its self |
| cd .. | Return back one directory |
| cp –R directoryName newPath | to copy directory |
| ln -s path symbolicLinkName | To create symbolic link ,can be apply on file/folder(when the file/folder removed link will be broken) |
| ln path hardLinkName | To create hard link ,it links to file |
| File / directory permissions  drwxrwx---  1-(d)2-(rwx)3-(rwx)4-(---)   1. Directory 2. Owner (r=read,w=write,x=execute) 3. Group (r=read,w=write,x=execute) 4. Other(no permissions)   -rwxrwx---  1-(d)2-(rwx)3-(rwx)4-(---)   1. File 2. Owner (r=read,w=write,x=execute) 3. Group (r=read,w=write,x=execute) 4. Other(no permissions) | |
| chmod | To change permission on file/directory |
| chmod (u=user,g=group,o=other,-=remove,+=add)  chmod u-w filename | Remove write permission from the file owner |
| groupadd groupName | To create group |
| getent | List all created groups |
| chown | Change owner of the file / directory |
| chown user:group directoryName | Change owner of directory to new user and group |
| chown :group directoryname | Change owner of directory to new group |
| usermod | To add user to group |
| usermod -G groupName user | To add user the specified group |
| chmod g+w directoryName | To change permission for parent directory only and to apply changes to new subdirectories |
| chmod g+w -R directoryName | To change permission for parent directory and to its subdirectories which already created |
| chmod ug+X -R directoryName | To add execute permission to directory only and not regular file |
| chmod a+r directoryName | To add read permission to all categories |
| chmod 777 (7=user,7=group,7=other)  7={4=read,2=write,1=execute,0=no permission}  chmod 500 filename  user=5{4=read,1=execute}=5  group=0{no permission}  other=0{no permission} | Octal permission is based on adding number to get permission for each category  7={  read=4  write=2  execute=1  } |
| chmod 7777 | Octal permission is based on adding number to get permission for each category  7={  setUid=4  setGid=2  stickybit =1  } |
| umask | User mask , which mask permissions for files/directories when initially created |
| man keyword | To show help for the specified keyword |
| apropos keyword | To use this command, you have to index man command so that it can locate what you are looking for.  To index , you have to use mandb |
| man pageNumber keyword | To look for command information in specific section |
| info (/usr/share/info) | Alternative to man command |
| info keyword | If keyword is not found , it will be opened in using man command |
| shift + ? | To show how to navigate in info |
| usr/share/doc | Documentations for any program installed in linux |
| locate keyword | Before using locate, you have to use this command updated so that it update the system with the latest files/directories that were created.  Now you can search the system |
| which command | will show you command path |
| whatis command | Will show info based on manual pages description |
| whereis command | Will look for documentation and command location |
| rpm –qd packageName | To look for documentations for packages that installed via rpm |
| find | To look for files/directories |
| find /directoryName –user | To for files/directory in the specified directory for user |
| find /directoryName -mtime -3 | All files that modified within the last 3 days |
| stat directory | To check and last time file was modified |
| find / -uid xxx | To find files/directories by UID |
| find / -user keyword | To find by user |
| find / -user keyword -type f -exec cat {} \; | | To find all the files for user and execute command |
| setxkbmap us | To make keyboard maps works perfectly without any issue like | etc |
| init 0(run level) or shutdown now | Shutdown the system |
| init 6(run level) or reboot | Reboot the system |
| shutdown -r +5 message | Reboot system after 5 minutes and notify the logged in users |
| shutdown -c | To cancel the reboot |
| shutdown -r time | To schedule a reboot at specific time 00:00 |
| shutdown -r now | Reboot the system now |
| shutdown -h +5 message | System will be shutdown in five minutes and notify the logged in users |
| systemctl halt or halt  shutdown -P | System will power off or shutdown |
| systemctl list-units --type=target | To list system units target |
| systemctl -t help | To show different types of units target |
| systemctl list-dependencies multi-user.tagert | To show dependencies for multi-user.target |
| systemctl get-default | Will get which you are on |
| multi-user.target  graphical.target  emergency.target  rescue.target | Group of dependencies which differ for each target |
| systemctl isolate target | To switch between targets |
| systemctl set-default target | To set default for target |
| To change boot  You have to interrupt boot process by pressing arrow key up or down then  press e key to edit grub record  then navigate to line where you find linux kernel then at the end of the line  type system.unit=rescue.target(or specific different target)  then press ctrl + x to boot into the new target | |
| To gain access to system by interrupting the boot process by pressing arrow key up or down then  press e key to edit grub record  then navigate to line where you find linux kernel then at the end of the line  type rd.break  then press ctrl + x to boot into the bug shell  1-mount -oremount,rw /sysroot  2-chroot /sysroot  3-passwd (to change password)  4.touch /.autorelabel  5.exit (two times) |  |
| ps | To list processes |
| pgrep keyword | To list processes id which equal to the specified keyword |
| pgrep keyword -l | To list processes id and its names which equal to the specified keyword |
| yum install httpd | To install httpd via yum |
| systemctl start httpd | Start httpd |
| pgrep httpd –l | Search for httpd process |
| pgrep -u user -l processName | To check if specific user runs specific process |
| prgrep -v -u root -l | To list all processes not owned by root user |
| pkill processName | Kill process by process name |
| pkill -1(closes the connection)  pkill -15 (kill process cleanly)  pkill -9 (kill the process immediately) |  |
| w | Show current users logged in to the system and which file they are running / working on |
| pkill -t TTYkeyword | To kill user process by tty |
| (while true; do echo –n “test” >> file; sleep 1; done) & | Create infinitive loop and run it in the background(&) |
| jobs | Which jobs are running in the background |
| kill -19 %number | Stop background job by passing its number |
| kill -18 %number | continue background job by passing its number |
| kill %number | Kill background job by passing its number |
| ps aux | It will show all processes running on our system |
| ps axo pid,comm,nice | grep httpd | To get priority level for specific process |
| nice –n 0(high) 20(low)  nice -n 0 httpd | To set priority for specific process and start it up |
| renice -n 2 $(pgrep httpd) | To change priority for all httpd process |
| uptime | To system uptime |
| cat /proc/cpuinfo | To cpu info and its cores |
| cat /proc/cpuinfo | grep "model name" | wc -l | To count number of processors |
| top | Provide information about the system |
| /var/log | Log files |
| tail –f secure | To view log in real time like when user login to the system |
| system-journald | To log all events |
| journalctl -n | To show the last 10 lines |
| journalctl -f | Will show the last 10 lines and will continue to listen |
| systemctl start httpd | To start httpd service |
| systemctl restart httpd | To restart httpd service |
| Systemctl status httpd | To check httpd service status |
| journal \_SYSTEM\_UNIT=httpd.service | To check the logs for specific service |
| journalctl --since=yesterday | to get logs since yesterday |
| systemd-analyze | Shows information about boot process |
| systemd-analyze blame | It will list how long each process took |
| yum search virt-manager.noarch | To search for virtual manager |
| yum install virt-manager.noarch | To install virtual manager |
| virt-manager | To run virtual manager via terminal |
| systemctl list-units |grep keyword | To list service of specific word |
| systemctl operation(start,restart,stop) name.service | To do all kind of operations by just replacing the name before .service |
| systemctl is-enabled service | To check if service is enabled |
| systemctl enable/disable service | To enable service at boot time |
| scp /sftp (22port) | To transfer files securely between systems |
| scp filename user@hostname/ipadress:~/path | Process of moving file securely to another system |
| sftp user@hostname/ipaddress  get filename (to download)  put filename (to upload) |  |
| MBR (32 bit)  Up to 4 primary partitions  Max 2TB for each partition  GPT(64 bit)  UEFI device and backward compatibility  Up to 128 primary partitions  8 zettabytes for each partition | |
| fdisk /dev/sd? | To select hard disk |
| fdisk /dev/sd?  press n  press p  press enter  type +200M(K, M,G)  press enter  press l (to list partition types)  press t (to set/change partition type)  type 83 & press enter  type w & press enter | To create partition using fdisk once done , you have to format using mkfs |
| mkfs -t filesystem sd?? | Format the partition with specific filesystem once you done , mount it to specific directory |
| best practice to place directory in mnt  mkdir mypartition  mount /dev/sd?? /mnt/mypartition | mount /dev/sd?? to directory |
| mount -U UUID /mnt/mypartition | To mount using UUID |
| umount /mnt/mypartition | To unmount |
|  |  |
| df -h | To list mounted devices |
| blkid /dev/sd?? | To get UUID for partition |
| fdisk /dev/sd?  press d  press partition#  type w & press enter | To delete partition using fdisk once you done, you have to use partprobe |
| gdisk | To do partitioning for GPT |
| gdisk /dev/sd?  press n  press enter  press enter  type +500M & press enter  type 8300 & press enter  press w | Create partition for GPT and use mkfs to format it |
| gdisk /dev/sd?  press n  press enter  press enter  type +500M & press enter  type 8e00 & press enter  press w | Create partition and assign its type as LVM |
| pvcreate /dev/sd? /dev/sd? | To convert created partition/s to physical volume |
| pvdisplay | To display physical volume |
| vgcreate volumeGroupName /dev/sd? /dev/sd? | Create volume group for grouping the created physical volume |
| vgdisplay | To display created volume group/s |
| lvcreate –n logicalVolumeName –L 500M /dev/volumeGroupName | create logical volume group of the volumeGroupName once done you need to format it using mkfs |
| lvdisplay | To Display logical volume/s |
| mkfs -t ext4 /dev/volumeGroupName/logicalVolumeName | Format logical volume |
| best practice to place directory in mnt  mkdir mypartition  mount /dev/volumeGroupName/logicalVolumeName /mnt/mypartition | Mount /dev/volumeGroupName/logicalVolumeName to directory |
| lvremove /dev/volumeGroupName/logicalVolumeName | To remove logical volume |
| vgremove /dev/volumeGroupName | Remove Volume Group |
| pvremove /dev/sd?? /dev/sd?? | To remove physical volume |
| xfs can only be increased in size  ext4 can be increased and decreased in size |  |
| xfs\_admin –L label /dev/sd?? (xsf only)  or  tun2fs\_admin –L label /dev/sd?? (ext3,4) | To create label for partition |
| /etc/fstab | To mount (not temporary) |
| mount -a | To reload fstab file and apply changes |
| free -m | Will show swap and physical memory |
| mkswap /dev/volumeGroupName/swap(created as logical volume) | Format logical volume to be used as swap partition |
| swapon /dev/volumeGroupName/swap | Switch on and verify that swap works |
| swapoff /dev/volumeGroupName/swap | to switch off swap |
| swapon -a | Will enable all swap entries in fstab file |
| Regular partition for swap we use 82 code  Only with LVM partition we use 8e code |  |
| swapon -s | Will show information of which swap partition being used |
| cat /proc/swaps | Will show information of which swap partition being used |
| vfat file system(will be used commonly with windows machine)  ext4 journal file system (commonly used among Linux system) support up to 16 TB in size and file system size up to 50 TB  xfs is used for parallel process specially writing to disk and up to 500 TB in size and file system size up to 500 TB |  |
| fsck.filsystem /dev/sd?? | To check partition |
| Do not run fsck command on mounted partition |  |
| fsck (without .ext4) /dev/sd?? | Will check ext4 partition without any issue |
| dumpe2fs /dev/sd ?? | To check the label we created and information about the partition |
| xfs\_info /dev/sd?? | To show information about xfs partition |
| xfs\_admin -L label /dev/sd?? | To create label for xfs partition |
| xfs\_repair /dev/sd?? | To repair xfs partition |
| To use NFS we need to install few utilities  yum -y install samba-client cifs-utils nfs-utils |  |
| smbclient -L ipaddress | Connect to NFS |
| mount -t cifs -o username=user //ipadress/sharename mountPath | cifs share (username and password required) |
| mount -t nfs ipaddress:/sharename mountPath | nfs share |
| //ipadress/sharename mountPath -o username=user ,password=pass 0 0 | In fstab for cifs |
| Ipaddress:/sharename mountPath nfs defaults 0 0 | In fstab for nfs |
| vgextend volumeGroupName /dev/physicalVolumeDisk | To add physical volume disk to volume group |
| pvmove /dev/physicalVolume | To move all data to physical volume which is part of the same volume group |
| vgreduce volumeGroupName /dev/physicalVolume | To remove physical volume from the volume group |
| lvextend -L 10G /dev/volumeGroupName/logicalVolumeName | To extend logical volume size to 10G |
| xfs\_growfs mountedPath | To check and reload after extending the logical volume (xfs file system) |
| resize2fs mountedPath | To check and reload after extending the logical volume (ext 4) |
| chmod g+s directoryName  chown :groupName directoryName | Set GID for directory |
| Access Control List(ACL) is supported by xfs and ext4 file systems | To check if file/directory has ACL by seeing plus |
| getfacl filename | To check ACL for the specified file |
| setfacl -m u:username:rw filename | To give permission for specific file for specific user and if mask is set to allow no one to add/modify then user won’t be able to add anything |
| setfacl -m m: :r filename | Set mask to read only |
| setfacl -m m: :- filename | Set mask to zero permission |
| setfacl -d -m u:username:rwx directoryName | Set default ACL for directory for newly created files |
| setfacl -m u:username:rwx directoryName | To give permission to directory for specific user |
| setfacl -x(--remove-default) directoryName | To remove default ACL |
| setfacl -x d:u:username directory name | To remove default from specific user |
| getfacl filename | setfacl –set-file=- filename1 | To apply the same permissions from one file to another |
| ifconfig (deprecated)  ip is the new command |  |
| ip addr | To display ipaddress of devices connected to our machine |
| ip addr show eth0 | To show ipaddress of specific device |
| ping ipaddress | To check the device if it is up/down and reply from device will not be stop |
| ping -c5 ipaddress | to receive 5 replies from the device |
| ping6/ping  tracepath6/tracepath  tracerout | ping6/tracepath6 for ipv6 |
| ss | Listening ports |
| ss -at | To show listening ports for tcp (t) |
| ss -au | To show listening ports for udp (u) |
| ss -atn | To show listening ports for tcp and port number |
| ip -s | Show statistics information |
| ip -s link show eth0 | To show statistics information for specific device |
| ls /sys/class/net | To show network devices that available on our machine |
| nmcli dev status | To show network devices that available on our machine |
| nmcli | Command will be used to configure network devices on our machine |
| nmcli con show | To running connections on our machine |
| nmcli con add con-name “mycon” autoconnect yes type Ethernet ifname eth0 | To add connection for device eth0 |
| nmcli con show --active | Will show active connection devices on our machine |
| nmcli dev show | Will show information of the connections devices |
| /etc/sysconfig/network-scripts/ | Connections for Network devices |
| ip route | To show ip address routes |
| nmcli con add con-name “mycon-static” type Ethernet ifname eth0 ip4 10.10.10.10 gw4 10.0.0.1 | To add connection for device eth0 with static ipv4 and gateway |
| nmcli con down “mycon” | To bring connection down |
| nmcli con up “mycon” | To bring connection up |
| nmcli con mod “mycon”connection.autoconnect yes | To modify auto connection for specific device |
| nmcli con del “mycon” | To delete connection |
| nmtui | To add/modify connection via text-based GUI |
| /etc/resolv.conf | DNS file (Network manager only) |
| /etc/nsswitch.conf | Configuration file (Naming Server) |
| hostnamectl set-hostname newname | To set hostname |
| exec bash | To reload new hostname configuration |
| hostnamectl status | Hostname information |
| nmcli con mod “mycon” ipv4.dns 8.8.8.8 | To set DNS(internal/external) for your connection |
| getent hosts [www.xx.com](http://www.xx.com) | To check local host file for result |
| /etc/hosts | Hosts files (local dns) |
| at | Utility to schedule a job for certain task |
| yum install at  systemctl enable atd  systemctl start atd |  |
| at 12:00am | Schedule job at 12 a.m |
| atq | To list queue jobs |
| atrm jobNumber | To remove job from the queue |
| logger | Command to log information into journal  To check the logged info , you can use journanctl –xn |
| systemctl status httpd | To check status of service |
| systemctl start httpd | To start a service |
| systemctl is-enabled httpd | To check if service enabled or not |
| systemctl list-unit-files –type=service | grep httpd | To check service status |
| systemctl enable httpd | To enable service |
| systemctl list-dependencies multi-user.target | grep httpd | To check if service for specific target will start when system reboot |
| systemctl get-default | To get the system boot target you are using |
| systemctl set-default multi-user.target | Will change system target from graphical to multi-user |
| Install Red Hat Enterprise Linux Automatically Using Kickstart | anaconda-ks.cfg file  virtual manager (virt-manager) |
| yum install virt-manager  yum install qemu-kvm  yum install qemu-img  yum install libvirt-python  yum install python-virtinst  yum install libvirt-client  systemctl enable libvirtd  systemctl start libvirtd  systemctl status libvirtd  virsh(command based)  virt-manager(GUI) | To virtualize machine  libvirtd is used to by virtual manager without it won’t work |
| systemctl is-enabled libvirtd | Check that libvirtd is enabled |
| virsh (console) then type  autostart virtualName | To autostart virtual machine when the system rebooted |
| systemctl list-dependencies multi-user.target | grep network | To see the network service is loaded at the boot time |
| /etc/sysconfig/network-scripts | Network configuration |
| nmcli con mod “mycon” connection.autoconnect yes | Will make the connections auto when system rebooted |
| cat /etc/sysconfig/network-scripts/ifcfg-mycon | Will show connection info |
| timedatectl | Show the configured time & date information of our system |
| timedatectl list-timezones | To list all time zones |
| tzselect | To select time zone for your system |
| timedatectl set-timezone zone | To set time zone |
| yum check-update | To check updates |
| yum update | To start update |
| yum search keyword | To search for package |
| yum info keyword | To show package info |
| yum install keyword | To install package |
| yum list installed | To list all installed packages |
| yum listed installed | grep httpd | To show all installed packages which contains httpd word |
| yum provides directory | To check of packages that directory come |
| yum whatprovides directory | To check of packages that directory come |
| yum list all | To show all packages in our system |
| yum remove keyword | To remove package along with its dependences |
| yum clean all | To clear everything like cached files etc |
| yumdownloader | To download rpm package |
| rpm -ivh rpmFile | Install RPM file via rpm command |
| rpm -qa | To list all rpm packages |
| rpm -qa keyword | To list package for specific word |
| rpm -ql keyword | To list all files and location of them which were unpacked during the installation process |
| rpm -qd keyword | To list documentations for specific keyword |
| rpm -e keyword | To remove package |
| yum localinstall keyword.rpm | To install rpm file from desktop |
| yum repolist all | To list all repositories |
| yum-config-manager --add-repo=repoName | To add repository using yum-config-manager |
| yum-config-manager --disable repoName | To disable repository |
| mkdir directoryName  mount -o loop isoName directoryName  nano repoName.repo  =================  {local-repo}  name=Red Hat  baseurl=file:///isoPath  enabled=1  gpgcheck=0  =================  yum repolist | Mount ISO to directory to get repositories from it |
| yum-config-manager --add-repo=repoUrl  best practice  put GPG-key in below path  cd /etc/pki/rpm-gpg/  wget url  cd /etc/yum.repos.d/  nano addedRepo  add the bottom of the file  gpgkey=file:///etc/pki/rpm-gpg/REPO-GPG-KEY | To add repository and add GPG-Key public key for that repository so that we verify that packages are coming from the repository |
| uname -r | To check kernel version |
| yum list kernel | To list kernel |
| yomdownloader kernel | To download kernel rpm |
| rpm –ivh kernel-rpm | To install kernel using rpm |
| dracut | To regenerate kernel in /boot |
| grub2-set-default 0(0=most recent) | To set kernel |
| id | 0=root  1-200=system users for specific Redhat processes  201-999=system users use system processes but do not own file |
| /etc/passwd | File contains user information |
| /etc/shadow | File contains user passwords |
| /etc/group | When we create user , it will create group for that user |
| /etc/skel | Directory to files documents on it so that when new user created the documents in that directory are copied to the new user home directory |
| /etc/login.defs | Contains all configuration needed when user created |
| /etc/defaults | You can change the default configuration |
| useradd user | create user |
| useradd -M user | Create user without directory |
| passwd user | To change password for that user |
| usermod | To modify user information |
| userdel | To delete user |
| chage -l user | To show password age |
| cat /etc/group | grep groupName | To show group details |
| getent group username  groups username | To all the groups that username belongs to |
| newgrp | To switch between groups |
| usermod -aG groupName username | to add a supplementary group to a user |
|  |  |