



COLLEGE OF ENGINEERING CHENGANNUR

# **CS232-FREE AND OPEN SOURCE SOFTWARE LAB REPORT**

**Ritty Thomas**

12.05.2019

S4-D. ROLL NO - 42

CHN17CS94

---

# CONTENTS

| NO. | EXPERIEMENTS           |
|-----|------------------------|
| 1   | Linux Commands         |
| 2   | Scripting              |
| 3   | Networking             |
| 4   | Data Transfer Tool     |
| 5   | File Transfer Protocol |
| 6   | Linux Installation     |
| 7   | HTTP and FTP Servers   |
| 8   | Package Management     |
| 9   | Perl                   |
| 10  | LAMP Stack             |
| 11  | Kernel compilation     |

---

# EXPERIMENT - 1

## LINUX COMMANDS

### AIM:

Linux has the Terminal in order to help you configure and interact with your system. For someone to work in the Terminal they need to familiarize themselves with Linux commands. This experiment helps to get familiarized with all the most common Linux commands and their usages.

### DESCRIPTION:

1. Listing files (ls): If you want to see the list of files on your UNIX or Linux system, use the 'ls' command. Syntax: `ls`.
2. Creating & Viewing Files: The 'cat' command is used to display text files. It can also be used for copying, combining and creating new text files. Syntax: `cat filename`, `cat > filename`, `cat file 1 file 2 > new filename`.
3. Deleting Files: The 'rm' command removes files from the system without confirmation. Syntax: `rm filename`.
4. Moving and Re-naming files: To move a file, use the command. Syntax: `mv filename new_file_location`
5. Directory Manipulations: Directories can be created on a Linux operating system using the following command. - Syntax: `mkdir directoryname`. To remove a directory, use the command. Syntax: `rmdir directoryname`. The 'mv' (move) command (covered earlier) can also be used for renaming directories. Syntax: `mv directoryname newdirectoryname`.
6. The 'man' command: Man stands for manual which is a reference book of a Linux operating system. It is similar to HELP file found in popular software. Syntax: `man`.
7. Clear: This command clears all the clutter on the terminal and gives you a clean window to work on, just like when you launch the terminal. Syntax: `clear`.

### RESULT:

Familiarized various Linux basic commands for directory operations, displaying directory structure in tree format etc.

---

# EXPERIMENT - 2

## SCRIPTING

### AIM:

To identify and use various commands for file manipulation, searching and filtering to obtain desired results from a database. In this way, they can be combined to process information in powerful ways.

### DESCRIPTION:

1. Curl command: The curl command is used to download files from the internet by HTTP or HTTPS. Example to fetch an Ubuntu torrent file and save it as test.torrent in the current directory. Syntax: curl `http://releases.ubuntu.com/18.04/ubuntu-18.04-desktop-amd64.iso.torrent` > test.torrent
2. pdftotext: Use pdftotext utility to convert Portable Document Format (PDF) files to plain text. It reads the PDF file, and writes a text file. Syntax: pdftotext {PDF-file} {text-file}
3. 'Grep' command: The grep command searches for a specified pattern in a file (or files) and displays in output lines containing that pattern. Syntax: grep pattern filename.
4. Sed command: Sed is basically a stream editor that allows users to perform basic text transformations on an input stream (a file or input from a pipeline). Syntax: sed OPTIONS... [SCRIPT] [INPUTFILE...]
5. 'Join' command: The join command allows you to join lines of two files on a common field (default is first). Syntax: join [OPTION]... FILE1 FILE2.
6. Chmod +x :The chmod command lets you change access permissions for a file. For example, if you have a binary file (say helloWorld), and you want to make it executable, you can run the following command. Syntax: chmod +x helloWorld

### RESULT:

Familiarized various Linux basic commands for shell programming, easy and efficient file searching, managing and manipulation.

---

# EXPERIMENT - 3

## NETWORKING

### AIM:

These commands are used to view and edit network configurations related aspects of the system

### DESCRIPTION:

1. Ifconfig:ifconfig (interface configurator) command is use to initialize an interface, assign IP Address to interface and enable or disable interface on demand. Syntax: `ifconfig etho0`.
2. Assigning IP Address and Gateway: Assigning an IP Address and Gateway to interface on the fly. The setting will be removed in case of system reboot. Syntax: `ifconfig eth0 192.168.50.5 netmask 255.255.255.0`
3. Enable or Disable Specific Interface: To enable or disable specific Interface, we use example command as follows. Syntax: `ifup etho0 & ifdown eth0`.
4. PING command:PING (Packet INternet Groper) command is the best way to test connectivity between two nodes. Whether it is Local Area Network (LAN) or Wide Area Network (WAN). Ping use ICMP (Internet Control Message Protocol) to communicate to other devices. Syntax: `ping www.google.com`
5. 'NETSTAT' command: Netstat (Network Statistic) command display connection info, routing table information etc. To displays routing table information use option as -r. Syntax: `netstat -r`.
6. ROUTE command: route command also shows and manipulate ip routing table. To see default routing table in Linux, type the following command. Syntax: `route`
7. HOST command: host command to find name to IP or IP to name in IPv4 or IPv6 and also query DNS records. Syntax: `host www.google.com`

### RESULT:

Various Linux commands useful for day to day use of Linux Network administrator in Linux / Unix-like operating system has been familiarized.

---

# EXPERIMENT - 4

## DATA TRANSFER TOOLS

### AIM:

This experiment discusses some of the basic transfer tools available that work over an SSH connection:

1. rsync (over SSH)
2. scp
3. sftp

### DESCRIPTION:

1. Rsync over SSH: rsync is a file synchronisation and file transfer program for Unix-like systems that can minimise network data transfer by using a form of delta encoding such that only the differences between source and destination data are actually transmitted. Syntax: `$ rsync mydata user@remote-host:/data/`

2. Scp command: scp is another basic command-line tool for secure copying between two machines. It is installed as part of most SSH implementations and comes as standard on the JASMIN transfer servers. scp is the secure analogue of the rcp command. Syntax: `scp myfile user@host:directory/target`. To copy a file (or directory) from a host to the local system `scp -r user@host:directory/source_folder target_folder`

3. SFTP : sftp is a similar tool to scp, but the underlying SFTP protocol allows for a range of operations on remote files which make it more like a remote file system protocol. sftp includes extra capabilities such as resuming interrupted transfers, directory listings, and remote file removal. Syntax: `sftp user@jasmin-xfer1.ceda.ac.uk:/group_workspaces/jasmin/myproject/data/notes.txt ./`

### RESULT:

Various linux commands of basic transfer tools in Linux / Unix-like operating system has been familiarized.

---

# EXPERIMENT - 5

## FILE TRANSFER PROTOCOL

### AIM:

FTP or File Transfer Protocol is a commonly used protocol for transferring files between computers, one act as a client, the other act as a server.

### DESCRIPTION:

Actually, the FTP server in Linux is one of the easiest servers that you can work with.

There are two types of accessing the FTP server:

Anonymous FTP access: anyone can login with the username anonymous without a password.

Local user login: all valid users on `/etc/passwd` are allowed to access the FTP server.

You can allow anonymous access to FTP server from the configuration, in `/etc/vsftpd/vsftpd.conf` by enabling `anonymous_enable=YES` if it is not enabled and reload your service.

Now you can try to connect to the FTP server using any FTP client

Connect as Local User:

Since there is an option in the settings for allowing local users to access FTP server which is `local_enable=YES`, now let's try to access the FTP server using a local user. `ftp localhost`

### RESULT:

Concept of a secure file transfer protocol using Linux commands has been learnt.

---

# EXPERIMENT - 6

## LINUX INSTALLATION

### AIM:

Linux is open-source, free to use kernel. It is used by programmers, organizations, profit and non-profit companies around the world to create Operating systems to suit their individual requirements.

### DESCRIPTION:

Installing Linux using CD-ROM:

Step 1) Download the .iso or the OS files onto your computer from this link <http://www.ubuntu.com/download/desktop>.

Step 2) Burn the files to a CD.

Step 3) Boot your computer from the optical drive and follow the instructions as they come.

Step-5) You have an option to Run Ubuntu WITHOUT installing.

Step-7) Select option to erase the disk and install Ubuntu and click on install now. This option installs Ubuntu into our virtual hard drive which is we made earlier. It will not harm your PC or Windows installation

Step-9) Select your keyboard layout, by default English (US) is selected but if you want to change then, you can select in the list. And click on continue.

Step-10) Select your username and password for your Ubuntu admin account.

Step-11) Installation process starts. May take up to 30 minutes. Please wait until the installation process completes.

Step-12) After finishing the installation, you will see Ubuntu Desktop.

### RESULT:

Linux has been successfully installed as desired.



---

# EXPERIMENT - 7

## HTTPS AND FTP SERVERS

### AIM:

HTTP and FTP are used to transfer information over a computer network and are an integral part of today's internet.

### DESCRIPTION:

We configure NGINX for setting up HTTP Server. Nginx is a high-performance web server that is responsible for handling the load of some of the largest sites on the internet. It is especially good at handling many concurrent connections and excels at serving static content.

1. For installation: `sudo apt-get install nginx`
2. For start Nginx service: `sudo systemctl start nginx`
3. We create a website in the following link: `sudo gedit /var/www/html/index.html`

FTP is the underlying protocol that is used to, as the name suggests, transfer files over a communication network. There are other opensource programs that use FTP protocol to transfer files on Linux systems, but VSFTPD is probably the most popular and easier to configure. VSFTPD daemon listens continuously for FTP requests from FTP clients

.

1. Install VSFTPD: `sudo apt-get install vsftpd`
2. Start the server using : `sudo vsftpd`
3. Go to Web Browser and open `ftp://localhost`

### RESULT:

Successfully installed and configured HTTP and FTP server in our computer system for secure transfer of information.

---

# EXPERIMENT - 8

## PACKET MANAGEMENT

### AIM:

As a Linux Administrator, these commands you will require to add and remove software frequently to your existing installation of Linux to keep the system updated and to do maintenance.

### DESCRIPTION:

Linux-based computers use a set of software tools called a package management system that assists with adding, configuring, removing and maintaining software on a computer in an orderly way. Additionally, organizations such as Canonical Ltd works with developers to improve software compatibility.

A number of package managers have been developed for Linux systems. Some of the popular options include:

1. APT-Get: Apt-get is a command line utility that provides the commands to install remove and manage applications and utilities on your system. `Sudo apt-get install nmap`.
2. Dpkg: Dpkg is the basic command-line tool for installing, removing, querying, and managing packages in Ubuntu. `sudo dpkg -i package_name.deb`
3. Gnome-app-install: The gnome-app-install utility is a graphical application that runs when you select Add/Remove programs from the Applications menu on your Ubuntu system.
4. Update Manager: Update Manager is a graphical, X window system tool for identifying and updating applications already installed on your system. `sudo apt-get update`
5. Make Install: Make is a series of command line instructions (CLI) that allow an administrator to compile and install applications that are part of a source code project.

---

## STEPS:

1. For updating the software we execute the command `sudo apt update` which is used to download package information from all configured sources.
2. These installed packages are to be upgraded from time to time for that we use `sudo apt-get upgrade` which installs available upgrades of all package currently installed on the system from the sources configured via the source lists.
3. To search if packages are available, `sudo apt search <package name>`
4. Sometimes we need to check whether software is installed or not before installation. `Sudo dpkg -s <package>` provides with the current status/ version of the package if its installed otherwise it displays not installed.
5. For installation of packages, `sudo apt-get install <package name>`.
6. Whereas for removal, `sudo apt remove <package name>`.

## CODE SNIPPET:

```
sudo apt-get update  ##update is used to download package information from all
configured sources.
```

```
sudo apt-get upgrade  ##is used to install available upgrades of all package currently
installed on the system from the sources configured via sources.list(5)
```

```
sudo apt search <package name>
```

```
dpkg -s <package>  ##Checks the status of the package. Whether installed or not.
```

```
sudo apt-get install <package name>
```

```
sudo apt remove <package>
```

## RESULT:

Various Linux commands for updating, installation and upgrading of software packages have been learnt.

---

## EXPERIMENT - 9

### PERL

#### AIM:

Perl is a general-purpose programming language originally developed for text manipulation and now used for a wide range of tasks including system administration, web development, network programming, GUI development, and more.

#### DESCRIPTION:

The power of Perl can be implemented in many fields. The most popular use of Perl is in Web development., Perl is also used to automate many tasks in the Web servers, and other administration jobs, it can automatically generate emails and clean up systems. Perl is still used for its original purpose i.e. extracting data and generating reports. It can produce reports on resource use and check for security issues in a network. Due to this reason, Perl has become a popular language used in web development, networking and bioinformatics too. Apart from all this perl can also be used for CGI programming.

Perl can also be utilized for image creation & manipulation. Apart from that networking via telnet, FTP, etc., Graphical User Interface creation, VLSI electronics & to create mail filters to reduce spamming practices are some use cases of Perl.

`Perl - v` : Let's you check the version of the perl installed. Mostly in linux, perl is preinstalled.

After creating a perl program like `simple.pl`. We execute it by the command `perl simple.pl`.

#### RESULT:

Perl programming and execution using Linux commands have been implemented successfully.

---

# EXPERIMENT - 10

## LAMP STACK

### AIM:

How to install and operate Linux, Apache, MySQL, PHP (Lamp stack) on Ubuntu 18.04.

### DESCRIPTION:

A "LAMP" stack is a group of open-source software that is typically installed together to enable a server to host dynamic websites and web apps. This term is actually an acronym which represents the Linux operating system, with the Apache web server. The site data is stored in a MySQL database, and dynamic content is processed by PHP.

#### Step 1 — Installing Apache and Updating the Firewall

The Apache web server is among the most popular web servers in the world. It's well-documented and has been in wide use for much of the history of the web, which makes it a great default choice for hosting a website.

#### Step 2 — Installing MySQL

Now that you have your web server up and running, it is time to install MySQL. MySQL is a database management system. Basically, it will organize and provide access to databases where your site can store information.

#### Step 3 — Installing PHP

PHP is the component of your setup that will process code to display dynamic content. It can run

scripts, connect to your MySQL databases to get information and hand the processed content over to your web server to display.

#### Step 4 — Testing PHP Processing on your Web Server

In order to test that your system is configured properly for PHP, create a very basic PHP script called info.php. In order for Apache to find this file and serve it correctly, it must be saved to a very specific directory, which is called the "web root".

### RESULT:

Now that you have a LAMP stack installed, you have many choices for what to do next. Basically, you've installed a platform that will allow you to install most kinds of websites and web software on your server.

---

# EXPERIMENT - 11

## KERNEL COMPILATION

### AIM:

How to compile and install Linux Kernel from source code.

### DESCRIPTION:

Compiling a custom kernel has its advantages and disadvantages. However, new Linux user/admin find it difficult to compile Linux kernel. Compiling kernel needs to understand a few things and then type a couple of commands. This step by step howto covers compiling Linux kernel version 4.20.12 under an Ubuntu or Debian Linux. The following instructions successfully tested on an RHEL 7/CentOS 7 (and clones), Debian Linux, Ubuntu Linux and Fedora Linux 28/29. However, instructions remain the same for any other Linux distribution.

The procedure to build (compile) and install the latest Linux kernel from source is as follows:

1. Grab the latest kernel from [kernel.org](http://kernel.org)
2. Verify kernel
3. Untar the kernel tarball
4. Copy existing Linux kernel config file
5. Compile and build Linux kernel 4.20.12
6. Install Linux kernel and modules (drivers)
7. Update Grub configuration
8. Reboot the system

### RESULT:

Successfully completed various steps to build the Linux kernel from source code and compiled kernel should be running on your system.