

When you are troubleshooting name resolution issues on a Windows network, it is important to narrow down the problem to see whether the application is resolving a NetBIOS name or a host name. If you understand the order that these names are resolved, you will be able to troubleshoot most of the connectivity problems on your network.

First let's make sure we understand the difference between the host names and NetBIOS names. There are two types of user-friendly names that Windows uses on the network.

- Host names
 - A host name can be 255 characters and can contain alphabetic and numeric characters, hyphens and periods.
 - May be the same or different than the NetBIOS name.
- NetBIOS names
 - A NetBIOS name is a 16-character name where the first 15 characters identify a unique host and the 16th character identifies a service or application running on the host.
 - Various services and client tools use NetBIOS names, such as Network Neighborhood and NET USE.

Host names are used by TCP/IP to identify a TCP/IP host on the network (or on the Internet). NetBIOS names are used by Windows to identify a NetBIOS-enabled computer on a private network. Before two hosts can communicate on the network, their NetBIOS names have to be resolved to an IP address. This process of resolving names to IP address is known as name resolution. Here are a few additional things to keep in mind when you are troubleshooting name resolution problems.

- Windows XP uses DNS as its primary method to locate network services and for name resolution. For example, to locate a domain controller for authentication, Windows XP uses DNS.
- Host names can be resolved either with a DNS server or with a static Hosts file. If the host name cannot be resolved, Windows XP will try to resolve the host name as a NetBIOS name.
- Windows XP applications are designed to use host names but both NetBIOS and hostnames can be resolved by using either method.
- A Windows XP computer has a host name and a primary DNS suffix. To resolve unqualified host names, Windows XP will use both the host name and primary DNS suffix.
- By default, a Windows computer (NT/XP/2000/2003, etc.) has the same host name as NetBIOS name. This name is also referred to as the computer name. So by default, computer name, host name, and NetBIOS name are all the same.

Now let's look at the order the names are resolved.

Host Name Resolution Order

Host name resolution is used when TCP/IP applications are used, such as FTP, Ping, Telnet, etc. Many modern database and e-mail applications that connect with Winsock (Windows implementation of



TCP/IP sockets) also use host name resolution, such as Microsoft Outlook and Exchange. Host names are resolved in the following order.

- 1. Local host name
- 2. DNS cache
- 3. Hosts file
- 4. DNS server
- 5. NetBIOS name cache
- 6. WINS server
- 7. Broadcast
- 8. Lmhosts file

NetBIOS Name Resolution Order

There are four NetBIOS over TCP/IP name resolution methods: b-node, p-node, m-node and h-node.

H-node = Hybrid P-node = Point-to-point node (a.k.a. peer-to-peer) M-node = Mixed node B-node = Broadcast node

Windows will use the following method for NetBIOS name resolution.

H-node *	P-node	M-node	B-node *
NetBIOS name Cache	NetBIOS name Cache	NetBIOS name Cache	NetBIOS name Cache
WINS server	WINS server	Broadcast	Broadcast
Broadcast		WINS server	
Lmhosts file	Lmhosts file	Lmhosts file	Lmhosts file
Hosts file	Hosts file	Hosts file	Hosts file
DNS server	DNS server	DNS server	DNS server

* H-node is the default node when there are WINS servers available. When there are no WINS servers then B-node is the default.

An easy way to remember the order of NetBIOS name resolution is to remember the following phrase.

Can We Buy Larger Hard Drives

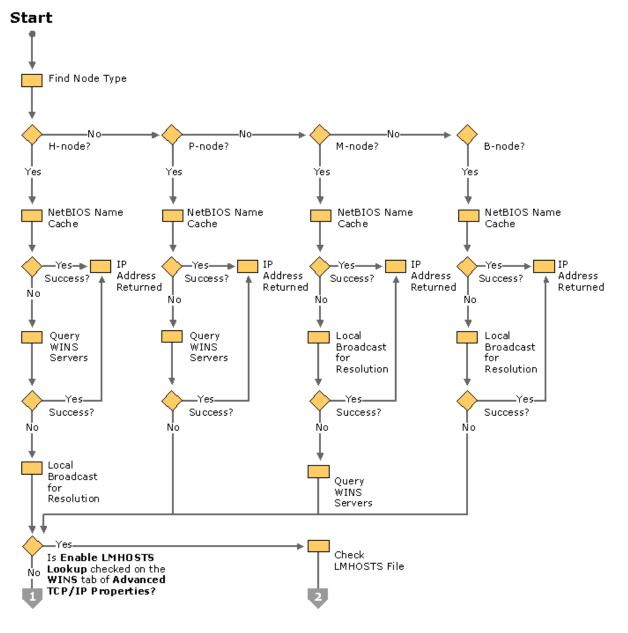
C = Cache W = WINS B = Broadcast



L = Lmhosts H = Hosts D = DNS

The following flow charts are courtesy of Microsoft TechNet. They show the name resolution methods in more detail. Notice that P-node doesn't use broadcast and B-node doesn't use WINS.

NetBIOS Name Resolution Flowchart (part 1 of 2)



Copyright ©2007 SeattlePro Enterprises. All rights reserved.



NetBIOS Name Resolution Flowchart (part 2 of 2)

