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*I confirm that I understand my coursework needs to be submitted online via my second teacher platform under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a mark of zero will be awarded.*

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## Introduction

Virtualization is a technique to merge or splitting computing resources to give one or more execution environments using technique like division of hardware and software,

machine simulation, mirroring and other (Rodríguez-Haro, et al.). It is the developing technology in the IT world. Majority of the IT company are using this technology to solidify their work load. Virtualization in computer system means creating a virtual instance of anything means it is the logical division of the resources of the system.

### i) Virtualization

A hypervisor is one of many virtualization techniques which allow multiple operating systems, termed guests, to run concurrently on a host computer (Li, 2010). An

operating

system on virtual machine is called a guest OS. Virtualization enables users to run multiple virtual machines on a single machine maximizing the use of hardware. Use of

virtualization technique is actually cost effective because it reduces the extra system.

At

last virtualization is enhancing the resources effectively, flexibility, security and cost-effective.

### ii) Containerization

In alternate to virtualization we can containerization platform like Docker. It is simply operating system for different containers. Docker provides you a platform that enables software to run in its own. Docker does not need a separate OS instance for each container so it is light weight. Docker let developer to ship code faster in standardize way by improving resource utilization.

Kali Linux:-

Kali Linux is a version of the Linux made for testing the security of systems. Before it was called Backtrack, which combined three older Linux systems: IWHAX, WHOPPIX, and Auditor. Backtrack was very popular at that time. Kali Linux officially

launched on March 12, 2013, as a new and improved version. Within just five days, over 90,000 people had downloaded it (allen, et al., 2014).

#### Features of Kali Linux:

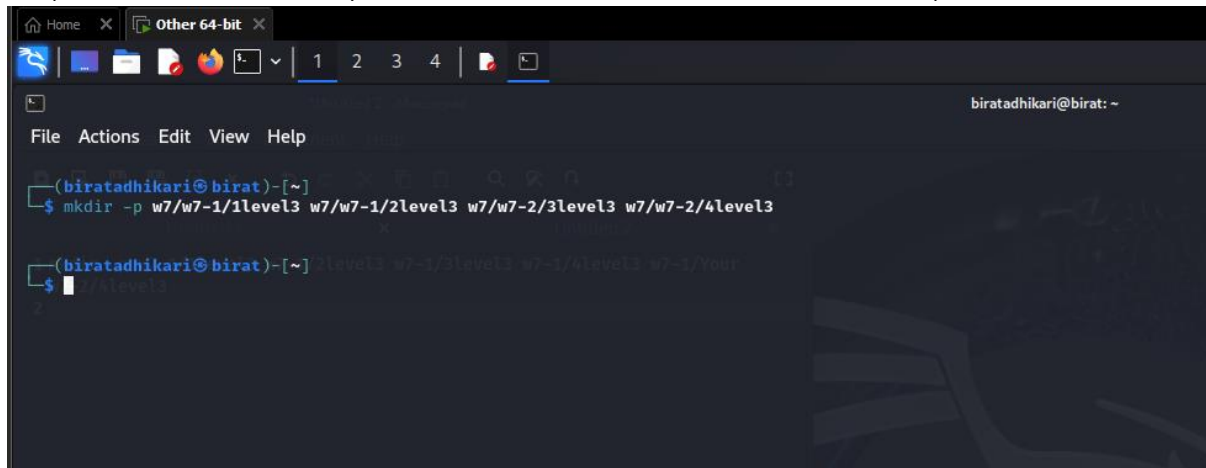
- Built on Debian: It's based on the Debian Linux system.
- Lots of Tools: It has more than 300 tools for security testing.
- Supports Wireless Devices: Works well with many wireless cards.
- Special Kernel: Includes a kernel that allows packet injection.
- Secure Software: All its software is signed for security.
- Customizable: Users can change it to fit their needs.
- Supports ARM Devices: Works on devices like Raspberry Pi.

## Objective:

The objective of this workshop is to practice using UNIX utilities for managing directories, files, and permissions, including creating, navigating, copying, moving, and modifying access permission.

## Steps to replicate:

Step 1: Create a directory with mkdir command and other relative path

A screenshot of a terminal window titled "Other 64-bit". The terminal shows the user "biratadhikari@birat: ~" and the command `mkdir -p w7/w7-1/1level3 w7/w7-1/2level3 w7/w7-2/3level3 w7/w7-2/4level3` being executed. The prompt `(biratadhikari@birat)-[~]` is visible above the command. The terminal has a dark background with a faint, stylized image of a person's face in the background.

```
(biratadhikari@birat)-[~]  
$ mkdir -p w7/w7-1/1level3 w7/w7-1/2level3 w7/w7-2/3level3 w7/w7-2/4level3  
  
(biratadhikari@birat)-[~] 2level3 w7-1/3level3 w7-1/4level3 w7-1/Your  
$
```

*Figure 1:directory structure creation*

Step 2: changing directories using relative pathnames, including navigating between parent and child directories by "." and "..".

A screenshot of a terminal window showing the user "biratadhikari@birat" and the command `cd w7/w7-1/1level3` being executed. The prompt `(biratadhikari@birat)-[~] 2level3 w7-1/3level3` is visible above the command. The terminal has a dark background with a faint, stylized image of a person's face in the background.

```
(biratadhikari@birat)-[~] 2level3 w7-1/3level3  
$ cd w7/w7-1/1level3
```

*Figure 2: changing directories*

Step 3: creating, copying and moving files with in different directories

```
$ cd ../../w7-2/4level3
(biratadhikari@birat)-[~/w7/w7-2/4level3]
$ cd ../../w7-1/1level3
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ cat>file
weroiyg
^C
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ cp file file1
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ ls
file file1
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ cp file ../2level3
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ ls ../2level3
file
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$
```

Figure 3: creating a file and merging it

```
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ ls ../../w7-2/4level3
file
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ ls
file1
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$
```

Figure 4: moving file to 4level3



## Step 4: Displaying Information

```
File Actions Edit View Help
(biratadhikari@birat)-[~/w7/w7-1/1level3]
$ echo "Hello! I can do it"
echo "5 > (20: 8) < (30 * 2)"
echo -e "Line 1\nLine 2"
echo "a-b, A-B, -, +, <, >, #, $, %, &." 1/3level3 w7-1/4level3
w7-2/6level3
Hello! I can do it
5 > (20: 8) < (30 * 2)
Line 1
Line 2
a-b, A-B, -, +, <, >, #, $, %, &.

(biratadhikari@birat)-[~/w7/w7-1/1level3]
$
```

Figure 5:display information

Step 5: Listing Directory Contents by man ls command and we can select our required one:

```
File Actions Edit View Help
ls(1) User Commands
NAME
ls - list directory contents
SYNOPSIS
ls [OPTION]... [FILE]...
DESCRIPTION
List information about the FILES (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.
Mandatory arguments to long options are mandatory for short options too.
-a, --all
do not ignore entries starting with .
-A, --almost-all
do not list implied . and ..
--author
with -l, print the author of each file
-b, --escape
print C-style escapes for nongraphic characters
--block-size=SIZE
with -l, scale sizes by SIZE when printing them; e.g., '--block-size=M'; see SIZE format below
-B, --ignore-backups
do not list implied entries ending with ~
-c
with -lt: sort by, and show, ctime (time of last change of file status information); with -l: show ctime and sort by name; otherwise: sort by ctime, newest first
-C
list entries by columns
--color[=WHEN]
color the output WHEN; more info below
-d, --directory
list directories themselves, not their contents
-D, --dired
generate output designed for Emacs' dired mode
-f
list all entries in directory order
-F, --classify[=WHEN]
append indicator (one of */=>@|) to entries WHEN
Manual page ls(1) line 1 (press h for help or q to quit)
```

Figure 6: listing directory contents

## Step 8: Manage file permissions

```
$ cd ..  
  
(biratadhikari@birat)-[~/w7/w7-1]  
$ ls -l 1level3/  
total 4  
-rw-rw-r-- 1 biratadhikari biratadhikari 9 Dec 21 07:00 file1  
  
(biratadhikari@birat)-[~/w7/w7-1]  
$ chmod -rw 1level3/file1  
  
(biratadhikari@birat)-[~/w7/w7-1]  
$ chmod -rw 1level  
chmod: cannot access '1level': No such file or directory  
  
(biratadhikari@birat)-[~/w7/w7-1]  
$
```

Figure 7: file permissions

```
(biratadhikari@birat)-[~/w7/w7-1]  
$ cat 1level3/file1  
cat: 1level3/file1: Permission denied  
  
(biratadhikari@birat)-[~/w7/w7-1]  
$
```

Figure 8: checking readable access

```
(biratadhikari@birat)-[~/w7/w7-1]  
$ cat>>1level3/file1  
zsh: permission denied: 1level3/file1  
  
(biratadhikari@birat)-[~/w7/w7-1]  
$
```

Figure 9: checking append access

## Step 9: file and directory access

```
(biratadhikari@birat)-[~/w7/w7-1]
$ chmod u+rwx 1level3/file1

(biratadhikari@birat)-[~/w7/w7-1]
$ las -l 1level3
Command 'las' not found, did you mean:
command 'as' from deb binutils
command 'als' from deb atool
command 'ls' from deb coreutils
command 'kas' from deb kas
command 'lvs' from deb lvm2
command 'lrs' from deb lrslib
command 'last' from deb wtmpdb
command 'les' from deb atm-tools
command 'laps' from deb epix
command 'cas' from deb amule-utils
Try: sudo apt install <deb name>

(biratadhikari@birat)-[~/w7/w7-1]
$ ls -l 1level3/
total 4
-rw-rw-r-- 1 biratadhikari biratadhikari 9 Dec 21 07:00 file1

(biratadhikari@birat)-[~/w7/w7-1]
$
```

Figure 9: access files and directory

```
(biratadhikari@birat)-[~/w7/w7-1]
$ cat >> 1level3/file1
this ois my second file
^N
dfg

^\\zsh: quit      cat >> 1level3/file1

(biratadhikari@birat)-[~/w7/w7-1]
$
```

Figure 10: verifying the access

```
(biratadhikari@birat)-[~/w7/w7-1]
$ la -l
total 8
drwxrwxr-x 2 biratadhikari biratadhikari 4096 Dec 21 07:07 1level3
drwxrwxr-x 2 biratadhikari biratadhikari 4096 Dec 21 07:04 2level3

(biratadhikari@birat)-[~/w7/w7-1]
$
```

Figure 11: file permission of 1level3

```
(biratadhikari@birat)-[~/w7/w7-1]
$ chmod -rwx 1level3

(biratadhikari@birat)-[~/w7/w7-1]
$ ls -l
total 8
d----- 2 biratadhikari biratadhikari 4096 Dec 21 07:07 1level3
drwxrwxr-x 2 biratadhikari biratadhikari 4096 Dec 21 07:04 2level3

(biratadhikari@birat)-[~/w7/w7-1]
$
```

Figure 12:removing all access permission of 1level3

```
(biratadhikari@birat)-[~/w7/w7-1]
$ chmod u+rwx 1level3

(biratadhikari@birat)-[~/w7/w7-1]
$ ls -l
total 8
drwx----- 2 biratadhikari biratadhikari 4096 Dec 21 07:07 1level3
drwxrwxr-x 2 biratadhikari biratadhikari 4096 Dec 21 07:04 2level3

(biratadhikari@birat)-[~/w7/w7-1]
$
```

Figure 13:adding read, write execute permissions

## References

Rodríguez-Haro, F., Freitag, F., Navarro, L., Hernández-sánchez, E., Farías-Mendoza,

N., Guerrero-Ibáñez, J.A. and González-Potes, A., 2012. A summary of virtualization techniques. *Procedia Technology*, 3, pp.267-272.

Allen, L., Heriyanto, T. and Ali, S., 2014. *Kali Linux—Assuring security by penetration testing*. Packt Publishing Ltd.