Experiment No. 3

Aim: To perform basic networking commands in Linux operating system terminal and understand their functions.

Apparatus (software): Terminal (for Ubuntu).

Details of Unix Commands:

1. hostname:

The `hostname` command helps display and change a system's hostname and domain and identifies devices within a network environment.

Syntax: `hostname [options] [name]`

2. ping:

The `ping` command is a network utility for testing whether a host is reachable. The command sends ICMP requests to a host (a computer or server) and measures the round-trip time (RTT). Pinging helps determine the network latency between two nodes and whether a network is reachable.

Syntax: `ping [options] [hostname/IP]`

3. ip:

The `ip` command is a unified networking tool for Linux systems. The ip command helps view and configure routing, interfaces, network devices, and tunnels.

Syntax: `ip [options] object [command]`

Each part of the command does the following:

- [options] are the command-line parameters that modify the command's behavior.
- object represents the available objects for configuration.
- [command] is a subcommand, an action performed on an object. The available commands differ depending on the object.

The `ip -V` prints the package and library version for the ip utility.

The `ip addr` command manages and shows network interface IP addresses.

The `ip route` command shows and configures the IP routing table. The command allows users to adjust the routing table and perform other crucial networking tasks with the routing table.

4. route:

The `route` command in Linux is a specialized command for displaying and configuring the routing table. The command modifies the kernel's IP routing tables and helps set up static routes to specific hosts or networks.

Syntax: `route [options] [subcommand] [arguments]`

5. host:

The `host` command is a simple tool for performing DNS lookups. The command resolves IP addresses into domain names and vice versa.

Syntax: `host [options] [hostname/IP]`

6. dig:

The `dig` command queries Domain Name Systems (DNS) and finds information for DNS records. The command collects domain name information and associated records.

Syntax: `dig [options] [domain] [record type] [DNS server]`

7. nslookup:

The `nslookup` command is similar to the `dig` command. The main difference between the two commands is that `nslookup` features an interactive mode. It enables diagnosing and querying DNS servers, which is helpful for network troubleshooting and DNS tasks.

Syntax: `nslookup [domain] [DNS server]`

8. netstat:

The `netstat` command (network statistics) is a networking utility that shows various networking statistics. The command provides statistics for network ports and shows port availability.

Syntax: `netstat [options]`

9. traceroute:

The `traceroute` command is a networking diagnostics tool available for Linux, macOS, and Windows. The command tracks the route that packets take to reach a destination on a TCP/IP network. It is used to discover routing issues and bottlenecks by showing a packet's intermediate hops while traveling from source to destination.

Syntax: `traceroute [options] [hostname/IP]`

10. arp:

The `arp` command shows and configures the Address Resolution Protocol (ARP) cache. The ARP protocol maps IP addresses to physical Media Access Control (MAC) addresses in a local network. The cache stores these mappings for all devices on the local network.

Syntax: `arp [options] [hostname/IP]`

Procedure:

1. Open terminal in Ubuntu operating system.
2. Type following commands with different options one by one and study the output/results. Upload the screenshots of the results in Google Classroom.
    i. hostname

ii. ping 192.168.10.1
iii. ping 192.168.0.1
iv. ping www.google.in
v. ifconfig
vi. ifcinfig -s
vii. ip -V
viii. ip addr
ix. ip route
x. route
xi. host www.google.in
xii. dig www.google.in
xiii. nslookup www.google.in
xiv. netstat
xv. traceroute www.google.in
xvi. arp

Conclusion:

Q. What is the role of networking commands?

Ans.- Networking commands are used at the terminal to get network information like the IP address of the system, MAC address, network route traversed by a packet, and the IP address of the server in which a website or URL is hosted. They can be used to configure, monitor and troubleshoot the network.