

FREE AND OPEN SOURCE SOFTWARE LAB REPORT

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LINUX COMMANDS

DATE: 10/02/2019

AIM :

This section gives insight into the most important commands of Linux system. To learn more about the various commands, it is usually possible to get additional information with the **man** program followed by the name of the command

DESCRIPTION :

The important commands in Linux are:

- ls : The program will list the contents of the current directory in short form, ls -l : detailed list , ls -a : displays hidden list
- rm : Remove the specified file , rm -r : removes any existing subdirectories
- cd : Change the current directory
- mkdir : make a new directory
- cat : displays the content of file
- grep : The grep command searches the substring inside the file
- passwd : Users may change their own passwords at any time using this command.

There are a ton of Linux commands. These are some of them to familiarize the Linux basics and expand our knowledge about Linux Server.

CGPA COMPUTATION

DATE: 11/02/2019

AIM :

This is an experiment to calculate CGPA of all students in S4D class from s1 and s2 results.

DESCRIPTION :

- In this experiment ,we first download the s1 result 2018 from Ktu sites and change the pdf file to text file by using : `pdftotext -nopgbrk filename.pdf`
- Select the Computer science students by using : `grep --no-group-separator -A3 'CHN17CS' filename.txt | tr '\n' ' ' | sed 's/\ CHN/\nCHN/g' > newFileName.txt`
- Change the grade value to points by using: `sed -i 's/(grade)/ point /g' newFileName.txt`
- Calculate the SGPA of all students by using : `awk '{s=$a*credit+$b*credit}{r=s/total credits}{print r}' newFileName.txt >sgpa.txt`
- Paste the Name , Register No: , SGPA in a file
- Complete the s2 result 2018 SGPA calculation as per the above commands
- Paste the Register No: , SGPA of s2 into a file
- Add two SGPA results and get CGPA of each students by using : `awk '{s=$a+$b}{r=s/number}{print r}' filename.txt`
- An “echo” command is used to display line of text/string that are passed as an argument. Echo is used here to display the output as Name , Reg.No: and CGPA of each student.
- Then displays our CGPA calculation by using : `cat filename.txt`

From this experiment we can familiarize more commands and uses in Linux and to know that how to calculate CGPA or others by using Linux commands.

AIM :

This experiment reviews some of the most used command-line tools and utilities for network management in Linux. Linux is a most powerful operating system and networking is an essential part of servers.

DESCRIPTION :

Computers are connected in a network to exchange information or resources each other. Here are some of the Linux networking commands we can use and apply immediately.

- Ifconfig : command with no arguments will display all the active interfaces details
- ifconfig -a : display information of all active or inactive network interfaces on server.
- Ifconfig eth0 : display details of specific network interface.
- Ifconfig eth0 up : activate the eth0 interface.
- Ifconfig eth0 down : deactivates the specified network interface.
- ifconfig eth0 ip_address : To assign an IP address to an specific interface.

Route command is used to show/manipulate the IP routing table. It is primarily used to setup static routes to specific host or networks via an interface. Some of them are:

- route : show the details of the kernel routing table entries.
- route add default gw ip_address : set the default gateway .

This task helps to configure networks using command lines without manual connections and also helps to increase my knowledge.

AIM :

SSH, or *Secure Shell*, is a protocol used to securely log onto remote systems. Rsync (Remote Sync) is a most commonly used command for copying and synchronizing files and directories remotely as well as locally in Linux system. Scp (Secure Copy) is a command line tool to copy or transfer files across hosts. We are aiming to transfer files using rsync and scp.

DESCRIPTON :

SSH is secure in the sense that it transfers the data in encrypted form between the host and the client .Some of the commands are :

- ssh user_name@ip_address : log in to the host server securely and type password for encrypting the login.

Now we are in the host server , so we can transfer files and remove files from server. *ls* command is used for displaying the transferred files to the host.

Rsync efficiently copies and sync files to or from a remote system. Some of them are :

- rsync -avzp /home/filename username@ip : sync a file from a local machine to a remote machine.
- rsync -avhze ssh /foo user@remote-host:/tmp/ : to contact a remote system.

When transferring data with scp both the files and password are encrypted . Some of the commands are:

- scp source_file.txt [user@remote_host.com:/some/remote/directory](#): sending file from your local machine to a remote machine
- scp [user@remote_host.com:/some/remote/directory](#) source_file.txt : copying file from remote host to local host.

Rsync is more secure than scp for secured file transfer. All the above commands are used to transfer, copying ,remove files to remote server.

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FTP Server

DATE : 11/03/2019

AIM :

FTP (File Transfer Protocol) is the simplest file transfer protocol to exchange files to and from a remote computer or network. We are aiming to transfer files using ftp commands.

DESCRIPTION :

An FTP transmission is not encrypted. Anyone who intercepts the transmission can read the data you send, including your username and password. Use SFTP(Secured FTP) for a secure transmission. Some of them are:

- sftp username@hostname : To start an sftp session and enter our password. Now we enter into the remote network and uses some standard commands.
 - ❖ get : Copy a file from remote host to the local host.
 - ❖ ls : List the contents of the current directory on the remote host.
 - ❖ put : Copy a file from the local computer to the remote host.
 - ❖ pwd : Show the present working directory on the remote host.
 - ❖ rm : Delete a file on the remote host.
 - ❖ Bye : Exit from the sftp

By using all the above commands to use the ftp securely and transfer or get files . This sftp is used for our daily working environment for transfer our scripted task. As we all know that File Transfer Protocol is not at all secure because all transmissions happens in clear text and the data can be readable by anyone during sniffing the packets on the network. The SFTP is a very useful tool for administrating servers and transferring files to and from .

AIM :

This experiment need not be the usage of Commands or terminal. This is just the installation of Operating system .

DESCRIPTION :

This is the clean installation of operating system. Download the Fedora Live CD from the [Fedora-Project](#). Burn it on CD using favourite burner. Make the PC to boot first from CD/DVD ROM.

Step 1: Select Start Fedora 16 from the boot screen. CD will start to initialize the installation. CD will start to initialize the installation.

Step 2: Start the Installation from Application —> System Tools —> Install to Hard Drive.

Step 3: Select the Keyboard type and click Next. Select the installation device type and click Next.

Step 4: Type the Host Name and click Next. Select your Time Zone and click Next.

Step 5: Enter the password for root account and click Next. Select your installation type and click Next.

Step 6: Confirm the installation. Once confirmed, fedora 16 will start to install on hard drive.

Step 7: Reboot to complete the installation. Once rebooted, select the fedora from the GRUB menu.

Step 8: Click Forward on the Welcome screen. Click Forward on License Screen.

Step 9: Click on Finish. You will see Ubuntu Desktop.

This is the way to install new Operating system using CD-ROM.

HTTP AND FTP SERVER

DATE : 11/03/2019

AIM :

How to easily and quickly serve files and folders over HTTP

DESCRIPTION :

http-server is a simple, zero-configuration command-line http server. It is powerful enough for production usage, but it's simple and hackable enough to be used for testing, local development, and learning.

- `npm install http-server -g` : This will install `http-server` globally so that it may be run from the command line.
- `http-server [path] [options]` : view your server

we configure NGINX for setting up HTTP server. NGINX is a high-performed web server that is responsible for handling the load of some of the largest sites on the internet.

- `Sudo apt-install nginx` : For installation
- `Sudo systemctl start nginx` : to start this service
- `Sudo gedit /var/www/html/index.html` : We create a website in the following link.

FTP is the underlying protocol that is used to , as the same suggests, transfer files on a communication network. VSFTPD daemon listens continuously for ftp requests from FTP clients.

- `sudo apt-get install vsftpd` : install vsftpd.
- `sudo vsftpd` : start the server.
- open <ftp://localhost> : Go to web browser and open.

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PACKAGE MANAGEMENT

DATE:18/03/2019

AIM :

To install new packages or remove by using package management tools in Linux systems

DESCRIPTION :

Software is usually distributed in the form of **packages**, kept in **repositories**. Working with packages is known as **package management**. Packages provide the basic components of an operating system, along with shared libraries, applications, services, and documentation. Some of the commands are:

- `sudo apt-get install` : update package lists.
- `sudo apt-get upgrade` : Only upgrades installed packages.
- `apt-cache search_string`: Find a package.
- `apt show package` : Shows locally-cached info about a package.
- `sudo apt-get install` : Install a package.
- `Sudo apt remove package` : Removes unneeded packages.

APT (Advanced Package Tool) is the command line tool to interact with the packaging system. You can use it to find and install new packages, upgrade packages, remove the packages etc.

PERL

DATE:18/03/2019

AIM :

Perl officially stands for "Practical Extraction and Report Language". It was originally a language optimized for scanning arbitrary text files, extracting information from those text files, and printing reports based on that information.

DESCRIPTION :

After installing Perl you will want to actually run some Perl code.

- Perl -v : check the Perl installed or not.
- Open a text editor creating a new file with the following content :
#!/usr/bin/perl and type the code.
- Save the file by filename.pl format
- Then run the script using : perl /path/to/perl_tests/filename.pl

This is the steps to run a Perl program in Linux terminal. The most popular use of Perl is in Web Development. Perl can also be utilized for image creation and manipulation. After creating a Perl program , we execute it by the command Perl filename.pl.

LAMP STACK

DATE: 25/03/2019

AIM :

LAMP stands for Linux, Apache, MySQL, and PHP. Together, they provide a proven set of software for delivering high-performance web applications.

DESCRIPTION :

- This procedure assumes that Ubuntu is already installed on your machine. After you have Ubuntu up and running, you'll want to make sure that everything on your system is current.

sudo apt-get update and sudo apt-get upgrade for update and upgrade the Linux system.

- The very heart of our LAMP stack is a piece of server software called Apache. A web server's job is to process HTTP requests, which are used to send information across the Internet.

sudo apt-get install apache2 : installing Apache

sudo service apache2 restart : restart your Apache server.

- Installing mysql : sudo apt-get install mysql server

After MySQL has finished installing, it starts automatically. To log into your server : mysql -u root -p .

- Testing PHP processing on your web page

Create a very basic PHP script called info.php. In order for Apache to find this file and serve it correctly.

KERNAL COMPILATION

DATE: 4/04/2019

AIM :

Linux kernel is the life force of all Linux family of operating systems including Ubuntu, CentOS, and Fedora. We do the installation of kernel in our system

DESCRIPTION :

How to compile and install Linux Kernel

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

1. Grab the latest kernel from 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

This completed various steps to build the Linux kernel from source code and compiled kernel should be running on your system. 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 few things and then type a couple of commands.

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CREATE OWN WEBPAGE AT OUR SERVER

DATE: 05/05/2019

AIM :

This task is used to create webpage(to access the whole task within a single click) which contains all the links of experimental details.

DESCRIPTION :

This is created using HTML file “index.html” which can be edited as per our required. I used the html tag *a href* to give link on the respective code which I uploaded earlier in the GitHub account.

Output of the webpage is given below :

Webpage link : <http://14.139.189.217/cs17d/cs17d24/>

Hence output is obtained.

VERSION CONTROL SYSTEM SETUP (GIT)

DATE: 11/05/2019

AIM :

To study the importance of Version Control System(VCS) and usage using GIT in Linux system.

DESCRIPTION :

Version Control is a way of recording changes to a file or collection of files over time so that you can recall specific versions later. A version control system is a tool that records changes to files on a file system. There are many version control systems out there, but GIT is currently the most popular and frequently used, especially for source code management. Version control can actually be used for nearly any type of file on a computer, not only source code.

The workflow under Git is very simple: you make modifications to files in your working directory, then selectively add just those files that have changed, to the staging area, to be part of your next commit.

- To install Git in Linux : `sudo apt install git`

Output:

```
[sudo] password for greeshma:
Reading package lists... 0%
Reading package lists... 100%
Reading package lists... Done

Building dependency tree... 0%
Building dependency tree... 0%
Building dependency tree... 50%
```

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Building dependency tree... 50%

Building dependency tree... 88%

Building dependency tree

Reading state information... 0%

Reading state information... 0%

Reading state information... Done

git is already the newest version (1:2.17.1-lubuntu0.4).

The following packages were automatically installed and are no longer required:

```
i965-va-driver liba52-0.7.4 libaacs0 libaribb24-0 libass9
libavcodec57
libavformat57 libavutil55 libbasicusageenvironment1 libbdplus0
libbluray2
libcdcb2 libchromaprint1 libcrystalhd3 libdc1394-22 libdca0
libdvbpsi10
libdvdnv4 libdvdread4 libebml4v5 libfaad2 libgme0 libgroupsock8
libgsm1
libkate1 liblivemedia62 libmad0 libmatroska6v5 libmicrodns0
libmpcdec6
libmpeg2-4 libnfs11 libopenjp2-7 libopenmpt-modplug1 libopenmpt0
libplacebo4
libpostproc54 libproxy-tools libqt5x11extras5 libresid-builder0c2a
libsdl-image1.2 libsdl1.2debian libshine3 libsidplay2 libsnappy1v5
libsoxr0
libssh-gcrypt-4 libssh2-1 libswresample2 libswscale4 libupnp6
libusageenvironment3 libva-drm2 libva-wayland2 libva-x11-2 libva2
libvdpau1
libvlc-bin libvlc5 libvlccore9 libvulkan1 libx264-152 libx265-146
libxvidcore4 libzvbi-common libzvbi0 linux-headers-4.15.0-46
linux-headers-4.15.0-46-generic linux-image-4.15.0-46-generic
linux-modules-4.15.0-46-generic linux-modules-extra-4.15.0-46-
generic
mesa-va-drivers mesa-vdpau-drivers va-driver-all vdpau-driver-all
vlc-bin
vlc-data vlc-l10n vlc-plugin-base vlc-plugin-notify vlc-plugin-qt
vlc-plugin-samba vlc-plugin-skins2 vlc-plugin-video-output
vlc-plugin-video-splitter vlc-plugin-visualization
```

Use 'sudo apt autoremove' to remove them.

0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.

- After installing Git, it is recommended that you tell Git who you are by providing your full name and email address :

Git config --global user.name "ceccs17d24"

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Git config – global user.email "Greeshmashaji123@gmail.com"

- To check your Git settings:

Git config –list

Output:

```
user.name=ceccs17d24
user.email = Greeshmashaji123@gmail.com
```

CREATING A NEW GIT REPOSITORY

- Log in to our github account or create a new github. Create a new repository like "MyProjects".
- create a group called sysadmins .
- To create a new folder for uploading the contents.
By using : mkdir foldername
- Cd /home/greeshma/foldername : to move to that directory

Output:

```
greeshma@Vbubuntu $ mkdir MyProjects
greeshma@Vbubuntu $ cd MyProjects/
```

- Create a new file in this directory for uploading "Filename.java"
- run git init from the existing project's directory
git init : creates a new .git subdirectory in the current directory.
- Git add filename :
After you have added the file, stage a commit and leave a commit message.

- git commit -m "Initialized a Git repository for this project. Tracking changes to a file."

Commit messages serve as a reminder of the changes that were made to a file.

```
greeshma@Vbubuntu ~/MyProjects $ git commit -m 'First commit'
[master (root-commit) 281685a] First commit
1 file changed, 7 insertions(+)
create mode 100644 name.java
```

- Now we can see the file uploaded in our new repository through linux commands

To set up a Central Repo as a remote to your local repo in order to update your local fork with updates.

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- Use git pull to sync your local repo with the forked GitHub.com repo.
update local repo using git pull with the added directions
of upstream indicating the central repository and master specifying which
branch you are pulling down
-git pull upstream master

Output:

```
remote: Counting objects: 25, done. remote: Compressing
objects: 100% (15/15), done. remote: Total 25 (delta 16), reused 19
(delta 10), pack-reused 0 Unpacking objects: 100% (25/25), done. From
https://github.com/ceccs17d24/MyProjects:74d9b7b..463e6f0 master ->
origin/master Auto-merging posts/institute-materials/name.java
```

- Check the status of repo : git status
- you will need to add and commit those changes. Once you've done that,
you can push the changes back up to your fork on github.com.
- git push origin master

how to compare different versions of files.

The main objective of version controlling is to enable you to work with different versions of files. Git provides a command **diff** to let you to compare different versions of your files.

- To check the status of the git :

```
C:/home/greeshma/MyProjects > git status
```

Output:

```
# On branch master
nothing to commit (working directory clean)
```

- Let's make a change in the *name.txt* file now and compare this file with previously committed version.

```
C:/home/greeshma/MyProjects> edit name.txt
C home/greeshma/MyProjects > git diff HEAD name.txt
diff --git a/name.txt b/name.txt
index e4f37c4..557db03 100644
--- a/name.txt
+++ b/name.txt
@@ -1,1 @@
-Hello India
+Hello World
```

There it is. Git shows the exact change I made in the file. But, if you look at the diff command, you might wonder what HEAD is doing there.

The git revert command can be considered an 'undo' type command, however, it is not a traditional undo operation. Instead of removing the commit from the project history, it figures out how to invert the changes introduced by the commit

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and appends a new commit with the resulting inverse content. This prevents Git from losing history, which is important for the integrity of your revision history and for reliable collaboration.

- Create a repo using commands:
- we are ready to initiate a git revert.
 - Git revert HEAD

Output :

```
[master b9cd081] Revert "prepend content to demo file"
1 file changed, 1 deletion(-)
```

This will revert the latest commit.

- We can now examine the state of the repo using git log and see that there is a new commit added to the previous log:

```
$ git log --oneline
1061e79 Revert "prepend content to demo file"
86bb32e prepend content to demo file
3602d88 add new content to demo file
299b15f initial commit
```

Version control systems are all about managing contributions between multiple distributed authors (usually developers). Sometimes multiple developers may try to edit the same content. If Developer A tries to edit code that Developer B is editing a conflict may occur. The git merge command's primary responsibility is to combine separate branches and resolve any conflicting edits.

- we will create a new branch to use as the conflicting merge.

```
$ git checkout -b new branch to merge later
$ echo "totally different content to merge later" > merge.txt
$ git commit -
am"edited the content of merge.txt to cause a conflict"
[new branch to merge later 6282319] edited the content of merge.txt to cause a conflict
1 file changed, 1 insertion(+), 1 deletion(-)
```

create and check out a new branch named new_branch_to_merge_later overwrite the content in merge.txt commit the new content

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- Running the git status command we can identify the conflicts.

```
$ git status
On branch master
You have unmerged paths.
(fix conflicts and run "git commit")
(use "git merge --abort" to abort the merge)

Unmerged paths:
(use "git add <file>..." to mark resolution)

both modified:   merge.txt
```

The output from git status indicates that there are unmerged paths due to a conflict.

Many people's version-control method of choice is to copy files into another directory. This approach is very common because it is so simple, but it is also incredibly error prone. It is easy to forget which directory you're in and accidentally write to the wrong file or copy over files you don't mean to. To deal with this issue, programmers long ago developed local VCSs that had a simple database that kept all the changes to files under revision control .



