Kali Linux Overview

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Kali Linux (formerly known as BackTrack Linux) is an open-source, Debian-based Linux distribution aimed at advanced Penetration Testing and Security Auditing. Kali Linux contains several hundred tools targeted towards various information security tasks, such as Penetration Testing, Security Research, Computer Forensics and Reverse Engineering. Kali Linux is a multi platform solution, accessible and freely available to information security professionals and hobbyists.

The official website of Kali Linux is Kali.org. It gained its popularity when it was practically used in Mr. Robot Series.

If you are interested in penetration testing or cybersecurity stuff you need some specific tools to perform some tasks which come pre-installed and settled up in Kali Linux so you may directly use them without doing any configuration. Or in case if one wants to check the vulnerabilities on a website or want to know security-related bugs in any application then it is great to go with Kali Linux.

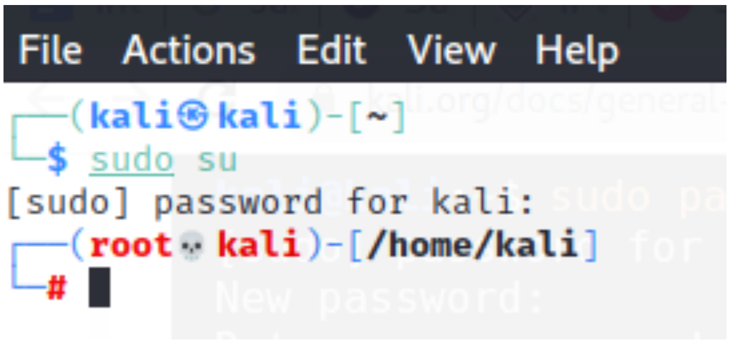
Sudo Overview

Sudo Overview

Whenever a user tries to install, remove, or change any piece of software, they must have the root/ administrative privileges to perform such tasks.

When it comes to working with Linux, there are two ways to run administrative applications. You can either change over to the super user, also known as the root account, using the “su” command, or you can use the “sudo” command.

The Unix command su, stands for “substitute user,” “super user,” or “switch user,” and allows you to log in as root and do whatever you want with the system.



```
┌──(kali㉿kali)-[~]
└─$ sudo su
[sudo] password for kali:
┌──(root💀kali)-[/home/kali]
└─# 
```

Sudo stands for either "substitute user do" or "super user do" and it allows you to temporarily elevate your current user account to have root privileges. This is different from “su” which is not temporary.

With “sudo,” you continue to use your user account, but with root privilege, whereas in “su,” you are actually logged into the root account. Also, the root privilege in “sudo” is only valid for a finite time. Once that time expires, you have to enter your password again to regain root privilege.

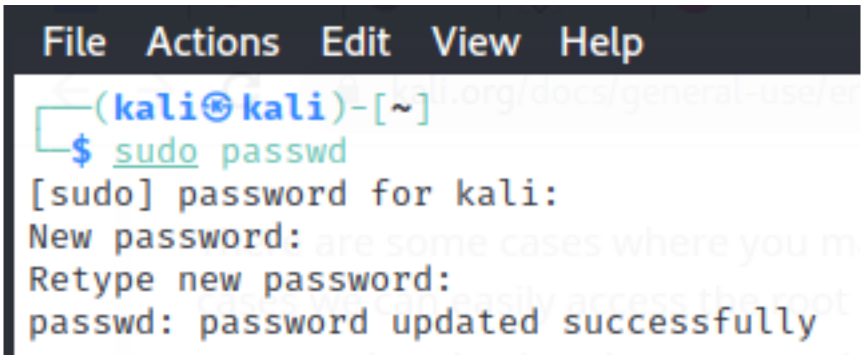
Having root user privileges can be dangerous, but using sudo instead of su can help you keep your system more secure.
Sudo - super user do; elevated privileges

sudo su -   -sudo switch user to root to run a particular instance

Access denied: try running sudo
Root

Navigating the File System

sudo passwd- Set a root password which should be different from the current user's



```
┌──(kali㉿kali)-[~]
└─$ sudo passwd
[sudo] password for kali:
New password:
Retype new password:
passwd: password updated successfully
```

Here is a list of basic Linux commands:

1**. pwd command**
Use the pwd command to find out the path of the current working directory (folder) you're in. The command will return an absolute (full) path, which is basically a path of all the directories that starts with a forward slash (/). An example of an absolute path is /home/username.

2. **cd command**
To navigate through the Linux files and directories, use the cd command. It requires either the full path or the name of the directory, depending on the current working directory that you're in.
Let's say you're in /home/username/Documents and you want to go to Photos, a subdirectory of Documents. To do so, simply type the following command: cd Photos.
Another scenario is if you want to switch to a completely new directory, for example,/home/username/Movies. In this case, you have to type cd followed by the directory's absolute path: cd /home/username/Movies.
There are some shortcuts to help you navigate quickly:
• cd .. (with two dots) to move one directory up
• cd to go straight to the home folder
• cd- (with a hyphen) to move to your previous directory

On a side note, Linux's shell is case sensitive. So, you have to type the name's directory exactly as it is.

3. **ls command**
The ls command is used to view the contents of a directory. By default, this command will display the contents of your current working directory.
If you want to see the content of other directories, type ls and then the directory's path. For example, enter ls /home/username/Documents to view the content of Documents.
There are variations you can use with the ls command:
◇ ls -R will list all the files in the sub-directories as well
◇ ls -a will show the hidden files
◇ ls -al will list the files and directories with detailed information like the permissions, size, owner, etc.

4. **cat command**
cat (short for concatenate) is one of the most frequently used commands in Linux. It is used to list the contents of a file on the standard output (sdout). To run this command, type cat followed by the file's name and its extension. For instance: cat file.txt.
Here are other ways to use the cat command:
◇ cat > filename creates a new file
◇ cat filename1 filename2>filename3 joins two files (1 and 2) and stores the output of them in a new file (3)
◇ to convert a file to upper or lower case use, cat filename | tr a-z A-Z >output.txt

5. **cp command**
Use the cp command to copy files from the current directory to a different directory. For instance, the command cp scenery.jpg /home/username/Pictures would create a copy of scenery.jpg (from your current directory) into the Pictures directory.

6. **mv command**
The primary use of the mv command is to move files, although it can also be used to rename files. The arguments in mv are similar to the cp command. You need to type mv, the file's name, and the destination's directory. For example: mv file.txt /home/username/Documents.
To rename files, the Linux command is mv oldname.ext newname.ext

7. **mkdir command**
Use mkdir command to make a new directory — if you type mkdir Music it will create a directory called Music.
There are extra mkdir commands as well:
◇ To generate a new directory inside another directory, use this Linux basic command mkdir Music/ Newfile
◇ use the p (parents) option to create a directory in between two existing directories. For example, mkdir -p Music/2020/Newfile will create the new "2020" file.

8. **rmdir command**
If you need to delete a directory, use the rmdir command. However, rmdir only allows you to delete empty directories.

9. **rm command**
The rm command is used to delete directories and the contents within them. If you only want to delete the directory — as an alternative to rmdir — use rm -r.
Note: Be very careful with this command and double-check which directory you are in. This will delete everything and there is no undo.

10. **touch command**
The touch command allows you to create a blank new file through the Linux command line. As an example, enter touch /home/username/Documents/Web.html to create an HTML file entitled Web under the Documents directory.

11. **locate command**
You can use this command to locate a file, just like the search command in Windows. What's more, using the -i argument along with this command will make it case-insensitive, so you can search for a file even if you don't remember its exact name.
To search for a file that contains two or more words, use an asterisk (*). For example, locate -i school*note command will search for any file that contains the word "school" and "note", whether it is uppercase or lowercase.

12. **find command**
Similar to the locate command, using find also searches for files and directories. The difference is, you use the find command to locate files within a given directory.
As an example, find /home/ -name notes.txt command will search for a file called notes.txt within the home directory and its subdirectories.
Other variations when using the find are:
◇ To find files in the current directory use, find . -name notes.txt
◇ To look for directories use, / -type d -name notes. txt

13. **grep command**
Another basic Linux command that is undoubtedly helpful for everyday use is grep. It lets you search through all the text in a given file.
To illustrate, grep blue notepad.txt will search for the word blue in the notepad file. Lines that contain the searched word will be displayed fully.

14. **sudo command**
Short for “SuperUser Do”, this command enables you to perform tasks that require administrative or root permissions. However, it is not advisable to use this command for daily use because it might be easy for an error to occur if you did something wrong.

15.**df command**
Use df command to get a report on the system’s disk space usage, shown in percentage and KBs. If you want to see the report in megabytes, type df -m.

16. **du command**
If you want to check how much space a file or a directory takes, the du (Disk Usage) command is the answer. However, the disk usage summary will show disk block numbers instead of the usual size format. If you want to see it in bytes, kilobytes, and megabytes, add the -h argument to the command line.

17. **head command**
The head command is used to view the first lines of any text file. By default, it will show the first ten lines, but you can change this number to your liking. For example, if you only want to show the first five lines, type head -n 5 filename.ext.

18. **tail command**
This one has a similar function to the head command, but instead of showing the first lines, the tail command will display the last ten lines of a text file. For example, tail -n filename.ext.

19. **diff command**
Short for difference, the diff command compares the contents of two files line by line. After analyzing the files, it will output the lines that do not match. Programmers often use this command when they need to make program alterations instead of rewriting the entire source code.
The simplest form of this command is diff file1.ext file2.ext

20. **tar command**
The tar command is the most used command to archive multiple files into a tarball — a common Linux file format that is similar to zip format, with compression being optional.
This command is quite complex with a long list of functions such as adding new files into an existing archive, listing the content of an archive, extracting the content from an archive, and many more. Check out some practical examples to know more about other functions.

21. **chmod command**
chmod is another Linux command, used to change the read, write, and execute permissions of files and directories.

22. **chown command**
In Linux, all files are owned by a specific user. The chown command enables you to change or transfer the ownership of a file to the specified username. For instance, chown linuxuser2 file.ext will make linuxuser2 as the owner of the file.ext.

23. **jobs command**
jobs command will display all current jobs along with their statuses. A job is basically a process that is started by the shell.

24. **kill command**
If you have an unresponsive program, you can terminate it manually by using the kill command. It will send a certain signal to the misbehaving app and instructs the app to terminate itself.
There is a total of sixty-four signals that you can use, but people usually only use two signals:
◇ SIGTERM (15) — requests a program to stop running and gives it some time to save all of its progress. If you don't specify the signal when entering the kill command, this signal will be used.
◇ SIGKILL (9) — forces programs to stop immediately. Unsaved progress will be lost.

Besides knowing the signals, you also need to know the process identification number (PID) of the program you want to kill. If you don't know the PID, simply run the command ps ux.
After knowing what signal you want to use and the PID of the program, enter the following syntax:
kill [signal option] PID.

25. **ping command**
Use the ping command to check your connectivity status to a server. For example, by simply entering ping google.com, the command will check whether you're able to connect to Google and also measure the response time.

26**. wget command**
The Linux command line is super useful — you can even download files from the internet with the help of the wget command. To do so, simply type wget followed by the download link.

27. **uname command**
The uname command, short for Unix Name, will print detailed information about your Linux system like the machine name, operating system, kernel, and so on.

28. **top command**
As a terminal equivalent to Task Manager in Windows, the top command will display a list of running processes and how much CPU each process uses. It's very useful to monitor system resource usage, especially knowing which process needs to be terminated because it consumes too many resources.

29. **history command**
When you've been using Linux for a certain period of time, you'll quickly notice that you can run hundreds of commands every day. As such, running history command is particularly useful if you want to review the commands you've entered before.

30. **man command**
Confused about the function of certain Linux commands? Don't worry, you can easily learn how to use them right from Linux's shell by using the man command. For instance, entering man tail will show the manual instruction of the tail command.

31. **echo command**
This command is used to move some data into a file. For example, if you want to add the text, "Hello, my name is John" into a file called name.txt, you would type echo Hello, my name is John >> name.txt

32. **zip, unzip command**

Use the zip command to compress your files into a zip archive, and use the unzip command to extract the zipped files from a zip archive.

33. **hostname command**
If you want to know the name of your host/network simply type hostname. Adding a -i to the end will display the IP address of your network.

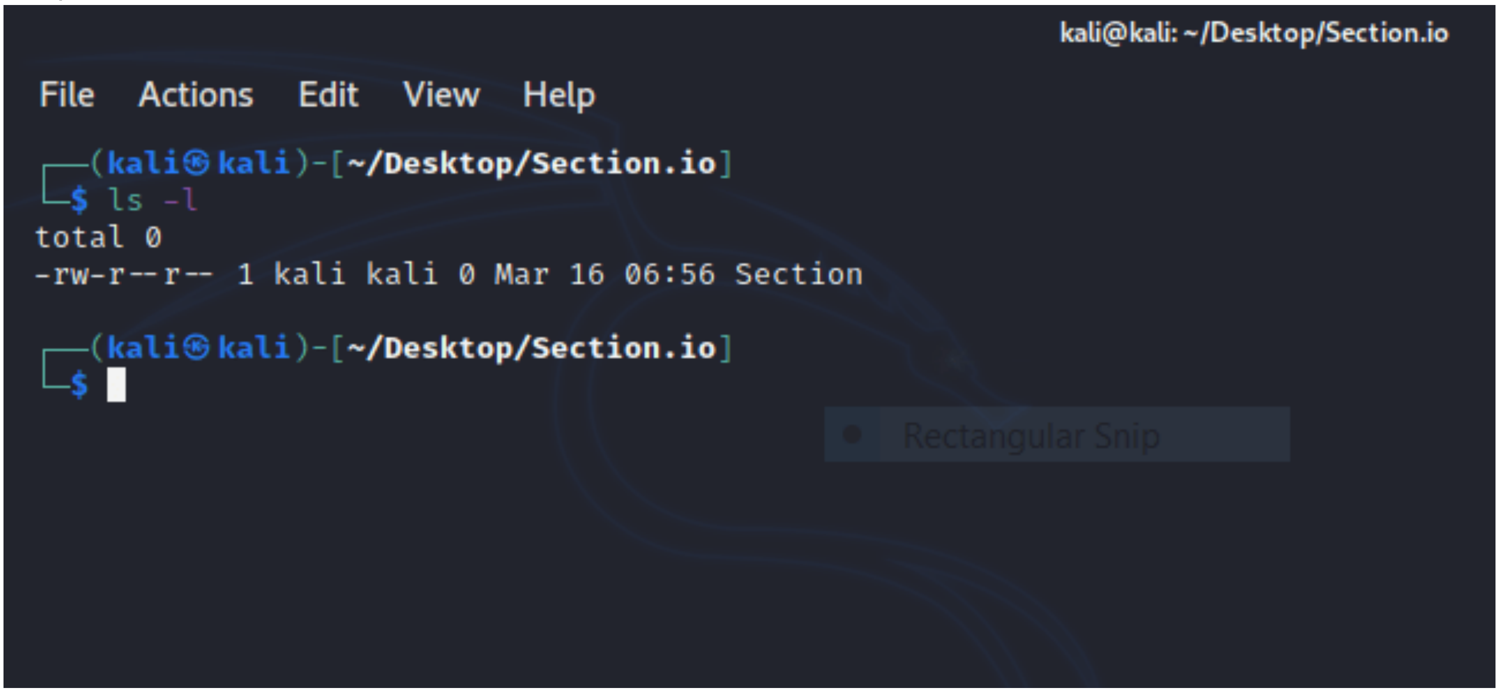
34. **useradd, userdel command**
Since Linux is a multi-user system, this means more than one person can interact with the same system at the same time. useradd is used to create a new user, while passwd is adding a password to that user's account. To add a new person named John type, useradd John and then to add his password type, passwd 123456789.
To remove a user is very similar to adding a new user. To delete the users account type, userdel UserName

Users and Privileges

To create a secure environment in Linux, you need to learn about user groups and permissions. For example, if you work in a company and you want the finance department to read a file but not make any modification to it, then you need to use permissions in Linux.

File permissions
Let's start by talking about the ownership of Linux files.
1. User: the owner of the file (person who created the file).
2. Group: the group can contain multiple users. Therefore, all users in that group will have the same permissions. It makes things easier than assign permission for every user you want.
3. Other: any person has access to that file, that person has neither created the file, nor are they in any group which has access to that file.

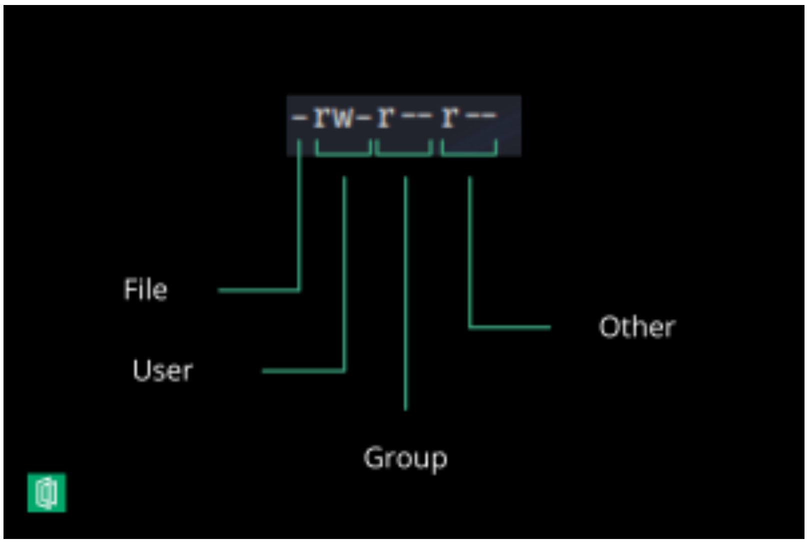
Command: ls -l
Output



```
┌──(kali㉿kali)-[~/Desktop/Section.io]
└─$ ls -l
total 0
-rw-r--r-- 1 kali kali 0 Mar 16 06:56 Section

┌──(kali㉿kali)-[~/Desktop/Section.io]
└─$ 
```

The characters mean:
• ‘r’ = read.
• ‘w’ = write.
• ‘x’ = execute.
• ‘-’ = no permission.



The empty first part means that it is a file. If it were a directory then it will be the letter “d” instead. The second part means that the user “Home” has read and write permissions but he does not have the execute one. The group and others have only the read permission.

Command: chmod o+w section.txt
This command will add the write permission for other users to my text file “section.txt”.
Now if you try to execute ls -l then you will see -rw-r--rw-.
“o” refers to others, “g” for the group, “u” for the user, and “a” for all.

Command: chmod u+x section.txt
The permissions will be -rwxr--rw-.
If you want to remove the permission, you can use the same method but with “-” instead of “+”. For example, let’s remove the execute permission from the user by: chmod u-x section.txt

And the permissions now are: -rw-r--rw-.

Also, you can use Symbolic Mode to modify permissions like the following:

Number	**Permission**
0	No permission
1	Execute
2	Write
3	Execute and Write
4	Read

Number	Permission
5	Read and Execute
6	Read and Write
7	Read, Write and Execute

For example, let's give every permission for all with:
chmod 777 section.txt

User accounts

Create a user
We can create a new user account by issuing the following command:
sudo useradd testuser

We can make sure that the user has been created in two ways:
1. id testuser .
And the output will be something like this:
uid=1007(testuser) gid=1009(testuser) groups=1009(testuser)

This will show the user id and the groups that the user is currently in, usually, a new group with the same username is assigned to the user.

1. By opening the following file: /etc/passwd.
So we can issue cat /etc/passwd and we will see the new user that has been created.
After creating the user using the command above, you notice that no user directories have been created inside /home directory, which is not good since the user cannot log in to his account.
To create a new user with its directories, we can issue:
sudo useradd -m -s /bin/bash testuser

If you navigate to the /home directory, you notice that a new directory with the name testuser is created.
Afterwards, you need to set a new password to the testuser by:
sudo passwd testuser

We noticed that creating a new user takes a lot of commands to accomplish, so there is a command that automates everything:
sudo adduser testuser

After creating a new user and setting a password to it, you can log in in two ways:
1. Through GUI.
2. By the terminal: su - testuser.

Delete a user
Like the process of adding users, there are two commands that delete a user.
sudo userdel testuser

If you try that command, you will notice that the user directory has not been deleted and you need to delete it by yourself.
You can use this automated command to do everything for you:

```
sudo deluser --remove-home testuser
```

User groups

A group is a collection of users. The primary purpose of the groups is to define a set of privileges like read, write, or execute permission for a given resource that can be shared among the users within the group.

Create a group

You can see all of the groups you have by opening the following file:

```
cat /etc/group
```

Let’s create a group with the name of section by:

```
sudo groupadd section
```

Add user to a group

We will add the testuser user to the section group by:

```
sudo usermod -aG section testuser
```

Delete user from a group

You can delete the testuser from the group with:

```
sudo gpasswd -d testuser section
```

Delete a group

Let’s delete the previous group by:

```
sudo groupdel section
```

Conclusion

Linux is one of the most secure systems because it allows an admin to create multiple users with different permissions in the same hardware.