

Networking Troubleshooting Command Reference

A cross-platform command and workflow guide for TCP/IP, DNS, Wi-Fi, routes, sockets, firewall checks, and service connectivity.

DOCUMENT CENTER

Compiled September 2026

Use this guide as a practical reference. Verify commands, targets, permissions, paths, versions, and organizational policy before making changes. Examples with placeholders must be adapted to the environment.

Contents

#	Section	Entries
1	First-response workflow	10
2	Windows command-line network diagnostics	35
3	PowerShell networking diagnostics	25
4	Linux network diagnostics	20
5	Symptom-to-check mapping	8

Total reference entries: 98

1. First-response workflow

Step	Command / Action	Purpose
1	ipconfig /all	Capture addressing, gateway, DNS, DHCP, and adapter details.
2	ping <gateway>	Confirm local IP path to the default gateway.
3	ping 1.1.1.1	Test basic routed IP reachability without relying on DNS.
4	nslookup example.com	Test DNS resolution.
5	tracert example.com	Identify where a route stops or becomes slow.
6	Test-NetConnection example.com -Port 443	Test a specific TCP service.
7	netstat -ano	Review listeners/connections and owning PIDs.
8	Get-NetAdapter	Verify adapter operational state.
9	Get-NetIPConfiguration	Review PowerShell IP configuration.
10	Get-WinEvent -LogName System -MaxEvents 100	Look for adapter, TCP/IP, DNS Client, or DHCP events.

2. Windows command-line network diagnostics

Command	Purpose / Notes
ipconfig	Show basic adapter addresses.
ipconfig /all	Show full adapter configuration.
ipconfig /release	Release DHCP IPv4 leases.
ipconfig /renew	Request DHCP IPv4 leases.
ipconfig /flushdns	Clear the DNS resolver cache.
ipconfig /displaydns	Display the DNS resolver cache.
ipconfig /registerdns	Refresh leases and DNS registration where applicable.
ping <host>	Test ICMP reachability.
ping -t <host>	Continuously test reachability until stopped.
ping -4 <host>	Force IPv4.
ping -6 <host>	Force IPv6.
tracert <host>	Trace routed hops.
pathping <host>	Trace route and gather packet-loss statistics.
nslookup <name>	Query the configured DNS resolver.
nslookup <name> 1.1.1.1	Query a specific DNS resolver.
netstat -ano	Show connections/listeners with PIDs.
netstat -abno	Show executables with connections/listeners; elevation is typically required.
netstat -rn	Show the routing table.
arp -a	Show the ARP cache.
route print	Show IPv4/IPv6 routing tables.
getmac /v /fo list	Show MAC addresses and connection names.
netsh interface show interface	Show network interface state.
netsh interface ipv4 show interfaces	Show IPv4 interface indexes.
netsh interface ip show config	Show Netsh IP configuration.
netsh winsock show catalog	Inspect the Winsock provider catalog.
netsh winsock reset	Reset Winsock; restart afterward.
netsh int ip reset	Reset TCP/IP components; custom settings may need reapplication.
netsh winhttp show proxy	Show WinHTTP proxy settings.
netsh winhttp reset proxy	Reset WinHTTP proxy; avoid where an organizational proxy is required.
netsh wlan show interfaces	Show Wi-Fi state.
netsh wlan show drivers	Show Wi-Fi driver capabilities.
netsh wlan show profiles	List saved Wi-Fi profiles.
netsh wlan show wlanreport	Generate the Windows wireless network report.
curl.exe -I https://example.com	Check HTTP response headers.
curl.exe -v https://example.com	Show detailed connection/TLS diagnostics.

3. PowerShell networking diagnostics

Command	Purpose / Notes
Get-NetAdapter	List adapters and state.
Get-NetAdapter -Physical	List physical adapters.
Get-NetIPConfiguration	Show IP configuration.
Get-NetIPAddress	List IP addresses.
Get-NetRoute	List routes.
Get-NetRoute -DestinationPrefix 0.0.0.0/0	Show IPv4 default routes.
Get-NetNeighbor	Show neighbor cache.
Get-DnsClientServerAddress	Show configured DNS servers.
Resolve-DnsName example.com	Resolve a DNS name.
Resolve-DnsName example.com -Server 1.1.1.1	Use a specified DNS resolver.
Clear-DnsClientCache	Clear the DNS client cache.
Test-NetConnection example.com	Test basic connectivity.
Test-NetConnection example.com -Port 443	Test a TCP port.
Test-NetConnection example.com -TraceRoute	Run route diagnostics.
Get-NetTCPConnection	List TCP connections.
Get-NetTCPConnection -State Established	List established TCP connections.
Get-NetUDPEndpoint	List UDP endpoints.
Get-NetIPInterface	Show IP interface settings.
Get-NetConnectionProfile	Show network profile categories.
Get-NetFirewallProfile	Show firewall profile state.
Get-NetFirewallRule -Enabled True	List enabled firewall rules.
Get-NetFirewallPortFilter	Inspect firewall port filters.
Get-NetAdapterStatistics	Show adapter byte/packet counters.
Get-NetOffloadGlobalSetting	Show global network offload settings.
Get-SmbConnection	Show SMB client connections.

4. Linux network diagnostics

Command	Purpose / Notes
<code>ip -br addr</code>	Compact interface/address view.
<code>ip link show</code>	Show link state.
<code>ip route show</code>	Show routes.
<code>ip route get 8.8.8.8</code>	Show selected route to a destination.
<code>ip neigh show</code>	Show neighbor cache.
<code>ss -tulpen</code>	Show listening sockets.
<code>ss -tan state established</code>	Show established TCP sessions.
<code>ping -c 4 <host></code>	Test reachability.
<code>tracpath <host></code>	Trace path and MTU hints.
<code>traceroute <host></code>	Trace routed hops where installed.
<code>dig example.com</code>	Query DNS.
<code>dig +trace example.com</code>	Walk DNS delegation from root; useful for authoritative troubleshooting.
<code>resolvectl status</code>	Show systemd-resolved DNS status.
<code>nmcli device status</code>	Show NetworkManager device state.
<code>nmcli connection show</code>	List NetworkManager profiles.
<code>ethtool eth0</code>	Show NIC link/driver details.
<code>curl -I https://example.com</code>	Fetch response headers.
<code>curl -v https://example.com</code>	Show verbose HTTP/TLS diagnostics.
<code>tcpdump -ni any host <ip></code>	Capture packets for a host with permission and appropriate privileges.
<code>tcpdump -ni any port 53</code>	Capture DNS traffic with authorization.

5. Symptom-to-check mapping

Symptom	First checks	Likely areas
No network at all	Link state, ipconfig/Get-NetAdapter, gateway ping	Cable/Wi-Fi, adapter, VLAN, DHCP, driver
Can reach gateway only	Ping public IP, route table, firewall	Upstream routing, NAT, WAN, firewall
IP works, names fail	nslookup/Resolve-DnsName, DNS servers, cache	DNS configuration, resolver reachability, suffixes
One site/service fails	Test-NetConnection/curl, DNS, route	Service outage, firewall, proxy, TLS, application
Intermittent loss	ping -t/pathping, adapter counters, WLAN report	Wireless quality, duplex, congestion, upstream loss
Slow transfers	Pathping, adapter stats, MTU, SMB state	Packet loss, duplex, Wi-Fi, storage, SMB, congestion
RDP/SMB unavailable	Test-NetConnection port 3389/445, firewall rules	Service state, firewall, profile, routing
VPN connected but no access	Routes, DNS suffixes, split tunnel, metrics	VPN policy, overlapping subnets, DNS, route priority

Authoritative references

Use vendor and standards documentation for exact syntax, current behavior, version-specific details, licensing, and policy requirements.

Microsoft Windows Commands

<https://learn.microsoft.com/windows-server/administration/windows-commands/windows-commands>

Microsoft Test-NetConnection

<https://learn.microsoft.com/powershell/module/nettcpip/test-netconnection>

Microsoft Get-NetTCPConnection

<https://learn.microsoft.com/powershell/module/nettcpip/get-nettcpconnection>