

Know and Understand the Network Troubleshooting Tools Available in Windows 7

When the troubleshooters don't solve the problem, it might be time to dig deeper into the Windows toolbox. Windows 7 contains an assortment of utilities you can use to diagnose, monitor, and repair network connections. Here are some of the more useful networking-related command-line utilities in Windows 7 and a summary of how you can use each. To learn more about a utility, including its proper syntax, in a Command Prompt window type the executable name followed by `/?`.

Get MAC Address (Getmac.exe) Discovers the Media Access Control (MAC) address and lists associated network protocols for all network cards in a computer, either locally or across a network.

Hostname (Hostname.exe) Displays the host name of the current computer.

IP Configuration Utility (Ipconfig.exe) Displays all current Transmission Control Protocol/Internet Protocol (TCP/IP) network configuration values, and refreshes Dynamic Host Configuration Protocol (DHCP) and DNS settings.

Name Server Lookup (Nslookup.exe) Displays information about Domain Name System records for specific IP addresses and/or host names so that you can troubleshoot DNS problems.

Net services commands (Net.exe) Performs a broad range of network tasks. Type net with no parameters to see a full list of available command-line options.

Netstat (Netstat.exe) Displays active TCP connections, ports on which the computer is listening, Ethernet statistics, the IP routing table, and IPv4/IPv6 statistics.

Network Command Shell (Netsh.exe) Displays or modifies the network configuration of a local or remote computer that is currently running. This command-line scripting utility has a huge number of options, which are fully detailed in Help.

PathPing (Pathping.exe) Combines the functions of Traceroute and Ping to identify problems at a router or network link.

TCP/IP NetBIOS Information (Nbtstat.exe) Displays statistics for the NetBIOS over TCP/IP (NetBT) protocol, NetBIOS name tables for both the local computer and remote computers, and the NetBIOS name cache.

TCP/IP Ping (Ping.exe) Verifies IP-level connectivity to another internet address by sending Internet Control Message Protocol (ICMP) packets and measuring response time in milliseconds.

TCP/IP Route (Route.exe) Displays and modifies entries in the local IP routing table.

TCP/IP Traceroute (Tracert.exe) Determines the path to an internet address, and lists the time required to reach each hop. It's useful for troubleshooting connectivity problems on specific network segments.

There is one very powerful and handy tool worth mentioning that is not available in Windows 7 but is available as a free download. **Network Monitor** is a protocol analyzer that lets you capture network traffic, view it, and analyze it. You can book [get the free download from Microsoft](#).

Changing the IP and DNS Addresses through CLI

Changing your IP information requires two commands, one for your IP address, subnet mask and default gateway and another for your DNS settings. In order to change the IP address and DNS addresses, use the **netsh** command.

1. To set a static address use the following command:

```
netsh interface ip set address name="Local Area Connection" static IP_Address  
Subnet_Mask Default_Gateway
```

2. You can go from using an already set static IP address to getting an address from DHCP using the following command:

```
netsh interface ip set address name="Local Area Connection" source=dhcp
```

3. You only have two settings to setup DNS, a primary DNS server and a secondary one. To set the primary DNS server use the following command:

```
netsh interface ip set dns name="Local Area Connection" static DNS_IP_Address
```

4. To change the IP address of the secondary DNS server you will need to specify the index parameter:

```
netsh interface ip add dns name="Local Area Connection" 2nd_DNS_Address index=2
```

5. To set the DNS settings to be assigned dynamically, use the following command:

```
netsh interface ip set dns name="Local Area Connection" source=dhcp
```

Speed up Web Browsing with OpenDNS

When you type in a domain name in your browser the computer must resolve the friendly name into an IP address of the server to download the web page and supporting files. Windows uses a DNS (domain name system) server to lookup this information. By default, Windows uses your ISP's DNS server. Depending on your provider, the performance of their DNS resolving server varies. Some large national providers are known to provide unreliable and slow DNS servers.

The performance of the DNS server you are using is one component that affects the speed of your internet browsing. Since each domain name you type in must be resolved into an IP address, the amount of time that takes will delay the loading of any web page. Some users with overloaded ISP DNS servers can see delays of many seconds before web pages start to load.

OpenDNS provides free alternative DNS servers that anyone can use with any Internet provider. Unlike many national internet providers, OpenDNS's DNS servers are very fast and reliable. Using OpenDNS servers instead of your ISP servers will help you speed up your internet browsing by cutting down on the delay between resolving a domain name and getting the IP address so your browser can start loading the web page.

Configuring your computer to use OpenDNS servers instead of your ISP's is a simple change that works in all versions of Windows:

1. Open the Network and Sharing Center and Click on Change adapter settings on the left. Alternately, you can Click on the Start Button or Run and type in `ncpa.cpl` and hit Enter.
2. Right click on your active network connection that you use to connect to the Internet and select Properties.
3. On the Networking tab, select Internet Protocol version 4 (TCP/IP/4) and Click Properties.
4. On the properties screen, select Use the following DNS server addresses and then type in **208.67.222.222** in the preferred and **208.67.220.220** in the alternate boxes.
5. Hit OK and Close to finished.

The image shows a screenshot of the Windows Network Connection Properties dialog box, specifically the 'Alternate Configuration' tab for Internet Protocol Version 4 (TCP/IPv4). The dialog box has two tabs: 'General' and 'Alternate Configuration'. The 'Alternate Configuration' tab is active. The text inside the dialog box reads: 'You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.' There are two radio button options: 'Obtain an IP address automatically' (which is selected) and 'Use the following IP address:'. Below the second option are three input fields for 'IP address:', 'Subnet mask:', and 'Default gateway:', each with a dotted placeholder. There are also two radio button options for DNS servers: 'Obtain DNS server address automatically' and 'Use the following DNS server addresses:'. The second option is selected. Below it are two input fields: 'Preferred DNS server:' with the value '208 . 67 . 222 . 222' and 'Alternate DNS server:' with the value '208 . 67 . 220 . 220'. At the bottom right of the dialog box is an 'Advanced...' button. At the very bottom are 'OK' and 'Cancel' buttons.