



Basic Network Information

IP Configuration

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| <code>ipconfig</code> (Windows) | Displays IP address, subnet mask, default gateway, and DNS settings. Example: <code>ipconfig /all</code> |
| <code>ifconfig</code> (Linux/macOS) | Configures network interfaces and displays IP address information. Example: <code>ifconfig eth0</code> |
| <code>ip addr</code> (Linux) | Modern replacement for ifconfig, displays detailed IP information. Example: <code>ip addr show eth0</code> |
| <code>hostname -I</code> (Linux) | Displays the IP address(es) of the host. Example: <code>hostname -I</code> |
| <code>nslookup <hostname></code> | Query DNS server to obtain domain name or IP address mapping, or other DNS records. Example: <code>nslookup google.com</code> |

Routing Information

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| <code>route print</code> (Windows) | Displays the routing table. Example: <code>route print</code> |
| <code>netstat -r</code> (Windows) | Also displays the routing table. Example: <code>netstat -r</code> |
| <code>route -n</code> (Linux/macOS) | Displays the kernel IP routing table. Example: <code>route -n</code> |
| <code>traceroute <destination></code> (Linux/macOS) | Traces the route packets take to a network host. Example: <code>traceroute google.com</code> |
| <code>tracert <destination></code> (Windows) | The Windows version of traceroute. Example: <code>tracert google.com</code> |

Network Statistics

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| <code>netstat -a</code> | Displays all active TCP connections and listening ports. Example: <code>netstat -a</code> |
| <code>netstat -an</code> | Displays active TCP connections and ports (numerical). Example: <code>netstat -an</code> |
| <code>netstat -tulpn</code> (Linux) | Shows listening TCP and UDP ports with process ID. Example: <code>netstat -tulpn</code> |
| <code>ss -tulpn</code> (Linux) | Another utility to investigate sockets. Example: <code>ss -tulpn</code> |

Connectivity Testing

Ping

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| <code>ping <destination></code> | Tests connectivity to a network host. Example: <code>ping google.com</code> |
| <code>ping -t <destination></code> (Windows) | Pings the specified host until stopped. Example: <code>ping -t google.com</code> |
| <code>ping -c <count> <destination></code> (Linux/macOS) | Sends a specified number of ICMP echo requests. Example: <code>ping -c 4 google.com</code> |

Telnet & Netcat

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| <code>telnet <host> <port></code> | Tests connectivity to a specific port on a host. Example: <code>telnet google.com 80</code> |
| <code>nc -zv <host> <port></code> | Netcat: versatile tool for network connections. Example: <code>nc -zv google.com 80</code> |
| <code>nc -l -p <port></code> | Netcat: Listens on a specific port. Example: <code>nc -l -p 12345</code> |

Pathping (Windows)

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| <code>pathping <destination></code> | Provides information about network latency and packet loss at intermediate hops between a source and a destination. Example: <code>pathping google.com</code> |
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Network Configuration

Interface Configuration (Linux)

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| <code>ip link set <interface> up</code> | Brings a network interface up. Example: <code>ip link set eth0 up</code> |
| <code>ip link set <interface> down</code> | Brings a network interface down. Example: <code>ip link set eth0 down</code> |
| <code>ip addr add <ip_address>/<cidr> dev <interface></code> | Assigns an IP address to a network interface. Example: <code>ip addr add 192.168.1.10/24 dev eth0</code> |
| <code>ip route add default via <gateway_ip></code> | Sets the default gateway. Example: <code>ip route add default via 192.168.1.1</code> |

Firewall Management

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| <code>firewall-cmd --zone=public --add-port=<port>/tcp --permanent</code> (CentOS/RHEL) | Opens a port in the firewall. Example: <code>firewall-cmd --zone=public --add-port=80/tcp --permanent firewall-cmd --reload</code> |
| <code>ufw allow <port></code> (Ubuntu) | Allows traffic on a specific port. Example: <code>ufw allow 80 ufw enable</code> |
| <code>iptables -A INPUT -p tcp --dport <port> -j ACCEPT</code> (Generic Linux) | Adds a rule to accept TCP traffic on a specific port. Example: <code>iptables -A INPUT -p tcp --dport 80 -j ACCEPT service iptables save</code> |

Wireless Networking

Wireless Information (Linux)

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| <code>iwconfig</code> | Displays wireless interface configuration. Example: <code>iwconfig wlan0</code> |
| <code>iwlist <interface> scan</code> | Scans for available wireless networks. Example: <code>iwlist wlan0 scan</code> |
| <code>nmcli dev wifi list</code> | Lists available Wi-Fi networks using NetworkManager. Example: <code>nmcli dev wifi list</code> |

Wireless Connection (Linux)

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| <code>nmcli dev wifi connect <SSID> password <password></code> | Connects to a Wi-Fi network using NetworkManager. Example: <code>nmcli dev wifi connect MyNetwork password MyPassword</code> |
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Troubleshooting

- When troubleshooting network issues, consider the following:
- Check physical connections:** Ensure cables are properly connected.
 - Verify IP configuration:** Confirm correct IP address, subnet mask, and gateway.
 - Test connectivity:** Use `ping` to verify basic network reachability.
 - Check DNS resolution:** Ensure DNS is resolving hostnames correctly using `nslookup`.
 - Inspect firewall rules:** Make sure necessary ports are open.
 - Examine routing table:** Confirm packets are being routed correctly.