HOW TO: Diagnose and Test TCP/IP or NetBIOS Network Connections in Windows 2000

This article provides information about how to diagnose and test Transmission Control Protocol/Internet Protocol (TCP/IP) or NetBIOS network configurations. This article also describes the use of the most common diagnostic tools along with basic network analysis techniques.

Your Computer Configuration

When you want to troubleshoot a TCP/IP networking problem, first check the TCP/IP configuration of the computer that is experiencing the problem.

To View the TCP/IP Configuration by Using the Ipconfig.exe Tool

1. Click Start, click Run, type cmd, and then press ENTER.
2. At the command prompt, type ipconfig, and then press ENTER. This command displays your computer's DNS suffix, IP address, subnet mask, and default gateway.
3. If you need more information and want to display a detailed configuration report, type ipconfig /all at the command prompt, and then press ENTER.
4. Confirm that your computer has the appropriate settings for DNS and WINS servers, an available IP address, the proper subnet mask, the proper default gateway, and the correct host name.

To Display Connection Information by Using the Nbtstat.exe Tool

NetBIOS over TCP/IP (NetBT) resolves NetBIOS names to IP addresses. TCP/IP provides many options for NetBIOS name resolution, including local cache lookup, WINS server query, broadcast, DNS server query, and LMHOSTS and HOSTS lookup.

Nbtstat.exe is a useful tool for troubleshooting NetBIOS name resolution problems. You can use the nbtstat.exe command to remove or correct preloaded entries. To use the nbtstat.exe command:

- To list the NetBIOS table of the local computer, type nbtstat -n at the command prompt, and then press ENTER. This command displays the names that were registered locally on the computer by programs such as the server and redirector.
- To list the contents of the NetBIOS name cache, type nbtstat -c at the command prompt, and then press ENTER. This command shows the NetBIOS name cache, which contains name-to-address mappings for other computers.
- To purge the name cache and reload it from the LMHOSTS file, type nbtstat -m at the command prompt, and then press ENTER.
- To perform a NetBIOS adapter status command against the computer that you specify by name, type nbtstat -a NetBIOS computer name at the command prompt, and then press ENTER. The adapter status command returns the local NetBIOS name table for that computer and the MAC address of the network adapter.
- To display a list of client and server connections, type nbtstat -a at the command prompt, and then press ENTER. This command lists the current NetBIOS sessions and their status, including statistics, as shown in the following example:

NetBIOS Connection Table
Testing Connections to Remote Servers

If you are unable to contact a remote server, there are two common tools that you can use. Use the ping command to verify that a Host computer can connect to the TCP/IP network and network resources. Use the Tracert.exe command to examine the route taken to a destination.

To Test Connections by Using Ping.exe

You can use the ping command as a troubleshooting tool to sequentially test connectivity to various network resources. To ping a network host directly:

1. Click Start, click Run, type cmd, and then press ENTER.
2. Type ping IP address of the remote network host (for example, ping 192.168.1.104) or ping host name (for example, ping www.microsoft.com), and then press ENTER.
3. Check for a reply that may look like this:
   
   Reply from 192.168.1.104: bytes=32 time=40ms TTL=61

If this message displays, the server is available on the network. If you are unable to contact the resource, you can troubleshoot the connection by using the ping command to test connectivity to various network resources:

a. Ping the loopback address (by using the ping 127.0.0.1 command) to verify that TCP/IP is installed and working correctly on the local computer.

b. Ping the IP address of the local computer to verify that it was added to the network correctly.

c. Ping the IP address of the default gateway to verify that the gateway is functional and it is possible to connect to a local host on the local network. You can obtain the IP address of the local default gateway by using the ipconfig command.

d. Ping the IP address of another remote host to verify that you can communicate through a router.

To Test Connections by Using Tracert.exe

Tracert.exe is a route-tracing utility that you can use to determine the network path to a destination. To determine the path that a packet takes on the network and where that path may be ending:

1. Click Start, click Run, type cmd, and then press ENTER.
2. At the command prompt, type tracert IP address of the remote network host, and then press ENTER.
3. Examine the results to determine the length of time that the packet took to reach each network segment and the point at which the connection may stop working.

To Test Connections by Using the NET VIEW Command

1. Click Start, click Run, type cmd, and then press ENTER.
2. At the command prompt, type net view \computer name, and then press ENTER. A list of the file and print shares of a computer that is running Windows 2000 is generated by establishing a temporary NetBIOS connection. If there are no file or print shares available on the specified computer, you receive a "There are no entries in the list." message. If the command does not work, type net view \IP address of the remote computer, and then press ENTER. If the command works, but a net view attempt to the computer name does not work, the computer name may be resolving to the wrong address. If the command does not work and generates a "System error has occurred" error message, verify that you typed the correct name of the remote computer, that the computer is operational (and is running the File and Printer Sharing for Microsoft Networks service), and that all of the gateways (routers) between the local computer and the remote host are operational by using the ping command.

Troubleshooting

This section describes how to troubleshoot some of the issues that you may have.

I Can Contact a Network Resource Directly, but If I "Ping" the Resource It Always Returns "Request Timed Out"

Many organizations block the return of ICMP (ping) packets as a security measure. Because of this, if you are trying to contact a resource across the Internet, or critical internal systems, it may not be possible to obtain a response to a "ping" or "tracert" message.

I Can Ping a Resource by Its IP Address, but I Can Not "Ping" It by Name

If it is possible to contact a resource by using its IP address but a ping message to its host name does not work, the problem is likely caused by a name resolution failure, rather than network connectivity. Check to make sure that the computer is configured with the proper DNS or WINS entries, and that the DNS or WINS servers are available.

REFERENCES

For additional related information, please see the following "Troubleshooting Tools and Strategies" Microsoft TechNet Web site: