

Group 2:

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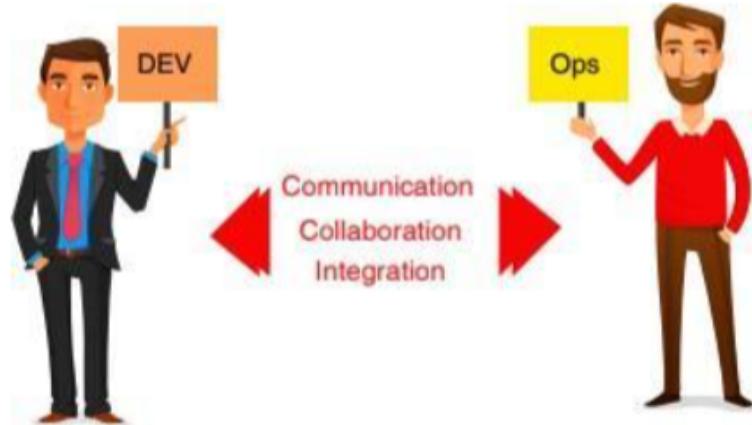
Aim: To Understand the Concept of DevOps with related technologies which are used to Code, Build, Test, Configure & Monitor the Software Applications.

Study of Basic Linux commands

Theory:

What is DevOps?

Patrick Debois, who's often called "the father of DevOps", coined the word "DevOps" in 2009. As the word depicts, it was formed by combining two words: "development" and "operations". DevOps is a collaborative way of developing and deploying software. DevOps (a portmanteau of development and operations) is a software development method that stresses communication, collaboration and integration between software developers and information technology (IT) operation professionals.



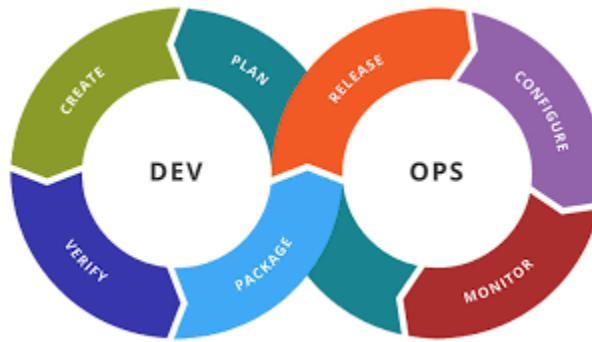
- DevOps is an approach based on agile and lean principles in which business owners, development, operations, and quality assurance team collaborate to deliver software in a continuous stable manner
- DevOps is an environment that promotes cross practicality, shared business tasks and belief
- DevOps is a movement that improves IT service delivery agility
- DevOps is a culture that promotes better working relationship within the company
- DevOps is a set of practices that provides rapid, reliable software delivery

Why is DevOps is Needed?

- Before DevOps, the development and operation team worked in complete isolation.

- Testing and Deployment were isolated activities done after design-build. Hence they consumed more time than actual build cycles.
 - Without using DevOps, team members were spending a large amount of their time in testing, deploying, and designing instead of building the project.
 - Manual code deployment lead to human errors in production
 - Coding & operation teams had their separate timelines and were not in sync causing further delays.
 - There was demand to increase the rate of software delivery by business stakeholders.
- As per Forrester Consulting Study, Only 17% of teams could do fast delivery software. This was the pain point.

DevOps Lifecycle



DevOps is deep integration between development and operations. Understanding DevOps is not possible without knowing DevOps lifecycle.

Here is a brief information about the Continuous DevOps life-cycle:

1. Development

In this DevOps stage the development of software takes place constantly. In this phase, the entire development process is separated into small development cycles. This benefits DevOps team to speed up software development and delivery process.

2. Testing

QA team use tools like Selenium to identify and fix bugs in the new piece of code.

3. Integration

In this stage, new functionality is integrated with the prevailing code, and testing takes place. Continuous development is only possible due to continuous integration and testing.

4. Deployment

In this phase, the deployment process takes place continuously. It is performed in such a manner that any changes made any time in the code, should not affect the functioning of high traffic website.

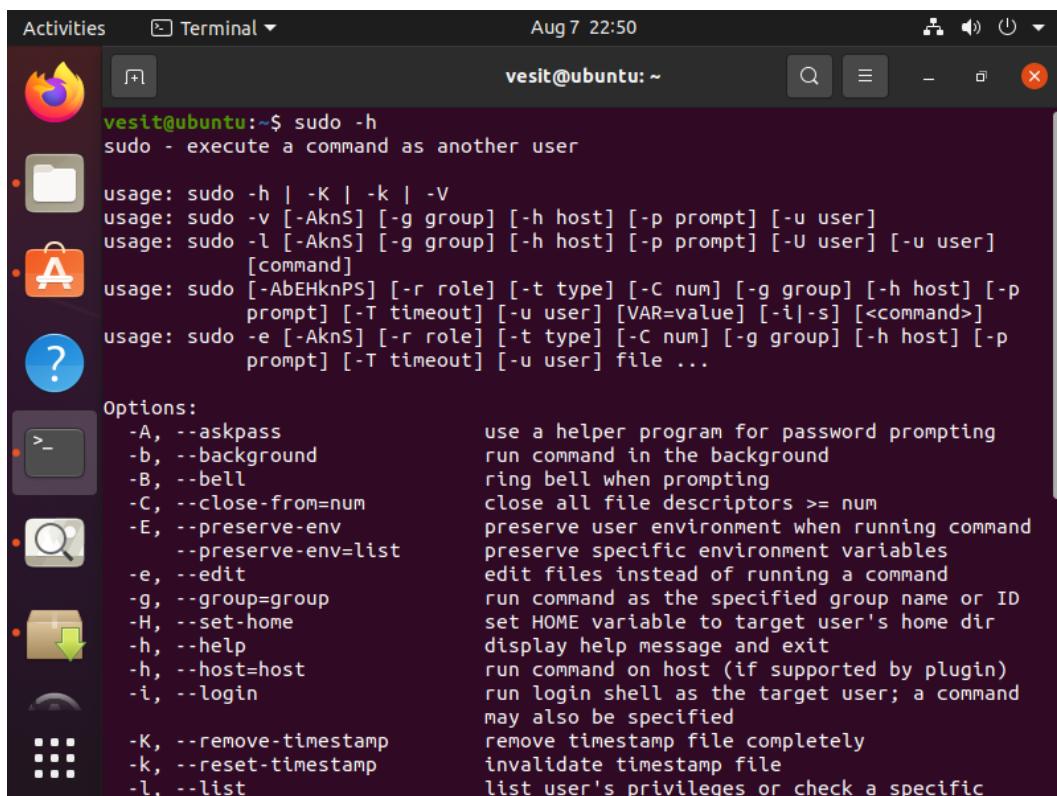
5. Monitoring

In this phase, operation team will take care of the inappropriate system behavior or bugs which are found in production.

Linux Commands-

Sudo

sudo (SuperUser DO) Linux command allows you to run programs or other commands with administrative privileges, just like “Run as administrator” in Windows. This is useful when, for example, you need to modify files in a directory that your user wouldn’t normally have access to.



The screenshot shows a Linux desktop environment with a terminal window open. The terminal title is "vesit@ubuntu: ~". The command "sudo -h" has been entered, and the output is displayed. The output provides usage information and a detailed list of options for the sudo command. The terminal window is part of a desktop interface with icons for various applications like a browser, file manager, and terminal.

```
vesit@ubuntu:~$ sudo -h
sudo - execute a command as another user

usage: sudo -h | -K | -k | -V
usage: sudo -v [-AknS] [-g group] [-h host] [-p prompt] [-u user]
usage: sudo -l [-AknS] [-g group] [-h host] [-p prompt] [-U user] [-u user]
      [command]
usage: sudo [-AbEHknPS] [-r role] [-t type] [-C num] [-g group] [-h host] [-p
            prompt] [-T timeout] [-u user] [VAR=value] [-i|-s] [<command>]
usage: sudo -e [-AknS] [-r role] [-t type] [-c num] [-g group] [-h host] [-p
            prompt] [-T timeout] [-u user] file ...

Options:
-A, --askpass          use a helper program for password prompting
-b, --background        run command in the background
-B, --bell              ring bell when prompting
-C, --close-from=num   close all file descriptors >= num
-E, --preserve-env     preserve user environment when running command
--preserve-env=list    preserve specific environment variables
-e, --edit              edit files instead of running a command
-g, --group=group       run command as the specified group name or ID
-H, --set-home          set HOME variable to target user's home dir
-h, --help               display help message and exit
-h, --host=host         run command on host (if supported by plugin)
-i, --login              run login shell as the target user; a command
                         may also be specified
-K, --remove-timestamp  remove timestamp file completely
-k, --reset-timestamp   invalidate timestamp file
-l, --list               list user's privileges or check a specific
```

Apt-get

1. Apt-get update

apt-get update with super user privileges is the first command you need to run in any Linux system after a fresh install. This command updates the database and let your system know if there are newer packages available or not.

```
vesit@ubuntu:~$ sudo apt-get update
[sudo] password for vesit:
Hit:1 http://ppa.launchpad.net/wireshark-dev/stable/ubuntu focal InRelease
Hit:2 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu focal InRelease
Hit:4 http://us.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:5 http://us.archive.ubuntu.com/ubuntu focal-backports InRelease
Reading package lists... Done
```

2. Apt-get upgrade

After updating the package database, next step is to upgrade the installed packages. For upgrading all the packages with available updates one can use this command.

```
vesit@ubuntu:~$ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
The following packages have been kept back:
  linux-generic-hwe-20.04 linux-headers-generic-hwe-20.04 linux-image-generic-hwe-20.04
The following packages will be upgraded:
  apport apport-gtk apt apt-utils bluez bluez-cups bluez-obexd ca-certificates cups cups-l
```

3. Sudo Apt-get install

If you know the name of the package, then you can easily install a program using this command.

```
vesit@ubuntu:~$ sudo apt-get install pinta
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
The following additional packages will be installed:
  binfmt-support binutils binutils-common binutils-x86-64-linux-gnu ca-certifi
  libctf-nobfd0 libctf0 libgdiplus libglib2.0-cil libgtk2.0-cil libmono-addins
  libmono-btls-interface4.0-cil libmono-cairo4.0-cil libmono-corlib4.5-cil lib
  libmono-security4.0-cil libmono-sharpzip4.84-cil libmono-system-configuration
  libmono-system-drawing4.0-cil libmono-system-numerics4.0-cil libmono-system-
  libmono-system4.0-cil mono-4.0-gac mono-gac mono-runtime mono-runtime-common
```

4. Sudo Apt-get remove and sudo autoremove

When it comes to removing the installed program apt-get remove command suits your need. You only have to know the exact package name of the software you want to uninstall.

```
vesit@ubuntu:~$ sudo apt-get remove
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libfwupdplugin1
Use 'sudo apt autoremove' to remove it.
0 upgraded, 0 newly installed, 0 to remove and 167 not upgraded.
vesit@ubuntu:~$ sudo apt autoremove
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages will be REMOVED:
  libfwupdplugin1
0 upgraded, 0 newly installed, 1 to remove and 167 not upgraded.
After this operation, 459 kB disk space will be freed.
Do you want to continue? [Y/n] y
(Reading database ... 155801 files and directories currently installed.)
Removing libfwupdplugin1:amd64 (1.5.11-0ubuntu1~20.04.2) ...
Processing triggers for libc-bin (2.31-0ubuntu9.7) ...
vesit@ubuntu:~$
```

Ls

ls (list) command lists all files and folders in your current working directory. You can also specify paths to other directories if you want to view their contents.

```
vesit@ubuntu:~$ ls
count.txt  Desktop  Documents  Downloads  f1.txt  Music  Pictures  price.txt
  Public   snap    Templates  Videos   word_count.sh  word_file.txt
```

Cd

cd ("change director") Linux command also known as chdir used to change the current working directory. It's one of the most used basic Ubuntu commands.

```
vesit@ubuntu:~$ cd Downloads
vesit@ubuntu:~/Downloads$
vesit@ubuntu:~/Downloads$ cd\

vesit@ubuntu:~$ cd Desktop
vesit@ubuntu:~/Desktop$
vesit@ubuntu:~/Desktop$ cd\
```

Pwd

pwd (print working directory) Ubuntu command displays the full pathname of the current working directory.

```
vesit@ubuntu:~$ pwd
```

```
/home/vesit
```

Cp

cp (copy) Linux command allows you to copy a file. You should specify both the file you want to be copied and the location you want it copied to – for example, cp xyz /home/myfiles would copy the file “xyz” to the directory “/home/myfiles”.

```
vesit@ubuntu:~/Desktop$ ls
armstrong.awk even.awk f1.txt f2.txt f3.txt g1.txt mul.sh test.txt
vesit@ubuntu:~/Desktop$ cp f1.txt f2.txt
vesit@ubuntu:~/Desktop$ ls
armstrong.awk even.awk f1.txt f2.txt f3.txt g1.txt mul.sh test.txt
```

Mv

mv (move) command allows you to move files. You can also rename files by moving them to the directory they are currently in, but under a new name.

```
vesit@ubuntu:~/Desktop$ ls
armstrong.awk even.awk f1.txt f2.txt f3.txt g1.txt mul.sh test.txt
vesit@ubuntu:~/Desktop$ mv f1.txt f2.txt
vesit@ubuntu:~/Desktop$ ls
armstrong.awk even.awk f2.txt f3.txt g1.txt mul.sh test.txt
```

Rm

rm (remove) command removes the specified file.

rmdir (“remove directory”) – Removes an empty directory.

rm -r (“remove recursively”) – Removes a directory along with its content.

```
vesit@ubuntu:~/Desktop$ ls
armstrong.awk even.awk f2.txt f3.txt g1.txt mul.sh test.txt
vesit@ubuntu:~/Desktop$ rm f2.txt
vesit@ubuntu:~/Desktop$ ls
armstrong.awk even.awk f3.txt g1.txt mul.sh test.txt
```

Man

man command displays a “manual page”. Manual pages are usually very detailed.

The image shows two terminal windows side-by-side. Both have a title bar with 'File Edit View Search Terminal Help' and a status bar at the bottom.

Terminal 1 (Left):

```

vesit510-04@vesit510-04: ~
File Edit View Search Terminal Help
MAN(1)                         Manual pager utils                         MAN(1)

NAME
    man - an interface to the on-line reference manuals

SYNOPSIS
    man [-C file] [-d] [-D] [--warnings[=warnings]] [-R encoding] [-L
    locale] [-m system[...]] [-M path] [-S list] [-e extension] [-i|-I]
    [--regex|--wildcard] [-n[names-only]] [-a] [-u] [--no-subpages] [-P
    pager] [-r prompt] [-7] [-E encoding] [--no-hyphenation] [--no-justification]
    [-t[pager]] [-p string] [-t] [-T[device]] [-H[browser]] [-X[dpi]] [-Z]
    [{section} page[{section}] ...] ...
    man -k [apropos options] regexp ...
    man -K [-w] [-W] [-S list] [-i|-I] [--regex] [{section}] term ...
    man -f [whatis options] page ...
    man -l [-C file] [-d] [-D] [--warnings[=warnings]] [-R encoding] [-L
    locale] [-P pager] [-r prompt] [-7] [-E encoding] [-p string] [-t]
    [-T[device]] [-H[browser]] [-X[dpi]] [-Z] file ...
    man -wl-W [-C file] [-d] [-D] page ...
    man -c [-C file] [-d] [-D] page ...
    man [-?V]

DESCRIPTION
    Manual page man(1) line 1 (press h for help or q to quit)

```

Terminal 2 (Right):

```

vesit510-04@vesit510-04: ~
File Edit View Search Terminal Help
INTRO(1)                         Linux User's Manual                         INTRO(1)

NAME
    intro - introduction to user commands

DESCRIPTION
    Section 1 of the manual describes user commands and tools, for example,
    file manipulation tools, shells, compilers, web browsers, file and
    image viewers and editors, and so on.

NOTES
    Linux is a flavor of UNIX, and as a first approximation all user com-
    mands under UNIX work precisely the same under Linux (and FreeBSD and
    lots of other UNIX-like systems).

    Under Linux, there are GUIs (graphical user interfaces), where you can
    point and click and drag, and hopefully get work done without first
    reading lots of documentation. The traditional UNIX environment is a
    CLI (command line interface), where you type commands to tell the com-
    puter what to do. That is faster and more powerful, but requires finding
    out what the commands are. Below a bare minimum, to get started.

Login
    Manual page intro(1) line 1 (press h for help or q to quit)

```

Info

It is Similar to man, but often provides more detailed or precise information.

The terminal window has a title bar with 'File Edit View Search Terminal Help' and a status bar at the bottom.

```

vesit510-04@vesit510-04: ~
File Edit View Search Terminal Help
File: dir,      Node: Top,      This is the top of the INFO tree.

This is the Info main menu (aka directory node).
A few useful Info commands:

  'q' quits;
  'H' lists all Info commands;
  'h' starts the Info tutorial;
  'mTexinfo RET' visits the Texinfo manual, etc.

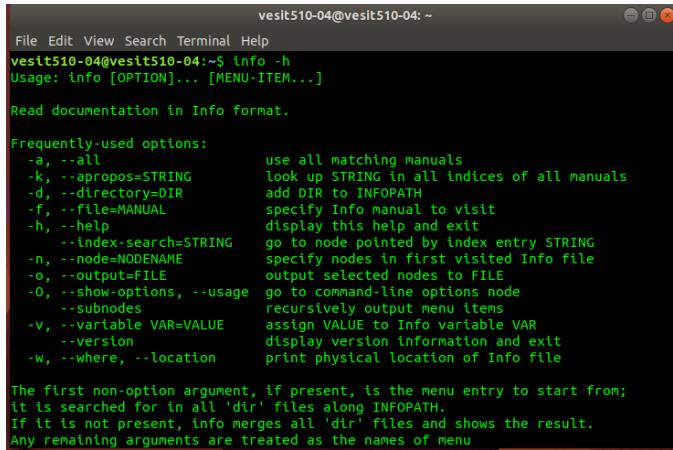
  □ Menu:
  Basics
  * Common options: (coreutils)Common options.
  * Coreutils: (coreutils).      Core GNU (file, text, shell) utilities.
  * Date input formats: (coreutils)Date input formats.
  * Ed: (ed).                  The GNU line editor
  * File permissions: (coreutils)File permissions.
  * Access modes.
  * Finding files: (find).      Operating on files matching certain criteria.

C++ libraries
-----Info: (dir)Top, 256 lines --Top-----

```

<command name> -h

This command is a third alternative to get help. While not as detailed as the info or man pages, this will provide a quick overview of the command and its uses.



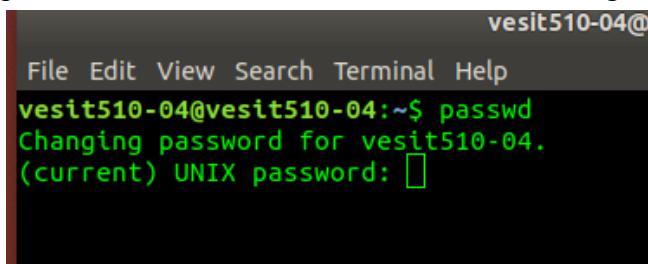
```
vesit510-04@vesit510-04:~$ info -h
Usage: info [OPTION]... [MENU-ITEM...]
Read documentation in Info format.

Frequently-used options:
-a, --all          use all matching manuals
-k, --apropos=STRING  look up STRING in all indices of all manuals
-d, --directory=DIR   add DIR to INFOPATH
-f, --file=MANUAL    specify Info manual to visit
-h, --help           display this help and exit
--index-search=STRING go to node pointed by index entry STRING
-n, --node=NODENAME   specify nodes in first visited Info file
-o, --output=FILE     output selected nodes to FILE
-O, --show-options, --usage  go to command-line options node
--subnodes          recursively output menu items
-v, --variable VAR=VALUE  assign VALUE to Info variable VAR
--version            display version information and exit
-w, --where, --location   print physical location of Info file

The first non-option argument, if present, is the menu entry to start from;
it is searched for in all 'dir' files along INFOPATH.
If it is not present, info merges all 'dir' files and shows the result.
Any remaining arguments are treated as the names of menu.
```

Passwd

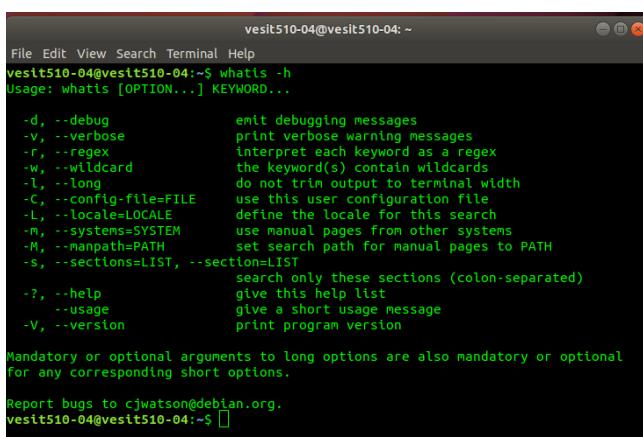
passwd Ubuntu basic command is used to change user password using Terminal.



```
vesit510-04@vesit510-04:~$ passwd
Changing password for vesit510-04.
(current) UNIX password: 
```

Whatis

whatis command shows a brief description of what is the functionality of specific built-in Linux command.



```
vesit510-04@vesit510-04:~$ whatis -h
Usage: whatis [OPTION...] KEYWORD...
-d, --debug          emit debugging messages
-V, --verbose         print verbose warning messages
-r, --regex           interpret each keyword as a regex
-w, --wildcard        the keyword(s) contain wildcards
-l, --long             do not trim output to terminal width
-C, --config-file=FILE use this user configuration file
-L, --locale=LOCALE    define the locale for this search
-M, --systems=SYSTEM   use manual pages from other systems
-N, --manpath=PATH     set search path for manual pages to PATH
-s, --sections=LIST, --section=LIST
                      search only these sections (colon-separated)
-?, --help             give this help list
--usage              give a short usage message
-V, --version          print program version

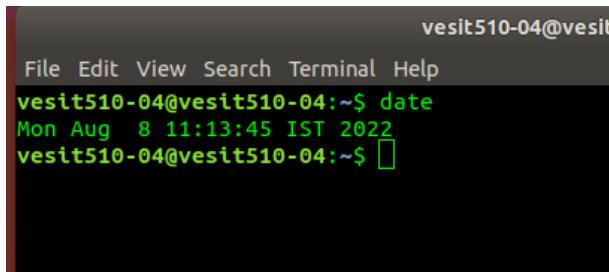
Mandatory or optional arguments to long options are also mandatory or optional
for any corresponding short options.

Report bugs to cjwatson@debian.org.
vesit510-04@vesit510-04:~$ 
```

Date

The simple “date” command displays the current date and time (including the day of the week, month, time, time zone, year).

Syntax: date

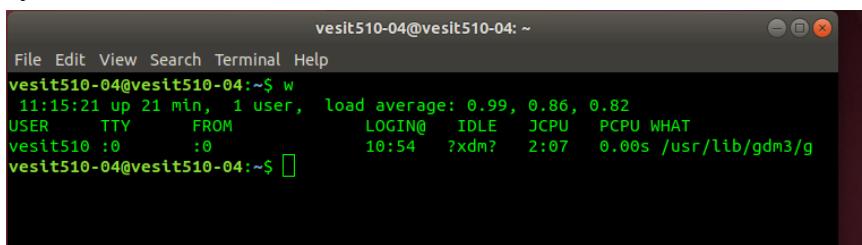


```
vesit510-04@vesit  
File Edit View Search Terminal Help  
vesit510-04@vesit510-04:~$ date  
Mon Aug  8 11:13:45 IST 2022  
vesit510-04@vesit510-04:~$
```

W

The command “w” displays the detailed information about the users who are logged in the system currently.

Syntax: w

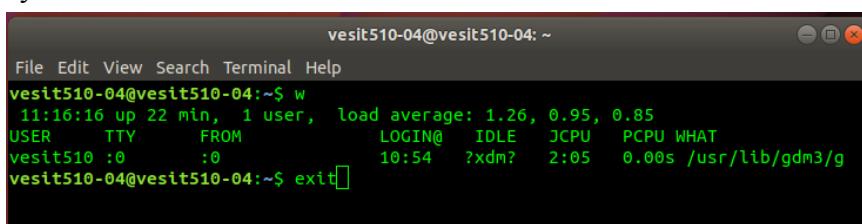


```
vesit510-04@vesit510-04:~  
File Edit View Search Terminal Help  
vesit510-04@vesit510-04:~$ w  
11:15:21 up 21 min, 1 user, load average: 0.99, 0.86, 0.82  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
vesit510 :0 :0 10:54 ?xdm? 2:07 0.00s /usr/lib/gdm3/g  
vesit510-04@vesit510-04:~$
```

Exit

The command “exit” as the name says it is used to exit from the system and log out from the current user.

Syntax: exit



```
vesit510-04@vesit510-04:~  
File Edit View Search Terminal Help  
vesit510-04@vesit510-04:~$ w  
11:16:16 up 22 min, 1 user, load average: 1.26, 0.95, 0.85  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
vesit510 :0 :0 10:54 ?xdm? 2:05 0.00s /usr/lib/gdm3/g  
vesit510-04@vesit510-04:~$ exit
```

Head

The command “head” prints the top N rows of data of the given input or file. By default, it prints the first 10 lines of the specified files.

Syntax: head -n File_name

```
vesit510-04@vesit510-04:~/Desktop$ head EXP

Winsol - Best Legal Winstrol Alternative
Clenbutrol - Best Legal Clenbuterol Alternative
Anvarol - Best Legal Anavar Alternative
Cutting Stack - Best for Fast and Effective Results

vesit510-04@vesit510-04:~/Desktop$ head -4 EXP

Winsol - Best Legal Winstrol Alternative
Clenbutrol - Best Legal Clenbuterol Alternative
vesit510-04@vesit510-04:~/Desktop$ 
```

Tail

The command “tail” prints the last N rows of data of the given input or file. By default, it prints the last 10 lines of the specified files.

Syntax: tail -n File_name

```
vesit510-04@vesit510-04:~/Desktop
File Edit View Search Terminal Help
vesit510-04@vesit510-04:~/Desktop$ tail EXP

Winsol - Best Legal Winstrol Alternative
Clenbutrol - Best Legal Clenbuterol Alternative
Anvarol - Best Legal Anavar Alternative
Cutting Stack - Best for Fast and Effective Results

vesit510-04@vesit510-04:~/Desktop$ tail -4 EXP
Clenbutrol - Best Legal Clenbuterol Alternative
Anvarol - Best Legal Anavar Alternative
Cutting Stack - Best for Fast and Effective Results

vesit510-04@vesit510-04:~/Desktop$ 
```

Echo

The command “echo” used to display any expression that is passed as an argument.

Syntax: echo expression_to_be_displayed

```
vesit510-04@vesit510-04:~/Desktop$ echo AY00000
AY00000
vesit510-04@vesit510-04:~/Desktop$ 
```

Grep

The command “grep” is used to search for a text in the specified file/folder.

Syntax: grep “expression_to_be_Searched” file_name_to_search_in

```
vesit510-04@vesit510-04:~/Desktop$ grep "Legal" EXP
  Winsol - Best Legal Winstrol Alternative
  Clenbutrol - Best Legal Clenbuterol Alternative
  Anvarol - Best Legal Anavar Alternative
vesit510-04@vesit510-04:~/Desktop$
```

Conclusion: From the given experiment we learnt what is DevOps, why it is needed, what is the DevOps lifecycle and also studied various basic linux commands.