Linux Networking Theory and Commands

What is Networking in Linux?

Networking in Linux refers to the processes and tools used to configure, manage, and troubleshoot network connections on Linux systems. Linux supports a wide range of network protocols and services, and provides powerful command-line utilities to control and monitor these connections.

Example:

If you want to check your IP address, you can run `ip a`. To test connectivity with another server, you can use `ping google.com`. Linux makes it possible to handle everything from simple tasks like these to complex setups involving routing, firewalls, virtual networks, and more.

Basic Networking Commands

ip a / ip addr:

Displays all network interfaces and their IP addresses.

ip link:

Lists all network interfaces and their status (up/down).

ip route:

Shows the routing table.

ifconfig (Deprecated):

Used to configure/display interfaces, replaced by `ip`.

ping <host>:

Checks connectivity with a remote host.

hostname:

Displays the system's hostname.

nslookup <domain>:

Queries DNS for domain IP address.

dig <domain>:

Performs detailed DNS lookups.

whois <domain>:

Shows domain registration info.

netstat (Deprecated):

Displays network connections and routing tables.

ss:

Detailed info on active network connections.

traceroute <host>:

Shows path taken to a destination host.

mtr <host>:

Combines `ping` and `traceroute` in real-time.

curl <url>:

Transfers data using various protocols.

wget <url>:

Downloads files from the web.

Intermediate Networking Commands

nmcli:

CLI for managing network connections.

nmtui:

Text-based UI for network settings.

ethtool <interface>:

Displays/changes interface settings.

iwconfig (Deprecated):

Wireless config tool, replaced by `iw`.

iw:

Advanced wireless management tool.

tcpdump:

Captures/analyzes packets.

arp:

Views/modifies ARP cache.

ip neigh:

Shows ARP table.

route (Deprecated):

Routing table command, replaced by `ip route`.

iptables:

Manages firewall rules.

ufw:

User-friendly firewall tool.

firewalld:

Firewall management using zones.

scp:

Secure file copy over SSH.

rsync:

Syncs files/directories efficiently.

Advanced Networking Commands

ip netns:

Manages network namespaces.

bridge:

Manages network bridges.

tc:

Traffic control for bandwidth and QoS.

nmap:

Scans network for hosts/services.

ss -atnp:

Shows TCP connections with process info.

lsof -i:

Lists open internet sockets.

tcpflow:

Captures TCP flows.

vnstat:

Monitors bandwidth usage.

iftop:

Shows real-time bandwidth usage.