

**HP Telnet/iX User's Guide**  
**HP 3000 MPE/iX Computer Systems**  
**Edition 2**



**36957-90156**  
**E1098**

Printed in: U.S.A. October 1998

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## **Preface**

The HP Telnet/iX product provides the ARPA Telecommunications Network Protocol (Telnet) service over TCP/IP to MPE/iX users who want simultaneous direct access to HP 3000, HP 9000, and non-HP systems, which support Telnet.

The chapters in this manual are organized as follows:

- Chapter 1, “Overview,” is a general summary of the Internet Services and what is provided on MPE/iX. A discussion of the MPE/iX Telnet implementations is also included.
- Chapter 2, “Telnet/iX Client Commands,” provides an alphabetic listing of Telnet/iX Client commands including syntax and a brief description of usage.
- Chapter 3, “Using the Telnet/iX Client,” provides a task-oriented approach to using the Telnet/iX Client.
- Chapter 4, “Accessing the Telnet/iX Server,” provides a task-oriented approach to accessing the Telnet/iX Server.
- Chapter 5, “Troubleshooting,” provides troubleshooting steps for resolving problems you may have using the Telnet/iX product.
- Glossary provides terms and definitions for Internet services and networking.

## **Related Documentation**

The following manuals contain information related to the product described in this manual. You may need information from one or all of the manuals listed here.

### **Internet Services**

*Configuring and Managing MPE/iX Internet Services Manual*

### **Software Installation**

*HP 3000 MPE/iX System Software Maintenance Manual*

*MPE/iX Documentation Guide*

### **General Networking**

*NS 3000/iX Operations and Maintenance Reference Manual*

*NS 3000/iX NMMGR Screens Reference Manual*

*NS 3000/iX Error Messages Reference Manual*

## **Link Products**

*HP 3000/iX Network Planning and Configuration Guide*

*(For NMMGR): Using the Node Management Services (NMS) Utilities*

## **MPE/iX**

*MPE/iX Error Messages Manual Volume I, II, and III*

*MPE/iX Commands Reference Manual*

*Asynchronous Serial Communications Programmer's Reference Manual*

*Command Interpreter Access and Variable Programmer's Guide*

## **DTC Telnet Access**

*Using HP OpenView DTC Manager*

*DTC Planning Guide*

## **FTP**

*Installing and Managing HP ARPA File Transfer Protocol Network Manager's Guide*

*HP ARPA File Transfer Protocol User's Guide*



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# 1

## Overview

This chapter briefly describes Telnet as part of the Internet Services and what is provided on MPE/iX. In addition, a discussion of who should use this manual is included.

## Internet Services

The **Internet Services** are a set of services that enable the HP 3000 computer to exchange information with remote computer systems on the network. The services on the HP 3000 include Telnet, FTP, inetd, tftp, and BOOTP.

On MPE/iX versions prior to 5.5, Telnet/iX was identified as part of the ARPA Services on the HP 3000. **ARPA (Advanced Research Projects Agency)** services are a subset of the MPE/iX Internet Services.

For information on the MPE/iX Internet Services refer to *Configuring and Managing MPE/iX Internet Services Manual*.

## Telnet

The **Telnet protocol** provides a standard virtual terminal connection between the HP 3000 and other HP and non-HP systems. MPE/iX Telnet connections can be made using one of two solutions: 1) via a direct HP 3000 implementation called “Telnet/iX” which enables users to have direct access to or from an HP 3000 using the Telnet protocol. This product provides both *inbound* and *outbound* Telnet connections using only HP 3000 resident code; 2) via a **Datacommunications and Terminal Controller (DTC)** with a Telnet Access Card (herein referred to as “**DTC Telnet Access**”) which provides only *inbound* Telnet access to an HP 3000 through a DTC.

A brief description follows for each Telnet implementation. The remainder of this manual mainly addresses the Telnet/iX product solution. For more information on the “DTC Telnet Access” implementation, see *Using HP OpenView DTC Manager* and the *DTC Planning Guide* (note that this solution may be referred to as “**Telnet Access**” in these manuals).

## **Who Should Use this Manual**

This manual is intended for MPE/iX users who want to use the Telnet/iX product to communicate between the HP 3000 and other systems that support Telnet.

## **Before Using this Telnet/iX Product**

In order to use the Telnet/iX product, it must first be installed and configured on the HP 3000 acting as the Client and/or Server. Refer to *Configuring and Managing MPE/iX Internet Services* manual. In addition, Telnet must be installed and configured on remote systems on your network that will be accessed by the Telnet/iX Client or that will provide Telnet client services to connect you to your HP 3000 Telnet/iX Server. Your network administrator must also have the network and all accessed servers up and running.

## Telnet/iX Client & Server

Telnet/iX provides the Telnet service over Transmission Control Protocol/Internet Protocol (TCP/IP) on MPE/iX. The **Telnet/iX Client** enables users on an HP 3000 to have direct access to HP 9000, HP 3000, and non-HP systems that support Telnet and TCP/IP.

The **Telnet/iX Server** enables users on a remote system running standard Telnet services to log on and run most applications on the HP 3000. Many MPE/iX file system intrinsics are supported over Telnet/iX Server connections. Please see the *Asynchronous Serial Communications Programmer's Reference Manual* for more details.

Telnet/iX can be used with systems supporting the Telnet protocol such as the HP 3000, HP 9000, and many non-HP systems. It is supported over the same links as TCP/IP on the HP 3000 including IEEE 802.3, Ethernet local area networks (LANs), X.25 wide area networks, Fiber Distributed Data Interface (FDDI), and Token Ring.

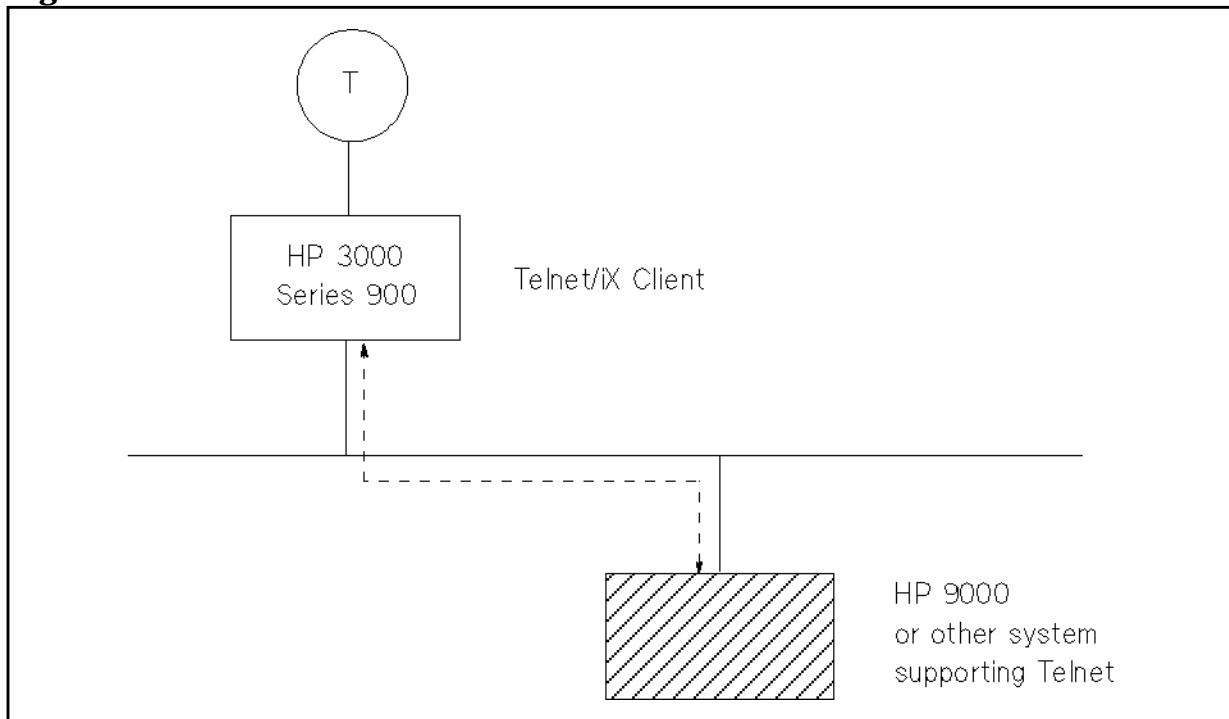
### Client

The Telnet/iX Client can perform the following tasks:

- Connect to a remote host system from a HP 3000
- Access applications on the remote host system
- Send/Receive ASCII or binary data

The user enters Telnet/iX Client commands from the MPE/iX system. The remote host responds with messages and data requested by the Telnet/iX Client as shown in Figure 1-1.

**Figure 1-1 Telnet/iX Client**



The Telnet/iX Client supports eight-bit characters when communicating with the remote host. To use eight-bit characters, you may need to reconfigure your terminal or the remote host. Additionally, you may need to enable the `binary` option to allow an eight-bit data stream between the Telnet/iX Client and the remote host. Note that some remote hosts may not support eight-bit characters.

The Telnet/iX Client program may be issued from a regular MPE/iX session or from within a program. It may not, however, be issued from a batch job or with the use of input/output redirection. Additionally, it is not supported when access to the MPE/iX session is from an MPE/V system or a PC using **Virtual Terminal (VT)**.

If you are using the Telnet/iX Client for the first time, review the Telnet/iX Client commands in Chapter 2, "Telnet/iX Client Commands." Chapter 3, "Using the Telnet/iX Client," provides a task-oriented approach to using the Telnet/iX Client and includes a discussion of tasks such as viewing Telnet/iX status, setting or toggling Telnet/iX variables to specific values, and suspending Telnet/iX.

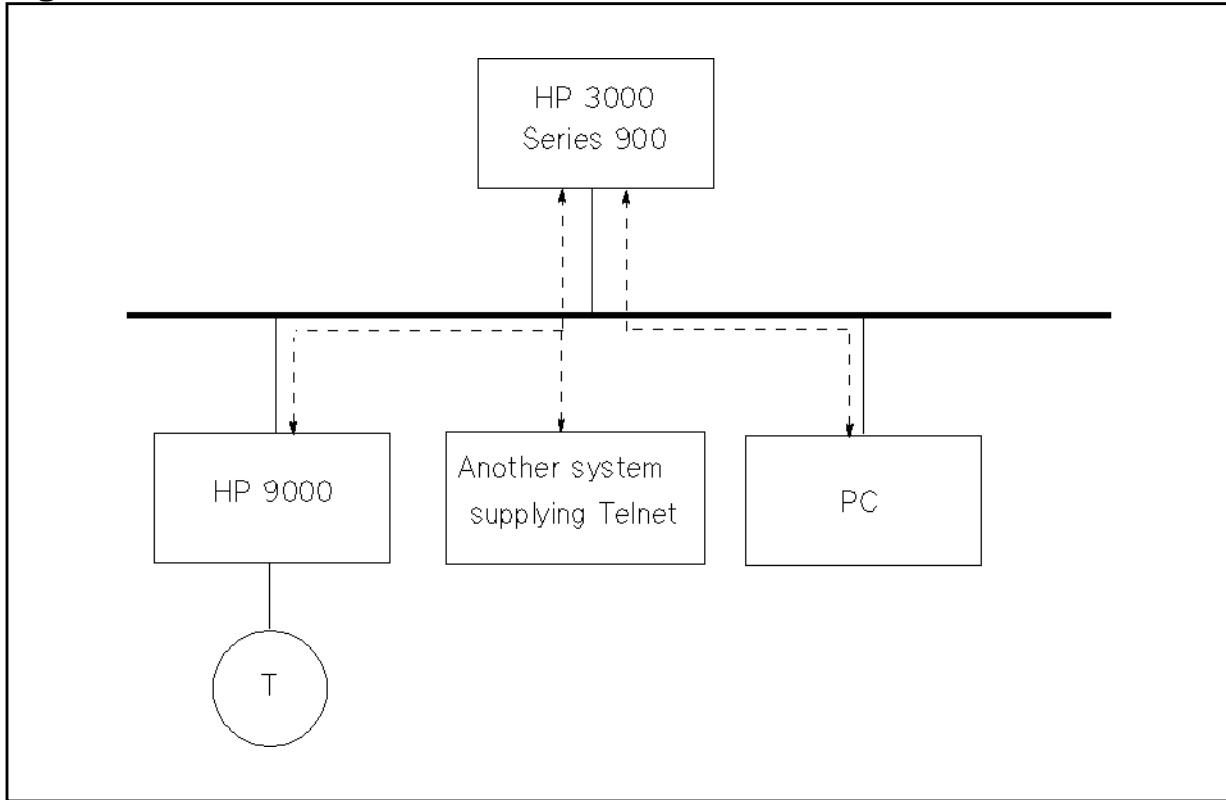
## Server

The Telnet/iX Server can perform the following tasks:

- Accept connection from local client.
- Access to the MPE/iX Command Interpreter and many HP 3000 applications.

After logging on to the remote HP 3000, the user can enter MPE/iX CI commands or access MPE applications on the remote HP 3000. The remote HP 3000 responds with messages and data to the local client. The local client may be a PC, HP 3000, HP 9000, or any system supporting the Telnet Protocol as shown in Figure 1-2.

**Figure 1-2**      **Telnet/iX Server**



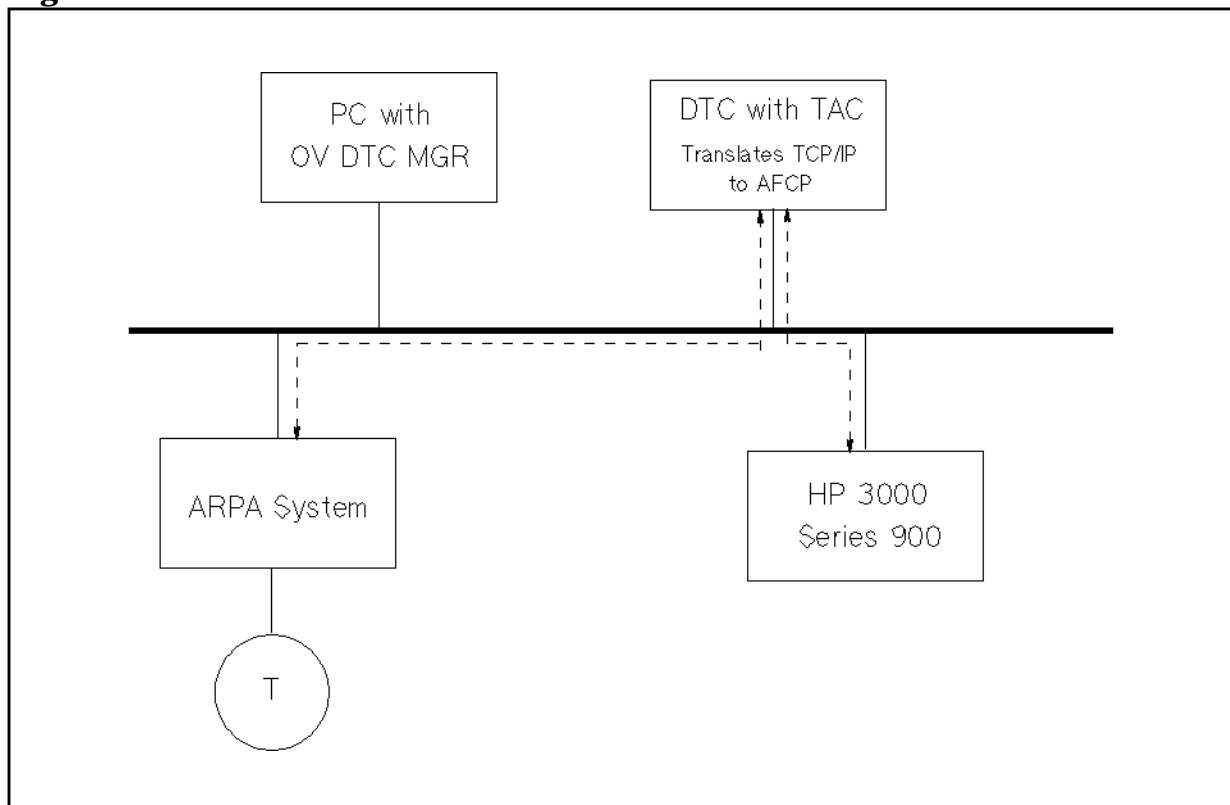
## DTC Telnet Access

Another Telnet implementation is **DTC Telnet Access**. DTC Telnet Access provides Telnet connections from HP 9000 and non-HP systems running ARPA standard Telnet services to the HP 3000. The DTC Telnet Access solution includes a **Telnet Access Card (TAC)** that resides in the DTC 72MX or DTC 48 and provides protocol conversion between Telnet and **Avesta Flow Control Protocol (AFCP)**. Equivalent functionality is provided by the **Telnet Express Box (TEB)** (HP 2344A).

Figure 1-3 shows a terminal user connected to an ARPA node using the Telnet service to access an HP 3000 system. The TAC in the DTC converts the Telnet traffic into AFCP traffic for the HP 3000.

The remainder of this manual will focus on the HP 3000 Telnet/iX product. For more information on DTC Telnet Access, see *Using HP OpenView DTC Manager* and the *DTC Planning Guide*.

**Figure 1-3** DTC Telnet Access







This chapter provides a quick reference of the syntax and usage of the Telnet/iX Client commands. The commands are listed in alphabetic order.

## Quick Reference

Telnet/iX Client commands can be entered in upper case or lower case letters. Command abbreviations are not supported.

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**NOTE**

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Telnet/iX Client commands can only be entered in Telnet/iX command mode (at the `telnet>` prompt); entering a command at the remote host's prompt when connected to a remote host will result in an error.

While connected to a remote host, Telnet/iX command mode can be entered by typing **[CTRL-]** (the default value). Once you are in Telnet/iX command mode and have entered a client command, you are automatically returned to remote host control (except for when entering the `?` or `HELP` command). However, you will not see the remote host's prompt until you press the **[Return]** key. If you entered the `?` or `HELP` command in Telnet/iX command mode, you will remain in command mode and can enter another client command. Alternatively, you can return to the remote host's prompt by pressing the **[Return]** key twice.

To close a Telnet/iX session, type `close` in Telnet/iX command mode. If the session was started from command mode, you return to command mode; otherwise, you exit the Telnet/iX Client and return to the MPE/iX prompt. To close any open Telnet/iX session and automatically exit the Telnet/iX Client, regardless of where the session was started, type `quit` at the `telnet>` prompt.

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**NOTE**

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The Telnet/iX Client supports eight-bit characters when communicating with the remote host. To use eight-bit characters, you may need to reconfigure your terminal or the remote host. Additionally, you may need to enable the `binary` option to allow an eight-bit data stream between the Telnet/iX Client and the remote host. Note that some remote hosts may not support eight-bit characters.

? *[command]* Displays a list of valid Telnet/iX Client commands and corresponding one-line command descriptions. If *command* is specified, Telnet/iX displays a one-line description of that command only. Equivalent to `HELP` command.

!*mpecommand* From within a Telnet/iX session you can execute an MPE/iX command or program by entering an exclamation point (!) followed by the command or program name. After the command is executed, or the program is exited, you are returned to your active session.

CLOSE Closes the active session. If the session was started from command mode, Telnet/iX returns to command mode; otherwise, you exit the program.

DISPLAY <i>[argument]</i>	Displays all <code>set</code> and <code>toggle</code> values. If <i>argument</i> is specified, Telnet/iX will display the <code>set</code> or <code>toggle</code> value for that argument only.
HELP <i>[command]</i>	Displays a list of valid Telnet/iX Client commands and corresponding one-line command descriptions. If <i>command</i> is specified, Telnet/iX displays a one-line description of that command only. Equivalent to <code>? command</code> .
MODE <i>[mode]</i>	Changes the user input mode to the <i>mode</i> specified. The value of <i>mode</i> can be <code>character</code> , for “character at a time” mode, or <code>line</code> , for “line by line” mode. The Telnet/iX Client asks the remote host for permission to go into the requested mode. If the remote host is capable of entering that mode, the protocol enters the requested mode. In <code>character</code> mode, Telnet/iX sends each character to the remote host as it is typed. In <code>line</code> mode, Telnet/iX accumulates user input into lines and transmits each line to the remote host when the user types the [Return] key, a linefeed, or EOF (default is [CTRL]-D). Be aware that setting <code>line</code> mode also sets local echo. Applications that expect to interpret user input character by character (such as UNIX utilities: <code>more</code> , <code>cs</code> , <code>ks</code> , and <code>vi</code> ) do not function correctly in <code>line</code> mode.
OPEN <i>[remotehostname]</i> <i>[port]</i>	Opens a connection to the named host at the specified <i>port</i> . If <i>port</i> is not specified, the Telnet/iX Client attempts to contact a server at the standard Telnet port (23). <i>remotehostname</i> can be either the official name or an alias, or an Internet address specified in the dot notation (refer to the <i>HP 3000/iX Network Planning and Configuration Guide</i> for more information on Internet addresses). If <i>remotehostname</i> is not specified, Telnet/iX prompts for one.
QUIT	Closes any open session and exits the Telnet/iX Client.
SEND <i>[argument]</i>	Sends one or more special character sequences to the remote host (more than one <i>argument</i> can be specified at a time). An open connection must already exist in order to use this command. The following are the arguments which can be specified:  ?                    Displays help information for the <code>SEND</code> command.

ao	Sends the Telnet <b>AO</b> (Abort Output) sequence which should (if the remote system supports this sequence) cause the remote system to flush all output from the remote system to the user's terminal.
ayt	Sends the Telnet <b>AYT</b> (Are You There) sequence to which the remote system should (if the remote system supports this sequence) respond.
brk	Sends the Telnet <b>BRK</b> (Break) sequence which will (if the remote system supports this sequence) have significance to the remote system.
ec	Sends the Telnet <b>EC</b> (Erase Character) sequence which should (if the remote system supports this sequence) cause the remote system to erase the last character entered.
el	Sends the Telnet <b>EL</b> (Erase Line) sequence which should (if the remote system supports this sequence) cause the remote system to erase the line currently being entered.
escape	Sends the Telnet escape character (default is <b>[CTRL]-</b> ).
ga	Sends the Telnet <b>GA</b> (Go Ahead) sequence which has significance to the remote system only in the rare case when the connection to the remote system is half duplex.
ip	Sends the Telnet <b>IP</b> (Interrupt Process) sequence which should (if the remote system supports this sequence) cause the remote system to abort the currently running process.
nop	Sends the Telnet <b>NOP</b> (No Operation) sequence.
synch	Sends the Telnet <b>SYNCH</b> sequence which causes the remote system to discard all previously typed (but not yet read) input. This sequence is sent as TCP urgent data. This argument may

not be supported on some remote systems; an `r` will be echoed on the user's terminal if it is not supported.

`SET [argument]  
[value]`

Sets *argument* entered to *value*. The special value `off` turns off the function associated with the variable. There is no special value `on`, which turns the function back on; you must assign a value to the variable. Use the `DISPLAY` command to list the current values of arguments. Valid arguments include:

- |                          |                                                                                                                                                                                                                                                                             |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>echo</code>        | In "line by line" mode, <code>echo</code> toggles between performing local echoing of entered characters (for normal processing) and suppressing echoing of entered characters (for entering a password, for instance). Default is <code>[CTRL]-E</code> .                  |
| <code>eof</code>         | Entering <code>eof</code> as the first character on a line will result in an EOF being sent to the remote system if the Telnet/iX Client is operating in <code>line</code> mode (see <code>MODE [mode]</code> command). Default is <code>[CTRL]-D</code> .                  |
| <code>erase</code>       | <code>erase</code> sends the Telnet EC sequence to the remote host if the Telnet/iX Client is in <code>localchars</code> mode (see <code>TOGGLE [argument]</code> command) and in character mode (see <code>MODE [mode]</code> command). Default is <code>[CTRL]-H</code> . |
| <code>escape</code>      | <code>escape</code> represents the escape character which enables you to enter into Telnet/iX command mode when connected to a remote system. Default is <code>[CTRL]-.</code>                                                                                              |
| <code>flushoutput</code> | <code>flushoutput</code> sends the Telnet AO sequence to the remote host if the Telnet/iX Client is in <code>localchars</code> mode (see <code>TOGGLE [argument]</code> command). Default is <code>[CTRL]-O</code> .                                                        |
| <code>interrupt</code>   | <code>interrupt</code> sends the Telnet IP sequence to the remote host if the Telnet/iX Client is in <code>localchars</code> mode (see <code>TOGGLE [argument]</code> command). Default is <code>[CTRL]-Y</code> .                                                          |

kill	kill sends the Telnet EL sequence to the remote host if the Telnet/iX Client is in localchars mode (see TOGGLE [argument] command) and in character mode (see MODE [mode] command). Default is [CTRL]-X.
quit	quit sends the Telnet BRK sequence to the remote host if the Telnet/iX Client is in localchars mode (see TOGGLE [argument] command). Default is [CTRL]-\.
STATUS	Shows current status of the Telnet/iX Client. The program reports the current escape character. If there is no Telnet/iX connection, the program reports No connection. If there is an open Telnet/iX connection, the program reports the host to which it is connected and the current mode.
TOGGLE [argument]	Toggles argument value between TRUE and FALSE which affects how the Telnet/iX Client responds to events. More than one argument may be specified. Use the DISPLAY command to list the current values of arguments. Valid arguments include:
?	Help. Displays the supported TOGGLE commands.
autoflush	Toggles autoflush mode. If autoflush and localchars are both TRUE, then when the ao, intr, or quit characters are recognized and transformed into Telnet sequences, the Telnet/iX Client will not display any data on the user's terminal until the remote system acknowledges (via a Telnet Timing Mark option) that it has processed those Telnet sequences. Default is FALSE.
autosynch	Toggles autosynch mode. If autosynch and localchars are both TRUE, then when either the intr or quit characters is typed, the associated Telnet sequence sent is followed by the Telnet SYNCH sequence. This procedure should (if supported by the remote system) cause the remote system to begin discarding all

	previously typed input until both of the Telnet sequences have been read and acted upon. Default is <code>FALSE</code> .
<code>binary</code>	Toggles binary mode. If this is <code>TRUE</code> , binary mode is enabled. This option should be enabled to send and receive 8-bit characters to and from the Telnet server. Default is <code>FALSE</code> .
<code>crlf</code>	Toggles carriage return/line feed mode. If this is <code>TRUE</code> , carriage returns will be sent as <code>&lt;CR&gt;&lt;LF&gt;</code> . If this is <code>FALSE</code> , carriage returns will be sent as <code>&lt;CR&gt;&lt;NUL&gt;</code> . Default is <code>FALSE</code> .
<code>crmod</code>	Toggles carriage return mode. If this is <code>TRUE</code> , any carriage return characters received from the remote host are mapped into a carriage return and a line feed. This mode does not affect those characters typed by the user, but rather, only those received. This mode is only required for some hosts that require the client to do local echoing but output carriage returns without linefeeds. Default is <code>FALSE</code> .
<code>debug</code>	Toggles the debug tracing option. If this is <code>TRUE</code> , you will create socket trace files (named <code>SOCK####</code> ). The trace files are formatted using <code>NMDUMP</code> . For information on using <code>NMDUMP</code> see the <i>NS 3000/iX Operations and Maintenance Reference Manual</i> .
<code>echo</code>	Toggles local echo mode or remote echo mode. If this is <code>TRUE</code> , local echo mode is enabled and user input is echoed to the user's terminal before being transmitted to the remote host. If this is <code>FALSE</code> , remote echo mode is enabled and any echoing of user input is done by the remote host. Applications that handle echoing of user input themselves, such as UNIX utilities <code>csh</code> , <code>ksh</code> , and <code>vi</code> , will not function properly with local echo. Default is <code>FALSE</code> .
<code>localchars</code>	Toggles local characters mode. If this is <code>TRUE</code> , the <code>flush</code> , <code>interrupt</code> , <code>quit</code> , <code>erase</code> , and <code>kill</code> characters (see <code>SET</code>

*[argument] [value]* command) are recognized locally and transformed into appropriate Telnet control sequences (ao, ip, brk, ec, and el, respectively). Default is TRUE in line mode and FALSE in character mode.

netdata	Toggles the display of all network data (in hexadecimal format). If this is TRUE, all network data is displayed. Default is FALSE.
options	Toggles viewing of Telnet options processing. If this is TRUE, options viewing is enabled and all option negotiations are displayed. Options sent by the Telnet/iX Client are displayed as SENT, while options received from the remote host are displayed as RCVD. Default is FALSE.
Z	Suspends the Telnet/iX Client and returns you to the MPE/iX session command line where you first invoked the program. Issuing this command is equivalent to pressing the [Break] key. The RESUME or ABORT command can then be used on this program.



This chapter provides you with the information you can use to accomplish the following tasks with the Telnet/iX Client:

- Running the Telnet/iX Client Program
- Viewing Telnet/iX Client Status
- Connecting and Logging on to a Remote Host
- Viewing a Remote Directory
- Displaying/Setting/Toggling Telnet/iX Client Values
- Suspending the Telnet/iX Client
- Issuing MPE/iX Commands From Within Telnet/iX
- Exiting the Telnet/iX Client

The examples in this chapter show output received from an MPE/iX user's terminal accessing an HP 9000 workstation.

Commands issued after connection to a remote host must be consistent with that host's user interface.

To follow the same steps as the examples, make sure you have the following:

- Remote logon name and password
- Remote system internet protocol (IP) address

---

**NOTE**

Telnet/iX Client commands can be entered in upper or lower case letters. Upper case letters for *client commands* are used in the examples for clarity.

---

## Running the Telnet/iX Client Program

After you have established a session on the MPE/iX system, at the MPE/iX prompt enter:

```
:TELNET
```

A banner similar to the following appears:

```
Telnet Client [A5500000] (C) Hewlett-Packard Co. 1994  
telnet>
```

If your CI variable, HPPATH, does not include ARPA.SYS, you can also enter the command as:

```
:TELNET.ARPA.SYS
```

or

```
:RUN TELNET.ARPA.SYS
```

To exit from the Telnet/iX Client at any time, enter QUIT at the telnet> prompt.

## Run-Time Options

You can start the Telnet/iX Client program and connect to a remote host in one step by using the INFO= string in the form:

```
:RUN TELNET.ARPA.SYS;INFO="remotehostname port"
```

*remotehostname* is the ARPA domain name (if the address of the Domain Names Services (DNS) Server is configured in the RESLVCF.NET.SYS file or the domain name is configured in the local HOSTS.NET.SYS file), the NS node name (if the remote and local hosts support Probe protocol or if the remote host name is configured in the local network directory), or the Internet Protocol (IP) address. *port* is the port designated for the Telnet/iX connection, (if no port is specified, the program attempts to contact a Telnet server at the standard Telnet port (23)) designated for the Telnet/iX connection supplied by your network administrator.

Once the connection has been established, enter the remote user login name and password when prompted as described in a later section under "Connecting and Logging On to a Remote Host".

## Viewing Telnet/iX Client Status

You can view current Telnet/iX Client status regarding existing Telnet/iX connections and the current escape character by typing the **STATUS** command at the `telnet>` prompt:

```
telnet> STATUS
No connection.
Escape character is "^]".
telnet>
```

If there is an open Telnet/iX connection, this command reports the host to which you are connected and the current mode. For example:

```
telnet> STATUS
Connected to nodex3.test.hp.
Operating in character-at-a-time mode.
telnet>
```

## Connecting and Logging On to a Remote Host

From the Telnet/iX Client, you must establish a connection to the remote host you wish to access.

From the `telnet>` prompt, enter the **OPEN** command followed by the `remotehostname` which is the ARPA domain name or NS node name if the Internet Protocol (IP) address, (see “Node Names” below), and `port` (if no port is specified, the program attempts to contact a Telnet server at the standard Telnet port (23)) designated for the Telnet/iX connection supplied by your network administrator:

```
telnet> OPEN [remotehostname] [port]
```

---

**NOTE**

---

Only one connection can be open at any given time. In order to open a second connection, the first must be closed.

IP addresses are assigned by your network administrator to uniquely identify computer systems to allow communication between systems on the network.

IP addresses, also called internet addresses, are in the form:

*nnn.nnn.nnn.nnn*

Where *nnn* is a number from 000 to 255, inclusive. For example, if the IP address of the remote system is `192.1.20.125`, you would enter:

```
telnet> OPEN 192.1.20.125
```

### Node Names

Besides using IP addresses with the Telnet/iX Client **OPEN** command, you can use either an ARPA domain name or an NS node name in the **OPEN** command. NS names are recognized if the remote and local hosts support the Probe protocol or if the remote host name is configured in your local node network directory. ARPA domain names are configured in the ASCII file `HOSTS.NET.SYS`; or an address which points to a system running Domain Names Services (DNS) is configured in the ASCII file `RESLVCNF.NET.SYS`. For ARPA domain name configuration information, refer to the *HP 3000/iX Network Planning and Configuration Guide*. Obtain the node names from your network administrator. For example, if the name, `node2`, is configured as a remote host name on your network, you can enter:

```
telnet> OPEN node2
```

## Logging On

When opening a remote host connection, you can use any of the following:

```
telnet> OPEN [IP address] [port]
or OPEN [ARPA domain name] [port]
or OPEN [NS node name] [port]
```

or

```
:telnet [IP address] | [ARPA domain name] | [NS node name] [port]
```

Once the connection has been established, enter the remote user login name and password when prompted. You must know the user logon syntax for the remote host you are accessing. For example, an HP 9000 login name could be: myname. You would enter the following when prompted:

```
login: myname
password: (enter password)
/users/student:
```

Passwords are not echoed back to your terminal screen.

## Closing a Connection/Accessing Another Remote Host

After establishing a connection to a remote host from Telnet/iX command mode, you can access another remote host by first typing the escape character (default [CTRL-]), entering the **CLOSE** command, and then entering another **OPEN** command (the **CLOSE** command is necessary, because only one connection can be open at any give time):

```
telnet> CLOSE
telnet> OPEN [remotehostname] [port]
```

If you issue the **CLOSE** command without an existing open connection, you will see the message "? Need to be connected first."

---

**NOTE**

---

If you established a connection to a remote host via the run-time option, issuing the **CLOSE** command will exit you from the Telnet program.

## Viewing a Remote Directory

With the Telnet/iX Client, you can view the remote working directory. Enter the UNIX `ls` command at the HP 9000's prompt. A listing of the files in the remote working directory is displayed.

```
/users/student: ls  
progl  progl.o  headerA.h  
/users/student:
```

## Displaying/Setting/Toggling Telnet/iX Client Values

You can set or toggle Telnet/iX Client variables to specific values. Use the **DISPLAY** command at the `telnet>` prompt to list the current values of variables.

```
telnet> DISPLAY
will flush output when sending interrupt characters.
won't send interrupt characters in urgent mode.
won't map carriage return on output.
won't recognize certain control characters.
won't turn on socket level debugging.
won't print hexadecimal representation of network traffic.
won't show option processing.

[^E]  echo.
[^]]  escape.
[^H]  erase.
[^O]  flushoutput.
[^Y]  interrupt.
[^X]  kill.
[^\\] quit.
{^D}  eof.
telnet>
```

Values shown in this example are default values. To display the value of particular **SET** and **TOGGLE** variables only, type these arguments after the **DISPLAY** command.

### Setting Telnet/iX Client Values

You can set particular Telnet/iX Client variables to specific values using the **SET** command. See Chapter 2, “Telnet/iX Client Commands,” for a summary of the variables that can be set using this command. For example, to set the escape character to **[CTRL]-C**, type the following at the `telnet>` prompt:

```
telnet> SET ESCAPE [CTRL]-C
escape character is "^C".
```

You can use the **DISPLAY** command to verify the new value of the escape character.

### Toggling Telnet/iX Client Values

You can also toggle particular Telnet/iX Client values using the **TOGGLE** command. See Chapter 2, “Telnet/iX Client Commands,” for a summary of the variables that can be toggled using this command. For example, to enable carriage return mode from its default disabled state (**FALSE**), type the following at the `telnet>` prompt:

```
telnet> TOGGLE CRMOD
Will map carriage return on output.
```

Using the Telnet/iX Client

### Displaying/Setting/Toggling Telnet/iX Client Values

You can use the `DISPLAY` command to verify that carriage return mode is enabled.



## Suspending the Telnet/iX Client

You can suspend the Telnet/iX Client and return to the MPE/iX prompt by using the **Z** command:

```
telnet> Z  
:
```

Suspending the Telnet/iX Client using this command is equivalent to pressing the **[Break]** key. The **RESUME** or **ABORT** command can then be used on the program.

## Issuing MPE/iX Commands From Within Telnet/iX Client

You can enter MPE/iX commands by preceding the command name with an exclamation point (!). The command will execute, and return you to the `telnet>` prompt on completion. For example, you can list your current group files on your local system with the `LISTF` command as follows:

```
telnet> !LISTF,2
ACCOUNT = SYS          GROUP = ARPA
FILENAME  CODE          -----LOGICAL RECORD-----
                SIZE      TYP      EOF      LIMIT
BLDPARMS          80B      FA       22       22
FTP              NMPRG    128W     FB      985     985
FTPDOC           80B      FA      234    204800
TELNET          NMPRG    128W     FB     2104    2104
TELNTDOC        80B      FA       43       43
[RETURNING TO REMOTE]
```

From within the Telnet/iX Client, you cannot change groups. To list files in other than the current group, include the group name in the `LISTF` command. For example:

```
telnet> !LISTF @.group1
```

You can also run programs, such as an editor, from the Telnet/iX Client. Upon exiting the program, you are returned to the `telnet>` prompt, if you did not originally have a remote connection.

You can also issue MPE/iX commands while connected to a remote host. Type `[CTRL-]` to get the Telnet prompt, and issue the command preceded by the exclamation point (!) as above.

## Exiting the Telnet/iX Client

To close any open Telnet/iX session and exit the Telnet/iX Client, use the `QUIT` command:

```
telnet> QUIT  
:
```

Using the Telnet/iX Client  
**Exiting the Telnet/iX Client**

This chapter provides you with the information you can use to accomplish the following tasks with the Telnet/iX Server:

- Connecting and Logging On to an HP 3000 Remote Host
- Using the MPE Command Interpreter
- Suspending the MPE Session
- Checking the Telnet Connection Status
- Exiting the MPE Session

The examples in this chapter show output received from a Telnet client connection accessing an HP 3000 running MPE/iX version 5.5 or later.

Commands issued to the Telnet/iX Server must be supported by the MPE/iX command interpreter (CI).

To follow the same steps as the examples, make sure you have the following:

- Remote logon name and password
- Remote system internet protocol (IP) address

## Connecting and Logging On to an HP 3000 Remote Host

After you have established a session to your local system, which supports the Telnet protocol and TCP/IP, run the Telnet client on that system. Use the client to establish a Telnet connection to the HP 3000 running MPE/iX version 5.5 or later.

The same commands are used to connect to any remote host supporting the Telnet protocol.

For information on connecting and logging on to a remote host, refer to Chapter 3, "Using the Telnet/iX Client."

### Logging On

Once the connection has been established, you will be prompted with the HP 3000 system prompt. At the system prompt, issue the MPE **:HELLO** command.

For example, from an HP 9000:

```
:telnet node3000
Trying...
Connected to node3000.cup.hp.com.
Escape character is "^]".
MPE XL: hello manager.sys
HP3000 Releases: N.55.08 User Version: N.55.08 TUE, JAN 16, 1996, 10:35 AM
MPE/iX HP31900 C.03.18 Copyright Hewlett-Packard 1987. All rights reserved.
```

```
*****
*                                     *
*           Welcome to the HP 3000     *
*                                     *
*****
```

```
You are logged onto ldev 2.
node3000(PUB):
```

---

**NOTE**

To return to the Telnet prompt from the MPE session, issue the escape character [CTRL]-].

Once connected to the HP 3000, issue MPE/iX commands as you would from a DTC, VT, or console connection.

## Using the MPE Command interpreter

After establishing a connection on the HP 3000 remote host, you now have access to the MPE command interpreter. For example, you can view the HP 3000 file directory by issuing the `:LISTF` command. A listing of the files in the HP 3000 file directory is displayed.

```
node3000(PUB): listf nmconfig,3
*****
FILE: NMCONFIG.PUB.SYS
FILE CODE          :      1192      FOPTIONS          :      ASCII, FIXEDC, NOCCTL, STD
BLK FACTOR         :      240      CREATOR           :      **
REC SIZE           :      32 (BYTES)  LOCKWOOD          :      **
BLK SIZE           :      7680 (BYTES) SECURITY--        READ              :      ANY
EXT SIZE           :      420 (SECT)   WRITE             :      ANY
NUM REC:           2275                APPEND           :      ANY
NUM SEC:           512                LOCK             :      ANY
NUM EXT:           2                  EXECUTE          :      ANY
MAX REC:           25600                **SECURITY IS ON

MAX EXT            :      8          FLAGS              :      NO ACCESSORS
NUM LABELS         :      0          CREATED            :      TUE, JAN 9, 1996, 11:51 AM
MAX LABELS         :      0          MODIFIED           :      MON, JAN 15, 1996, 2:32 PM
DISC DEV #         :      1          ACCESSED           :      MON, JAN 15, 1996, 2:33 PM
SEC OFFSET         :      0          LABEL ADDR        :      **
VOLNAME            :      MPEXL_SYSTEM_SET:MEMBER1
```

```
node3000(PUB): listf nmc@,2
ACCOUNT = SYS          GROUP = PUB
```

FILENAME	CODE	-----LOGICAL RECORD-----					-----SPACE-----		
		SIZE	TYP	EOF	LIMIT	R/B	SECTORS	#X	MX
NMCAT*		80W	FA	13828	20000	16	4608	18	*
NMCBACK	NCONF	32B	FA	2255	25600	240	512	2	8
NMCFG	NCONF	32B	FA	2255	25600	240	512	1	8
NMCONFIG	NCONF	32B	FA	2255	25600	240	512	2	8
NMCONFIGX	NCONF	32B	FA	2255	25600	240	512	2	*
NMCONSOL*	NMPRG	128W	FB	2407	2407	1	2416	10	*

## Suspending the MPE Session

Suspend the remote MPE session and return to the local system prompt by using the **Z** command. For example if the local system is an HP 9000:

```
node3000(PUB): [CTRL-]  
telnet> Z
```

```
[1] + Stopped
```

```
telnet node3000
```

```
/usr: ls  
adm          diag          include       lost+found    vue  
bin          doc           lib           man  
contrib     etc           local         news
```

To resume the remote MPE session, issue the appropriate command on the local system. For example, if the local system is an HP 9000, issue the **fg** command.

```
/usr: fg  
telnet node3000  
node3000(PUB):
```



## Exiting the MPE Session

While connected to the HP 3000, you can check the status of your connection at any time:

```
node3000(PUB): [CTRL-]  
telnet> status  
Connected to node3000.cup.hp.com  
Operating in character-at-a-time mode.  
Escape character is "^]"
```

To close any open MPE session and exit the Telnet/iX Server, use the MPE **BYE** command; or the Telnet client **CLOSE** command or the Telnet client **QUIT** command.

```
node3000(PUB):bye  
CPU=3. Connect=1. TUE, JAN 16, 1996, 10:26 am.  
Connection closed by foreign host.  
/usr:
```

or

```
node3000(PUB): [CTRL-]  
telnet> close  
/usr:
```

or

```
node3000(PUB): [CTRL-]  
telnet> quit  
/usr:
```

Accessing the Telnet/IX Server  
**Exiting the MPE Session**

This chapter describes possible problems you may encounter and the methods you can use to troubleshoot them.

## Cannot Run Telnet/iX Client

- Did you specify the correct *filename.group.account* to run the Telnet/iX Client program:

```
TELNET.ARPA.SYS
```

- Check with your network administrator: The network and link(s) must be active.
- If you are able to run the Telnet/iX Client program but you see the message `telnet/tcp: Unknown service` at the Telnet/iX prompt, Telnet/iX was unable to find the Telnet service entry in the `SERVICES.NET.SYS` data base file. Verify that the line `"telnet 23/tcp"` is in the file, and that `telnet` and `tcp` are in lower case letters. Refer to *Configuring and Managing MPE/iX Internet Services* manual for information on how to modify or create the `SERVICES` file.

## Cannot Connect to the Remote Host

- Did you enter the correct ARPA domain name, IP address, or NS node name? See your network administrator.
- Check with your network administrator to find out the following:
  - Does the remote host system support Telnet?
  - Is the network link active on the remote host system?
  - If an NS node name was used, make sure it is correctly entered in the local network directory, or that the remote host supports Probe, or has local Probe proxy answering for it.
  - If an ARPA domain name was used, make sure the name is configured in the local `HOSTS.NET.SYS` file, or that the configured domain name server is responding correctly. If not, use the IP address.
- Use the `PING` test of `NETTOOL` to verify the remote system is responding on the network.

`NETTOOL` is documented in the *NS 3000/iX Operations and Maintenance Reference Manual*.

- If the remote system is an HP 3000 or HP 9000, verify that `inetd` is running, and that Telnet is configured in the `inetd` and `SERVICES` configuration file. Also verify that the server software is installed in the remote system; refer to *Configuring and Managing MPE/iX Internet Services* manual.

## Cannot Logon to Remote Host

- If an MPE/iX user cannot log on to the remote system, verify that the remote host's logon account and passwords are correct.
- Try to directly log on the remote system without using a network, to see if the remote system is running.

## **Telnet/iX Client Command Not Supported**

If you see the message “?Invalid command” at the Telnet/iX prompt, you have entered an invalid command. Type ? at the Telnet/iX prompt to see a list of valid Telnet/iX Client commands and corresponding one-line command descriptions.

## Problems Running HP 3000 Applications

**Telnet/iX Server connection cannot run application, or application does not behave correctly.** Please see the *Asynchronous Serial Communications Programmer's Reference Manual* to see if the application is attempting to use MPE/iX file system intrinsics not supported by the Telnet/iX Server. Note that many MPE/iX file system intrinsics (for example, VPLUS block mode intrinsics) require the use of an HP 3000 terminal emulator program on the client side of the connection. Also, check the set and toggle values on the client side to verify that they are set to the values required by the application.



### A

**address** A numerical identifier defined and used by a particular protocol and associated software to distinguish one node from another.

**address resolution** In NS networks, the mapping of node names to IP addresses and the mapping of IP addresses to subnet addresses. *See also* **probe protocol, ARP**.

**AFCP** Avesta Flow Control Protocol. An HP proprietary protocol which provides data flow control features. AFCP is optimized for communications between nodes, including DTCs, in an MPE/iX environment.

**ARP** Address Resolution Protocol. ARP provides IP to LAN station address resolution for Ethernet nodes on a LAN.

**ARPA** Advanced Research Projects Agency.

**ARPANET** The Advanced Research Projects Agency computer network.

**ASCII** American National Standard Code for Information Interchange. A character set using 7-bit code used for information interchange among data processing and data communications systems. The American implementation of International Alphabet No. 5.

### B

**binary mode** Data transfer scheme in which no special character processing is performed. All characters are considered to be data and are passed through with no control actions being taken.

**byte** A sequence of eight consecutive bits operated on as a unit.

### C

**Client** A Telnet client provides *outbound* Telnet access to a remote host.

### D

**DCE** Data circuit-terminating equipment. The interfacing equipment required in order to interface to data terminal equipment (DTE) and its transmission circuit. Synonyms: data communications equipment, dataset.

**domain name** A name designated for a system in ARPANET standard format. This name can be used by other nodes on the network to access the host for which it is configured.

**DTC** Datacommunications and Terminal Controller. The DTC is a hardware device, configured as a node on a LAN, that enables asynchronous devices to access HP 3000 Series 900 computers or HP 9000 Series computers.

Terminals can either be directly connected to the DTC, or they can be remotely connected through a Packet Assembler Disassembler (PAD). The DTC can be configured with DTC/X.25 Network Access cards and DTC/X.25 Network Access software. A DTC/X.25 iX Network Link consists of two software modules: the X.25 iX System Access software (running on the host) and the DTC/X.25 Network Access software (running on the DTC).

**DTC Telnet Access** An HP product providing Telnet connections from HP 9000 and non-HP systems running ARPA standard Telnet services to the HP 3000. The solution includes a Telnet Access Card (TAC) that resides in the DTC 72MX or DTC 48 and provides protocol conversion between Telnet and Avesta Flow Control Protocol (AFCP). Equivalent functionality is provided by a separate product, the Telnet Express Box (TEB).

**DTE** Data Terminal Equipment. Equipment that converts user information into data transmission signals or reconverts received data signals into user information. Data terminal equipment operations in conjunction with data circuit-terminating equipment.

### E

**environment** A session that is established on a remote node.

**Ethernet** A Local Area Network system that uses baseband transmission at 10 Mbps over coaxial cable. Ethernet is a trademark of Xerox Corporation.

### F

**file equation** Assignment statement used to associate a file with a specific device or type of device during execution of a program.

**file system** The part of the operating system that handles access to input/output devices, data blocking, buffering, data transfers, and deblocking.

**flow control** A means of regulating the rate at which data transfer takes place between devices to protect against data overruns.

**FTP** The application protocol offering file service in the Internet suite of protocols developed by the Advanced Research Projects Agency (ARPA)

### H

**host computer** The primary or controlling computer on a network. The computer on which the network control software resides. For HP purposes, it may also be used to distinguish the MPE/iX system (host) from the DTC.

**HOSTS.NET.SYS** The host name database file which associates Internet addresses with official host names and aliases.

### I

**IEEE 802.3** A standard for a broadcast local area network published by the Institute for Electrical and Electronics Engineers (IEEE). This standard is used for both the ThinLAN and ThickLAN implementations of the LAN.

**inetd** Internet Superserver. When a Telnet connection comes into an HP 3000, `inetd` starts the telnet server.

**Internet Protocol (IP)** A protocol used to provide routing between different local networks in an internetwork, as well as among nodes in the same local network. *See also* **IP address**.

**Internet Services** A set of programs that allows your computer to exchange information with other nodes on the internetwork. Each of the programs uses a standard TCP/IP communications protocol originally developed for the Advanced Research Projects Agency (ARPA). For this reason, Internet Services are sometimes referred to as ARPA Services.

**intrinsic** System call or procedure accessible by user programs which provides an interface to operating system

resources and functions.

Intrinsics perform common tasks such as file access and device control.

**IP** Internet Protocol. A protocol used to provide routing between different local networks in an internetwork, as well as among nodes in the same local network. The internet protocol corresponds to layer 3, the network layer, of the OSI model. *See also* **IP address**.

**IP address** Internet Protocol address. An address used by the Internet Protocol to perform internet routing. A complete IP address comprises a network portion and a node portion. The network portion of the IP address identifies a network, and the node portion identifies a node within the network.

### L

**local host** The system from which your Telnet session is initiated. This is the side running the Telnet client software.

**loopback** The routing of messages from a node back to itself.

### M

**MPE/iX** The operating system for the HP 3000 Series 900 computers.

### N

**network address** This can be either 1) the network portion of an IP address as opposed to the node portion, or 2) when referring to X.25 networks, it is a node's X.25 address.

**network directory** A file containing information required for one node to communicate with other nodes in 1) an internetwork, 2) an X.25 network, or 3) a network that contains non-HP nodes. The active network directory on a node must be named `NSDIR.NET.SYS`.

**NI** The collective software and hardware that enables data communication between a system and a network. A node possesses one or more network interfaces for each of the networks to which it belongs. Network interface types are LAN, FDDI, point-to-point (router), X.25, token ring, SNA, loopback, and gateway half. The maximum number of supported NIs is 12, one of which is reserved for loopback.

**NMCONFIG.PUB.SYS** A file that contains all the network configuration data for the HP 3000 Series 900 computer on which it resides. It includes information about the DTCs that can access the system as well as information about any Network Services (NS) products running on the system. This is the only file name allowed.

**NMMAINT** Node management services maintenance utility. A utility that lists the software module version numbers for all HP network products, including NS 3000/iX. It detects missing or invalid software modules.

**NMMGR** Node Management Services Configuration Manager. A software subsystem that enables you to configure DTC connectivity and network access parameters for an HP 3000 Series 900 computer.

**NMMGRVER** Node management services conversion utility. A conversion program that converts configuration files created with NMMGR from an earlier version to the latest format.

**node** A computer that is part of a network. The DTC is also considered to be a node and has its own address.

**node address** The node portion of an IP address

**Node Management Services Configuration Manager** *See* NMMGR.

**node name** A character string that uniquely identifies each system in a network or internetwork. Each node name in a network or internetwork must be unique; however, a single node can be identified by more than one node name.

**NS** Software application products that can be used to access data, initiate processes, and exchange information among nodes in the network. The NS 3000/iX Network Services include RPM, VT, RFA, RDBA, and NFT.

**NS 3000/iX Link** Software and hardware that provides the connection between nodes on a network. Some of the NS 3000/iX links available are the ThinLAN 3000/iX Link and its ThickLAN option, the DTC/X.25 iX Network Link, FDDI, Token Ring, and the NS Point-to-Point 3000/iX Link.

### **NS 3000/iX Network Services**

Software applications that can be used to access data, initiate processes, and exchange information among nodes in a network. The services are RPM, VT, RFA, RDBA, and NFT.

## **P**

**privileged mode** capability assigned to accounts, groups, or users allowing unrestricted memory access, access to privileged CPU instructions, and the ability to call privileged procedures

**probe protocol** An HP protocol used by NS 3000/iX IEEE 802.3 networks to obtain information about other nodes on the network. It provides name to IP address resolution, and IP to IEEE 802.3 address resolution.

**protocol** A set of rules that enables two or more data processing entities to exchange information. In networks, protocols are the rules and conventions that govern each layer of network architecture. They define what functions are to be performed and how messages are to be exchanged.

## **R**

**remote host** The system that the Telnet session is going to, from your local host. This is the host running the Telnet server software.

**remote node** A node on an internetwork other than the node you are currently using or referring to

**RSLVSAMP.NET.SYS** Sample initialization file for the domain name resolver.

**RESLVCNF.NET.SYS** An initialization file for the domain name resolver. It contains information needed by the network to determine how to resolve a domain name to an IP address.

## **S**

**Server** A Telnet server provides *inbound* Telnet access to a remote host.

**SERVICES.NET.SYS** The services name data base file which associates official service

names and aliases with the port number and protocol the services use.

**SERVSAMP.NET.SYS** Sample services name data base file.

**subnet** Another name for a network, especially if the network is part of an internetwork. The word subnet is also a synonym for intranet.

**subnet mask** Grouping of bits that determines which bits of the IP address will be used to define a subnetwork. The subnet mask is configured using the NMMGR utility and specified in the same format as an IP address.

## T

**TAC** Telnet Access Card. A board within a DTC 48 or 72MX.

**TCP** Transmission Control Protocol. A network protocol that establishes and maintains connections between nodes. TCP regulates the flow of data, breaks messages into smaller fragments if necessary (and reassembles the fragments at the destination), detects errors, and retransmits messages if errors have been detected.

**TEB** Telnet Express Box. An HP product consisting of a DTC dedicated to providing protocol conversion between Telnet on TCP/IP and AFCP to allow incoming calls from the ARPA environment to HP 3000 systems.

**Telnet** Telecommunications Network Protocol. The application protocol offering virtual terminal service in the Internet suite of protocols developed by the Advanced Research Projects Agency (ARPA).

**Telnet/iX** An HP product providing Telnet services over TCP/IP on MPE/iX.

**TELNET.ARPA.SYS** A file that contains the Telnet/iX product.

**Telnet Express** An HP product consisting of a DTC dedicated to providing protocol conversion between Telnet on TCP/IP and AFCP to allow incoming calls from the ARPA environment to HP 3000 systems.

**TELNTDOC.ARPA.SYS** The readme file for the Telnet/iX product.

**Terminal Emulator** Software package that emulates characteristics of some specific hardware terminal model(s). This includes mimicking the keyboard and display handling characteristics, and the communication link characteristics, of the emulated terminal.

## V

**Virtual Terminal** A network service that allows a user to establish interactive sessions on a node.

### W

**WAN** Wide Area Network. A data communications network of unlimited size, used for connecting localities, cities, and countries.

### X

**X.25** Defines the interface between a DTE and a DCE for packet mode operation on a public data network (PDN).





---

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