Networking Assignment using Ubuntu Net-tools Package

Objective:

The objective of this assignment is to familiarise students with basic networking commands using the `net-tools` package on Ubuntu. Students will learn how to gather information about network interfaces, configure network settings, perform ARP-related tasks, and troubleshoot basic networking issues.

Assignment Tasks:

Task 1: Installation of Net-tools Package

Open a terminal on your Ubuntu system.
Install the `net-tools` package using the following command:

sudo apt-get update

$sudo apt-get install net-tools

Verify the installation by running the command:

$ifconfig

Task 2: Basic Network Information

Use the `ifconfig` command to display information about all network interfaces on your system. Identify your system's IP address, subnet mask, and MAC address.
Use the `route` command to display the routing table. Identify the default gateway and understand the routing information.
Use the `netstat` command to display information about network connections, routing tables, interface statistics, masquerade connections, and multicast memberships.

Task 3: Interface Configuration

Use the `ifconfig` command to manually configure a new IP address for one of your network interfaces. Verify the changes using `ifconfig`.
Use the `route` command to add a new route to a specific network. Confirm the addition using the `route` command.

Explore the `ping` command to test the connectivity to a remote server or website. Use both domain names and IP addresses for testing.

Task 4: ARP Commands

Use the `arp` command to display the ARP cache on your system. Identify the MAC addresses associated with IP addresses.
Simulate ARP resolution by pinging a device on your local network and observe the changes in the ARP cache using the `arp` command.
Use the `arping` command to send ARP requests to a specific IP address and verify if the corresponding MAC address is in the ARP cache.

Task 5: Network Troubleshooting

Use the `ping` command to check the reachability of a remote server. Analyse the results and identify potential network issues.
Use the `traceroute` command to trace the route that packets take to reach a destination. Interpret the output and identify any delays or issues.
Use the `nslookup` command to perform DNS queries for a given domain. Verify the DNS resolution for both local and external domains.

Task 6: Documentation

Create a document summarising the results of each task. Include screenshots where necessary to illustrate the output of commands. Provide explanations for any errors encountered during the tasks and describe how these errors can be resolved. Reflect on the importance of understanding basic networking commands for troubleshooting and maintaining a networked system.