PART A

(PART A: TO BE COMPLETED BY STUDENTS)

Experiment No. 3

A.1 Aim:

Use basic networking commands in Linux

A.2 Prerequisite:

- Linux Operating System and their basic commands.

A.3 Objective:

Execution of network based commands of Linux and making use of them in configuring, finding route and IP and HW addresses of source and destination

A.4 Outcome:

After successful completion of this experiment students will be able to

- Execution of network related commands on command prompt.
- Finding and configuring the IP and HW addresses of source and destination.
- Tracing the route and Troubleshooting for NW connectivity.
- Finding the DNS, HOST and Destination machine names
- To find the Network statistics and understand the speed and the traffic on the NW.

A.5 Theory:

1. ifconfig

ifconfig (**interface configurator**) command is use to initialize an interface, assign **IP Address** to interface and **enable** or **disable** interface on demand. With this command you can view **IP Address** and **Hardware** / **MAC address** assign to interface and also **MTU** (**Maximum transmission unit**) size.

2. PING Command

PING (**Packet INternet Groper**) command is the best way to test connectivity between **two nodes**. Whether it is **Local Area Network** (**LAN**) or **Wide Area Network** (**WAN**). Ping use **ICMP** (**Internet Control Message Protocol**) to communicate to other devices. You can ping host name of **ip address**

3. TRACEROUTE Command

traceroute is a network troubleshooting utility which shows number of hops taken to reach destination also determine packets traveling path. Below we are tracing route to global **DNS server IP Address** and able to reach destination also shows path of that packet is traveling.

4. NETSTAT Command

Netstat (**Network Statistic**) command display connection info, routing table information etc.

5. DIG Command

Dig (**domain information groper**) query **DNS** related information like **A Record**, **CNAME**, **MX Record** etc. This command mainly use to troubleshoot **DNS** related query.

6. NSLOOKUP Command

nslookup command also use to find out **DNS** related query.

7. ROUTE Command

route command also shows and manipulate **ip** routing table.

8. HOST Command

host command to find name to **IP** or **IP** to name in **IPv4** or **IPv6** and also query **DNS** records.

9. ARP Command

ARP (Address Resolution Protocol) is useful to **view** / **add** the contents of the kernel's **ARP tables**..

10. HOSTNAME Command

hostname is to identify in a network. Execute **hostname** command to see the hostname of your box.

PART B

(PART B : TO BE COMPLETED BY STUDENTS)

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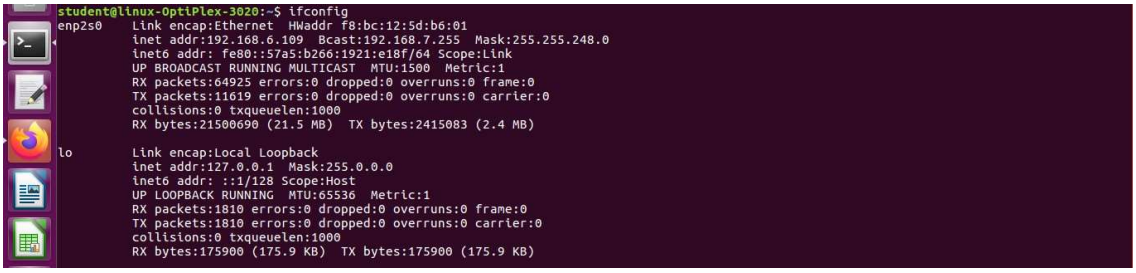
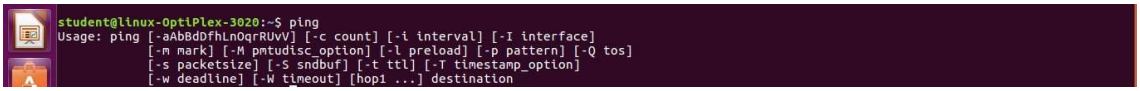
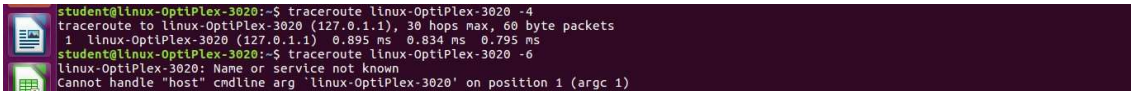
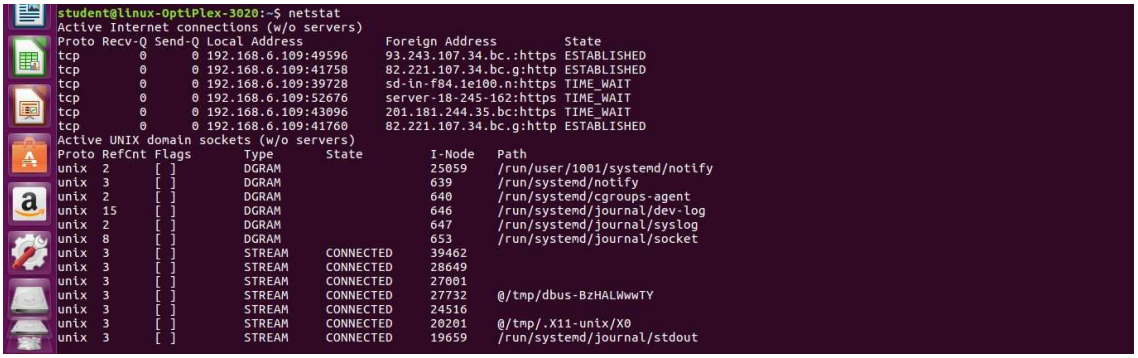
Class : T.E A	Batch : A1
Date of Experiment:	Date of Submission:
Grade :	

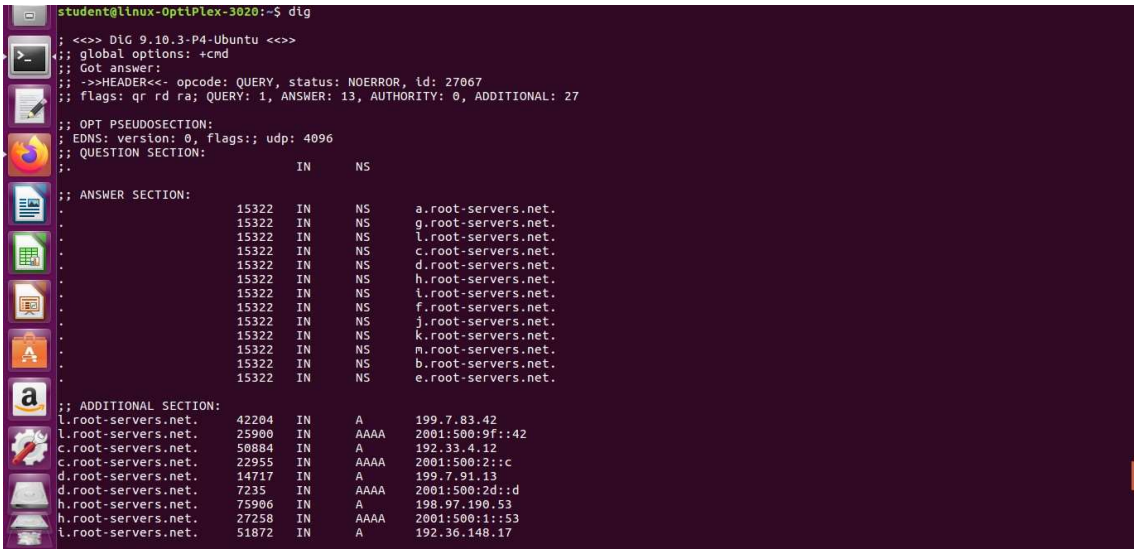
B.1 Document created by the student:

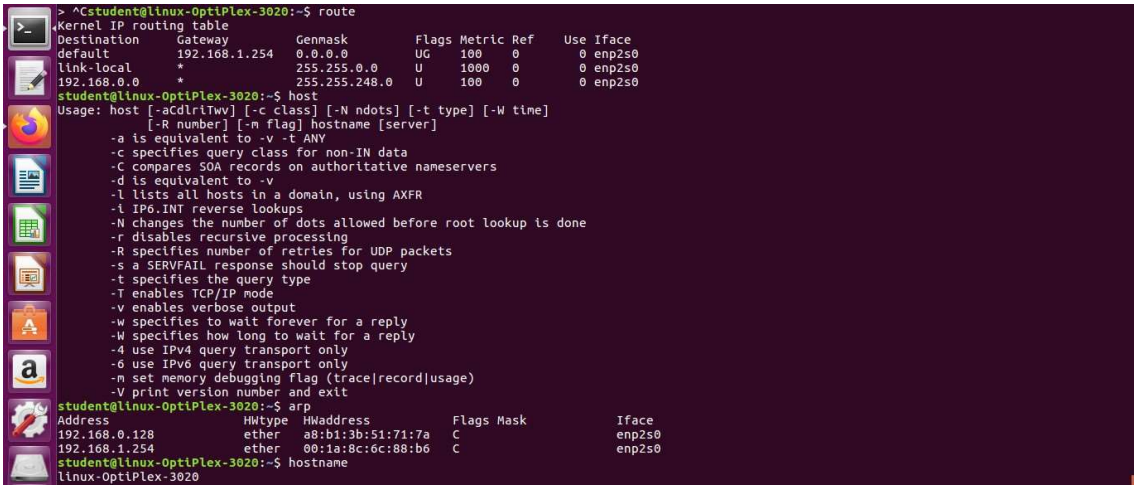












B.3 Observations and learning:

During the experiment focused on using basic networking commands in Linux, it was observed that each command plays a critical role in managing and troubleshooting network connectivity. The ifconfig command provided detailed information about network interfaces, including IP and MAC addresses, which are essential for network configuration. The ping command effectively tested the connectivity between nodes, confirming the presence or absence of network communication. The traceroute command was instrumental in revealing the path packets take to reach their destination, allowing for the identification of any potential bottlenecks in the network. The netstat command offered insights into active connections and routing tables, which are crucial for diagnosing network

performance issues. Additionally, DNS-related commands like dig, nslookup, and host proved invaluable for resolving domain names and troubleshooting DNS queries. The route command enabled the manipulation and viewing of the routing table, while arp provided visibility into the ARP table, which maps IP addresses to MAC addresses. Finally, the hostname command was used to verify the identity of the machine within the network.

B.4 Conclusion:

The successful execution of this experiment provided students with a comprehensive understanding of fundamental Linux networking commands. These commands are vital for configuring network interfaces, diagnosing connectivity issues, resolving DNS queries, and analyzing network traffic. By mastering these commands, students are better equipped to manage network configurations, troubleshoot network problems, and ensure the smooth operation of networked systems. The experiment underscored the importance of these tools in both day-to-day network administration and in-depth network analysis, making them essential skills for anyone working in network management or IT support.

B.5 Question of Curiosity

(To be answered by student based on the practical performed and learning/observations)

Q1: Which command is used to test the connectivity??

Ans. Ping: The ping command is used to test the connectivity between two devices on a network. It sends ICMP Echo Request messages to the target device and waits for a reply, allowing you to determine if the target device is reachable.

Q2: What is default Gateway?

Ans. Default Gateway: The default gateway is the device (usually a router) that routes traffic from a local network to external networks or the internet. It serves as an access point or IP router that a networked computer uses to send data to a device on another network.

Q3: What is the use of ARP?

Ans. Address Resolution Protocol (ARP): ARP is used to map an IP address to a MAC (Media Access Control) address. When a device wants to communicate with another device on the same local network, it uses ARP to discover the MAC address associated with the destination IP address.

Q4: Why class C IP addresses are assigned in an organization?

Ans. Class C IP Addresses: Class C IP addresses are commonly assigned in organizations because they provide up to 254 usable IP addresses within a

single subnet. This is ideal for small to medium-sized networks where a limited number of devices need unique IP addresses.

Q5: How do you configure the IP address of your machine?

Ans. Configuring IP Address:

Windows: You can configure the IP address by going to the Control Panel > Network and Sharing Center > Change adapter settings, right-clicking the network adapter, selecting Properties, choosing Internet Protocol Version 4 (TCP/IPv4), and then manually entering the IP address, subnet mask, and default gateway.

Linux: You can configure the IP address using the ifconfig or ip command in the terminal, or by editing network configuration files depending on the Linux distribution.

Q6: Can you change the HW address of the NIC?

Ans. Changing HW Address (MAC Address): Yes, the hardware (MAC) address of the NIC (Network Interface Card) can be changed, though this is typically done using software and is referred to as MAC address spoofing. The change is temporary and resets when the device is restarted.

Q7: Can you change the IP address of destination machine?

Ans. Changing the IP Address of the Destination Machine: Yes, you can change the IP address of the destination machine if you have access to it. This can be done by accessing the machine's network settings and manually assigning a new IP address.

Q8: What is routing table? State the importance of Routing table.

Ans. Routing Table: A routing table is a data table stored in a router or a networked device that lists the routes to particular network destinations. It includes information such as the destination IP address, the subnet mask, the gateway, and the interface. The routing table is essential because it determines the best path for data packets to travel across networks, ensuring that data reaches its intended destination efficiently.

Q9: How Netstat will help you in troubleshooting the network.

Ans. Netstat: The netstat command provides information about network connections, routing tables, interface statistics, masquerade connections, and multicast memberships. It helps in troubleshooting by allowing you to see open

ports, active connections, and listening services, which can be crucial in diagnosing network issues such as connectivity problems or unexpected network activity.

Q10: What are the function of DNS?

Ans. Domain Name System (DNS): DNS translates domain names (like www.example.com) into IP addresses (like 192.0.2.1), allowing users to access websites and other resources using easy-to-remember names instead of numerical IP addresses. DNS also supports email routing by associating domain names with mail server addresses, and it plays a role in load balancing and distributing traffic among multiple servers.