

Networking & System Administration Lab
Basic Linux Commands
ASSIGNMENT-4

Submitted to:

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Submitted by:

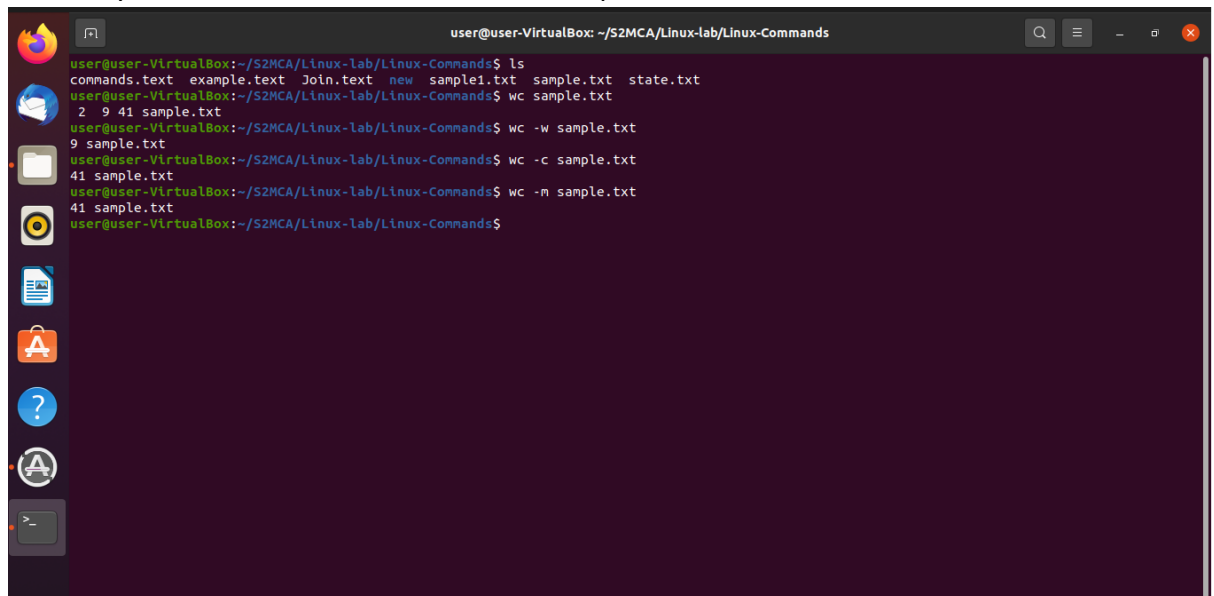
Amal Vijayan

Roll no: 10

S2 RMCA A

1. Wc

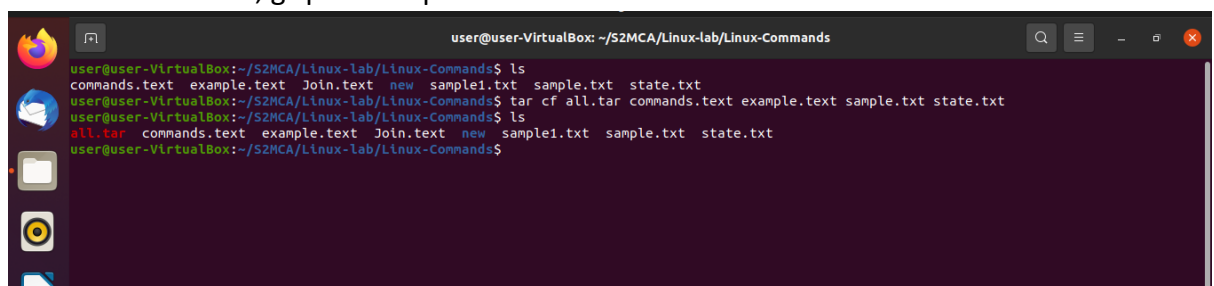
The wc command in Linux with examples It is used to find out number of lines, word count, byte and characters count in the files specified in the file.

A terminal window titled 'user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands' showing a series of commands and their outputs. The commands include 'ls', 'wc sample.txt', 'wc -w sample.txt', 'wc -c sample.txt', and 'wc -m sample.txt'. The outputs show the number of lines, words, characters, and lines respectively for the file 'sample.txt'.

```
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
commands.text example.text Join.text new sample1.txt sample.txt state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ wc sample.txt
 2  9 41 sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ wc -w sample.txt
 9 sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ wc -c sample.txt
41 sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ wc -m sample.txt
41 sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$
```

2. tar

The Linux “tar” stands for tape archive, which is used by large number of Linux/Unix system administrators to deal with tape drives backup. The tar command used to rip a collection of files and directories into highly compressed archive file commonly called tarball or tar, gzip and bzip in Linux.

A terminal window titled 'user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands' showing the creation of a tar archive. The commands include 'ls', 'tar cf all.tar commands.text example.text sample.txt state.txt', and 'ls' again to verify the archive. The output shows the successful creation of 'all.tar' containing the specified files.

```
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
commands.text example.text Join.text new sample1.txt sample.txt state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ tar cf all.tar commands.text example.text sample.txt state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
all.tar commands.text example.text Join.text new sample1.txt sample.txt state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$
```

Creation and extraction methods

- **Gzip**

A file that ends in .tar.gz or .tgz is a Tar archive compressed with Gzip. Gzip is most often used to compress text files, Tar archives, and web pages. Do not use Gzip to compress images, audio, PDF documents, and other binary files as they are already compressed.

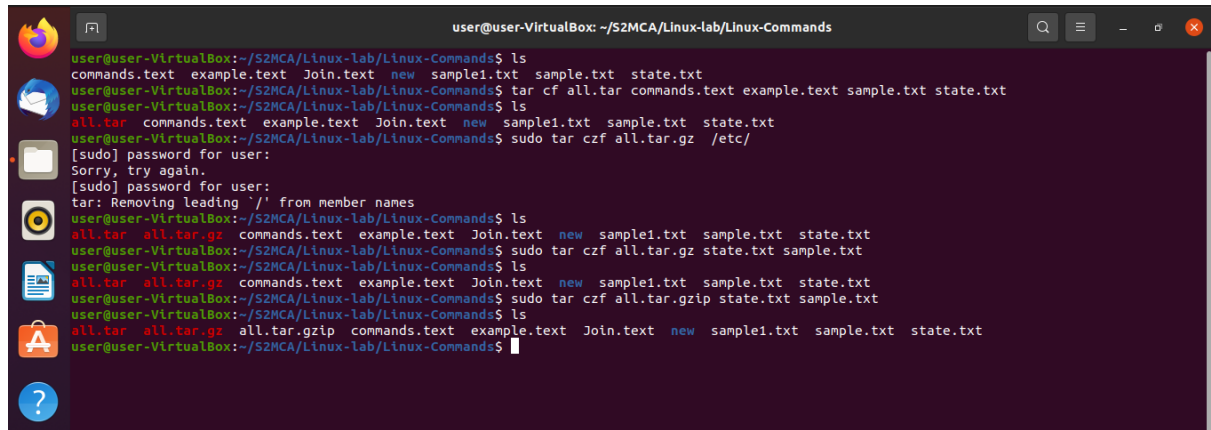
- **Bz2**

The .bz2 extension suffix tells us it has been compressed using the bzip2 command. Bzip2 command in Linux is used to compress and decompress the files i.e. it helps in binding the files into a single file which takes less storage space as the original file use to take. It has a slower decompression time and higher memory use.

- **Gz**

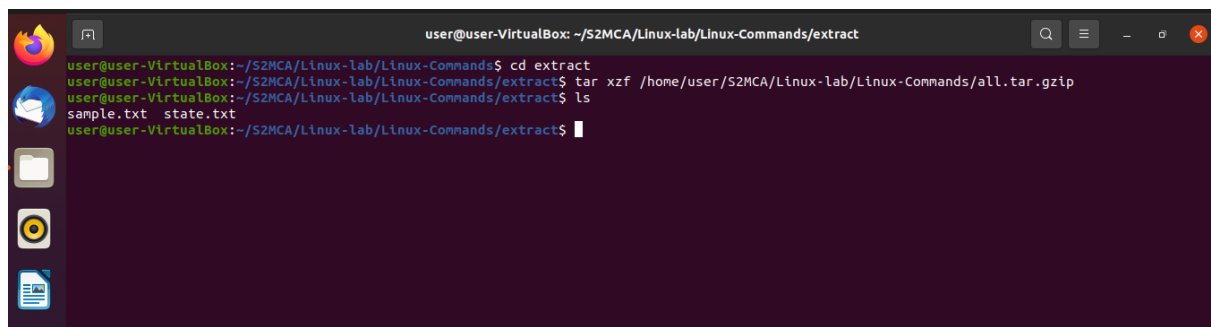
You need to use the tar command which can create and manipulate archive files in .tar.gz under UNIX like operating systems. It is very useful for archiving multiple files together into a single archive file. It allows us to restore files individually.

Creation using Gzip,bz2,gz



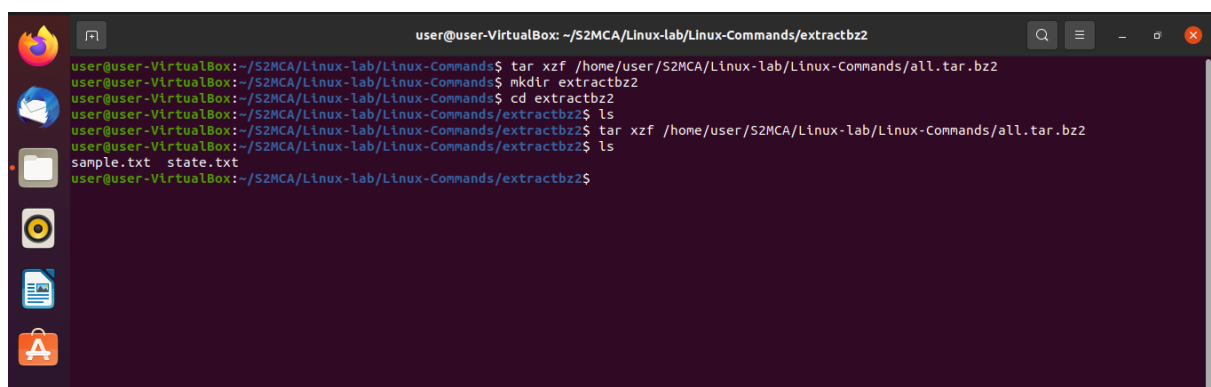
```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
commands.text  example.text  Join.text  new  sample1.txt  sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ tar cf all.tar commands.text example.text sample.txt state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
all.tar  commands.text  example.text  Join.text  new  sample1.txt  sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ sudo tar czf all.tar.gz /etc/
[sudo] password for user:
Sorry, try again.
[sudo] password for user:
tar: Removing leading '/' from member names
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
all.tar  all.tar.gz  commands.text  example.text  Join.text  new  sample1.txt  sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ sudo tar czf all.tar.gz state.txt sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
all.tar  all.tar.gz  commands.text  example.text  Join.text  new  sample1.txt  sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ sudo tar czf all.tar.bz2 state.txt sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls
all.tar  all.tar.gz  all.tar.bz2  commands.text  example.text  Join.text  new  sample1.txt  sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$
```

Extracting using Gzip



```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands/extract
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ cd extract
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extract$ tar xzf /home/user/S2MCA/Linux-lab/Linux-Commands/all.tar.gz
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extract$ ls
sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extract$
```

Extracting using Bz2



```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands/extractbz2
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ tar xzf /home/user/S2MCA/Linux-lab/Linux-Commands/all.tar.bz2
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ mkdir extractbz2
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ cd extractbz2
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2$ ls
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2$ tar xzf /home/user/S2MCA/Linux-lab/Linux-Commands/all.tar.bz2
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2$ ls
sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2$
```

Extracting using Gz

```
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2$ mkdir extractgz
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2$ cd extractgz
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ ls
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ tar xzf /home/user/S2MCA/Linux-lab/Linux-Commands/all.tar.gz
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ ls
sample.txt  state.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$
```

3. Expr

The `expr` command supports the following operators: for integer: addition, subtraction, multiplication, division, and modulus. For strings: regular expression, set of characters in a string.

```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ expr 10 + 2
12
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ expr 10 - 2
8
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ expr 10 % 2
0
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ expr 10 / 2
5
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$
```

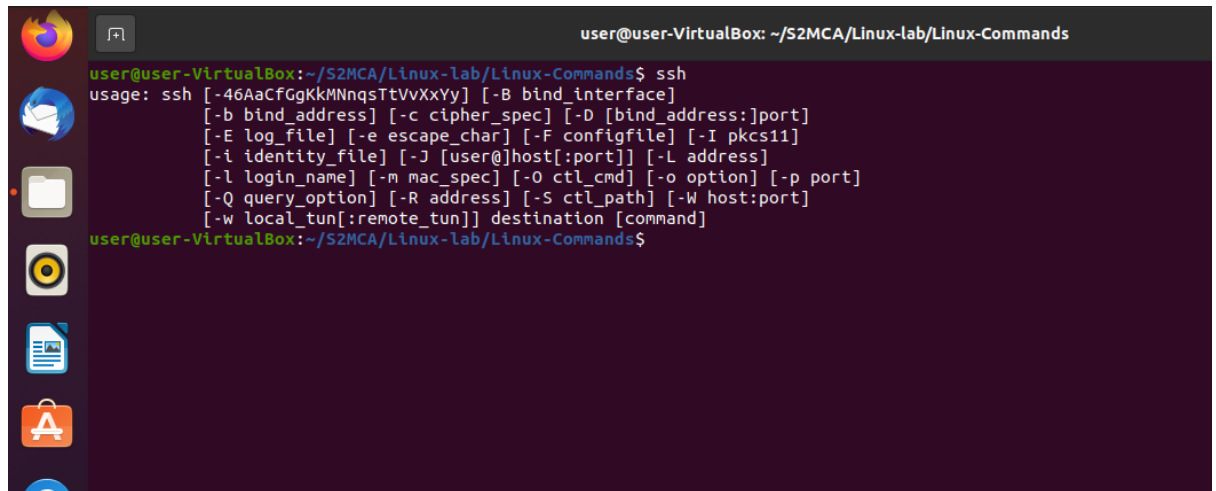
4. redirections and piping

The pipe command denoted by the symbol `|` allows you to send output of one command to another for further processing. It can redirect the standard output, input, or error of one process to another.

```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2/extractgz$ cd ..
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands/extractbz2$ cd ..
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls -l | wc sample.txt
 2  9 41 sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls | wc sample.txt
 2  9 41 sample.txt
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls | wc -l
wc -l: command not found
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ls | wc -l
13
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$
```

5. ssh

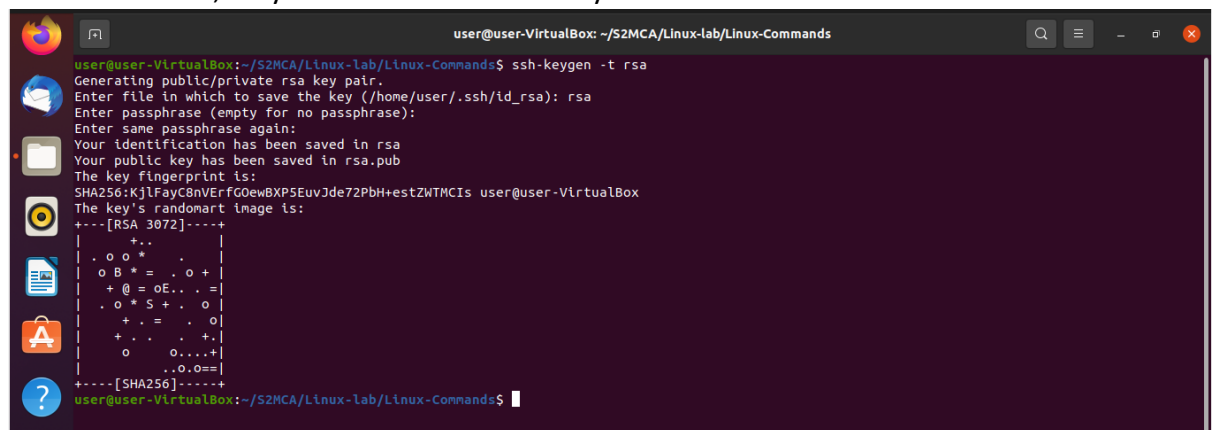
In Linux, ssh is a protocol, which stands for Secure Shell or Secure Socket Shell. The secure shell is useful for security while connecting to a remote server. The ssh command uses a ssh protocol, which is a secure protocol, as the data transfer between the client and the host takes place in encrypted form.



```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ssh
usage: ssh [-46AaCfGgKkMNNqsTtVvXxYy] [-B bind_interface]
          [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
          [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
          [-i identity_file] [-J [user@]host[:port]] [-L address]
          [-l login_name] [-m mac_spec] [-O ctl_cmd] [-o option] [-p port]
          [-Q query_option] [-R address] [-S ctl_path] [-W host:port]
          [-w local_tun[:remote_tun]] destination [command]
```

6. ssh-keygen

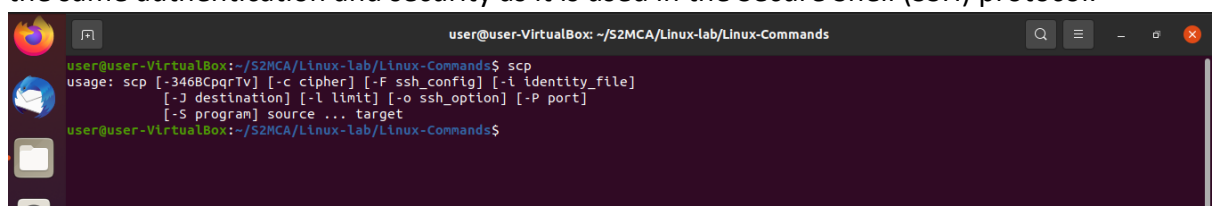
The ssh-keygen command to generate a public/private authentication key pair. Authentication keys allow a user to connect to a remote system without supplying a password. Keys must be generated for each user separately. If you generate key pairs as the root user, only the root can use the keys.



```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/user/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa
Your public key has been saved in rsa.pub
The key fingerprint is:
SHA256:Kj1FayC8nVERFG0ewBXP5EuvJde72PbHestZWtMCIs user@user-VirtualBox
The key's randomart image is:
+----[RSA 3072]-----+
  +.
  o o *
  o B * = . o +
  + @ = oE.. . =
  . o * S + . o
  + . = . o
  + . . . +.
  o   o...+
  . .O.O=
+----[SHA256]-----+
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$
```

7. scp

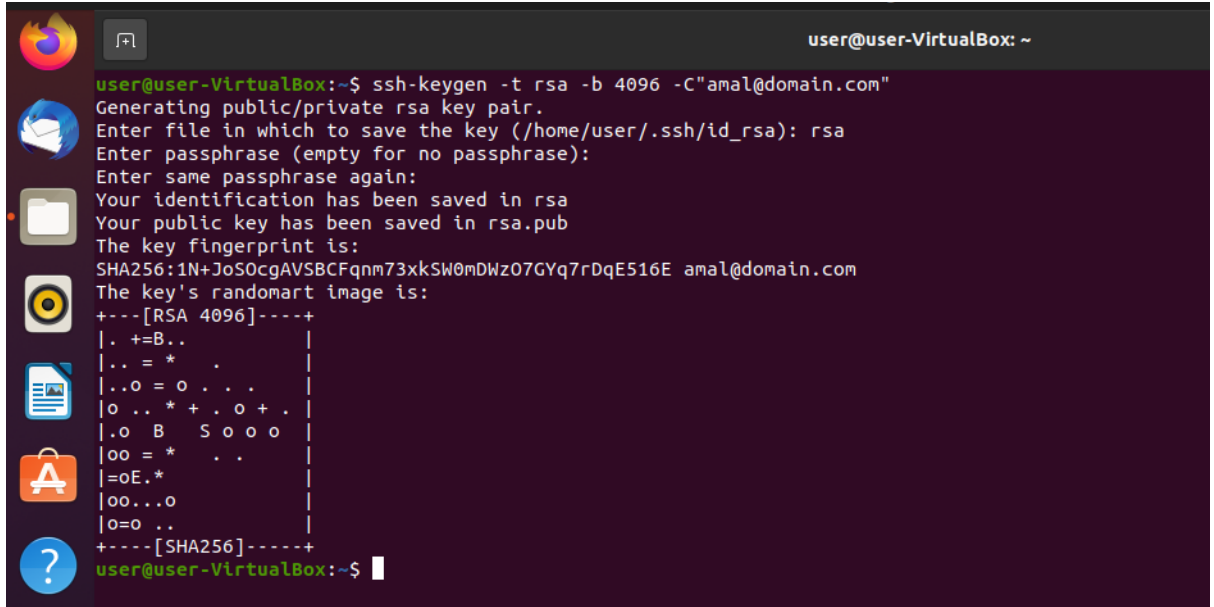
The scp (secure copy) command in Linux system is used to copy file (s) between servers in a secure way. The SCP command or secure copy allows secure transferring of files in between the local host and the remote host or between two remote hosts. It uses the same authentication and security as it is used in the Secure Shell (SSH) protocol.



```
user@user-VirtualBox: ~/S2MCA/Linux-lab/Linux-Commands
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$ scp
usage: scp [-346BCpqrv] [-c cipher] [-F ssh_config] [-i identity_file]
          [-J destination] [-l limit] [-o ssh_option] [-P port]
          [-S program] source ... target
user@user-VirtualBox:~/S2MCA/Linux-lab/Linux-Commands$
```

8. ssh-copy-id

The ssh-copy-id command is a simple tool that allows you to install an SSH key on a remote server's authorized keys. This command facilitates SSH key login, which removes the need for a password for each login, thus ensuring a password-less, automatic login process.

A terminal window titled 'user@user-VirtualBox: ~' showing the execution of the 'ssh-keygen' command. The user enters '-t rsa -b 4096 -C "amal@domain.com"'. The terminal displays the following output: 'Generating public/private rsa key pair.', 'Enter file in which to save the key (/home/user/.ssh/id_rsa): rsa', 'Enter passphrase (empty for no passphrase):', 'Enter same passphrase again:', 'Your identification has been saved in rsa', 'Your public key has been saved in rsa.pub', 'The key fingerprint is:', 'SHA256:1N+JoS0cgAVSBCFqnm73xkSW0mDWz07GYq7rDqE516E amal@domain.com', 'The key's randomart image is:', followed by a randomart image for the RSA 4096 key, and finally '++++[SHA256]-----+'. The terminal prompt returns to 'user@user-VirtualBox:~\$'.

```
user@user-VirtualBox:~$ ssh-keygen -t rsa -b 4096 -C"amal@domain.com"
Generating public/private rsa key pair.
Enter file in which to save the key (/home/user/.ssh/id_rsa): rsa
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in rsa
Your public key has been saved in rsa.pub
The key fingerprint is:
SHA256:1N+JoS0cgAVSBCFqnm73xkSW0mDWz07GYq7rDqE516E amal@domain.com
The key's randomart image is:
+---[RSA 4096]-----+
|. +=B..|
|.. = * .|
|..o = o . . .|
|o .. * + . o + .|
|.o B S o o o|
|oo = * . .|
|=oE.*|
|oo...o|
|o=o ..|
+----[SHA256]-----+
user@user-VirtualBox:~$
```