

Lab Activity - 4

-Networking & System Administration Lab

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Submitted on :13-08-2021

Basic Linux Commands

1. **wc** : It is used to find out number of lines, word count, byte and characters count in the files specified in the file arguments.

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ wc -w file3.txt
13 file3.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents$ wc -m file3.txt
64 file3.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents$ wc file2.txt file3.txt file4.txt
 2   7  34 file2.txt
 2  13  64 file3.txt
 4  20  98 file4.txt
 8  40 196 total
kunjuzz@kunjuzz-VirtualBox:~/Documents$
```

2. **tar** : The command is short for **tape archive** in Linux. This command is used for creating Archive and extracting the archive files. It is one of the essential commands which facilitate archiving functionality. We can use this command for creating uncompressed and compressed archive files and modify and maintain them .

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
file1.txt file2.txt file3.txt file4.txt files file.txt states
kunjuzz@kunjuzz-VirtualBox:~/Documents$ tar cf archive.tar file1.txt file2.txt
file3.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls archive.tar
archive.tar
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
archive.tar file2.txt file4.txt file.txt
file1.txt   file3.txt files      states
kunjuzz@kunjuzz-VirtualBox:~/Documents$ tar tf archive.tar
file1.txt
file2.txt
file3.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents$ pwd
/home/kunjuzz/Documents
kunjuzz@kunjuzz-VirtualBox:~/Documents$ mkdir lab
kunjuzz@kunjuzz-VirtualBox:~/Documents$ cd lab
kunjuzz@kunjuzz-VirtualBox:~/Documents/lab$ tar xf /home/kunjuzz/Documents/arch
ive.tar
kunjuzz@kunjuzz-VirtualBox:~/Documents/lab$ ls
file1.txt file2.txt file3.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents/lab$
```

Extracting an archive created with tar

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar czf mca.tar.gz /etc/
[sudo] password for kunjuzz:
tar: Removing leading '/' from member names
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
archive.tar  file2.txt  file4.txt  file.txt  mca.tar.gz
file1.txt    file3.txt  files      lab       states
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar cjf mcareg.tar.bz2 file1.txt f
ile2.txt file3.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
archive.tar  file2.txt  file4.txt  file.txt  mcareg.tar.bz2  states
file1.txt    file3.txt  files      lab       mca.tar.gz
```

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar cjf mcareg.tar.bz2 /etc/
tar: Removing leading '/' from member names
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls -l
total 2492
-rw-rw-r-- 1 kunjuzz kunjuzz 10240 Aug 12 13:25 archive.tar
-rw-rw-r-- 1 kunjuzz kunjuzz 0 Jun 13 22:18 file1.txt
-rw-rw-r-- 1 kunjuzz kunjuzz 34 Jun 13 21:59 file2.txt
-rw-rw-r-- 1 kunjuzz kunjuzz 64 Jun 13 22:05 file3.txt
-rw-rw-r-- 1 kunjuzz kunjuzz 98 Jun 13 22:09 file4.txt
drwxrwxr-x 2 kunjuzz kunjuzz 4096 Jun 13 21:51 files
-rw-rw-r-- 1 kunjuzz kunjuzz 49 Jun 20 21:03 file.txt
drwxrwxr-x 2 kunjuzz kunjuzz 4096 Aug 12 13:28 lab
-rw-r--r-- 1 root root 1143115 Aug 12 15:19 mcareg.tar.bz2
-rw-r--r-- 1 root root 1363472 Aug 12 15:16 mca.tar.gz
-rw-rw-r-- 1 kunjuzz kunjuzz 127 Jun 20 20:16 states
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar cjf mcareg.tar.bZ2 /etc/
tar: Removing leading '/' from member names
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar cjf sample.tar.bZ2 /etc/
tar: Removing leading '/' from member names
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
archive.tar  file3.txt  file.txt  mcareg.tar.bZ2  states
file1.txt    file4.txt  lab       mca.tar.gz
file2.txt    files      mcareg.tar.bz2  sample.tar.bZ2
```

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar cjf sample.tar.bZ2 file1.txt f
ile2.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
archive.tar  file3.txt  file.txt  mcareg.tar.bZ2  states
file1.txt    file4.txt  lab       mca.tar.gz
file2.txt    files      mcareg.tar.bz2  sample.tar.bZ2
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar cjf sample.tar.xz file1.txt fi
le2.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
archive.tar  file3.txt  file.txt  mcareg.tar.bZ2  sample.tar.xz
file1.txt    file4.txt  lab       mca.tar.gz      states
file2.txt    files      mcareg.tar.bz2  sample.tar.bZ2
```

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ mkdir joy
kunjuzz@kunjuzz-VirtualBox:~/Documents$ sudo tar xzf mca.tar.gz
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls
archive.tar  file2.txt  files      lab       mca.tar.gz      states
etc          file3.txt  file.txt  mcareg.tar.bz2  sample.tar.bZ2
file1.txt    file4.txt  joy       mcareg.tar.bZ2  sample.tar.xz
kunjuzz@kunjuzz-VirtualBox:~/Documents$ cd joy
kunjuzz@kunjuzz-VirtualBox:~/Documents/joy$ tar xzf /home/kunjuzz/Documents/mca
.tar.gz
kunjuzz@kunjuzz-VirtualBox:~/Documents/joy$ ls
etc
kunjuzz@kunjuzz-VirtualBox:~/Documents/joy$ ls etc
acpi                hostname            ppp
adduser.conf        hosts              profile
alsa               hosts.allow        profile.d
alternatives        hosts.deny         protocols
anacrontab          hp                 pulse
apg.conf            ifplugd           python3
apm                 init               python3.9
apparmor            init.d             rc0.d
apparmor.d          initramfs-tools   rc1.d
appport             inputrc           rc2.d
appstream.conf      insserv.conf.d    rc3.d
apt                ipp-usb            rc4.d
avahi               iproute2          rc5.d
bash.bashrc         issue             rc6.d
bash_completion     issue.net         rcS.d
bash_completion.d   kernel            resolv.conf
bindresvport.blacklist kernel-img.conf    rmt
```



```
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$ tar xjf /home/kunjuzz/Documents/sample.tar.xz
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$ ls
file1.txt  file2.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$ tar xjf /home/kunjuzz/Documents/mcareg.tar.bz2
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$ ls
etc  file1.txt  file2.txt
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$
```

Extracting using gzip, xz, bzip2

- 3. expr :** used to evaluate a given expression and display its standard output. Each separated expression is considered as an argument. These expressions could be integer and string expressions, including regular expressions.

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ expr 10 + 2
12
kunjuzz@kunjuzz-VirtualBox:~/Documents$ expr 10 \* 4
40
kunjuzz@kunjuzz-VirtualBox:~/Documents$ expr 10 / 4
2
kunjuzz@kunjuzz-VirtualBox:~/Documents$ expr 10 % 4
2
kunjuzz@kunjuzz-VirtualBox:~/Documents$ expr 10 - 4
6
kunjuzz@kunjuzz-VirtualBox:~/Documents$
```

- 4. Redirection & piping :** A pipe is a form of redirection to send the output of one command/program/process to another command/program/process for further processing. Pipe is used to combine two or more commands, the output of one command acts as input to another command, and this command's output may act as input to the next command and so on.

```
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls | wc -m -w
7      62
kunjuzz@kunjuzz-VirtualBox:~/Documents$ ls -l | wc -l
8
kunjuzz@kunjuzz-VirtualBox:~/Documents$ cat file4.txt | tail -3 file.txt
eight
nine
ten
kunjuzz@kunjuzz-VirtualBox:~/Documents$
```

5. ssh : ssh is a protocol, which stands for **Secure Shell** or **Secure Socket Shell**. The secure shell is useful for security while connecting to a remote server. The **ssh command uses a ssh protocol**, which is a secure protocol, as the data transfer between the client and the host takes place in encrypted form. It transfers the input through the client to the host and returns the output transferred by the host. It executes through TCP/IP port 22.

```
kunjuzz@kunjuzz-VirtualBox:~$ sudo apt-get update
[sudo] password for kunjuzz:
Hit:1 http://in.archive.ubuntu.com/ubuntu hirsute InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu hirsute-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu hirsute-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu hirsute-security InRelease [101 kB]
Fetched 101 kB in 2s (65.2 kB/s)
Reading package lists... Done
kunjuzz@kunjuzz-VirtualBox:~$ sudo apt install
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
0 upgraded, 0 newly installed, 0 to remove and 225 not upgraded.
kunjuzz@kunjuzz-VirtualBox:~$ sudo apt install openssh-client
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
openssh-client is already the newest version (1:8.4p1-5ubuntu1).
0 upgraded, 0 newly installed, 0 to remove and 225 not upgraded.
kunjuzz@kunjuzz-VirtualBox:~$ ssh localhost
ssh: connect to host localhost port 22: Connection refused
```

```
kunjuzz@kunjuzz-VirtualBox:~$ sudo apt-get install openssh-server ii
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  ncurses-term openssh-client openssh-sftp-server ssh-import-id
Suggested packages:
  keychain libpam-ssh monkeysphere ssh-askpass molly-guard
The following NEW packages will be installed:
  ii ncurses-term openssh-client openssh-server openssh-sftp-server
  ssh-import-id
0 upgraded, 6 newly installed, 0 to remove and 225 not upgraded.
Need to get 1,361 kB of archives.
After this operation, 8,747 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu hirsute-updates/main amd64 openssh-cl
lient amd64 1:8.4p1-5ubuntu1.1 [702 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu hirsute/universe amd64 ii amd64 1.8-2
[15.3 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 ncurses-term all 6
.2+20201114-2build1 [249 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu hirsute-updates/main amd64 openssh-sf
tp-server amd64 1:8.4p1-5ubuntu1.1 [31.7 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu hirsute-updates/main amd64 openssh-se
rver amd64 1:8.4p1-5ubuntu1.1 [353 kB]
Get:6 http://in.archive.ubuntu.com/ubuntu hirsute/main amd64 ssh-import-id all
5.11-0ubuntu1 [10.1 kB]
```

```
kunjuzz@kunjuzz-VirtualBox:~$ sudo service ssh status
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/lib/systemd/system/ssh.service; enabled; vendor preset: ena
   Active: active (running) since Thu 2021-08-12 17:32:45 IST; 1min 14s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
   Process: 17777 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 17778 (sshd)
     Tasks: 1 (limit: 1089)
    Memory: 1.5M
    CGroup: /system.slice/ssh.service
            └─17778 sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups

Aug 12 17:32:44 kunjuzz-VirtualBox systemd[1]: Starting OpenBSD Secure Shell se
Aug 12 17:32:45 kunjuzz-VirtualBox sshd[17778]: Server listening on 0.0.0.0 po
Aug 12 17:32:45 kunjuzz-VirtualBox sshd[17778]: Server listening on :: port 22.
Aug 12 17:32:45 kunjuzz-VirtualBox systemd[1]: Started OpenBSD Secure Shell se

kunjuzz@kunjuzz-VirtualBox:~$ ssh localhost
The authenticity of host 'localhost (127.0.0.1)' can't be established.
ECDSA key fingerprint is SHA256:eLg6BlJ2zc53Ipr6Aak09V/9q2Gq44//Gyn/eSUGwZg.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'localhost' (ECDSA) to the list of known hosts.
kunjuzz@localhost's password:
Welcome to Ubuntu 21.04 (GNU/Linux 5.11.0-18-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage
```

6. scp : It is a file transfer client that provides an RCP-like command-line interface.

7. ssh-keygen : It is used to create a key pair for establishing a connection and public key authentication.

```
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/kunjuzz/.ssh/id_rsa): text
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in text
Your public key has been saved in text.pub
The key fingerprint is:
SHA256:6JzqujqDN/PH0Ksb5WDR9wpLvFxuQz1PfBwU01nWMMWI kunjuzz@kunjuzz-VirtualBox
The key's randomart image is:
+----[RSA 3072]-----+
|
|             E+=B|
|      .      ...++|
|      . . .      |
|      o o o . . . |
|      o.* S + o o |
|      ..O.O . + . |
|      .oO.=      |
|+ +  o+. .      |
|.=oB*+          |
+-----[SHA256]-----+
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$ ls
doc.txt  doc.txt.pub  etc  file1.txt  file2.txt  text  text.pub
kunjuzz@kunjuzz-VirtualBox:~/Documents/books$
```

8. ssh-copy-id : It is used to configure a public key as a valid user on a server.