

Windows Me TCP/IP Utilities

OBJECTIVES

1. Configure the Command Prompt window to improve visibility.
2. Use the IPCONFIG and WinIPCFG utilities to examine your current TCP/IP configuration.
3. Use the ARP utility to map IP addresses to physical MAC addresses.
4. Use the NETSTAT utility to examine all current network connections.
5. Use the NBTSTAT utility to resolve Windows computer names on the network.
6. Use the NET VIEW utility to list all shared devices on a network node.
7. Use the TRACERT utility to test data packet routing and timing.
8. Use the PING utility to test other network nodes.



Networking

RESOURCES

1. Marcraft 8000 Trainer with 64 MB RAM
2. Windows Me operating system (installed)
3. Network Interface Card (installed)
4. Internet access through a network connection or modem

DISCUSSION

Windows provides several networking tools, called TCP/IP utilities, which can assist you in troubleshooting network problems, and in determining how your network is performing. A network server, or a computer with direct Internet access, will provide the broadest range of utilities for you to use. You should also try to use them at a network node (client workstation), since their appearance and function will differ at these locations. For each utility, study the displayed information and develop a feel for how each works. Ideally, you will be able to select the proper utility to troubleshoot the problem, given the symptoms that are presented.

Most TCP/IP utilities are run from the MS-DOS command line prompt. In the case of Windows Me, this will be the MS-DOS Prompt screen. As stated above, many of the functions of these Internet/network utilities will be different depending on whether your network connection is provided by a modem, a network server, or a network client workstation. In many cases, network clients may only be able to see the local area network, and not the Internet.

NOTE: These utilities are available only if the TCP/IP protocol has been installed on your computer.



Networking

PROCEDURE

In this lab procedure you will modify the *MS-DOS command prompt* window to increase the visibility of the displayed information, and add a shortcut to the desktop. When completed, the IPCONFIG /all command will list all current network parameters. Next, you will access the WinIPCFG graphical configuration tool. The ARP command will map your network host's IP address to a NIC's MAC address. You will use the NETSTAT command will be used to identify your current network connections and the NBTSTAT command to resolve the Windows computer names of the other nodes you are connected to on the network. The NET VIEW command will list the nodes on your LAN and the shared devices on one of these nodes. You will use the TRACERT command to test data packet routing to a remote host, and to examine the time required for it to travel between waypoints. Finally, the PING command will be used to test for responsiveness from a network node.

NOTE: The information actually displayed when running these utilities will vary greatly depending on your particular network configuration. The examples provided below will not precisely match your results.

1. Modify the command prompt window to increase visibility

- ___ a. Boot the computer to Windows Millennium.
- ___ b. Use the path Start/Programs/Accessories/MS-DOS Prompt to open the *MS-DOS command prompt* window.
- ___ c. Click the button in the toolbar labeled with the letter "A".
- ___ d. In the *Font size:* window at the upper right, scroll down the list and select "TT 9x15".
- ___ e. Click the OK button to change the window settings.
- ___ f. Close the *MS-DOS command prompt* window.
- ___ g. Use the path Start/Programs/Accessories and right-click on MS-DOS Prompt to open the pop-up menu.
- ___ h. Highlight Send To and select Desktop (create shortcut) from the submenu.

IPCONFIG

The IPCONFIG utility will allow you to see your current IP Address and other useful network configuration information. The command "IPCONFIG /all" will display the complete network information for the host computer you are using. As shown in Figure 33-1, this utility will identify the current network configuration, including the IP address and physical MAC address. If you are using DHCP to provide your IP address, you can use the "ipconfig /release" and "ipconfig /renew" switches to force the DHCP server to withdraw the current IP address lease, or drop the current lease and grab a new one.

1. Run IPCONFIG to display your network configuration

- ___ a. Open the *MS-DOS command prompt* window.
- ___ b. At the MS-DOS command prompt, type **ipconfig ?**, and press the ENTER key. Review the options for IPCONFIG.
- ___ c. At the command prompt, type **ipconfig /all**, and press the ENTER key.
- ___ d. Record the listed information for your client workstation in Table 33-1.



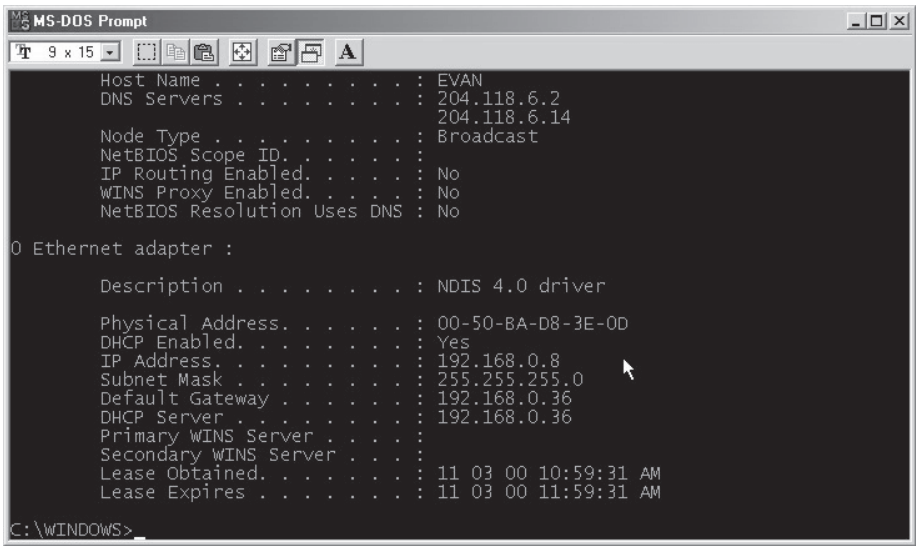


Figure 33-1: IPCONFIG /all
Lists the Network Configuration

WinIPCFG

The WinIPCFG utility provides all of the network configuration features of IPCONFIG, but is far more user-friendly due to its graphical interface.

1. Run WinIPCFG to display the graphical network configuration tool
 - a. Use the path Start/Run to open the *Run* window.
 - b. In the Open box, type **winipcfg** and click the OK button to open the *IP Configuration* window.
 - c. Click the More Info button in the lower-right corner. The displayed window should appear similar to Figure 33-2.
 - d. Record the Lease Obtained and Lease Expires information in Table 33-2.
 - e. Click the Renew All button to request a new IP lease.
 - f. Record the new Lease Obtained and Lease Expires information in Table 33-3.

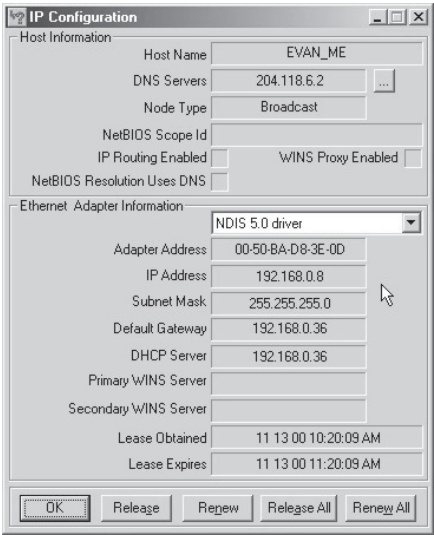


Figure 33-2: The Full Graphical IP
Configuration Window

ARP

The Address Resolution Protocol (ARP) utility can be used to identify addressing information by examining the contents of the ARP caches on either the client or the server. It is primarily used to map IP addresses to physical MAC addresses of active network connections.



- 1. Run ARP to resolve your client and current network connections
 - a. At the command prompt, type **arp**, and press the ENTER key. Review the usage notes for ARP.
 - b. At the command prompt, type **arp -a**, and press the ENTER key. This will show information similar to Figure 33-3.

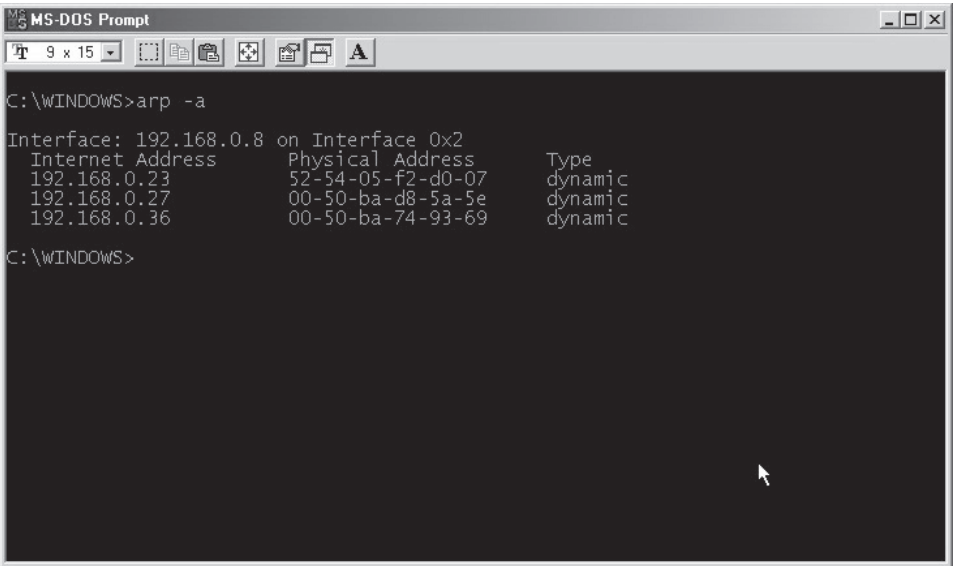


Figure 33-3: ARP will Map IP Addresses and Physical MAC Addresses

- c. Record the IP address of your host computer, as shown in the Interface line, in Table 33-4.
- d. Record the IP and physical MAC addresses in Table 33-5.

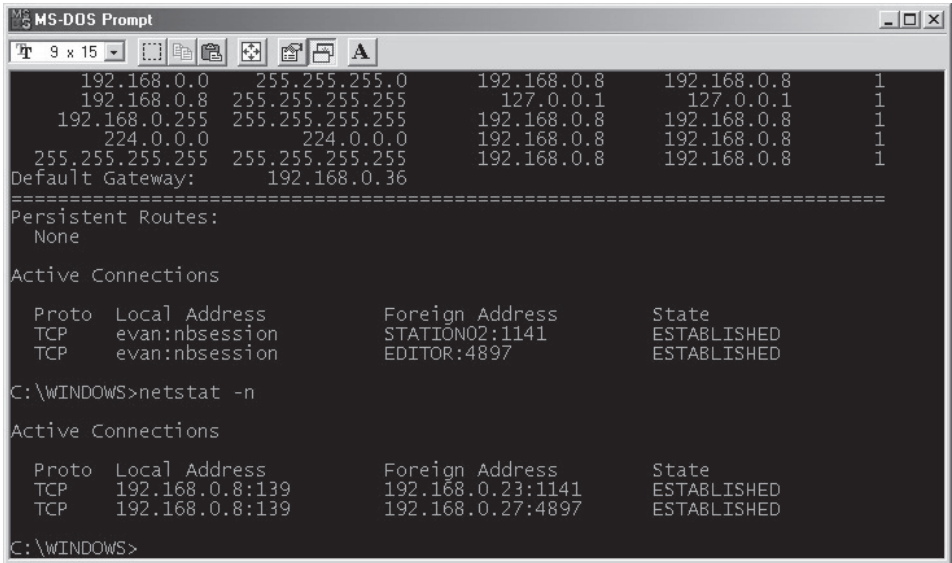
NETSTAT

The command "netstat -e" will be used to display the number of data packets transmitted and received, as well as the number of errors generated. The command "netstat -r" will display a list of all of the current connections and show which are active.



- 1. Run NETSTAT to examine the current network connection
 - a. At the command prompt, type **netstat ?**, and press the ENTER key. Review the usage notes for NETSTAT.
 - b. At the command prompt, type **netstat -e**, and press the ENTER key to display packet statistics.
 - c. At the command prompt, type **netstat -r**, and press the ENTER key to display routing table and NetBIOS names of connected nodes.

- d. At the command prompt, type **netstat -n**, and press the ENTER key to display addresses and port numbers in numerical form similar to Figure 33-4.



```
MS-DOS Prompt
9 x 15
192.168.0.0 255.255.255.0 192.168.0.8 192.168.0.8 1
192.168.0.8 255.255.255.255 127.0.0.1 127.0.0.1 1
192.168.0.255 255.255.255.255 192.168.0.8 192.168.0.8 1
224.0.0.0 224.0.0.0 192.168.0.8 192.168.0.8 1
255.255.255.255 255.255.255.255 192.168.0.8 192.168.0.8 1
Default Gateway: 192.168.0.36
=====
Persistent Routes:
None
Active Connections
Proto Local Address Foreign Address State
TCP evan:nbssession STATION02:1141 ESTABLISHED
TCP evan:nbssession EDITOR:4897 ESTABLISHED
C:\WINDOWS>netstat -n
Active Connections
Proto Local Address Foreign Address State
TCP 192.168.0.8:139 192.168.0.23:1141 ESTABLISHED
TCP 192.168.0.8:139 192.168.0.27:4897 ESTABLISHED
C:\WINDOWS>
```

Figure 33-4: NETSTAT Displays a List of Current Connections

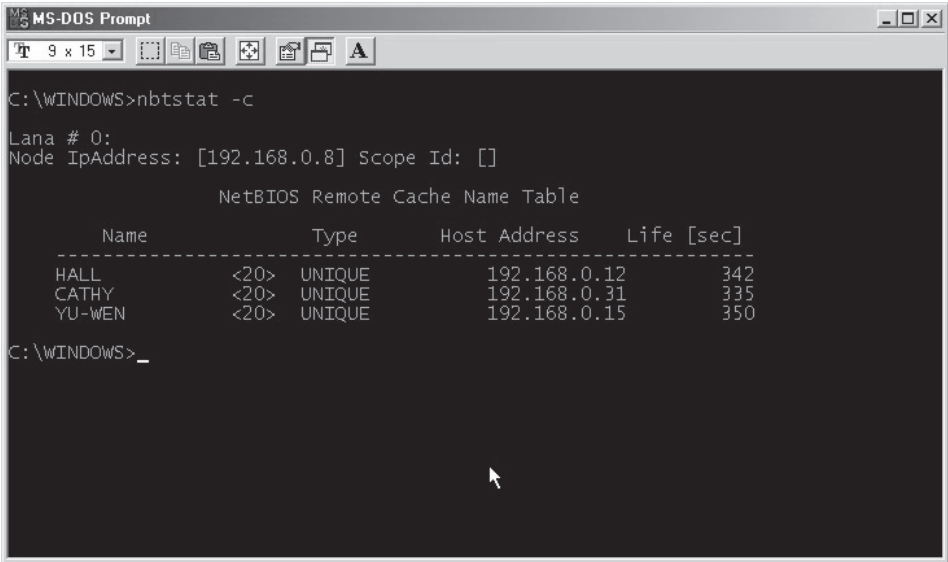
NBTSTAT

The NBTSTAT (NetBIOS over TCP STATistics) utility shows the Windows NetBIOS names for the connected computers, and lists their IP addresses and the status of the connection. This will allow you to check connections made with the Windows Network Neighborhood tool. The "nbtstat -c" command will display the NetBIOS names of the hosts you are connected to and the IP addresses they map to.



1. Run NBTSTAT to resolve your client's current network connections

- a. At the command prompt, type **nbtstat**, and press the ENTER key. Review the usage notes for NBTSTAT.
- b. At the command prompt, type **nbtstat -c**, and press the ENTER key. This will show you remote host identification information similar to Figure 33-5.



```
MS-DOS Prompt
9 x 15
C:\WINDOWS>nbtstat -c
Lana # 0:
Node IpAddress: [192.168.0.8] Scope Id: []

NetBIOS Remote Cache Name Table

Name                Type      Host Address      Life [sec]
-----
HALL                 <20>     UNIQUE           192.168.0.12      342
CATHY                <20>     UNIQUE           192.168.0.31      335
YU-WEN               <20>     UNIQUE           192.168.0.15      350
C:\WINDOWS>
```

Figure 33-5: NBTSTAT Identifies a Remote Host Connection

NET VIEW

The NET VIEW command lists all of the computers currently connected to your Local Area Network (LAN). It can also display all of the shared devices associated with a particular network host. The format for displaying shared devices is "net view \\your server name", where the server name is the actual NetBIOS name of the workstation or server you are connected to. For example, "net view \\accounting" will resolve a list of all of the shared devices supported by the server named "accounting".



1. Run NET VIEW to list the nodes on the LAN and display the shared devices on a node

- a. At the command prompt, type **net view /?**, and press the ENTER key. Review the usage notes for NET VIEW.
- b. At the command prompt, type **net view**, and press the ENTER key to list all of the nodes connected to your LAN. Your results should be similar to Figure 33-6.

```

C:\WINDOWS>net view
Servers available in workgroup PRODUCTION.
Server name          Remark
-----
\\CAPTURE             Capture
\\CATHY               Cathy
\\EDITOR              Technical Editor 5
\\EVAN                EVAN_ME
\\HALL                HALL
\\MARCRAFT1            MARCRAFT1
\\MARCRAFT2            marcraft2
\\TONY                ANTHONY TONDA
\\YU-WEN              YU-WEN
The command was completed successfully.
C:\WINDOWS>
  
```

**Figure 33-6: NET VIEW
Creates a List of Nodes on
the LAN**

```

C:\WINDOWS>net view \\yu-wen
Shared resources at \\YU-WEN

Sharename    Type      Comment
-----
ACHIEVE      Disk
C            Disk
CCNA TESTBAN Disk
D            Disk
DC700-LG     Disk
MY DOCUMENTS Disk
OS102CORRECT Disk
SALES        Disk
TEMPSHARE    Disk
The command was completed successfully.
C:\WINDOWS>_
  
```

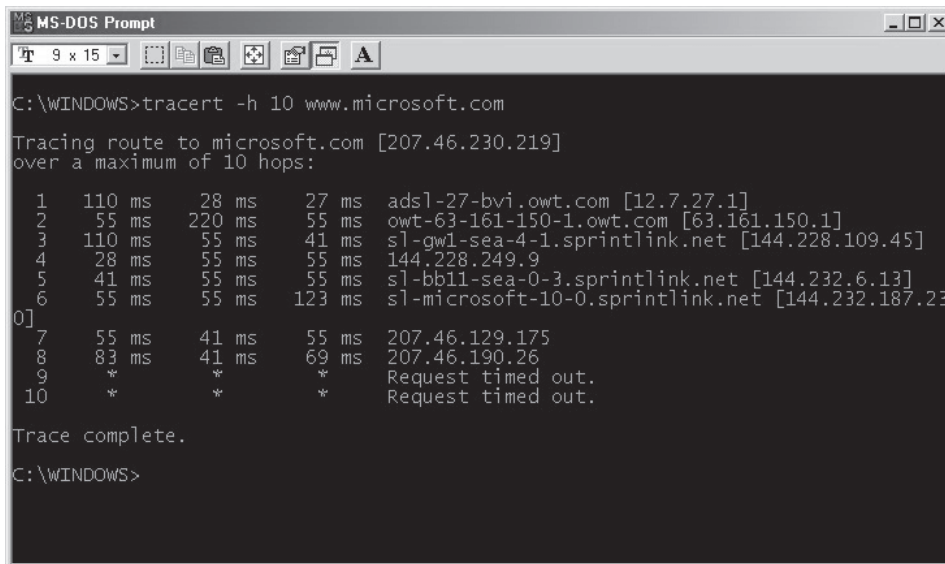
- c. Record the host names listed by NET VIEW in Table 33-6.
- d. At the command prompt, type **net view \\host name**, and press the ENTER key. In this command, you should replace *host name* with the NetBIOS name of one of the hosts listed in Table 33-6. This will show the shared devices on a particular host computer as seen in the example shown in Figure 33-7.

Figure 33-7: NET VIEW will List Shared Devices

TRACERT

The command "tracert *hostname*", where *hostname* is the IP address or DNS name of a host, will trace the path of a network connection to that remote host. This command will display the number of hops and the IP addresses of the routers that a data packet has traveled through in order to reach the remote host. It will also measure the time (in milliseconds) it takes for the data packet to travel from point to point on this route.

If you are having trouble connecting to a specific destination, the question then becomes: Is the problem at the destination, or at one of the routers along the way? TRACERT will detect whether a particular router along the current path is not functioning. If a particular router does not respond, the response time values are marked with an asterisk [*], indicating that the data packet timed out. TRACERT will also indicate if a router is slow. You can determine this by looking at the time it takes for a packet to get through a particular router. As you can see in Figure 33-8, the time delay is calculated three times for each router in the chain. The median of the three values should be used to evaluate the time it took to get the data packet through the router.



```

MS-DOS Prompt
C:\WINDOWS>tracert -h 10 www.microsoft.com

Tracing route to microsoft.com [207.46.230.219]
over a maximum of 30 hops:
  0  110 ms  28 ms  27 ms  ads1-27-bvi.owt.com [12.7.27.1]
  1  55 ms  220 ms  55 ms  owt-63-161-150-1.owt.com [63.161.150.1]
  2  110 ms  55 ms  41 ms  sl-gw1-sea-4-1.sprintlink.net [144.228.109.45]
  3  28 ms  55 ms  55 ms  144.228.249.9
  4  41 ms  55 ms  55 ms  sl-bb11-sea-0-3.sprintlink.net [144.232.6.13]
  5  55 ms  55 ms  123 ms  sl-microsoft-10-0.sprintlink.net [144.232.187.23]
  6  55 ms  41 ms  55 ms  207.46.129.175
  7  83 ms  41 ms  69 ms  207.46.190.26
  8  *      *      *      Request timed out.
  9  *      *      *      Request timed out.
 10  *      *      *      Request timed out.

Trace complete.
C:\WINDOWS>

```

Figure 33-8: TRACERT will Track a Data Packet

1. Run TRACERT to check a remote network connection

- ___ a. At the command prompt, type **tracert**, and press the ENTER key. Review the usage notes for TRACERT.
- ___ b. At the command prompt, type **tracert -h 15 www.microsoft.com**, and press the ENTER key to use 15 hops to trace the route to the Microsoft Web server.
- ___ c. Record the IP address associated with www.microsoft.com in Table 33-7.
- ___ d. On the keyboard, press the UP ARROW key to show the last entered command, and then press the ENTER key to run TRACERT again.
- ___ e. Record the new IP address associated with www.microsoft.com in Table 33-8.



PING

The PING command is one of the key tools for troubleshooting TCP/IP. PING causes a data packet to be sent to a specified IP address and returned to your machine. If the IP address is not currently active, you will receive a message stating that the transaction has timed out. If you are having trouble connecting to a network, PING can be used to test the functionality of TCP/IP on your own machine. If you are able to PING the loopback address (127.0.0.1), and your own network IP address, you can be fairly sure that TCP/IP on your host computer is working properly. The next step is to test the IP address for your network server and/or your default gateway. As a final test you can PING the IP address of a remote host server.

NOTE: Can't remember your IP address, or the IP address of the local server? Run IPCONFIG to get your IP address and the address of the host DNS server and gateway, or you can look up the data in Table 33-1.



1. Run PING to check the status of a TCP/IP connection

- a. At the command prompt, type **ping**, and press the ENTER key. Review the usage notes for PING.
- b. At the command prompt, type **ping 127.0.0.1**, and press the ENTER key to test TCP/IP on your local host computer.
- c. At the command prompt, type **ping xxx.xxx.xxx.xxx**, where xxx.xxx.xxx.xxx is the host IP address listed in Table 33-1. Now press the ENTER key to test your local TCP/IP connection. Your screen should appear similar to Figure 33-9.

```
MS-DOS Prompt
9 x 15
Reply from 127.0.0.1: bytes=32 time<10ms TTL=128
Reply from 127.0.0.1: bytes=32 time<10ms TTL=128
Reply from 127.0.0.1: bytes=32 time<10ms TTL=128
Reply from 127.0.0.1: bytes=32 time<10ms TTL=128
Ping statistics for 127.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\WINDOWS>ping 192.168.0.8
Pinging 192.168.0.8 with 32 bytes of data:
Reply from 192.168.0.8: bytes=32 time<10ms TTL=128
Reply from 192.168.0.8: bytes=32 time<10ms TTL=128
Reply from 192.168.0.8: bytes=32 time<10ms TTL=128
Reply from 192.168.0.8: bytes=32 time<10ms TTL=128
Ping statistics for 192.168.0.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\WINDOWS>
```

Figure 33-9: PING can Test the Local Host

- d. At the command prompt, type **ping 206.61.210.100**, and press the ENTER key to test your connection to the remote server at Marcraft. You should see a screen similar to Figure 33-10.
- e. Close all open windows, and shut down the computer.

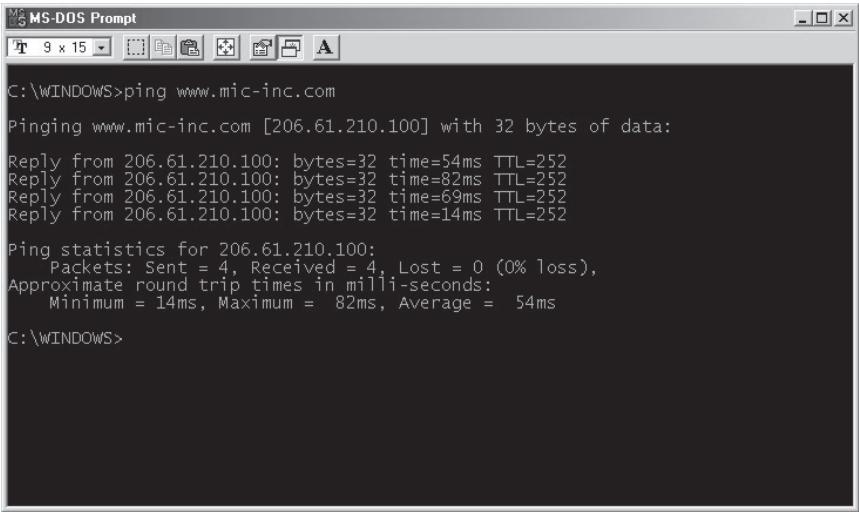


Figure 33-10: PINGing the Marcraft Server

TABLES

Table 33-1

Modem Connection Preferences	
Host Name	
DNS Servers	
Node Type	
NetBIOS Scope ID	
IP Routing Enabled	
WINS Proxy Enabled	
NetBIOS Resolution Uses DNS	
Description	
Physical Address	
DHCP Enabled	
IP Address	
Subnet Mask	
Default Gateway	
DHCP Server	
Primary WINS Server	
Secondary WINS Server	
Lease Obtained	
Lease Expires	

PROCEDURE - 33

Table 33-2

More Info - Current Lease Information	
Lease Obtained	
Lease Expired	

Table 33-3

New Lease Information	
Lease Obtained	
Lease Expired	

Table 33-4

IP Addresses of Host Computer	
Interface Line	

Table 33-5

IP and Physical MAC addresses		
IP Address	Physical MAC Address	Type

Table 33-6

Net View Host Names	

Table 33-7

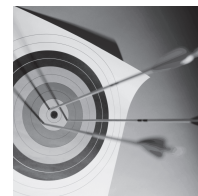
IP Address	
IP Address for www.microsoft.com:	

Table 33-8

New IP Address	
New IP Address for www.microsoft.com:	

LAB QUESTIONS

1. Which TCP/IP utility can identify the NetBIOS, IP address, and portal information for connected network hosts?
2. Where do you enter the command to run a TCP/IP utility program?
3. What command will match a NetBIOS host name with the appropriate IP address?
4. Which command will resolve the IP and physical MAC addresses of the nodes connected to your network?
5. Name a web site that frequently changes its IP address as a security precaution?



Feedback

