

COLLEGE OF ENGINEERING CHENGANNUR

FREE AND OPEN SOURCE SOFTWARE LAB REPORT

NAME : SHABEERDAS C

ROLL NO : 46

CLASS : S4D

REG. NO. : CHN17CS101

Certificate

Name :

Class :

Roll No :

Exam No :

*This is certified to be the bonafide record of practical work done in
Free and Open Source Software as per Syllabus of class
in the Lab during the academic year 20 /20*

.....
Teacher In-charge

.....
Head of Dept.

.....
Examiner's Signature

.....
Principal

Date :

Institution Rubber Stamp

Contents

1.Linux Commands	2
2.CGPA Computation	3
3.Networking Task	4
4.SSH	5
5.SCP.....	6
6.RSYNC.....	7
7.FTP Usage.....	8
8.OS Installation.....	9
9.HTTP & FTP Server.....	10
10.Package Management.....	12
11.Pperl.....	13
12.Lamp Stack.....	14
13.Own Webpage.....	15
14.Kernel Compilation -Detailed report.....	16

Linux Commands

ls - Used to list all files under a directory

ls - Long list all files

pwd- To know which directory you are in It gives us the absolute path, which means the path that starts from the root.

cd - Use the "cd" command to go to a directory. To go back from a folder to the folder before that, you can type "cd .." .

cat - Use the cat command to display the contents of a file.

mkdir & rmdir - Use the mkdir command when you need to create a folder or a directory. Use rmdir to delete a directory.

cp - Use the cp command to copy files through the command line.

alias -An alias definition provides a string value that shall replace a command name when it is encountered.

join -Write a line for each pair of lines with identical join fields
join <file1> <file2>

paste -paste is used to write lines consisting of the sequentially corresponding lines from each files
Separated by TAB
paste <file1> <file2>

CGPA Computation

The task is to compute cgpa of all students of S4D in S1 and S2.

Computing CGPA requires to download the PDFs of the results and the file containing register number and names of students in our class.

The pdf file is converted to text by pdftotext command.

Using grep command unwanted details are removed.

Using join command file containing name , grades and register number is created.

By using a c program the cgpa is calculated.

Github: <https://github.com/ceccs17d46/cs232/tree/master/2.gpa>

Networking Task

The task is to setup networking using `ifconfig` , `route`

ifconfig - `ifconfig` stands ‘for interface configuration’.`ifconfig` is used to configure the kernel-resident network interfaces.s *ifconfig* command is used to assign ip address and netmask to an interface or to disable or enable a given interface.

Display details about all interfaces

```
ifconfig -a
```

Display details about interface

```
ifconfig <interface>
```

Set ip address for interface

```
ifconfig <interface> <ip>
```

To connect or disconnect from an interface

```
Ifconfig up/down
```

Route – `route` manipulates the kernel’s ip routing table. Its primary use is to set up static routes to specific c host or networks via an interface after it has been configured with the `ifconfig`.

SSH

One essential tool to master as a system administrator is SSH. SSH, or Secure Shell, is a protocol used to securely log onto remote systems. It is the most common way to access remote Linux Server. SSH has remained popular because it is secure, light-weight, and useful in diverse situations. SSH uses the client server model.

ssh connects and logs into the specified destination, which may be specified as either [user@]hostname or a URI of the form ssh://[user@]hostname[:port].

Connect to a remote server `ssh user@remoteip`

Once you have connected to the server, you will probably be asked to verify your identity by providing a password.

Commands used

put - This command is used to upload a file . use `put -r` to upload Directories.

get - This command is used to download files.

mkdir - This command is used to create a new directory.

To exit from the session simply type
`$ exit`

SCP

This task is done to familiarize with the important scp commands. SCP (secure copy) is a command line utility that allows you to securely copy files and directories between two locations.

It uses the same kind of security mechanism like the ssh program. In fact it uses an ssh connection in the background to perform the file transfer.

The basic syntax of scp is

```
$scp source_file_path destination_file_path
```

It can be used

To copy a file from a remote host to the local host:

```
$scp your_username@remotehost:file_name/path
```

To copy a file from the local host to a remote host:

```
$scp file_name your_username@remotehost:/path
```

Apart from it, there are a couple of extra options and functions that scp supports. By default scp will always overwrite files on the destination.

RSYNC

Rsync (Remote Sync) is a most commonly used command for copying and synchronizing files and directories remotely as well as locally in Linux/Unix systems.

Basic syntax

```
rsync [options] <source> <destination>
```

Copy/Sync a file on a local computer

```
rsync -azvh <source> <destination>
```

Copy/Sync a directory on a local computer

```
rsync -azvh <source directory> <destination>
```

Copy/Sync a directory to a remote computer

```
rsync -azvh <source directory> user@serverip <destination>
```

Some common options used with rsync command are:

1. -v : verbose
2. -r : copies data recursively
3. -a : archive mode, archive mode allows copying files recursively and it also preserves symbolic links, file permissions, user & group ownerships and timestamps
4. -z : compress file data
5. -h : human-readable, output numbers in a human-readable format.

FTP Usage

FTP is file transfer protocol. It is used to transfer files between to and from remote systems. FTP commands can be used to transfer files.

It is network protocol similar to HTTP, but for file transfer. ftp clients are used to connect to ftp servers. After connection tools provided by FTP can be used for file transfer.

Usage

ftp <server> :-connect to server get

get <file>:-download file from server mget

mget<directory>:-download directories

put <file>:-upload file to server

mput<file>:-upload directories

lcd<directory> :-change local working directory

cd<directory>:-change remote working directory

Use *\$exit* to exit from the session.

OS Installation

This task is to install OS in a system. It is free to download and install on any computer.

Steps

1. Insert the disc containing the OS(In my case ubuntu) and restart the device.
2. Boot into the Live CD: Most computers are set to boot into the hard drive first, which means you will need to change some settings to boot from your CD or USB.
3. Start the installation process. You can start the installation from the boot menu.
4. Create a username and password. You will need to create login information to install Linux. A password will be required to log into your account and perform administrative tasks.
5. Set up the partition. Linux needs to be installed on a separate partition from any other operating systems on your computer if you intend dual booting Linux with another OS.
6. Boot into Linux

Images: https://github.com/ceccs17d46/cs232/tree/master/6.linux_installation

HTTP & FTP Server

The task is to create http and ftp server

HTTP

HTTP means HyperText Transfer Protocol. I used nginx HTTP server. The nginx HTTP server is also a frequently used web server in the world. It provides many powerful features, including dynamically loadable modules, robust media support, and extensive integration with other popular software.

Commands

`apt install nginx`:- To install nginx server

`nginx -s start` :-To start nginx server

`nginx -s stop`:- To stop nginx server

`nginx -s restart`:- To restart nginx server

The most common server hosting directory (server root) is `/var/www/html/`. This can be changed in nginx configuration file located at `/etc/nginx/nginx.conf`. By creating an `index.html` at the server root directory and restart nginx will make nginx load the `index.html` file when the IP address of the server machine is accessed through the same machine or a machine connected to the same network.

FTP

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.

Commands

```
sudo apt install vsftpd
```

```
sudo vsftpd
```

```
ftp localhost
```

All files will be displayed

Package Management

In this task we were able to study the various commands that is used to download , update and upgrade all apps in the system through the terminal.

A package manager deals with packages, distributions of software and data in archive files. Packages contain metadata, such as the software's name, description of its purpose, version number, vendor, checksum, and a list of dependencies necessary for the software to run properly. Upon installation, metadata is stored in a local package database.

Commands

- 1.apt-get install package-name(s) - Installs the package(s) specified, along with any dependencies.
- 2.apt-get remove package-name(s) - Removes the package(s) specified, but does not remove dependencies.
- 3.apt-get autoremove - Removes any orphaned dependencies, meaning those that remain installed but are no longer required.
- 4.apt-get clean - Removes downloaded package files for software that is already installed.
- 5.apt-get purge package-name(s) - Combines the functions of remove and clean for a specific package, as well as configuration files.
- 6.apt-get update - Reads the /etc/apt/sources.list file and updates the system's database of packages available for installation.
- 7.apt-get upgrade - Upgrades all packages if there are updates available.
- 8.apt-cache show package-name(s) - Shows dependency information, version numbers and a basic description of the package.
- 9.apt-cache depends package-name(s) - Lists the packages that the specified packages depends upon in a tree. These are the packages that will be installed with the apt-get install command.

PERL

Perl is a programming language that can be used to perform tasks that would be difficult or cumbersome on the command line. Perl is included by default with most GNU/Linux distributions. Usually, one invokes Perl by using a text editor to write a file and then passing it to the perl program.

Perl scripts can be named anything but conventionally end with ".pl". You can use any text editor to create this file.

Program to print 'Hello'

```
#!/usr/bin/perl
```

```
use strict;
```

```
use warnings;
```

```
print "Hello\n";
```

Command used to run the program

```
$ perl filename.pl
```

LAMP Stack

LAMP is an [open source](#) Web development platform that uses [Linux](#) as the operating system, [Apache](#) as the Web server, [MySQL](#) as the relational database management system and [PHP](#) as the object-oriented scripting language.

Commands

```
#!/usr/bin/env bash
sudo apt update
sudo apt install apache2
sudo ufw app list
sudo apt install ufw
sudo apt install ufw app list
sudo ufw app info "WWW Full "
sudo ufw app allow in "WWW Full "
sudo systemctl enable apache2
cd /var/www/html/
rm index.nginx-debian.html
vim index.html
sudo apt install mariadb-server
sudo mysql_secure_installation
sudo mariadb
mariadb -u admin -p
sudo apt install php libapache2-mod-php php-mysql
sudo vim /etc/apache2/mods-enabled/dir.conf
sudo systemctl restart apache2
sudo systemctl status apache2
sudo vim index.php
```

Firefox <http://localhost>

Own Webpage

Task is to create your own webpage which can be accessed through
<http://14.139.189.217/cs17d/cs17d46/>

1. Create a html file namely index.html containing your lab experiments.
2. Upload this html file to your server using sftp.

Kernel Compilation--Detailed Report

The Linux kernel is the heart of any Linux system. It handles user input/output, hardware, and controlling the power in the computer. While the kernel that comes with your Linux distribution is usually sufficient, this allows you to make your own specialized kernel.

We may need to compile our own kernel to add/remove some features present in the system. The kernel distributed with general settings which should run on all the possible installations. Thus they need to support a wide range of hardware. Some of the features may be built in the kernel while some of them may be built as modules.

Commands

```
wget http://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.0.10.tar.xz
```

```
xz -d -v linux-5.0.10.tar.xz
```

```
cd linux-5.0.10
```

```
cp /boot/config-$(uname -r) .config
```

```
make menuconfig
```

```
sudo make
```

```
sudo make modules_install
```

```
sudo make install
```

```
sudo update-initramfs -c -k 5.0.10
```

```
sudo update-grub
```

wget <http://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.0.10.tar.xz>

-This is to download the latest kernel from kernel.org

xz -d -v linux-5.0.10.tar.xz

-This is to extract the kernel source file for compilation

cd linux-5.0.10

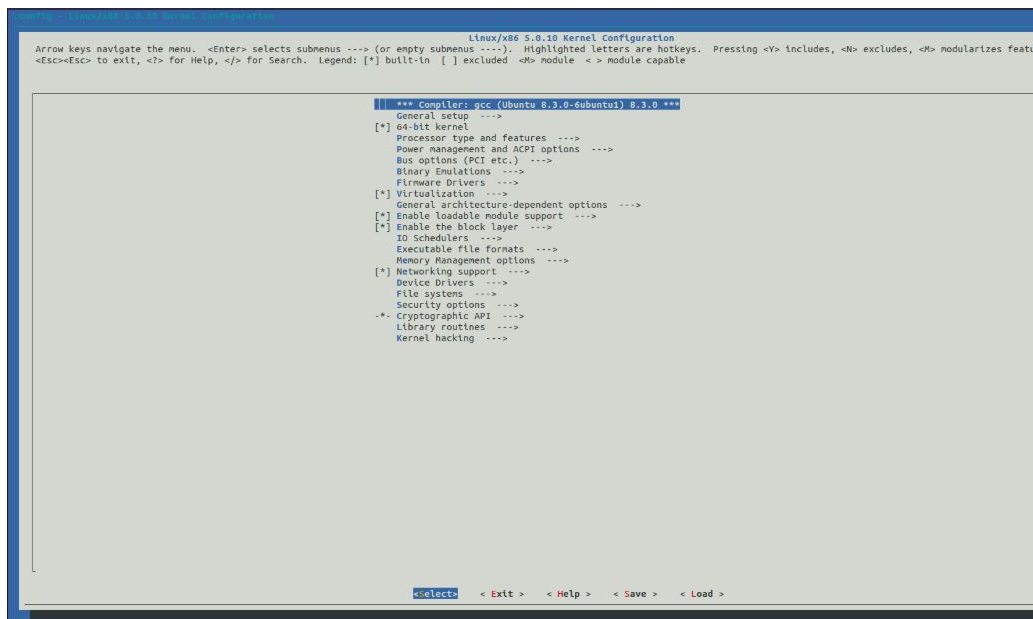
-Changing the directory to the newly formed directory linux-5.0.10

cp /boot/config-\$(uname -r) .config

-It is to configure the kernel. Before we actually compile the kernel, we must first configure which modules to include

make menuconfig

-This will launch a text-based user interface with default configuration options



`sudo make`

-This is to compile the main kernel.

`sudo make modules install`

- This is to install the kernel modules

`sudo make install`

-Install the new kernel on the system.

`sudo update-initramfs -c -k 5.0.10`

-It is to enable the kernel for boot

`sudo update-grub`

-It is to update grub.GRUB is multiboot bootloader.

We can now be able to restart the system and select the newly installed kernel.