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Batch: 03

EXPERMINT: 02

●**Aim: Use basic networking commands in Linux (ping, tracert, nslookup, netstat, ARP, RARP, ip, ifconfig, dig, and route)**

●**Theory:**

❖ **What Is Linux**

Linux is an open-source operating system like other operating systems such as Microsoft Windows, Apple Mac OS, iOS, Google android, etc. An operating system is a software that enables the communication between computer hardware and software.

It conveys input to get processed by the processor and brings output to the hardware to display it. This is the basic function of an operating system. Although it performs many other important tasks, let's not talk about that.

❖ **Structure of a Linux System:**

It consists of three parts.

i. UNIX kernel
ii. Shells
iii. Tools and Applications

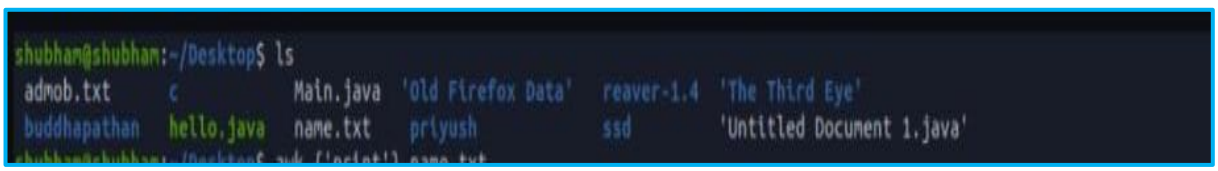
❖ **Linux command:**

The Linux command is a utility of the Linux operating system. All basic and advanced tasks can be done by executing commands. The commands are executed on the Linux terminal. The terminal is a command-line interface to interact with the system, which is similar to the command prompt in the Windows OS.

1) ls:

The ls is the list command in Linux. It will show the full list or content of your directory. Just type ls and press the enter key. The whole content will be shown.

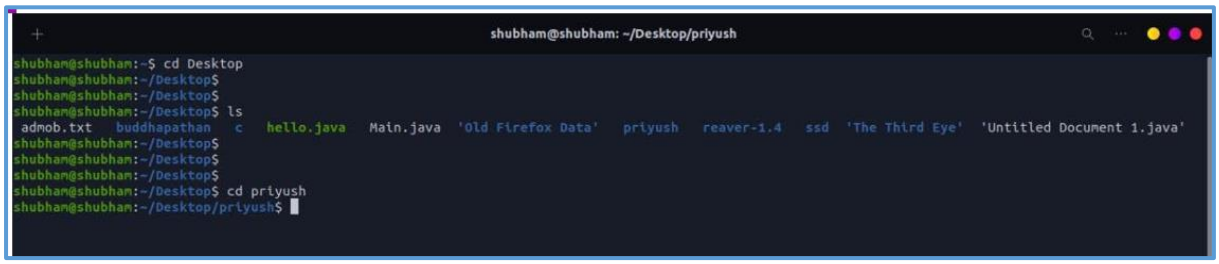
Syntax: ls



2) cd:

Linux **cd** command is used to change the current working directory (i.e., in which the current user is working). The "cd" stands for '**change directory**.' It is one of the most frequently used commands in the Linux terminal.

Syntax: cd **<dirname>**



3) mkdir:

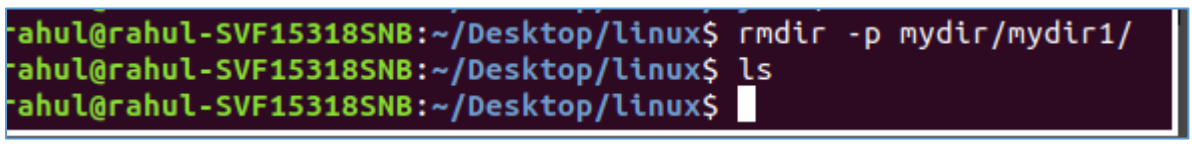
The mkdir stands for 'make directory'. With the help of mkdir command, you can create a new directory wherever you want in your system. Just type **"mkdir <dir name>**, in place of <dir name> type the name of new directory, you want to create and then press enter.

Syntax: mkdir **<dirname>**

4) rmdir:

rmdir command is used remove empty directories from the file system in Linux. The rmdir command removes each and every directory specified in the command line only if these directories are empty. So if the specified directory has some directories or files in it then this cannot be removed by rmdir command.

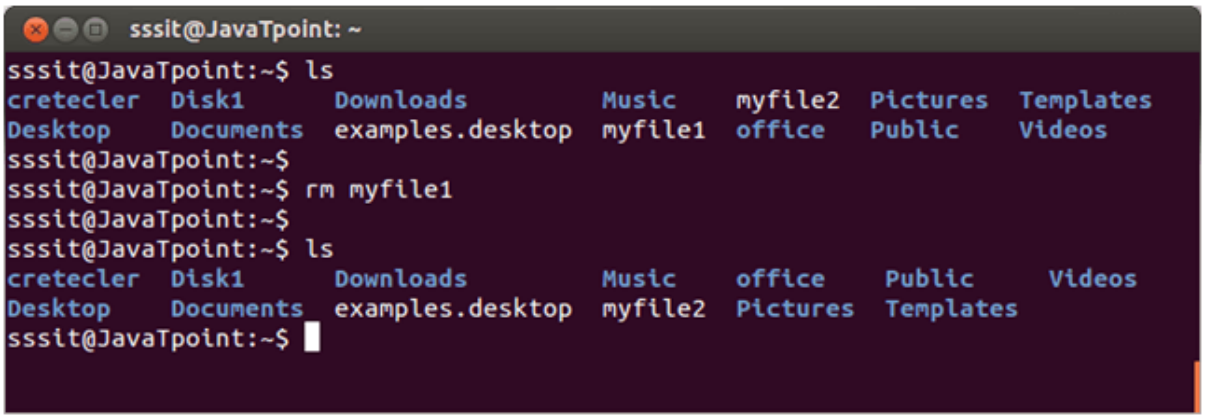
Syntax: rmdir **<dirname>**



5) rm:

rm stands for remove here. rm command is used to remove objects such as files, directories, symbolic links and so on from the file system like UNIX.

Syntax: rm **<dirname>**



6) Man:

man command in Linux is used to display the user manual of any command that we can run on the terminal. It provides a detailed view of the command which includes NAME, SYNOPSIS, DESCRIPTION, OPTIONS, EXIT STATUS, RETURN VALUES, ERRORS, FILES, VERSIONS, EXAMPLES, AUTHORS and SEE ALSO.

Every manual is divided into the following sections:

- Executable programs or shell commands
- System calls (functions provided by the kernel)
- Library calls (functions within program libraries
- Games
- Special files (usually found in /dev)
- File formats and conventions eg /etc/passwd

Syntax: man

7) Touch:

It is used to create a file without any content. The file created using touch command is empty. The touch command is used to create a file in current working directory.

Syntax: touch <filename>

8) Cp:

cp stands for copy. This command is used to copy files or group of files or directory. It creates an exact image of a file on a disk with different file name.

Syntax: cp <filename1 to filename 2>

9) mv:

This command is used to move a file from one location to other, that is from one directory to other.

Syntax: mv <filename1 to filename 2>

10) pwd:

pwd‘ stands for ‘Print Working Directory‘. As the name states, command ‘pwd‘ prints the current working directory or simply the directory user is, at present. It prints the current directory name with the complete path starting from root (/).

Syntax: pwd

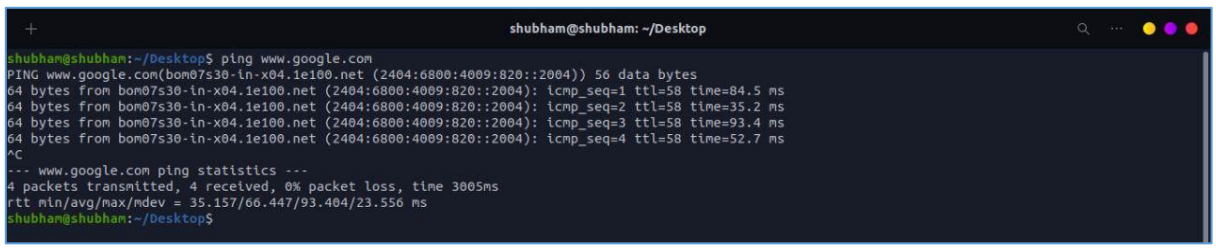
❖ **Basic networking commands:**

“A computer network is a set of devices connected through links. A node can be computer, printer, or any other device capable of sending or receiving the data. The links connecting the nodes are known as communication channels.”

1) ping:

Ping is used to **testing** a *network host capacity to interact with another host*. Just enter the command Ping, followed by the target host’s name or IP address. The ping utilities seem to be the most common network tool. This is performed by using **the Internet Control Message Protocol** (ICMP), which allows the echo packet to be sent to the destination host and a listening mechanism.

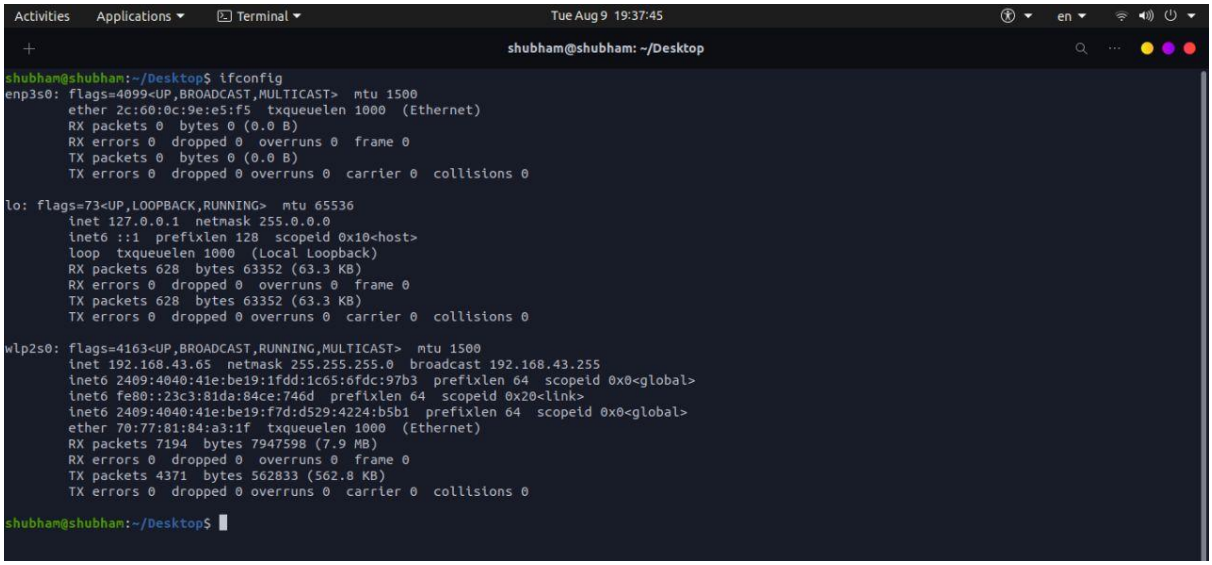
Syntax: ping **<option> <destination>**



2) ipconfig:

The command ipconfig will *display basic details about the device's IP address configuration*. Just type Ipconfig in the Windows prompt and the IP, subnet mask and default gateway that the current device will be presented. If you have to see full information, then type on command prompt config-all and then you will see full information.

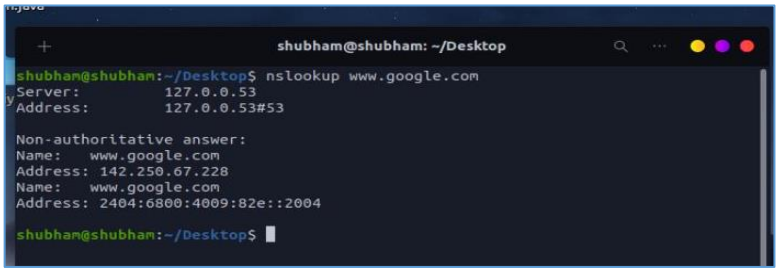
Syntax: ipconfig



3) nslookup:

nslookup command queries the DNS in order to fetch the IP address or the *domain name from DNS records.*

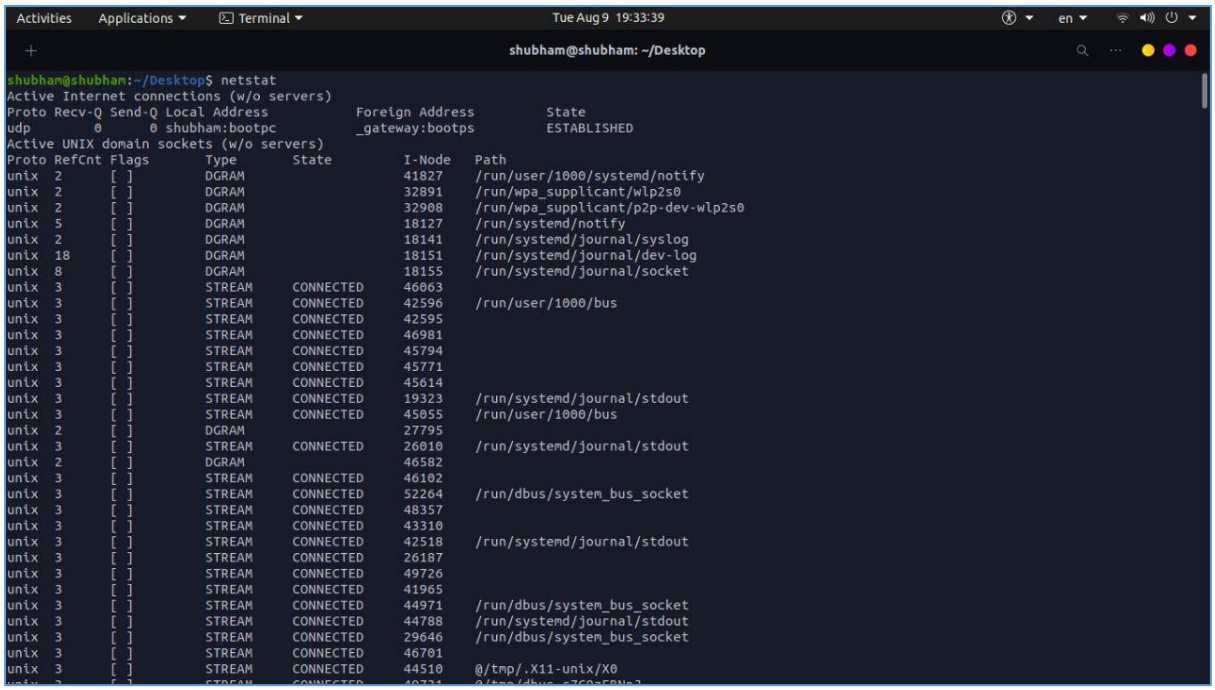
Syntax: nslookup <domainName>



4) netstat:

netstat (Network Statistics) is the command that is used to *display routing table, connection information*, the status of ports, etc. This command works with Linux Network Subsystem.

Syntax: nststat



5) arp:

To send IP packets, a computer needs two addresses. These addresses are the *MAC address and the IP address.* A MAC address is the physical or hardware address of the NIC. An IP address is the logical or software address of NIC. If a computer knows the IP address of the destination computer but it does not know the MAC address of the destination computer, it uses the ARP protocol to know the MAC address of the destination computer.

Syntax: arp

6) rarp:

rarp manipulates the kernel's RARP table in various ways. The primary options are clearing an address mapping entry and manually setting up one. For debugging purposes, the rarp program also allows a complete dump of the RARP table.

Syntax: rarp

7) Ip:

Ip command in Linux is present in the net-tools which is used for *performing several network administration tasks*. IP stands for Internet Protocol. This command is used to show or manipulate routing, devices, and tunnels.

Syntax: Ip

```
javatpoint@javatpoint-Inspiron-3542:~$ ip address show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group defaul
t qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp7s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc fq_codel state DOW
N group default qlen 1000
    link/ether 74:e6:e2:02:93:b8 brd ff:ff:ff:ff:ff:ff
3: wlp6s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP gro
up default qlen 1000
    link/ether 00:71:cc:00:e2:89 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.103/16 brd 192.168.255.255 scope global dynamic noprefixroute
 wlp6s0
       valid_lft 25210sec preferred_lft 25210sec
    inet6 2405:204:a708:91ad:200d:c1b9:1172:87c9/64 scope global temporary dynam
ic
       valid_lft 6811sec preferred_lft 2311sec
    inet6 2405:204:a708:91ad:4cb5:51da:541d:b834/64 scope global dynamic mngtmpa
ddr noprefixroute
       valid_lft 6811sec preferred_lft 2311sec
    inet6 fe80::6475:6e63:aa97:3634/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

8) route:

The route command *displays and manipulate IP* routing table for your system. A router is a device which is basically used to determine the best way to route packets to a destination.

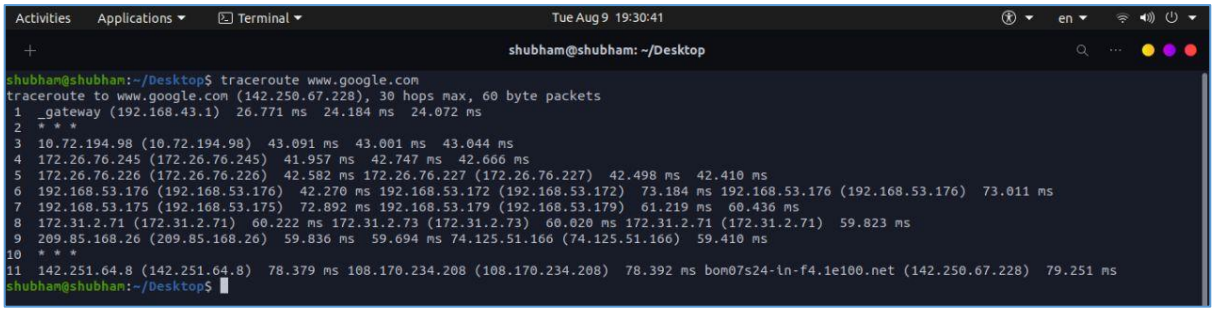
Syntax: route

```
Activities  Applications  Terminal        Tue Aug 9 19:38:14        en
                                shubham@shubham: ~/Desktop
shubham@shubham:~/Desktop$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         _gateway        0.0.0.0         UG    600    0        0 wlp2s0
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 wlp2s0
192.168.43.0    0.0.0.0         255.255.255.0   U     600    0        0 wlp2s0
shubham@shubham:~/Desktop$
```

9) tracert:

This command is used to diagnose path-related problems. On an IP network*, routers exchange IP packets* between the source and the destination. tracert command is a Command Prompt command which is used to get the network packet being sent and received and the number of hops required for that packet to reach to target.

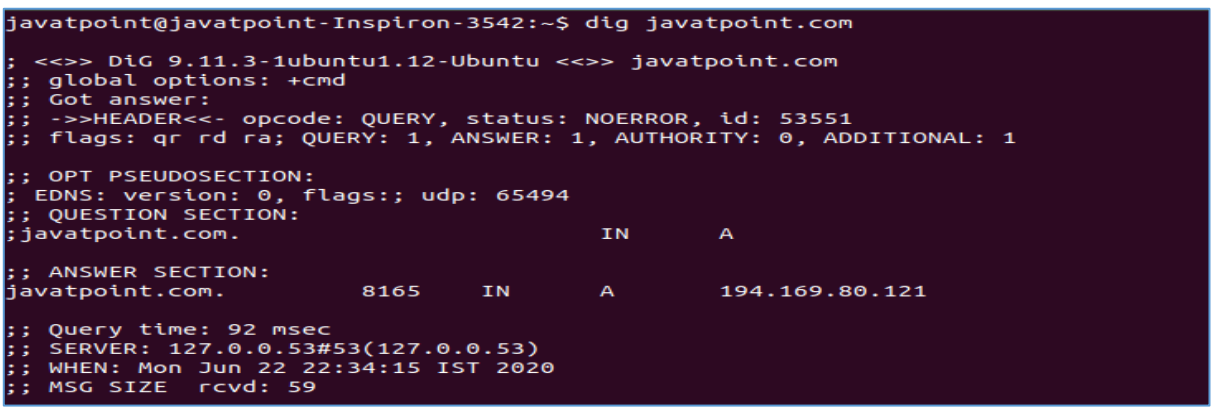
Syntax: traceroute [OPTION...] HOST



10) dig:

Linux dig command stands for Domain Information Groper. This command is used for tasks related to *DNS lookup to query DNS name* servers. It mainly deals with troubleshooting DNS related problems. It is a flexible utility for examining the DNS (Domain Name Servers). It is used to perform the DNS lookups and returns the queried answers from the name server.

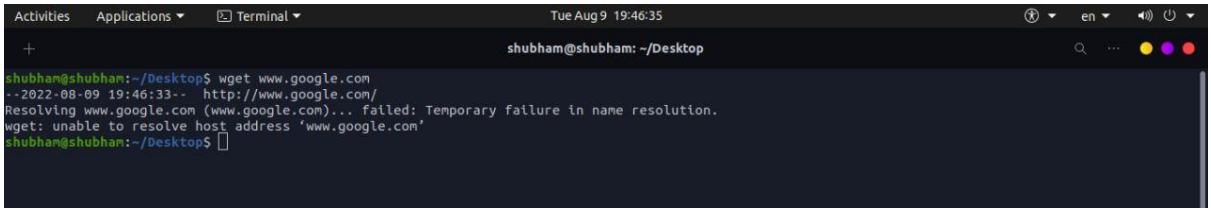
Syntax: dig [OPTION...]



11) wget :

Wget is the non-interactive network downloader which is used to download files from the server even when the user has not logged on to the system and it can work in the background without hindering the current process.

Syntax: wget <fileLink>



● **Conclusion**: Hence, we have implemented **basic as well as networking basic networking** commands in Linux (ping, tracert, nslookup, netstat, ARP, RARP, ip, ifconfig, dig, and route).