



BEA M3

Installing the BEA M3 Software

Software Version 2.2
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October 1998

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Installing the BEA M3 Software

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Contents

Preface

Purpose of This Document	ix
Who Should Read This Document	ix
How This Document Is Organized	ix
Documentation Conventions	x
Related Documentation	xii
M3 Documentation	xii
BEA Publications	xiii
Other Publications	xiii
Contact Information	xiv
Documentation Support	xiv
Customer Support	xiv

1. Preparing to Install the M3 Software

Checking Your Package	1-1
Hardware and Software Prerequisites	1-2
For UNIX Systems	1-3
For Microsoft Windows NT, 95, and 98 Systems	1-3
Managing Files and Databases	1-3
Assigning File Ownership on UNIX Systems	1-4
Allocating Disk Space	1-4
Selecting Directories for the M3 Files	1-8
For All Platforms	1-8
For All Server Platforms Supporting the BEA Administration Console ...	1-8
Selecting an Administrative Password	1-10
Configuring the M3 System for Microsoft Windows NT	1-11
Configuring the UNIX Operating System for the M3 Software	1-11

Semaphores.....	1-12
Message Queues and Messages.....	1-13
Shared Memory	1-16
Other Kernel Tuning Parameters.....	1-17
Calculating IPC Requirements	1-18
2. Installation on Microsoft Windows NT, 95, and 98 Systems	
Platforms Supported	2-2
Installing the M3 Software on Microsoft Windows NT Systems	2-2
Preinstallation Consideration: Backing Up Files	2-3
Microsoft Windows NT Installation Procedure	2-3
Setting Microsoft Windows NT Environment Variables	2-16
Installing the M3 Software Product License After You Install the M3 Software	2-18
Running Simpapp to Verify the M3 Software Installation on Microsoft Windows NT	2-19
Installing the M3 Software on Microsoft Windows 95 and 98 Systems	2-22
Removing (Uninstalling) the M3 Software from Your System	2-32
3. Installation on UNIX Systems	
Platforms Supported	3-1
Installing the M3 Software on UNIX Systems	3-2
Preinstallation Consideration: Backing Up Files	3-2
UNIX Installation Procedure	3-2
Installing the M3 Software License After You Install the M3 Software ...	3-8
Running Simpapp to Verify the M3 Software Installation.....	3-9
Removing (Uninstalling) the M3 Software from Your System	3-10
4. BEA Administration Console Startup	
System Requirements	4-1
Platforms Supported	4-1
Hardware Requirements	4-2
Operating System Requirements	4-2
Browser Requirements	4-3
Setting Up Your Environment	4-3
Starting tuxwsrv.....	4-3

Starting wlisten.....	4-4
Starting the BEA Administration Console	4-5

5. Postinstallation Considerations

Configuring the M3 System for Microsoft Windows NT	5-2
Accessing the Control Panel Applet.....	5-3
Accessing Machines on a Network	5-4
Modifying Environment Variables.....	5-5
Directing M3 Messages to the Microsoft Windows NT Event Log	5-6
Configuring tlisten Processes to Start Automatically	5-8
Maximizing System Performance	5-9
Setting Up Your Environment on UNIX Systems	5-12
Editing a UBBCONFIG File	5-13
Verifying IPC Requirements	5-18
Creating the Universal Device List and TLOG	5-19
Creating the UDL	5-19
Creating the TLOG.....	5-20
Starting the tlisten Process on UNIX Systems	5-20
Using the TYPE Parameter in the UBBCONFIG File	5-22
Important Consideration About the Browser Installed with the Help System	5-22

A. Platform Data Sheets

Supported Platforms	A-1
Digital UNIX Version 4.0d on DEC Alpha.....	A-2
Available BEA M3 Version 2.2 Packages	A-2
Hardware Requirements	A-2
Software Requirements	A-3
Network Requirements.....	A-3
Disk Space Requirements.....	A-3
Mounting and Unmounting the CD.....	A-4
Tuning Parameters.....	A-5
HP-UX Version 10.20 and 11.0 on HP 9000 Series 800.....	A-6
Available BEA M3 Version 2.2 Packages	A-6
Hardware Requirements	A-7
Software Requirements	A-7

Network Requirements.....	A-8
Disk Space Requirements.....	A-8
Mounting and Unmounting the CD.....	A-8
Tuning Parameters.....	A-8
IBM-AIX Version 4.2.1 on RS/6000 and SP2	A-10
Available BEA M3 Version 2.2 Packages	A-10
Hardware Requirements	A-10
Software Requirements	A-10
Network Requirements.....	A-11
Disk Space Requirements.....	A-11
Mounting and Unmounting the CD.....	A-11
Tuning Parameters.....	A-12
Microsoft Windows NT Version 4.0 on Intel.....	A-12
Available BEA M3 Version 2.2 Packages	A-12
Hardware Requirements	A-13
Software Requirements	A-13
Network Requirements.....	A-13
Disk Space Requirements.....	A-14
Tuning Parameters.....	A-14
Microsoft Windows NT Version 4.0 on DEC Alpha	A-14
Available BEA M3 Version 2.2 Packages	A-14
Hardware Requirements	A-15
Software Requirements	A-15
Network Requirements.....	A-15
Disk Space Requirements.....	A-16
Tuning Parameters.....	A-16
Microsoft Windows 95 and 98	A-16
Available BEA M3 Version 2.2 Packages	A-16
Hardware Requirements	A-16
Software Requirements	A-17
Network Requirements.....	A-17
Disk Space Requirements.....	A-17
Solaris Version 2.51 and 2.6 UltraSPARC.....	A-18
Available BEA M3 Version 2.2 Packages	A-18
Hardware Requirements	A-18

Software Requirements	A-18
Network Requirements.....	A-19
Disk Space Requirements.....	A-19
Mounting and Unmounting the CD.....	A-19
Tuning Parameters.....	A-19



Preface

Purpose of This Document

This document describes how to install and configure the BEA M3 (hereafter referred to as M3) software.

Who Should Read This Document

This document is intended for the M3 software installers and system administrators.

How This Document Is Organized

This document is organized as follows:

- ◆ Chapter 1, “Preparing to Install the M3 Software,” describes how to prepare to install the M3 software.
- ◆ Chapter 2, “Installation on Microsoft Windows NT, 95, and 98 Systems,” describes how to install the M3 software on Microsoft Windows NT, 95, and 98 systems.
- ◆ Chapter 3, “Installation on UNIX Systems,” describes how to install the M3 software on UNIX systems.
- ◆ Chapter 4, “BEA Administration Console Startup,” describes how to start the BEA Administration Console.

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- ◆ Chapter 5, “Postinstallation Considerations,” discusses postinstallation issues.
 - ◆ Appendix A, “Platform Data Sheets,” provides data sheets for each Microsoft Windows and UNIX platform that can be used to run the M3 software.

Documentation Conventions

The following documentation conventions are used throughout this document.

Convention	Item
boldface text	Indicates terms defined in the glossary.
Ctrl+Tab	Indicates that you must press two or more keys simultaneously.
<i>italics</i>	Indicates emphasis or book titles.
monospace text	Indicates code samples, commands and their options, data structures and their members, data types, directories, and file names and their extensions. Monospace text also indicates text that you must enter from the keyboard. <i>Examples:</i> #include <iostream.h> void main () the pointer psz chmod u+w * .doc BITMAP float
monospace boldface text	Identifies significant words in code. <i>Example:</i> void commit ()
<i>monospace italic text</i>	Identifies variables in code. <i>Example:</i> String <i>expr</i>

Convention	Item
UPPERCASE TEXT	Indicates device names, environment variables, and logical operators. <i>Examples:</i> LPT1 SIGNON OR
{ }	Indicates a set of choices in a syntax line. The braces themselves should never be typed.
[]	Indicates optional items in a syntax line. The brackets themselves should never be typed. <i>Example:</i> buildobjclient [-v] [-o name] [-f file-list]... [-l file-list]...
	Separates mutually exclusive choices in a syntax line. The symbol itself should never be typed.
...	Indicates one of the following in a command line: <ul style="list-style-type: none">◆ That an argument can be repeated several times in a command line◆ That the statement omits additional optional arguments◆ That you can enter additional parameters, values, or other information The ellipsis itself should never be typed. <i>Example:</i> buildobjclient [-v] [-o name] [-f file-list]... [-l file-list]...
.	Indicates the omission of items from a code example or from a syntax line. The vertical ellipsis itself should never be typed.

Related Documentation

The following sections list the documentation provided with the M3 software, related BEA publications, and other publications related to the technology.

M3 Documentation

The M3 information set consists of the following documents:

Installing the BEA M3 Software (this document)

BEA M3 Release Notes

Introduction to the BEA M3 System

How the BEA M3 System Works

BEA M3 Guide to the Sample Applications

BEA M3 Creating Client Applications

BEA M3 Creating Server Applications

Administering the BEA M3 System

BEA M3 Programming Reference

BEA M3 System Messages

BEA M3 Glossary

BEA M3 Design Patterns technical article

Note: The BEA M3 Online Documentation CD includes HTML and Adobe Acrobat PDF files for all of the documents listed above except the *Installing the BEA M3 Software* manual. The files on the Online Documentation CD for the *Installing the BEA M3 Software* manual are obsolete and are superseded by this document. You can use your browser to view the documents or use the Adobe Acrobat Reader to print all or a portion of each document.

BEA Publications

Selected documents for the BEA TUXEDO Release 6.4 for M3 version 2.2 software are available on the M3 Online Documentation CD.

To access these documents:

1. Click the Reference button from the main menu.
2. Click the BEA TUXEDO Manuals option.

Other Publications

For more information about CORBA and related technologies, refer to the following books and specifications:

Cobb, E. 1997. *The Impact of Object Technology on Commercial Transaction Processing*. VLDB Journal, Volume 6. 173-190.

Edwards, J. with DeVoe, D. 1997. *3-Tier Client/Server At Work*. Wiley Computer Publishing.

Edwards, J., Harkey, D., and Orfali, R. 1996. *The Essential Client/Server Survival Guide*. Wiley Computer Publishing.

Fowler, M. with Scott, K. 1997. *UML Distilled, Applying the Standard Object Modeling Language*. Addison-Wesley.

Gamma, E., Helm, R., Johnson, R., and Vlissides, J. 1995. *Design Patterns: Elements of Reusable Object-Oriented Software*. Addison-Wesley Professional Computing Series.

Jacobson, I. 1994. *Object-Oriented Software Engineering: A Use Case Driven Approach*. Addison-Wesley.

Orfali, R., Harkey, D., and Edwards, J. 1997. *Instant CORBA*. Wiley Computer Publishing.

Otte, R., Patrick, P., and Roy, M. 1996. *Understanding CORBA*. Prentice Hall PTR.

Rosen, M. and Curtis, D. 1998. *Integrating CORBA and COM Applications*. Wiley Computer Publishing.

Rumbaugh, J., Blaha, M., Premerlani, W., Eddy, F., and Loresen, W. 1991. Object-Oriented Modeling and Design. Prentice Hall.

The Common Object Request Broker: Architecture and Specification. Revision 2.2, February 1998. Published by the Object Management Group (OMG).

CORBA services: Common Object Services Specification. Revised Edition. Updated: November 1997. Published by the Object Management Group (OMG).

Contact Information

The following sections provide information about how to obtain support for the documentation and software.

Documentation Support

If you have questions or comments on the documentation, you can contact the BEA Information Engineering Group by e-mail at **docsupport@beasys.com**. (For information about how to contact Customer Support, refer to the following section.)

Customer Support

If you have any questions about this version of the BEA M3 software, or if you have problems installing and running the BEA M3 software, contact your BEA Customer Support Center through BEA Web Support at www.beasys.com. You can also contact your BEA Customer Support Center by using the contact information provided on the Customer Support Card, which is included in the product package, or found on the Web at www.beasys.com/support.

When contacting your BEA Customer Support Center, be prepared to provide the following information:

- ◆ Your name, e-mail address, phone number, and fax number
- ◆ Your company name and company address

-
- ◆ Your machine type and authorization codes
 - ◆ The name and version of the product you are using
 - ◆ A description of the problem and the content of pertinent error messages



1 Preparing to Install the M3 Software

The BEA M3 product is a sophisticated software product; it should not be installed without proper planning.

This chapter covers the following topics:

- ◆ Checking Your Package
- ◆ Hardware and Software Prerequisites
- ◆ Managing Files and Databases
- ◆ Selecting Directories for the M3 Files
- ◆ Selecting an Administrative Password
- ◆ Configuring the M3 System for Microsoft Windows NT
- ◆ Configuring the UNIX Operating System for the M3 Software

Checking Your Package

When you open your BEA M3 box, you will find the following:

- ◆ A compact disk (CD) that contains the M3 Version 2.2 core software, the M3 client software for all supported platforms, and the BEA Administration Console software

1 PREPARING TO INSTALL THE M3 SOFTWARE

- ◆ A CD that contains the online documentation for the BEA M3 software
- ◆ A 3.5-inch diskette that contains the product license
- ◆ Two manuals:
 - ◆ *Introduction to the BEA M3 System*
 - ◆ *Installing the BEA M3 Software* (this manual)
- ◆ Release Notes
- ◆ A *BEA Software License and Limited Warranty* pamphlet
- ◆ A product registration card
- ◆ A *Customer Support Quick Reference and Other Important Information* card

If you have also licensed the BEA Administration Console to administer your M3 system, that package enables automatically when the license file is installed.

For a list of the platforms supported for this release of the M3 software, see Appendix A, “Platform Data Sheets.”

Hardware and Software Prerequisites

The M3 software must be installed on each machine that will run an M3 client or server application.

Note: Do not try to share the M3 executables across remote file systems; this practice has proven to be unreliable.

The BEA Administration Console must be installed in a file system that supports long file names (that is, those containing more than 14 characters).

For details about the hardware and software prerequisites for all platforms on which the M3 software is supported, see Appendix A, “Platform Data Sheets.” Check the data sheet for each platform on which you plan to install the M3 software.

For UNIX Systems

You need the following information and resources before installing the M3 software on a UNIX system:

- ◆ A system that meets the hardware and software requirements described in Appendix A, “Platform Data Sheets.”
- ◆ The superuser password so that you can mount the CD as a file system.
- ◆ The name of a file system with enough free space for the M3 software packages you want to install. For disk space requirements, see Appendix A, “Platform Data Sheets.”

For Microsoft Windows NT, 95, and 98 Systems

You need the following resources before installing the M3 software on a Microsoft Windows system:

- ◆ Administrative privileges.
- ◆ A system that meets the hardware and software requirements described in Appendix A, “Platform Data Sheets.”
- ◆ Enough disk space for the packages you want to install. For disk space requirements, see Appendix A, “Platform Data Sheets.”

Note: Microsoft Windows 95 and 98 systems support only the M3 Client-Only software. Microsoft Windows 95 and 98 systems do not support the M3 full system software (server and client) or the BEA Administration Console software.

Managing Files and Databases

This section explains how to assign ownership of the M3 system files to the system administrator, and how to set up your disk to accommodate those files.

Assigning File Ownership on UNIX Systems

If you are installing the M3 software on a UNIX system, we strongly recommend that you create a separate user account for the M3 system administrator and give ownership of the M3 system files to that account.

Allocating Disk Space

A running M3 client or server application needs disk space for system files and for the application's database(s). You do not use this space until you begin to develop or run your M3 client or server application, but it is important to plan for this space before installing the software. To help explain what is involved, the following sections describe how the M3 system handles files.

The M3 System Disk Management Interface

The M3 system has a facility, the Disk Management Interface (DMI), that manages logical files within a single disk device or set of devices. Among other things, the DMI stores binary configuration tables and the transaction log.

The M3 disk management software supports the notion of an M3 file system distinct from any operating system file system. (For the remainder of this discussion, the term OS file system is used to refer to any operating system file system.)

Administrative access to the DMI to create, initialize, or destroy entries in the M3 file system is through `tmadmin` administrative commands.

There are two ways to physically store the logical files managed by the DMI: physical storage can be on an OS file system, and alternatively, disk space outside the control of all OS file systems can be set aside for the M3 system.

Files reside on special device files in that disk space and the DMI manages the files directly. Space outside the OS file system is usually referred to as raw disk space. Not only is I/O faster when done by system calls reading directly from and writing directly to device special files on raw disks, raw disk space is preferred when it is important to know for certain that a physical `write()` has been done.

With the OS file system, the precise moment at which a `write()` is done cannot be relied upon. In the M3 system, accurate control of the write operation is particularly important for entries in the transaction log. With multiple users, control of the write operation is also an important element in assuring database consistency.

Arranging for Raw Disk Space

If you decide to use raw disk space for your M3 client or server application, you may find that the hard disk devices on your machine are fully allocated to file systems such as `/`(root), `/usr`, and other UNIX file systems. If that is the case, it is necessary to repartition your hard disk device to set aside some partitions that are not to be used for an OS file system. Information on how to do this can be found in the system administration documentation for your particular platform.

Note: On Microsoft Windows NT platforms, the default behavior is unbuffered I/O; no special arrangements are needed.

How the M3 File System Is Organized

An M3 file system has a Volume Table of Contents (VTOC) that lists files on a set of devices named in the Universal Device List (UDL). The UDL contains information about the location of the physical storage space for the M3 tables.

All System Tables on the Same Device?

In an M3 system, all the system files might be stored together on the same raw disk slice or OS file system file. While it is possible to use regular OS file system files for the configuration tables, it is strongly recommended that the transaction log (TLOG) be stored on a raw disk device. Because the TLOG seldom needs to be larger than 100 blocks and because disk partitions are always substantially larger than 100 blocks, it may make sense to use the same device for everything. The pathname of the device needs to be contained in both the `TUXCONFIG` and the `FSCONFIG` environment variables.

1 PREPARING TO INSTALL THE M3 SOFTWARE

Listing 1-1 shows approximately how the content might appear.

Listing 1-1 VTOC and UDL Diagram

Output based on setting FSCONFIG=\$TUXCONFIG, and invoking tmdadmin:

No bulletin board exists. Entering boot mode.

```
> livtoc
Volume Table of Contents on /usr2/bank/tuxconfig:
0: VTOC: Device 0 Offset 0 Pages 7
1: UDL: Device 0 Offset 7 Pages 28
2: _RESOURCE_SECT: Device 0 Offset 35 Pages 3
3: _MACHINES_SECT: Device 0 Offset 38 Pages 40
4: _GROUPS_SECT: Device 0 Offset 78 Pages 40
5: _SERVERS_SECT: Device 0 Offset 118 Pages 40
6: _SERVICES_SECT: Device 0 Offset 158 Pages 20
7: _ROUTING_SECT: Device 0 Offset 178 Pages 100
8: _NETWORK_SECT: Device 0 Offset 278 Pages 20
9: _MIBPERMS_SECT: Device 0 Offset 298 Pages 2
```

If the TLOG is stored on the same device, there will be an
entry something like:

```
9: TLOG1: Device 0 Offset 236 Pages 100
> q
```

The M3 system administrator must ensure that raw disk slices are available, as needed, on each machine participating in an M3 domain. The size of entities in the M3 file system are shown in Table 1-1.

Table 1-1 Size of System Tables

Entity	512-byte Pages
VTOC	1
TUXCONFIG	270
TLOG	100 (default)
UDL	28

Table 1-1 Size of System Tables (Continued)

Entity	512-byte Pages
TOTAL	399

The size of the TUXCONFIG file is larger if there are more entries in the configuration file (UBBCONFIG). The administrator is encouraged to allocate additional space for dynamic reconfiguration and for growth of the application. The default size assumed by the `crdl` subcommand of `tmadmin` is 1000 blocks, which should be adequate for the initial installation.

Space for Application Databases (If You Are Using /D)

If your M3 server application is using the BEA TUXEDO system/D as a resource manager, your database tables can be listed in the same UDL and can be managed by the M3 VTOC. If another resource manager is used, you should check the installation instructions for that product to see how its space requirements affect your M3 system planning.

Space for Queue Spaces (If You Are Using /Q)

If your M3 application is using the BEA TUXEDO system/Q for store-and-forward queue management, your queue space can be listed in the same UDL and can be managed by the M3 VTOC.

Space for Application Servers

As you are calculating the space requirements for the M3 system, also consider the requirements of the server machines that perform the work of the server application. These requirements are specified by the application, and they are in addition to the requirements for the M3 system itself (unless otherwise specified).

Selecting Directories for the M3 Files

During the installation process, you are prompted to make decisions about where, in your file system, a number of your M3 directories and files are installed. To help you plan for this part of the process, this section describes the directories and files about which you are prompted to make a decision, as follows:

- ◆ “For All Platforms” should be read by anyone installing the M3 software.
- ◆ “For All Server Platforms Supporting the BEA Administration Console” should be read by anyone installing the BEA Administration Console for M3 administration.

For All Platforms

You are prompted for a pathname for the base directory of your M3 software. There is no restriction on the location of this directory, as long as it meets the following requirements:

- ◆ The directory must be dedicated to the M3 software. It must not contain files for any other applications.
- ◆ The directory must have read, write, and search (execute) permissions for the M3 administrator.

Throughout the M3 documentation this directory is referred to as `M3DIR`.

For All Server Platforms Supporting the BEA Administration Console

If you are installing the M3 software on a server machine, and you elect to install the BEA Administration Console for system administration, you are prompted, during the installation process, to accept or replace the default pathnames and file names used for the BEA Administration Console components. These default pathnames and file names are based on the value of `M3DIR` that you specify.

If you are running a commercial Web server, you may find the default settings inappropriate, especially if your server is handling requests from both the BEA Administration Console and other Web programs on the same port. To accommodate this situation, the M3 software enables you to choose between accepting the defaults and assigning your own pathnames and file names. The remainder of this section describes the choices you are given, as follows:

1. A pathname for the HTML files—By default, the following HTML files are installed in the directory `M3DIR\udataobj\webgui` on Microsoft Windows NT systems and `M3DIR/udataobj/webgui` on UNIX systems. You are prompted to supply your own paths for these files if you prefer to have them installed elsewhere.
 - ◆ An HTML template file (`webgui.html`) that is used by `tuxadm` as the basis for many screens displayed during a BEA Administration Console session
 - ◆ An HTML file (`webguitop.html`) that displays legal notices and warnings when the BEA Administration Console is first displayed on the screen
 - ◆ The HTML files that make up the BEA Administration Console documentation are installed in `M3DIR\help` on Microsoft Windows NT systems and `M3DIR/help` on UNIX systems

Exception: If you are installing the M3 software on a Microsoft Windows NT platform and the installation program detects an existing Web server, a default directory appropriate for that Web server is used, instead.
2. A pathname for the Java and image files—By default, the class files for the Java applet are installed in one of the following directories. You are prompted to supply your own paths for these files if you prefer to have them installed elsewhere.
 - ◆ `M3DIR\udataobj\webgui\java` on Microsoft Windows NT systems and `M3DIR/udataobj/webgui/java` on UNIX systems
 - ◆ A subdirectory called `java` in the HTML directory you specified after the prompt described in step 1
3. A directory pathname for the CGI program (`tuxadm`)—Specify one of the following (unless the following exception applies):
 - ◆ `M3DIR\udataobj\webgui\cgi-bin` on Microsoft Windows NT systems and `M3DIR/udataobj/webgui/cgi-bin` on UNIX systems
 - ◆ A subdirectory called `cgi-bin` in the HTML directory you specified after the prompt described in step 1

Exception: If the installation program detects the Microsoft Internet Information Server (IIS) in a standard directory, `tuxadm` is installed in a subdirectory called `scripts` in the directory you specified in step 1 as the pathname for the HTML files.

Note: Do not specify `M3DIR/bin` (for UNIX systems) or `M3DIR\bin` (for Microsoft Windows NT systems) as your CGI directory. If you do, you risk having other M3 client or server applications executed accidentally by an uninformed user of the BEA Administration Console. You may also introduce a security risk.

4. An alias for the directory pathname for `tuxadm`. This is the path for the directory in which Web clients expect to find `tuxadm`. The default is either `/cgi-bin` or `/scripts` (for UNIX systems) or `\cgi-bin` or `\scripts` (for Microsoft Windows NT systems).

Selecting an Administrative Password

The M3 system uses an administrative password to protect the machine on which it is installed from unauthorized administrative requests and operations (such as `tmboot`). Whenever administrative communications arrive on this machine through the `tlisten` and `wlisten` processes, the M3 system authenticates the communications by means of the password.

You assign an administrative password during the installation process (to the machine on which the M3 software is being installed) by entering the password of your choice after the appropriate prompt. The password must be a string of alphanumeric characters in clear-text format. It may contain no more than 80 characters.

A common password is required for two machines in an M3 domain to communicate successfully. For this reason, you must use the same password whenever you install the M3 software on multiple machines for a single domain. As described previously, you are prompted to provide the password during the M3 installation process. If, however, you use a different password for one machine, you must add that password to the `tlisten.pw` file on each existing machine with which you want that machine to communicate.

For these reasons, you may have more than one administrative password in your `tlisten.pw` file. A single password file may contain no more than 20 passwords, with one password per line.

The administrative password that you enter during installation is collected by the installation script and is stored in:

`M3DIR/udataobj/tlisten.pw` (UNIX systems)

`M3DIR\udataobj\tlisten.pw` (Microsoft Windows NT systems)

Make sure the permissions on your `tlisten.pw` file are set such that only the M3 system administrator can read the file.

Configuring the M3 System for Microsoft Windows NT

You cannot configure your M3 system for Microsoft Windows NT until after you install the M3 software and the M3 license. After you complete the installation as described in Chapter 2, “Installation on Microsoft Windows NT, 95, and 98 Systems,” refer to the section “Configuring the M3 System for Microsoft Windows NT” on page 5-2 for instructions on configuring the M3 system for Microsoft Windows NT.

Configuring the UNIX Operating System for the M3 Software

The M3 software uses the UNIX operating system Interprocess Communications (IPC) resources.

IPC resources are configured by three sets of tuning parameters that control the amount of shared memory (prefix `SHM`), number of semaphores (prefix `SEM`), and size of message queues and messages (prefix `MSG`).

The settings for these parameters are M3 system dependent. Most UNIX systems, however, are shipped with default values that are too low for M3 systems.

The following sections describe the IPC parameters and provide guidelines for configuring them. Because these parameters vary across different versions of UNIX, the following descriptions are generic. For the exact parameter names, default settings, settings used for the M3 sample applications for each platform, and information about how to change the parameters, see Appendix A, “Platform Data Sheets.”

If you change a parameter, you need to rebuild the kernel and reboot the operating system using the standard administrative tools. Consult your operating system administrator or the system administrator’s guide for your platform for details.

If your M3 client or server application is distributed, the minimum IPC resources must be available on every UNIX platform participating in the application.

Semaphores

Every process that participates in an M3 system requires a semaphore. When the M3 system boots, the number of semaphores configured in the operating system is checked, and the boot fails if the configured number is not high enough.

The following semaphore parameters may need to be adjusted:

SEMMNS

Maximum number of semaphores in the system. The minimum requirement for SEMMNS is:

`MAXACCESSERS - MAXWSCLIENTS + 13`

where MAXACCESSERS is the maximum number of M3 processes on a particular machine (including servers and native clients) and MAXWSCLIENTS is the maximum number of M3 remote clients. Both of these parameters are specified in the application’s `UBBCONFIG` file.

For more information about `UBBCONFIG`, see the *Administering the BEA M3 System* manual or the `ubbconfig(5)` reference page in the *BEA TUXEDO Reference*.

SEMMNI

Maximum number of active semaphore sets. See `SEMMSL`.

SEMMSL

Maximum number of semaphores per semaphore set. `SEMMSL` and `SEMNI` are commonly chosen so that their product equals `SEMMS`. The M3 system does not perform semaphore operations on semaphore sets; however, it attempts to allocate as many semaphores per semaphore set as possible.

SEMAP

Size of the control map used to manage semaphore sets. `SEMAP` should be equal to `SEMNI`.

SEMMNU

Number of undo structures in the system. Because an undo structure is needed for each process that can access the Bulletin Board, `SEMMNU` must be at least as large as `SEMMS`.

SEMUME

Maximum number of undo entries per undo structure. The value 1 suffices.

Message Queues and Messages

M3 client and server applications use UNIX messages and message queues for client/server communication. Examples of such messages are service requests, service replies, conversational messages, unsolicited notification messages, administrative messages, and transaction control messages.

Every Multiple Servers, Single Queue (MSSQ) set of servers, and every individual server has a message queue for receiving requests. Every client has its own queue for receiving replies. Servers that specify the `REPLYQ` parameter also get individual reply queues.

The adjustment of kernel message parameters is important to the proper tuning of the M3 system. Inappropriate values can lead to an inability to boot or to severe performance degradation.

There are various message queue parameters. They limit various characteristics of the queue space, including the total number of outstanding messages (`MSGTQL`), the total number of bytes that can be on one queue (`MSGMNB`), the size limit of an individual message (`MSGMAX`), the total number of message segments that can be outstanding at one time (`MSGSEG`), and the size of each segment (`MSGSSZ`).

Exceeding any of the parameter limits described previously results in what is known as a blocking condition. There is a special case for MSGMAX. Messages that exceed 75 percent of MSGMNB, or that are larger than MSGMAX, are placed in a UNIX file. A very small message with the file name in it is then sent to the recipient. Avoid this mode of operation, because it results in a severe reduction in performance.

An application deadlock can result if every process is blocked when it tries to send a message. For example, when client applications fill the message space with requests, and server applications are all blocked when they try to send replies, because no server application can read a message, there is a deadlock. Timeouts can sometimes break the deadlock, but no useful work will have been done.

Especially troublesome is a client application that sends its requests with the `TPNOREPLY` flag. This practice can fill either individual queues or the system message space, depending on the size of the messages. Such applications may have to implement their own flow control to limit the number of outstanding messages.

To summarize, if client applications or server applications are blocking on their send operations (that is, requesting services or sending replies), there is potential for trouble. It is usually no problem, though, for a single server request queue to always be full, as long as there is space in the system for more messages on other queues.

There are performance implications to queue blocking conditions, both on the sending side and the receiving side. The UNIX operating system, when waking up blocked processes, wakes up all the processes blocked on a particular event, even if only one can proceed. The other processes go back to sleep. This process scheduling overhead can be expensive.

For example, on an empty server request queue where there is more than one server application (that is, MSSQ), an arriving message wakes up all the idle, or blocked, server applications on that queue. In the case of a full server request queue, as each request is read by a server application, the system wakes up all the blocked clients. Depending on the size of the messages, zero or more clients are allowed to place their messages on the queue. The remainder of the clients have to go back to sleep. Because there may be hundreds of clients in the system, the mass wakeup of all of these clients every time a service request is processed can severely degrade performance.

A properly tuned system rarely fills its queues. Enough slack should be left in the queues to handle the natural variability of the message flow. No exact settings can be recommended. Tuning is very system dependent. The UNIX `ipcs(1)` command provides a snapshot of the queues so you can tell whether they are full. You can try the

TPNOBLOCK flag when sending requests. That way, clients can tell when queues are full, and they can slow down a bit. It might help to increase the scheduling priority of the servers whose request queues are full.

The following message parameters may need to be adjusted:

MSGMNI

Number of unique message queue identifiers. Each process participating in an M3 client or server application on a particular machine typically needs at least one message queue. This number is reduced if MSSQ sets are used, where multiple server processes share a single queue. For transaction processing, count an additional queue per server group for TMS processes. Thus, the minimum requirement for MSGMNI can be determined by this formula:

$$\begin{aligned} \text{MSGMNI} &= \text{MAXACCESSERS} + 7 \\ &+ (\text{number of servers with REPLYQ}) \\ &+ (\text{number of MSSQ sets}) \\ &- (\text{number of servers in MSSQ sets}) \end{aligned}$$

MSGMAX

Maximum message size in bytes. MSGMAX must be large enough to handle any M3 client or server application running on this machine.

MSGMNB

Maximum message queue length in bytes. This number must accommodate the total size of all messages that are on a queue and that have not been taken off by the associated process(es). The minimum value for MSGMNB is MSGMAX. Messages longer than 75 percent of MSGMNB are sent to a file instead of to a message queue. Avoid this situation because it severely degrades performance.

MSGMAP

Number of entries in the control map used to manage message segments. MSGMAP should be the same as the number of message segments (MSGSEG), which should be twice the size of MSGMNI.

MSGSSZ

Size of a message segment in bytes. A message can consist of several such segments. The value of MSGSSZ should be such that a multiple of MSGSSZ is equal to the size (including the M3 system header) of the most commonly sent message. This practice avoids wasting space.

MSGSEG

Number of message segments in the system.

MSGTQL

Total number of outstanding messages that can be stored by the kernel. This is the maximum number of unread messages at any given time.

Shared Memory

In the M3 environment, shared memory is used for the Bulletin Board and for the control table of the IIOP Server Listener. An application also may choose to use shared memory for its own purposes.

The following shared memory parameters may need to be adjusted:

SHMMAX

Maximum shared memory segment size in bytes. This number represents the largest shared memory segment that can be allocated. A process can, however, attach to more than one segment of size SHMMAX.

SHMSEG

Maximum number of shared memory segments per process. For a given configuration, the maximum amount of shared memory in bytes to which a process can attach is $SHMMAX * SHMSEG$. A value between 6 and 15 should be adequate.

SHMMNI

Maximum number of shared memory identifiers in the system. The M3 system requires one identifier per Bulletin Board and an additional identifier if the IIOP Server Listener is running.

SHMMIN

Minimum shared memory segment size in bytes. This should always be set to 1.

Other Kernel Tuning Parameters

Experience with M3 systems has shown that some other UNIX tuning parameters may need to be set to higher values. The settings are dependent on the application and do not apply to all applications.

ULIMIT

Maximum file size. `ULIMIT` needs to be large enough so that you can install the M3 software and build servers. We recommend 4 megabytes.

NOFILES

Maximum number of open files per process. An M3 server application requires a minimum of four file descriptors.

MAXUP

Maximum number of processes per non-super user. The M3 system processes (servers and administrative processes) run with the `UID` specified in the application's `UBBCONFIG` file. `MAXUP` needs to be large enough to allow all these processes to run.

NPROC

Maximum number of processes (system wide).

NREGION

Number of region table entries to allocate. Most processes have three regions: text, data, and stack. Additional regions are needed for each shared memory segment and shared library (text and data) attached. However, the region table entry for the text of a shared text program is shared by all processes executing that program. Each shared memory segment attached to one or more processes uses another region table entry.

NUMTIM

Maximum number of `STREAMS` modules that can be pushed by the Transport Layer Interface (TLI). A typical default value is 16. Set `NUMTIM` to at least 256.

NUMTRW

The number of TLI read/write structures to allocate in kernel data space. A typical default value is 16. Set `NUMTRW` to at least 256.

Calculating IPC Requirements

When the M3 software has been installed and an application configuration file (UBBCONFIG file) is available, the `tmloadcf` command can be used to calculate the IPC resources needed to support the application. For more information, see the `tmloadcf(1)` reference page in the *BEA TUXEDO Reference* and the section “Verifying IPC Requirements” on page 5-18.

2 Installation on Microsoft Windows NT, 95, and 98 Systems

This chapter provides procedures for:

- ◆ Platforms Supported
- ◆ Installing the M3 Software on Microsoft Windows NT Systems
- ◆ Installing the M3 Software on Microsoft Windows 95 and 98 Systems
- ◆ Removing (Uninstalling) the M3 Software from Your System

Platforms Supported

The Microsoft Windows platforms listed in Table 2-1 are supported.

Table 2-1 Supported Platforms

Vendor	Operating System	Release/Version
Microsoft	Microsoft Windows NT	4.0 (Intel)
	Microsoft Windows NT	4.0 (Alpha)
	Microsoft Windows 95	Not applicable
	Microsoft Windows 98	Not applicable

M3 client and server software can be installed and used on the Intel NT and Alpha NT operating systems. The M3 client software can be installed and used on the Microsoft Windows 95 and 98 operating systems. Microsoft Windows 95 and 98 systems cannot be used as M3 server systems.

For the hardware and software requirements for these operating systems, see Appendix A, “Platform Data Sheets.”

Installing the M3 Software on Microsoft Windows NT Systems

This section describes how to install the M3 software on Microsoft Windows NT systems.

Preinstallation Consideration: Backing Up Files

If you are installing M3 software on a system that already has M3 software installed, there are some files that you may want to back up prior to the installation, and then restore them after the installation is complete. This is because some files that you may have modified are overwritten when the M3 software is re-installed.

To avoid having to modify these files again, proceed as follows:

1. If you are installing the BEA M3 server software, back up the `RM` file to a temporary location. This file is located in the `M3DIR\udataobj` directory.
2. If you are installing the BEA Administration Console, back up the `webgui.ini` file to a temporary location. This file is located in the `M3DIR\udataobj\webgui` directory.
3. After the installation is complete, restore these files to their original locations.

Microsoft Windows NT Installation Procedure

To install the M3 software on a Microsoft Windows NT operating system, perform the following procedure:

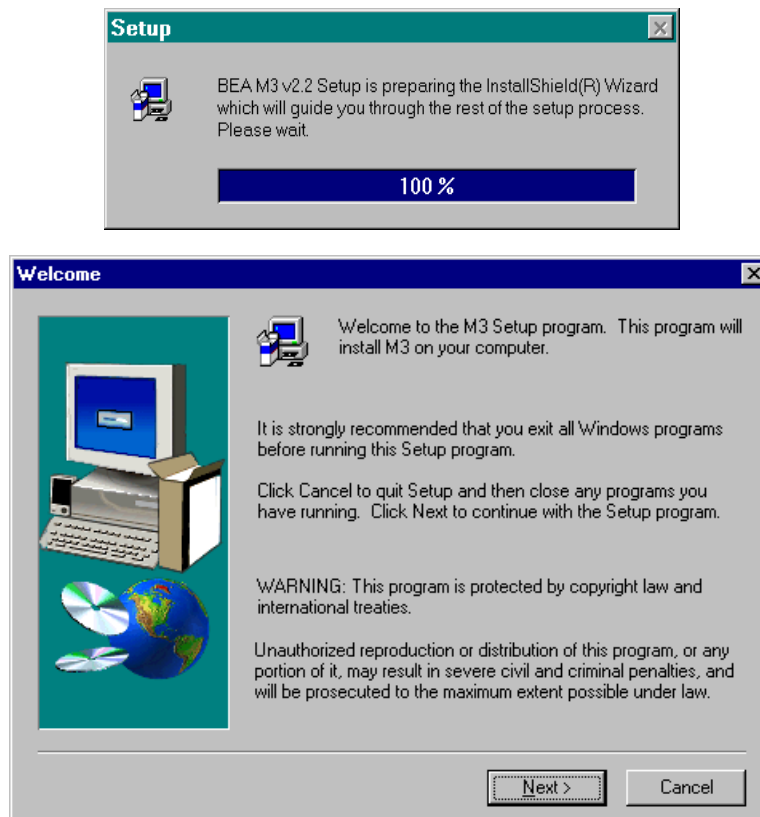
Note: Before beginning installation, make sure no BEA TUXEDO or BEA M3 client or server applications are running.

Note: It will take approximately 5 minutes to install the software on a local disk; installation on a remote disk may take as long as 10 minutes.

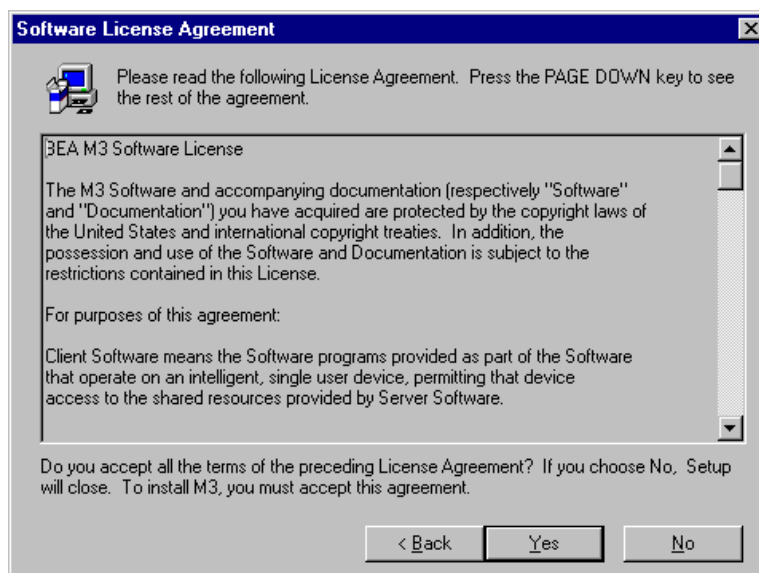
Note: You need administrative privileges to perform the installation. If you attempt to install the M3 software without administrative privileges, the following error message will be displayed: "Cannot Install M3 IPC Helper Service."

1. Insert the BEA M3 CD in the CD drive and use the Taskbar to click Start—>Programs—>Windows NT Explorer.
2. Click the CD drive and then click the `winnt` folder.
3. Double-click the `Setup.exe` program. The Setup screen is displayed, followed by the Welcome screen.

2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*

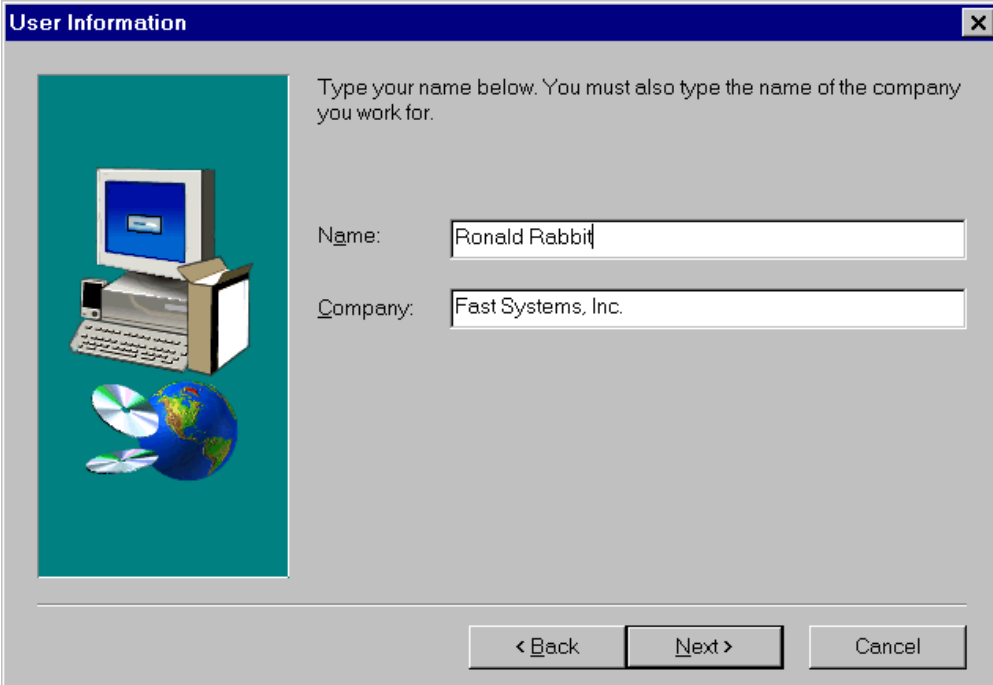


4. Click Next. The Software License Agreement screen is displayed.



5. To accept the license agreement, click Yes. The User Information screen is displayed.

2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*



The image shows a Windows-style dialog box titled "User Information". On the left is a graphic of a computer monitor, keyboard, and CD-ROMs. On the right, there is instructional text and two text input fields. The "Name:" field contains "Ronald Rabbit" and the "Company:" field contains "Fast Systems, Inc.". At the bottom are three buttons: "< Back", "Next >", and "Cancel".

User Information

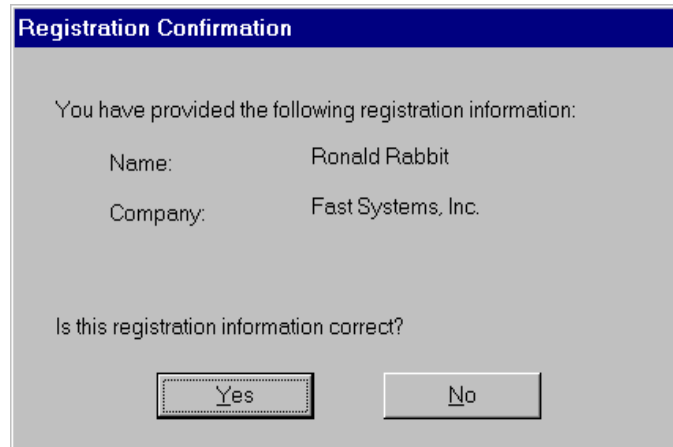
Type your name below. You must also type the name of the company you work for.

Name:

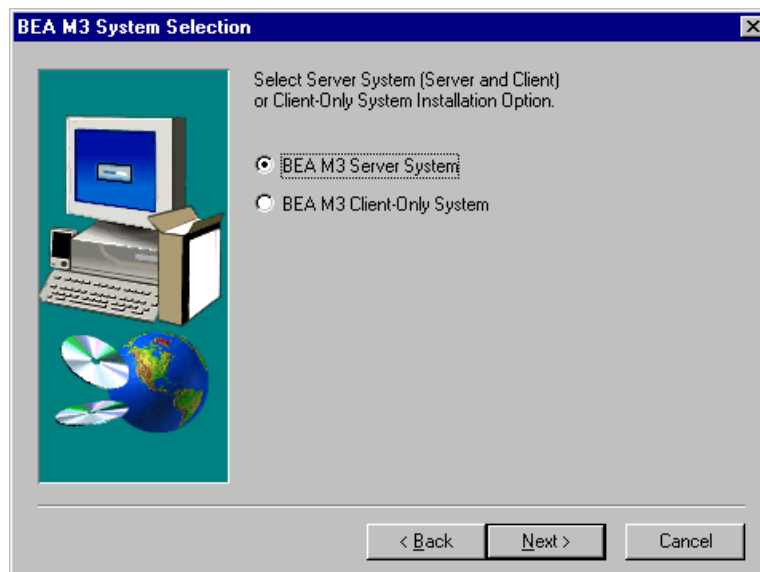
Company:

< Back Next > Cancel

6. Enter your name and the name of your company and click Next. The Registration Confirmation screen is displayed.

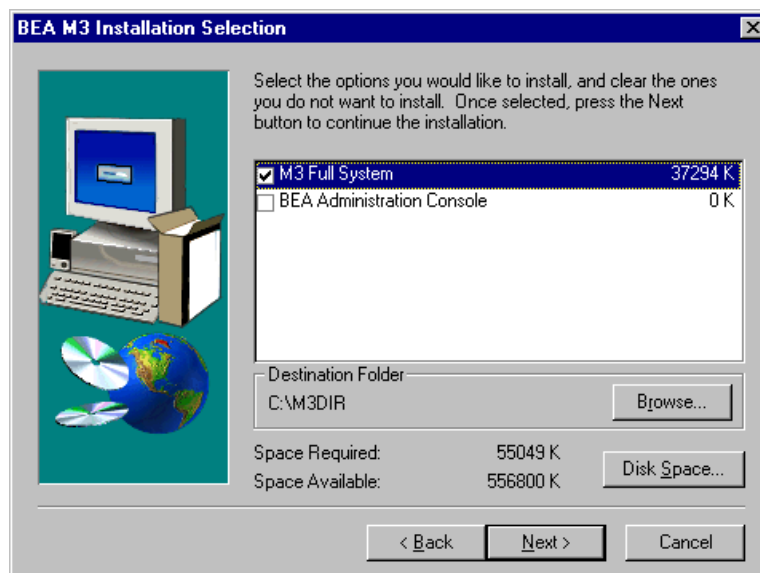


7. If the registration information is correct, click Yes; otherwise, click No and correct the information. The BEA M3 System Selection screen is displayed.

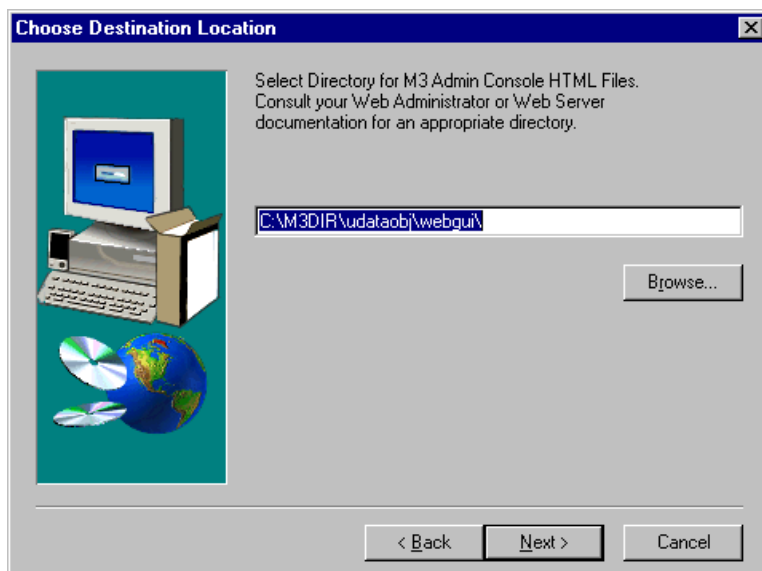


2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*

8. The BEA M3 Server System is selected as the default. This selection includes both the server software and the client software. To install the client software only, click the bottom radio button and click Next; otherwise, just click Next. The BEA M3 Installation Selection screen is displayed.

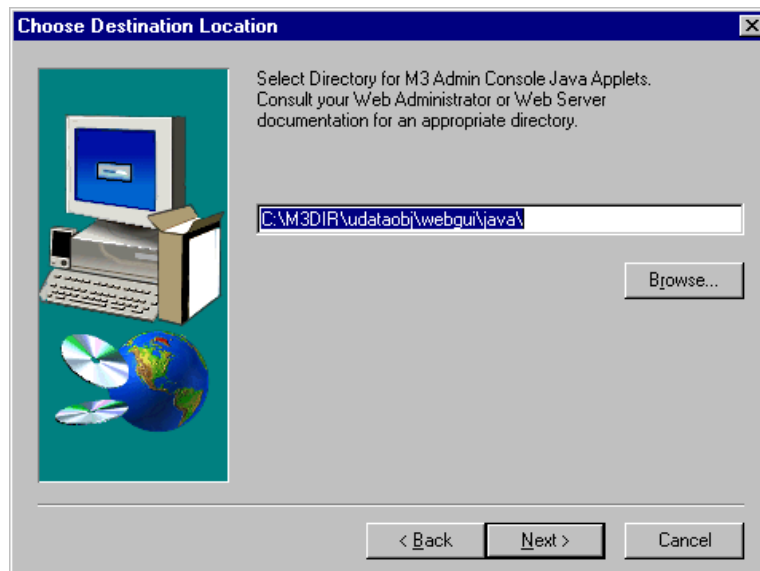


9. Respond to the BEA M3 Installation Selection screen as follows:
 - ◆ To install the M3 full system only, leave the check boxes as they are. To install the BEA Administration Console and the M3 full system, select both boxes.
 - ◆ To specify a nondefault directory for the software, click Browse and specify the nondefault directory. For information about default file locations and path names, see the section "Selecting Directories for the M3 Files" on page 1-8.
 - ◆ Verify that your machine has enough free disk space and click Next.
10. If you chose to install the BEA Administration Console, the Choose Destination Location screen is displayed. Go to the next step. Otherwise, the Select Program Folder screen is displayed. Skip to step 15 and continue.

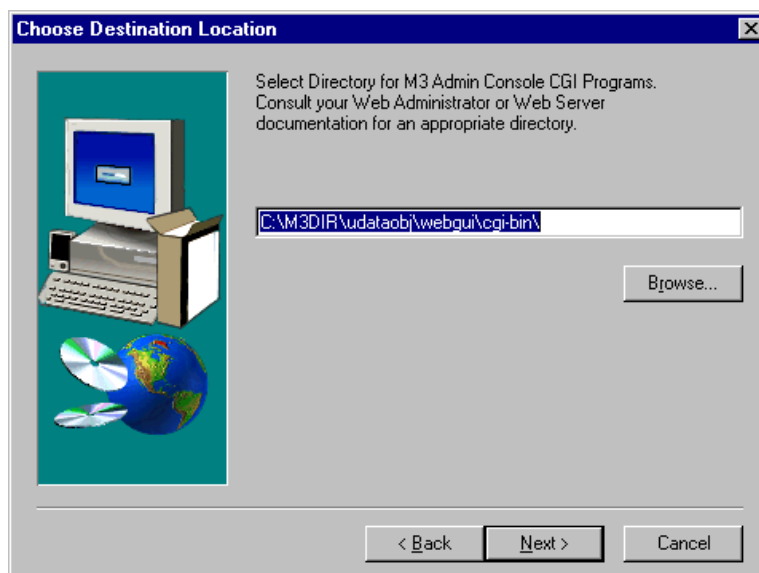


11. To specify a nondefault directory for the BEA Administration Console GUI HTML, click Browse, specify the nondefault directory, and click Next. Otherwise, click Next. Another Choose Destination Location screen is displayed.

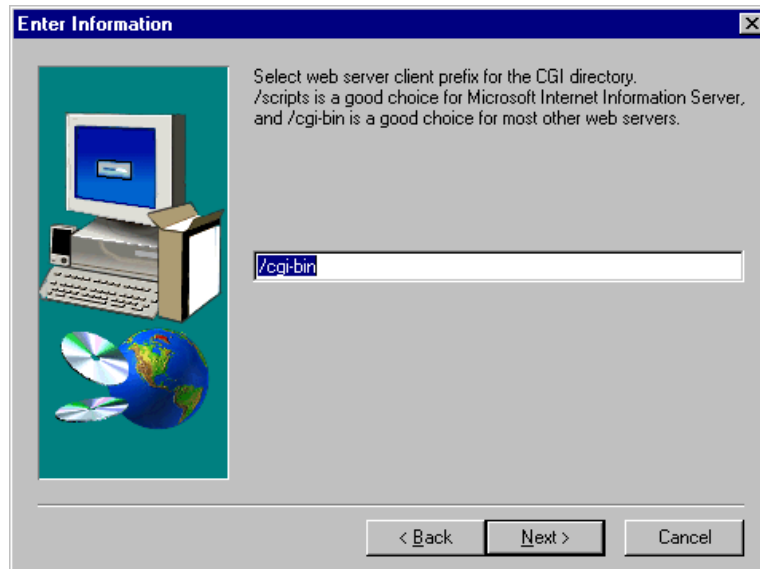
2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*



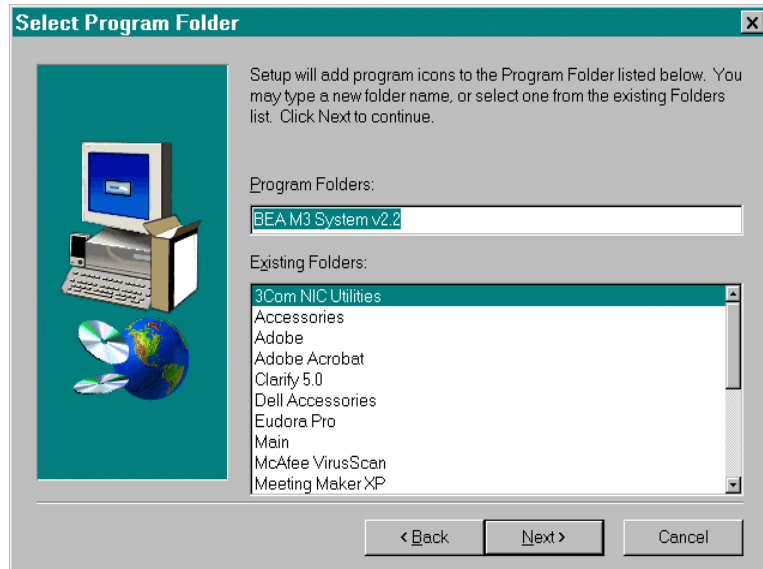
12. To specify a nondefault directory for the BEA Administration Console GUI Java applets, click Browse, specify the nondefault directory, and click Next. Otherwise, click Next. Another Choose Destination Location screen is displayed.



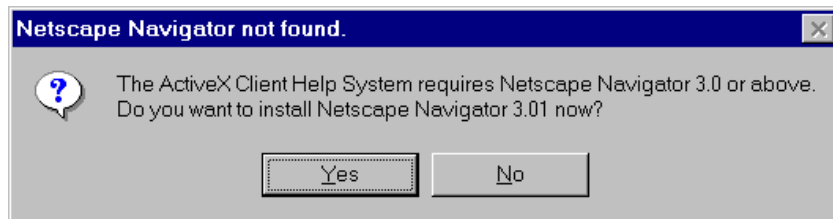
13. To specify a nondefault directory for the BEA Administration Console GUI CGI programs, click Browse, specify the nondefault directory, and click Next. Otherwise, click Next. The Enter Information screen is displayed.



14. To specify a nondefault Web Server client prefix for the GUI CGI directory, click Browse, specify the nondefault prefix, and click Next. Otherwise, click Next. The Select Program Folder screen is displayed.

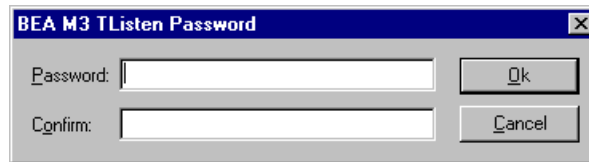


15. To specify a nondefault program folder name, enter the folder name or select a folder name from the Existing Folders, and click Next.
16. The Setup Program installs the BEA M3 software.
17. If your system does not have the required version of Netscape Navigator installed, the Netscape Navigator not found screen is displayed to assist you in installing the correct version.

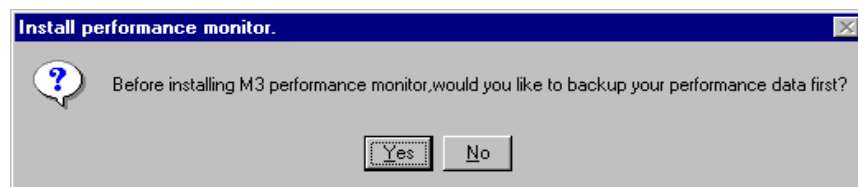


18. When the software installation is completed, the BEA M3 TListen Password screen is displayed.

2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*



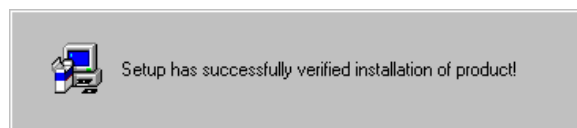
19. Enter the `tlisten` password in the Password field and again in the Confirm field and click Ok. If Cancel is clicked, the `tlisten` password installation is deferred. For information about the `tlisten` password and instructions for setting it, see the section "Selecting an Administrative Password" on page 1-10. The Install performance monitor screen is displayed.



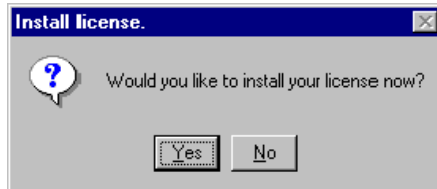
20. To back up your performance data files before you install the M3 performance monitor, click Yes. The Setup is verifying installation... screen is displayed.



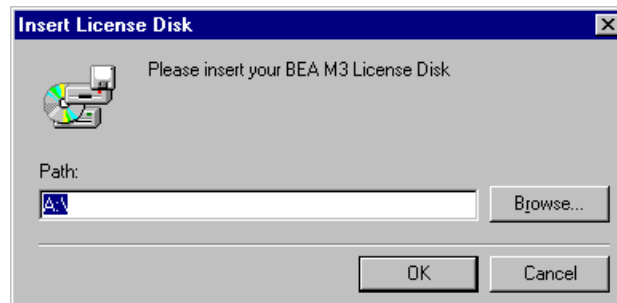
21. After the Setup program verifies the installation, the installation successful screen is displayed.



22. The Install license screen is displayed.



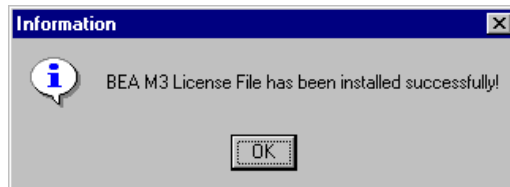
23. To install the M3 software license now, click Yes; otherwise, click No to install the license later. If you click Yes, the Insert License Disk screen is displayed.



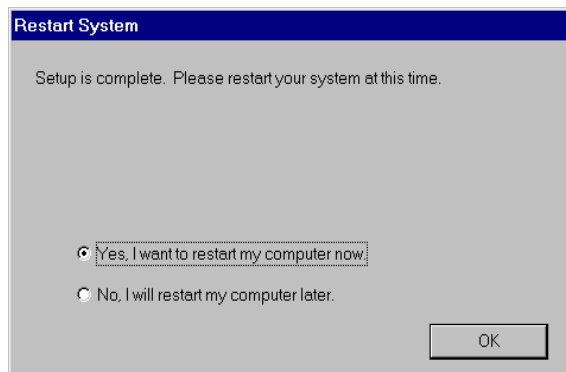
24. Your product license is on a 3.5-inch disk that is included in the software box. To install the license, insert the license disk in the disk drive on your machine and, if your disk drive is drive A, click OK; otherwise, enter the correct drive and click OK. An Information screen is displayed informing you that the M3 license file installed successfully.

Note: If you decide that you do not want to install the license now, but you want to complete the installation procedure and install the license later, do not click Cancel. Clicking Cancel terminates the installation. Instead, remove the license disk from the disk drive and click OK. A screen is displayed that states that the `lic.txt` could not be found and you can elect to complete the installation without installing the license.

2 INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS



25. Click OK. The Restart System screen is displayed.



26. Click OK. Your system restarts.

Note: If you attempt to run the M3 software before you restart your system, the software will fail.

Setting Microsoft Windows NT Environment Variables

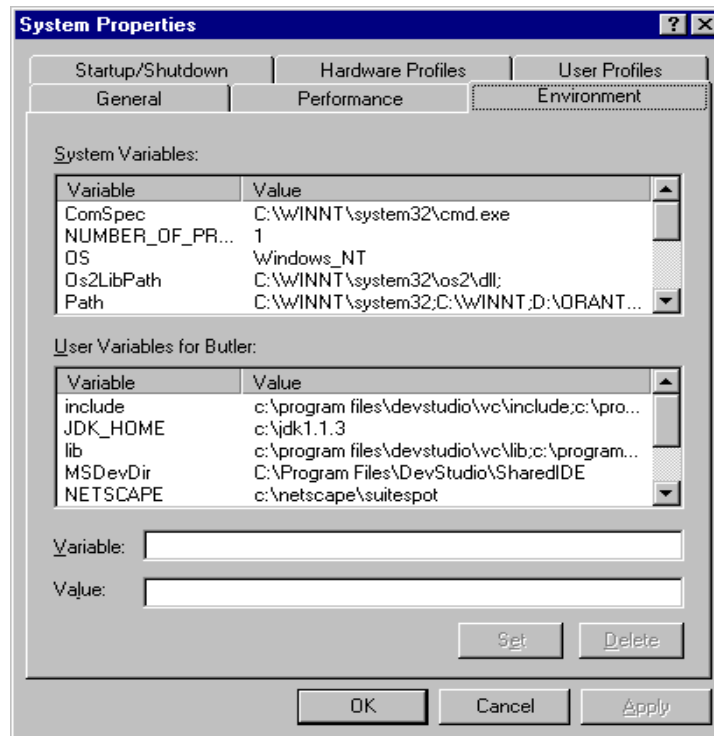
Before you use the M3 software, you may need to set two environment variables, `NETSCAPE` and `JDK_HOME`.

Note: If you run the M3 sample applications, these variables will be automatically set for you and you can ignore this section.

- ◆ The `NETSCAPE` variable is needed only by the M3 online help files.
- ◆ The `JDK_HOME` variable is needed only to build and run Java clients.

To set these variables, perform the following procedure.

1. Click the Microsoft Windows NT Start button, and click Settings—>Control Panel—>System—>Environment. The System Properties screen is displayed.



2. Enter the following environment variables as user variables:

- ◆ NETSCAPE = c:\netscape\suitespot
- ◆ JDK_HOME = c:\jdk1.1.5

Note: For instructions on how to set environment variables, click the Microsoft Windows NT Start button, click Help, and enter environment variables on the Index tab.

3. Click Apply and OK to close the System Properties window.

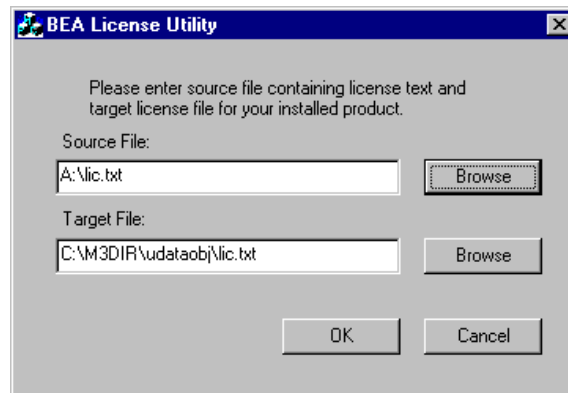
Installing the M3 Software Product License After You Install the M3 Software

If you elected not to install your software license when you installed the M3 software, you can install the license using the BEA License Utility.

Note: Your product license is on a 3.5-inch disk that is included in the software box.

To install the license, perform the following steps:

1. Insert the license disk into the disk drive on your machine.
2. Use the Taskbar to click Start—>Programs—>BEA M3 System v2.2—>BEA License Utility 2.2. The BEA License Utility screen is displayed.



3. If the disk drive on your machine is drive A, click OK; otherwise, enter the correct drive and click OK. The license is installed and the License File updated message is displayed.



Running Simpapp to Verify the M3 Software Installation on Microsoft Windows NT

To verify that you have successfully installed the M3 client and server software, execute the `simpapp` application. This “simple application” is an M3 C++ client/server application that converts strings to uppercase and lowercase letters.

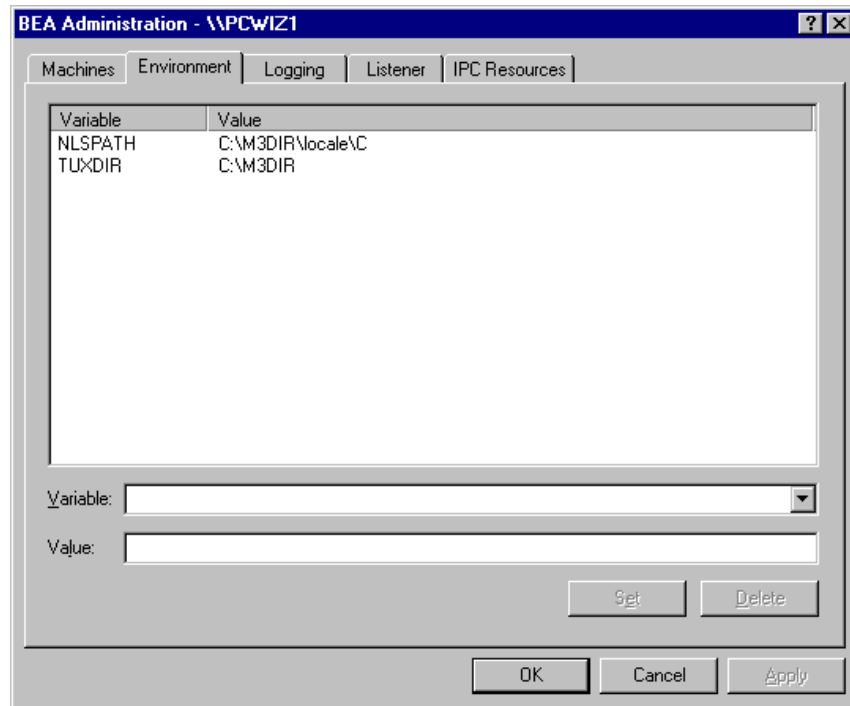
To run `simpapp`, open an MS-DOS window and perform the following steps:

1. Make sure that the directory in which you installed the M3 software is set in the environment variable `TUXDIR`. For example, if you installed the M3 software in the default directory, perform the following steps to set the `TUXDIR` environment variable to `C:\M3DIR`:
 - a. On the Microsoft Windows NT Task Bar, click Start—>Settings—>Control Panel. The Control Panel is displayed.

2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*



- b. Click the BEA Administration icon. The BEA Administration Control Panel is displayed.



- c. If the Control Panel is not displaying the Environment page as shown in the above screen, click on the Environment tab. The Environment page is displayed.
- d. Click on the TUXDIR variable, enter C:\M3DIR in the value field, and click OK.
2. Create a directory under M3DIR and copy the contents of the simpapp directory to it. If you installed the M3 software in the default directory, the simpapp directory is located at C:\M3DIR\Samples\Corba\Simpapp.
3. Change (cd) to the copy directory.
4. Check the permissions on all the files in the copy directory and, if necessary, change the permissions to allow full access. To set permissions to full access, enter `attrib -R /S *.*.`
5. To run simpapp automatically, enter `runme`. The simpapp application runs and prints the following messages:

```
Testing simpapp
  cleaned up
  prepared
  built
  loaded ubb
  booted
  ran
  shutdown
  saved results
PASSED
```

6. To run the sample manually to observe the `simpapp` processes starting and stopping, perform the following steps:
 - a. Enter `results\setenv`.
 - b. Enter `tmboot -y`. The application starts several processes.
 - c. Enter `simple_client`. The prompt `String?` is displayed.
 - d. Enter a word in lowercase letters. The application converts the word to uppercase and then to lowercase letters.
 - e. Enter `tmshutdown -y`. The application shuts down the processes.
7. To restore the directory to its original state, enter the following:
 - a. `results\setenv`
 - b. `nmake -f makefile.nt clean`

Installing the M3 Software on Microsoft Windows 95 and 98 Systems

Note: Before beginning installation, make sure no BEA TUXEDO or BEA M3 client applications are running.

Note: It takes approximately 5 minutes to install the software on a local disk; installation on a remote disk may take as long as 10 minutes.

INSTALLING THE M3 SOFTWARE ON MICROSOFT WINDOWS 95 AND 98 SYSTEMS

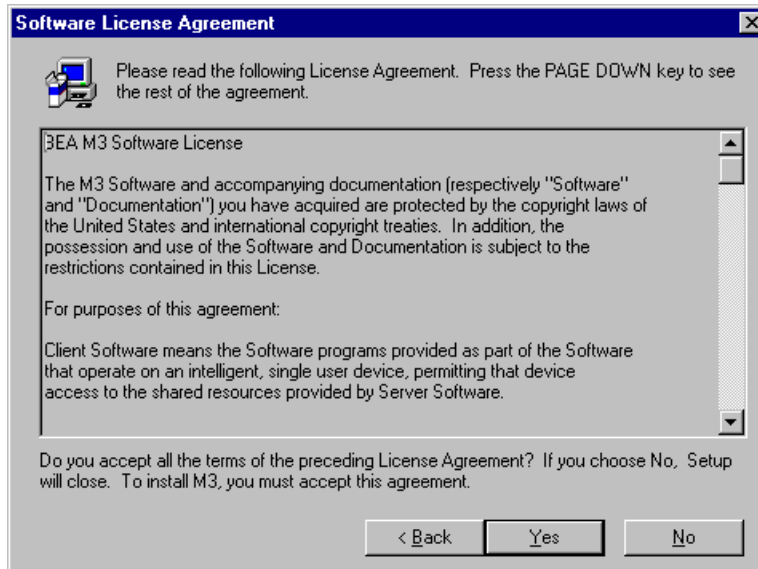
To install the BEA M3 software on a Microsoft Windows 95 or 98 operating system, use the following procedure:

1. Insert the BEA M3 CD in the CD drive and use the Taskbar to click Start—>Programs—>Windows Explorer.
2. Click the CD drive and then click the `winnt` folder.
3. Double click the Setup.exe program. The Welcome screen is displayed.

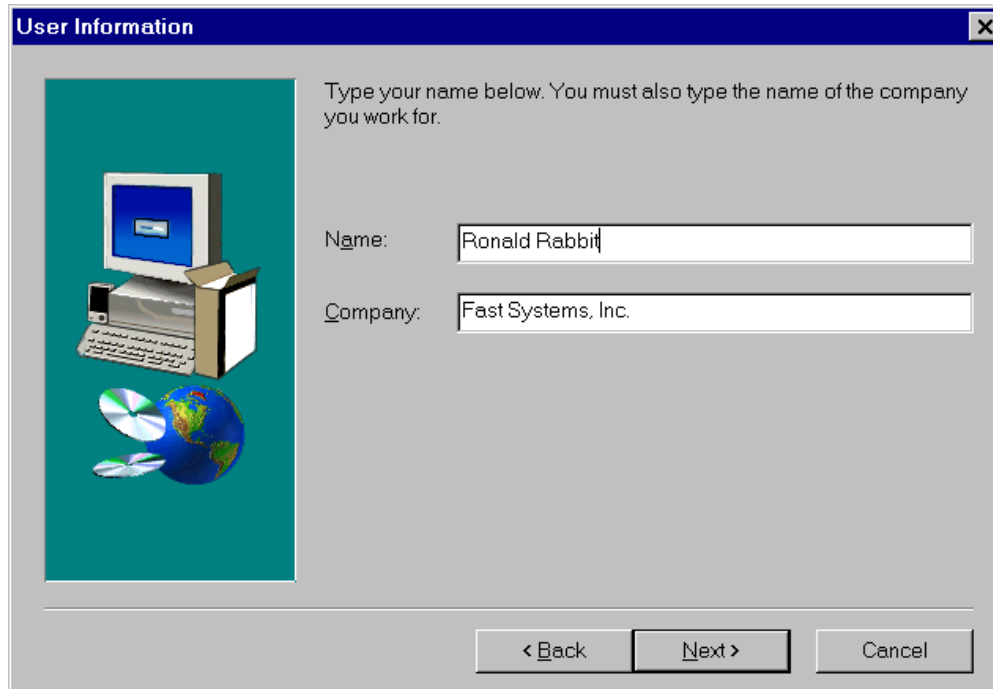


4. Click Next. The Software License Agreement screen is displayed.

2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*



5. To accept the license agreement, click Yes. The User Information screen is displayed.



The image shows a Windows-style dialog box titled "User Information". On the left is a graphic of a computer monitor, keyboard, and CD-ROMs. On the right, there is a text prompt: "Type your name below. You must also type the name of the company you work for." Below this are two text input fields. The first is labeled "Name:" and contains the text "Ronald Rabbit". The second is labeled "Company:" and contains the text "Fast Systems, Inc.". At the bottom right are three buttons: "< Back", "Next >", and "Cancel".

User Information

Type your name below. You must also type the name of the company you work for.

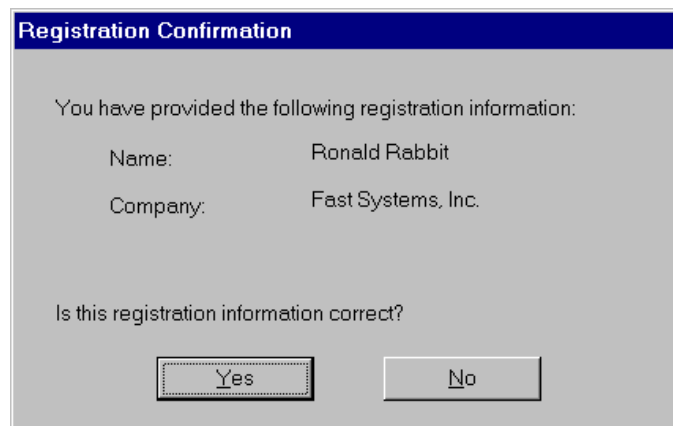
Name:

Company:

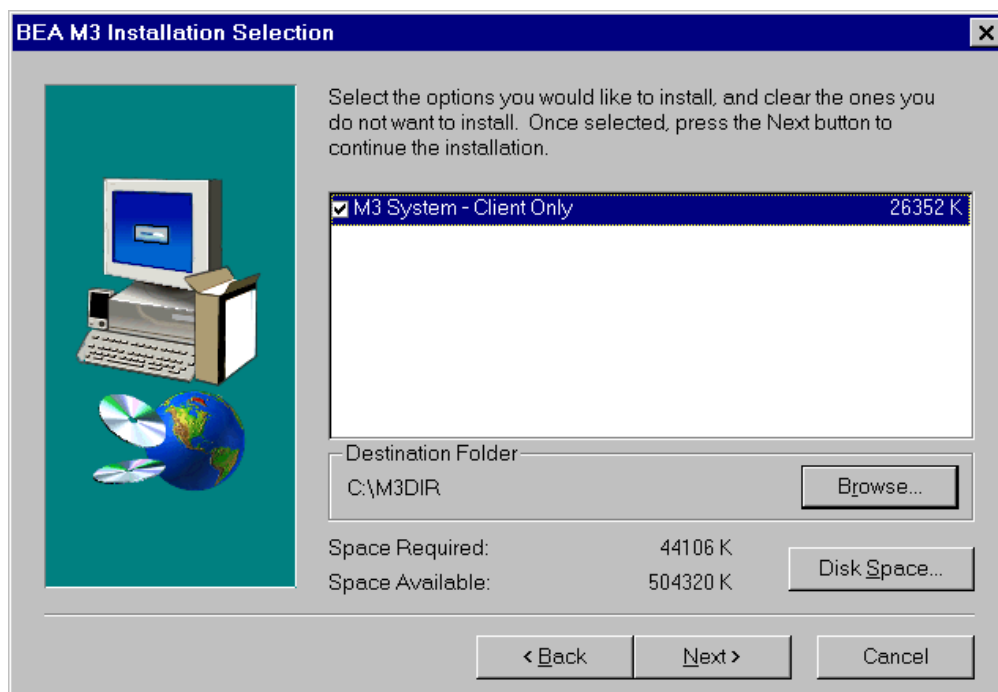
< Back Next > Cancel

6. Enter your name and the name of your company and click Next. The Registration Confirmation screen is displayed.

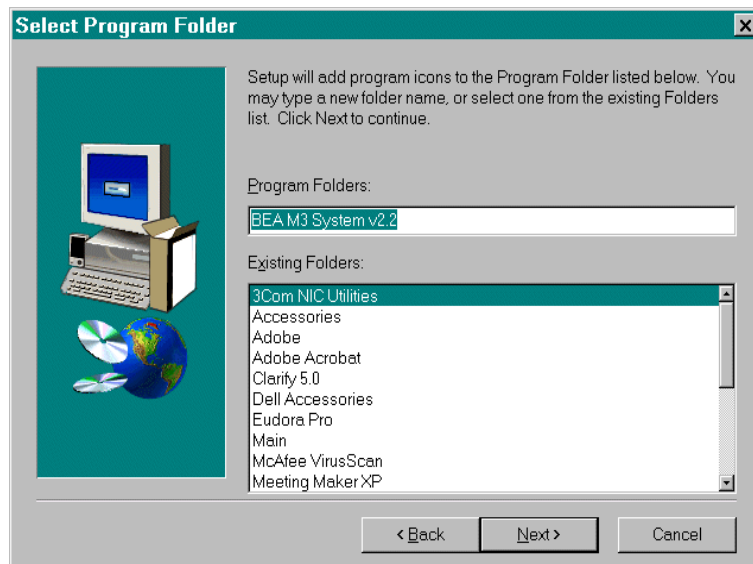
2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*



7. If the registration information is correct, click Yes. Otherwise, click No and correct the information. The BEA M3 Installation Selection screen is displayed.

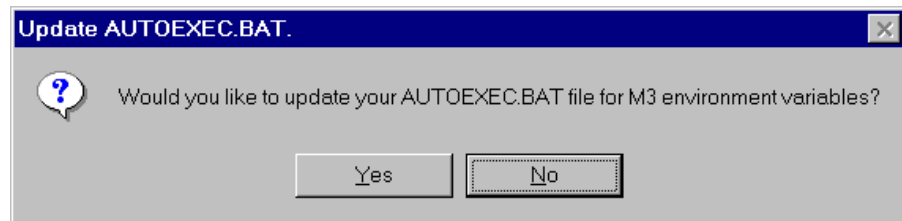


8. Respond to the BEA M3 Installation Selection screen as follows:
 - ◆ You can install only client software on Microsoft Windows 95 and 98 systems, so leave the check box as is.
 - ◆ To specify a nondefault directory for the software, click Browse, and specify the nondefault directory. For information about default file locations and pathnames, see the section “Selecting Directories for the M3 Files” on page 1-8.
9. Verify that your machine has enough free disk space and click Next. The Select Program Folder screen is displayed.

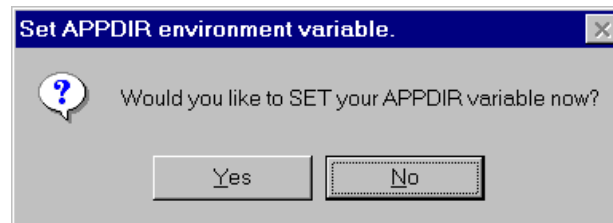


10. To specify a nondefault program folder name, enter the folder name or select a folder name from the Existing Folders, and click Next. The BEA M3 software is installed. When the software installation completes, the Update AUTOEXEC.BAT screen is displayed.

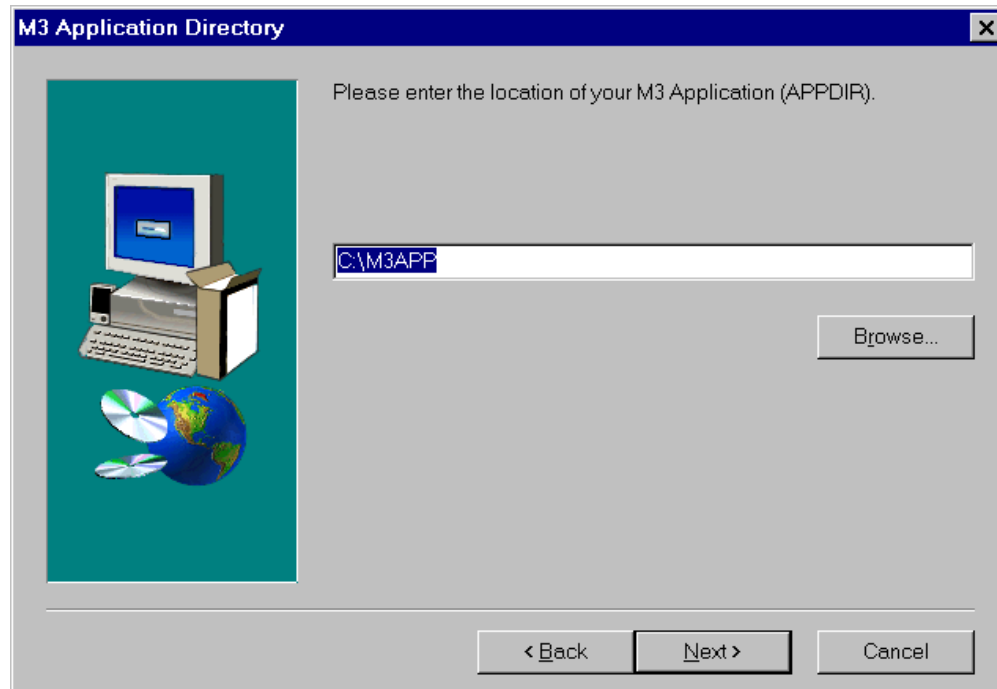
2 *INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS*



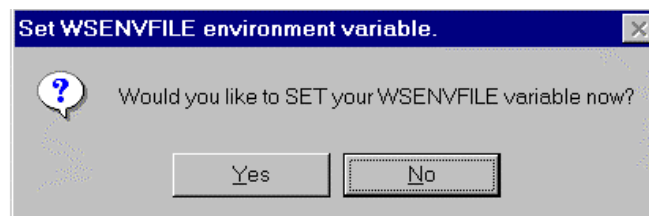
11. Click Yes to update the AUTOEXEC.BAT file. The Set APPDIR environment variable screen is displayed.



12. Click Yes. The M3 Application Directory screen is displayed.

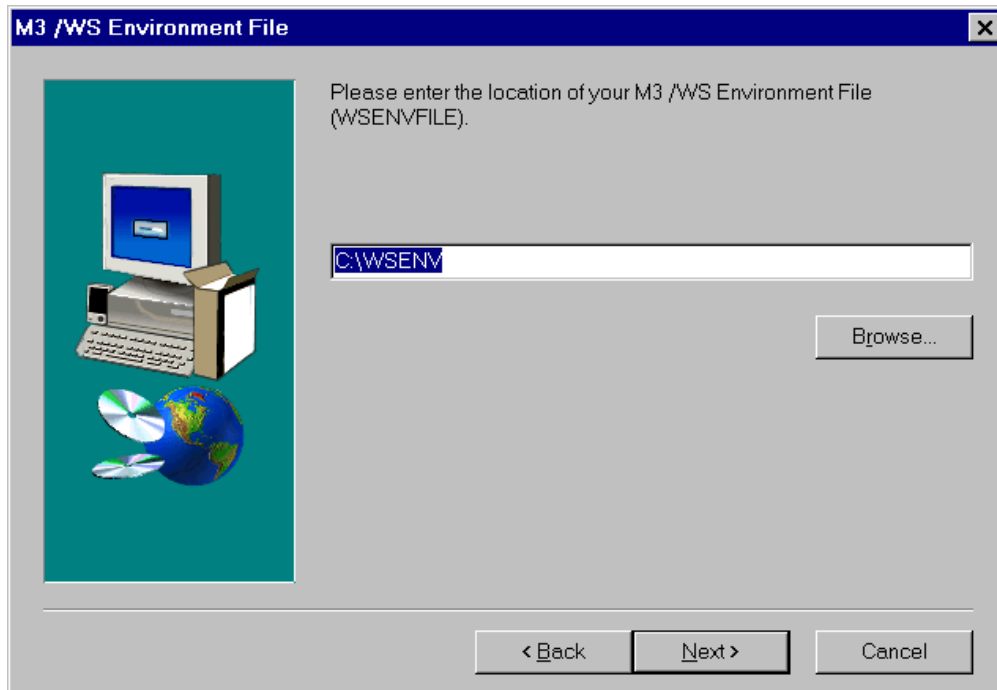


13. To accept the default directory, click Next. To specify a nondefault directory, click Browse, enter the desired directory, and click Next. The Set WSENVFILE environment variable screen is displayed.



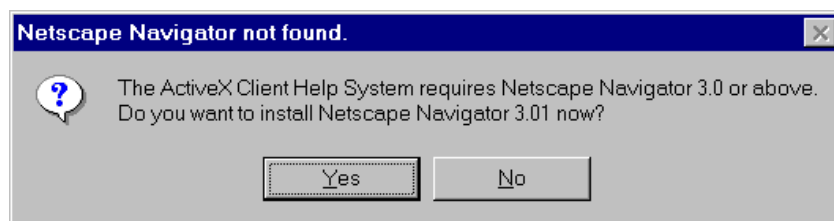
14. To set the WSENVFILE environment variable, click Yes. The M3 /WS Environment File screen is displayed.

2 INSTALLATION ON MICROSOFT WINDOWS NT, 95, AND 98 SYSTEMS

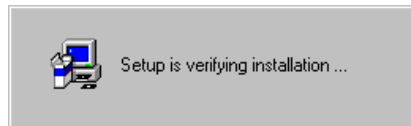


15. To accept the default directory, click Next. To specify a nondefault directory, click Browse, enter the desired directory, and click Next.

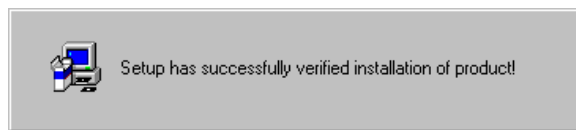
Note: If your system does not have the required version of Netscape Navigator installed, the Netscape Navigator not found screen is displayed to assist you in installing the correct version.



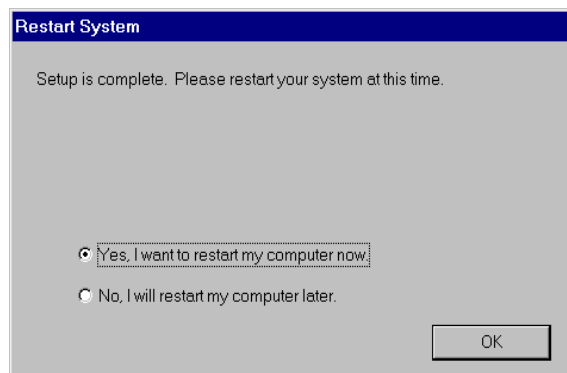
16. The Setup is verifying installation... screen is displayed.



17. After the Setup program verifies the installation, the Setup has successfully verified installation of product screen is displayed.



18. The Restart System screen is displayed.



19. Click OK to restart your system. To restart your system later, click the No radio button and click OK.

Note: If you attempt to run the M3 software before you restart your system, the software may fail.

Removing (Uninstalling) the M3 Software from Your System

To remove the M3 software from your system, proceed as follows:

1. Log on to the system. (If you are using a Microsoft Windows NT system, log on as the administrator or as a member of the Administrator group.)
2. Make sure that no BEA TUXEDO or BEA M3 client or server applications are running. Use `tmshutdown` to shut down all M3 applications.
3. Use the Taskbar to click Start—>Programs—>BEA M3 System v2.2, and click M3 UnInstall 2.2.
4. Click Yes to confirm the removal. The BEA M3 product is removed from your system and from the Windows Registry.

3 Installation on UNIX Systems

This chapter provides procedures for:

- ◆ Platforms Supported
- ◆ Installing the M3 Software on UNIX Systems
- ◆ Removing (Uninstalling) the M3 Software from Your System

Platforms Supported

The platforms listed in Table 3-1 are supported.

Table 3-1 Supported Platforms

Vendor	Operating System	Release/Version
Digital	Digital UNIX	4.0d (Alpha)
HP	HP-UX	10.20 and 11.00
IBM	AIX	4.2.1 (RS/6000, SP2)
Sun	Solaris	2.5.1 and 2.6 (UltraSPARC)

For the hardware and software requirements for these operating systems, see Appendix A, “Platform Data Sheets.”

Installing the M3 Software on UNIX Systems

This section describes how to install the M3 software on UNIX systems.

Preinstallation Consideration: Backing Up Files

If you are installing M3 software on a system that already has M3 software installed, there are some files that you may want to back up prior to the installation, and then restore them after the installation is complete. This is because some files that you may have modified are overwritten when the M3 software is re-installed.

To avoid having to modify these files again, proceed as follows:

1. If you are installing the BEA M3 server software, back up the `RM` file to a temporary location. This file is located in the `M3DIR/udataobj` directory.
2. If you are installing the BEA Administration Console, back up the `webgui.ini` file to a temporary location. This file is located in the `M3DIR/udataobj/webgui` directory.
3. After the installation is complete, restore these files to their original locations.

UNIX Installation Procedure

Note: Before beginning installation, use the `tmshutdown` command to shut down any active M3 or BEA TUXEDO applications.

Note: It takes approximately 5 minutes to install the software on a local disk; installation on a remote disk may take as long as 10 minutes.

Note: On most systems, you need superuser privileges to mount the CD.

To install the BEA M3 software on a UNIX operating system, use the following procedure:

1. Log on to the system with administrative privileges.
2. Insert the BEA M3 CD into the reader.
3. Mount the CD as a file system. For platform-specific instructions on how to do this, see Appendix A, "Platform Data Sheets." On most systems you need superuser privileges to perform the mount.

Note: If your system does not have a directly connected CD reader, you can mount the CD on a remote system, share (export) the CD file system, and then mount the remote file system. For detailed instructions for each platform, see Appendix A, "Platform Data Sheets." Alternatively, you can mount the CD on a remote system, copy the contents of the CD directory for your platform to the system in which you plan to install the BEA M3 software, and continue with the remainder of the installation procedure. Table 3-2 lists the CD directory names.

Table 3-2 BEA M3 CD Directory Name for UNIX Platforms

Platform	Directory
Digital UNIX v4.0d on DEC Alpha	alpha/dux40
HP UX v10.20 on HP 9000 Series 800	hp/hpux1020
HP UX v11 on HP 9000 Series 800	hp/hpux11
IBM AIX v4.2.1 on RS/6000 and SP2	ibm/aix421
Solaris v2.5.1 on UltraSPARC	sun5x/sol251
Solaris v2.6 on UltraSPARC	sun5x/sol26

4. Log on to the M3 account, if it was set up.
5. Change directory to the root of the mounted CD.

3 *INSTALLATION ON UNIX SYSTEMS*

6. To invoke the installation procedure, enter `sh ./INSTALL.SH`. The following prompt is displayed:

```
01) ALPHA/DUX40  02) HP/HPUX1020  03) HP/HPUX11
04) IBM/AIX421   05) SUN54/SOL251  06) SUN54/SOL26
Install which platform's files [01-06, q to quit, l for list]:
```

7. Select the desired operating system. For example, if you select Digital UNIX, the following prompt is displayed:

```
** You have chosen to install from ALPHA/DUX40 **

BEA M3 System Release 2.2

This directory contains the BEA M3 Core System for Digital Unix
4.0 on DEC Alpha.

Is this correct [y,n,q]:
```

8. Enter `y`. The following prompt is displayed:

```
To terminate the installation at any time
press the interrupt key,
typically <del>, <break>, or <ctrl+c>.

The following packages are available:

1      m3          BEA M3 Core System

Select the package(s) you wish to install (or 'all' to install
all packages) (default: all) [?,?,q]:
```

9. Enter `1`. The following prompt is displayed:

```
BEA M3 Core System
(alpha) Release 2.2
Copyright (c) 1998 BEA Systems, Inc.
All Rights Reserved.
BEA and M3 are trademarks of BEA Systems, Inc.

The following installation options are available:

1 both          Install the full M3 System - client and server
2 client        Install the client only

Select an option (default: both) [?,?,q]:
```

Note: The following steps assume that you select option 1.

10. Select the desired option. The following prompt is displayed:

```
Directory where M3 files are to be installed [?,q]:
```

11. Enter the name of the desired directory (for example, /usr/local/M3DIR). If you elected to install the full M3 system, the following prompt is displayed:

```
Determining if sufficient space is available...
63292 blocks are required
658976 blocks are available to /usr/local/M3DIR

Using /usr/local/M3DIR as the M3 base directory

Directory where BEA Administration Console documents and images
are to be installed (default: /usr/local/M3DIR/udataobj/webgui)
[?,q]:
```

12. This prompt allows you to choose between (a) accepting default locations for files being installed, or (b) specifying nondefault pathnames for these files. For details, see the section “Selecting Directories for the M3 Files” on page 1-8. If you accept the default, the following prompt is displayed:

```
Creating /usr/local/M3DIR/udataobj/webgui

Using /usr/local/M3DIR/udataobj/webgui as the BEA Administration
Console document tree

Directory where BEA Administration Console java applets are to
be installed (default: /usr/local/M3DIR/udataobj/webgui/java)
[?,q]:
```

13. Again, you have a choice. If you accept the default, the following prompt is displayed:

```
Creating /usr/local/M3DIR/udataobj/webgui/java

Using /usr/local/M3DIR/udataobj/webgui/java as the BEA
Administration Console document tree

Directory where BEA Administration Console CGI programs are to
be installed (default:
/usr/local/M3DIR/udataobj/webgui/cgi-bin) [?,q]:
```

14. If you accept the default, the following prompt is displayed:

```
Creating /usr/local/M3DIR/udataobj/webgui/cgi-bin

Using /usr/local/M3DIR/udataobj/webgui/cgi-bin as the BEA
Administration Console CGI directory

Web server client prefix for CGI directory. /cgi-bin is a good
choice for most web servers. (default: /cgi-bin) [?,q]:
```

15. If you accept the default, the following prompt is displayed and the install program proceeds to install the M3 files:

```
Using /cgi-bin as the BEA Administration Console CGI prefix

Unloading /kits/dec/pxx/alpha/dux40/iceberg/WS.Z...
```

16. After the installation of the M3 files is completed, the following prompt is displayed:

```
... finished

Moving BEA Administration Console files to their proper
location...
... finished

Changing file permissions...
... finished

Processing default license file...
... finished

Install tlisten password? [y/n]:
```

17. If you want to specify a tlisten password, enter y; otherwise enter n. For information about the tlisten password and instructions for setting it, see the section “Selecting an Administrative Password” on page 1-10. If you enter y, the following prompt is displayed:

```
Please enter the tlisten password:
```

18. Enter the tlisten password. The following prompt is displayed:

```
Please verify the password:
```


19. Enter the `tlisten` password again. The following prompt is displayed:

```
tlistpwd: INFO: Password appended to file
"/usr/local/M3DIR/udataobj/tlisten.pw".

Verifying installation...
... Installation successful!

If your license file is accessible, you may install it now.
Install license file? [y/n]:
```

20. If you want to install the BEA M3 software license now, enter `y`; otherwise, enter `n` and install the license later. If you enter `y`, the following prompt is displayed:

```
To terminate the license update at any time
press the interrupt key,
typically <del>, <break>, or <ctrl+c>.

Directory containing source license text file [?,q]:
```

21. Insert the license disk, which is shipped in the BEA M3 software box, in the disk reader on your machine, mount the disk (if necessary), copy the `lic.txt` file to a system directory, and enter the location of the `lic.txt` file at the prompt. For example, if you copy the `lic.txt` file to `/usr`, enter `/usr`. The following prompt is displayed:

```
Using /usr/lic.txt to copy license information.

Updating /usr/local/M3DIR/udataobj/lic.txt with license
information.

Please don't forget to fill out and send in your registration
card
```

22. After the installation is completed, unmount the CD file system and remove the CD from the reader. For platform-specific instructions for unmounting the CD, see Appendix A, "Platform Data Sheets."

Installing the M3 Software License After You Install the M3 Software

If you elected not to install your software license when you installed the M3 software, you can install the license using the BEA License Utility.

Note: Your product license is on a 3.5-inch disk that is included in the software box.

To install the license, use the following steps:

1. Insert the license disk, which is shipped in the M3 software box, in the disk reader on your machine, mount the disk (if necessary), and copy the `lic.txt` file to a directory of your choice, but not to the `M3DIR` directory or any of its subdirectories.

2. Enter the following command to change to the `/bin` directory:

```
cd /usr/local/M3DIR/bin
```

3. Enter `sh ./lic.sh`. The following prompt is displayed:

```
To terminate the license update at any time
press the interrupt key,
typically <del>, <break>, or <ctrl+c>.
```

```
Directory containing source license text file [?,q]:
```

4. Enter the name of the directory that contains the `lic.txt` file (for example, `/kits/license`). The following prompt is displayed:

```
Using /kits/license/lic.txt to copy license information.
```

```
Directory where M3 files are installed. [?,q]:
```

5. Enter `/usr/local/M3DIR` or the name of the directory where you installed the M3 software. The following prompt is displayed:

```
Updating /usr/local/M3DIR/udataobj/lic.txt with license
information.
```

Running Simpapp to Verify the M3 Software Installation

To verify that you have successfully installed the M3 client and server software, execute the `simpapp` application. This “simple application” is an M3 C++ client/server application that converts strings to uppercase and lowercase letters.

To run `simpapp`, perform the following steps:

1. Make sure that the directory in which you installed M3 is set in the environment variable `TUXDIR`. For example, if you installed the M3 software in the default directory, enter the following to set the `TUXDIR` environment variable:
`TUXDIR=/usr/local/M3DIR; export TUXDIR`
2. Create a directory under `M3DIR` and copy the content of the `simpapp` directory to it. If you installed the M3 software in the default directory, the `simpapp` directory is located at `usr/local/M3DIR/samples/corba/simpapp`.
3. Change (`cd`) to the copy directory.
4. To change the permissions on all the files to allow full access, enter:
`chmod 777 *`
5. Make sure `make` is in your path.
6. To run the `simpapp` automatically, enter `./runme.ksh`. The `simpapp` application runs and prints the following messages:

```
Testing simpapp
  cleaned up
  prepared
  built
  loaded ubb
  booted
  ran
  shutdown
  saved results
PASSED
```

7. To run the `simpapp` manually to observe the processes starting and stopping, do the following:
 - a. Enter `./results/setenv.ksh`.
 - b. Enter `tmboot -y`. The application starts several processes.

- c. Enter `./simple_client`. The prompt `String?` is displayed.
 - d. Enter a word in lowercase letters. The application converts the word to uppercase and then to lowercase.
 - e. Enter `tmshutdown -y`. The application shuts down the processes.
8. To restore the directory to its original state, enter:
- a. `./results/setenv.ksh`
 - b. `make -f makefile.mk clean`

Removing (Uninstalling) the M3 Software from Your System

To remove the software from your system, use the following procedure:

1. Log on as the M3 administrator.
2. Make sure that no BEA TUXEDO or BEA M3 client or server applications are running. Use `tmshutdown` to shut down all M3 applications.
3. Enter the following command:

```
# rm -rf M3DIR
```

where `M3DIR` is the BEA M3 base directory.

4 BEA Administration Console Startup

This chapter discusses the following topics:

- ◆ System Requirements
- ◆ Setting Up Your Environment
- ◆ Starting the BEA Administration Console

System Requirements

This section lists the hardware, operating system resources, and browser you must provide to support the BEA Administration Console.

Platforms Supported

The BEA Administration Console runs on all server platforms that support the BEA M3 version 2.2 software. For a complete list of supported platforms, see the section “Supported Platforms” on page A-1.

Hardware Requirements

In addition to the hardware and software requirements for installing M3 client and server software on your particular platform (see Appendix A, “Platform Data Sheets”), the BEA Administration Console requires a color display device with the following capabilities:

- ◆ Resolution: 800 by 600 dpi or more is required; 1024 by 768 or more is recommended.
- ◆ Colors: 256 colors or more is recommended.

Operating System Requirements

Given the broad outlines of an application design, you must verify the availability of operating system resources needed to support your application. Operating system resources include:

- ◆ System shared resources (IPC), which control the maximum message size and maximum queue length, among other things
- ◆ Resources governed by kernel parameters

For information about setting Microsoft Windows NT IPC parameters, see the section “Maximizing System Performance” on page 5-9.

For information about setting UNIX system IPC parameters, see the section “Verifying IPC Requirements” on page 5-18.

For more information about system tuning parameters for a particular platform, see Appendix A, “Platform Data Sheets.”

Browser Requirements

Although any Java capable Web browser may be able to run the BEA Administration Console, at this time BEA supports only the following browsers:

- ◆ Netscape Navigator 4.05 Gold
- ◆ Microsoft Internet Explorer 4.0

For up-to-date information about other supported Web browsers, see the M3 Release Notes on the Customer Support section of the BEA Web site:

<http://www.beasys.com/>

Setting Up Your Environment

To run the BEA Administration Console, you need to set up two servers:

- ◆ `tuxwsvr`
A Web server provided with the M3 system software. (You are not required to use this server; you may, if you prefer, use your own commercial Web server.)
- ◆ `wlisten`
A server required to administer the BEA Administration Console. It should be run on the master machine.

Note: You can use any machine that supports a Java capable browser for performing M3 system administration through the BEA Administration Console.

Starting tuxwsvr

To start `tuxwsvr` on UNIX systems, enter:

```
$ tuxwsvr -l //machine:port -i \  
  ${TUXDIR}/udataobj/tuxwsvr.ini
```

To start `tuxwsvr` on Microsoft Windows NT systems:

1. Open an MS-DOS window.
2. Enter `tuxwsvr -l//machine:port -i%TUXDIR%\udataobj\tuxwsvr.ini`

During installation, the `tuxwsvr.ini` file is created. Usually, you do not need to edit this file. Under certain circumstances, however, you may want to edit this file. For example, you may decide, after installation, to move your Java files to a nondefault directory. In that case, you would need to edit the pathnames in the initialization file appropriately. For details, see the `tuxwsvr(1)` reference page in the *BEA TUXEDO Reference*.

Starting wlisten

To start `wlisten`, proceed as follows:

1. Before starting `wlisten`, check the `webgui.ini` file (located in `M3DIR\udataobj\webgui` for Microsoft Windows NT systems and in `M3DIR/udataobj/webgui` for UNIX systems) to make sure that the default values assigned to the parameters during installation are appropriate. Otherwise, make the appropriate changes.
2. For example, on a machine called `popeye`, the default port assigned to `wlisten` is 4003. To run `wlisten` with port 6060, edit the `NADDR` parameter line in the `webgui.ini` file, as follows:

```
NADDR=/popeye:6060
```

For details about other parameters in the `webgui.ini` file, see the `wlisten(1)` reference page in the *BEA TUXEDO Reference*.

3. Start the `wlisten` process:

```
$ wlisten
```


Starting the BEA Administration Console

To start the BEA Administration Console, proceed as follows:

1. Start the browser.
2. Enter the following URL:

`http://<machine_name>:<port>/webguitop.html`

Use of this URL depends on the following assumptions:

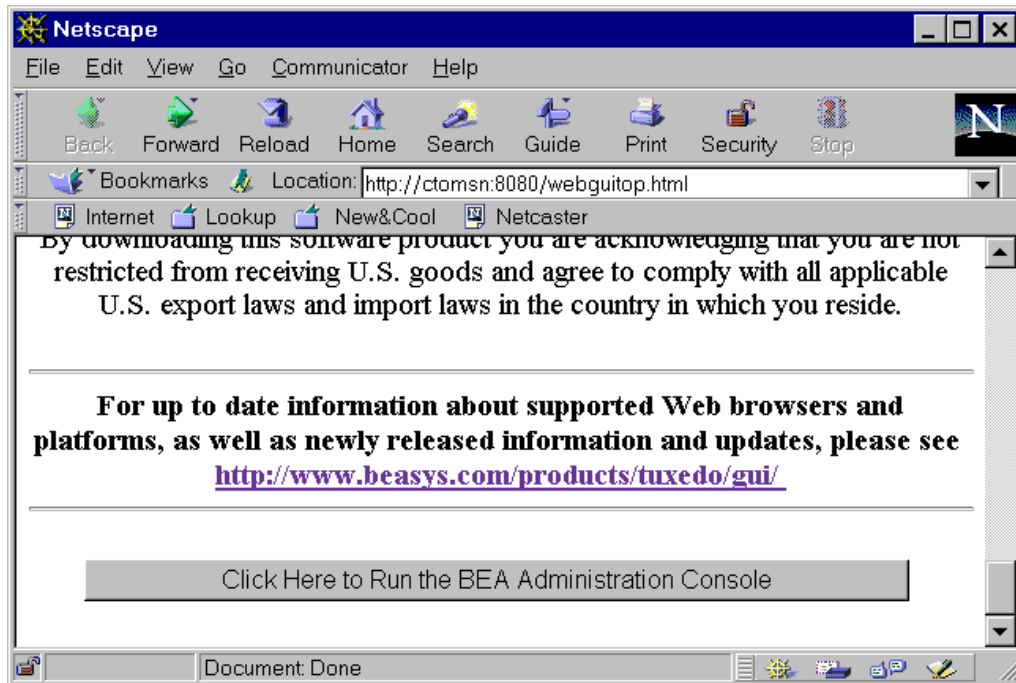
- ◆ You are using `tuxwsvr` with the file `tuxwsvr.ini`.
- ◆ The `webgui.ini` file is in the default location, `M3DIR/udataobj/webgui`.

Note: If you are using a commercial browser on the default port (8080), you can use something like the following URL:

`http://ctomsn:8080/webguitop.html`

The BEA Administration Console entry page is displayed, including warranty and license notices.

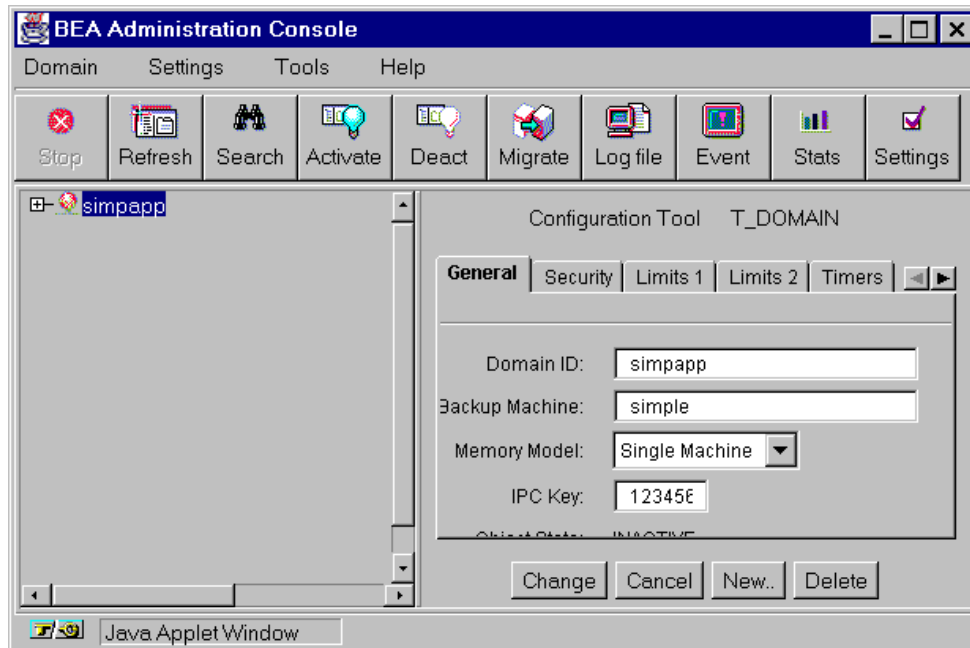
4 BEA ADMINISTRATION CONSOLE STARTUP



3. To start the BEA Administration Console, click the prompt at the bottom of the screen. The Login window is displayed.

A login window with a gray background. At the top, it says "Please enter your BEA Administration Console Password". Below this, there are two input fields: "Login Name:" and "Password:". At the bottom right, there is a button labeled "LOGIN".

4. Enter your login name and password in the appropriate fields, and click LOGIN. The password must be one of the entries in the `tlisten.pw` file in the `M3DIR/udataobj` directory. The main window of the BEA Administration Console is displayed.



Note: Refer to Table 4-1 for instructions for accessing additional information about the BEA Administration Console main window.

Table 4-1 Accessing Information About the BEA Administration Console Main Window

If ...	Then ...
The main window is displayed and you want to start working with the GUI	See “Tutorial” section in the BEA Administration Console online help.
The main window is displayed and you want to read a description of it	See Chapter 2, “A Tour of the Main Window,” in the BEA Administration Console Online Help.

Table 4-1 Accessing Information About the BEA Administration Console Main Window (Continued)

If . . .	Then . . .
The main window does not display and the <code>Connect Failed</code> error message is displayed	<ol style="list-style-type: none"> 1. Enter the <code>ps</code> command to verify that the <code>wlisten</code> process is running. 2. If <code>wlisten</code> is not running, open the <code>webgui.ini</code> file and, in the line <code>"NADDR=//lcsol1:4003"</code>, replace the port number (4003) with a valid port number. 3. Enter <code>wlisten</code> again: <pre>\$ wlisten -i \ M3DIR/udataobj/webgui/webgui.ini</pre> 4. Check that the <code>tuwsvr</code> process is running at the port as described in the URL. 5. Verify the password. It must match one of the entries in the <code>tlisten.pw</code> file in the <code>M3DIR/udataobj</code> directory. 6. Return to step 1 above.

5. Click the `Deact` button to start the deactivate process and pop up the `Progress of Deactivate (Entire Domain)`.
6. When you see the confirmation message "Deactivation has completed successfully," click the `Dismiss` button to close the dialog box.
7. To exit the BEA Administration Console, click `Domain—>Exit`.

You may now start setting up your environment for your own application domain.

5 Postinstallation Considerations

Now that you have successfully installed the M3 software, you must set up your machine and parts of the M3 software to prepare for developing or installing your application. This chapter describes the required set-up tasks in the following sections:

- ◆ “Configuring the M3 System for Microsoft Windows NT” describes how to use the M3 control panel applet to configure the M3 machine for Microsoft Windows NT.
- ◆ “Setting Up Your Environment on UNIX Systems” recommends settings for various environment variables.
- ◆ “Editing a UBBCONFIG File” explains how to edit the configuration file for an application before booting the application.
- ◆ “Verifying IPC Requirements” describes the commands that enable you to calculate the minimum IPC requirements for an application, based on its UBBCONFIG file.
- ◆ “Creating the Universal Device List and TLOG” describes how to create a Universal Device List (UDL) and a transaction log for those applications that require them.
- ◆ “Starting the tlisten Process on UNIX Systems” describes several methods for starting the `tlisten` process, which provides remote service connections.
- ◆ “Using the TYPE Parameter in the UBBCONFIG File” calls special attention to how the `TYPE` parameter in the UBBCONFIG file should be set.

Configuring the M3 System for Microsoft Windows NT

In addition to the BEA Administration Console, the M3 system provides a control panel applet that you can use to configure the M3 machine for Microsoft Windows NT. This section describes how to use the applet to do the following:

- ◆ Access machines on a network by setting the Machines page
- ◆ Modify environment variables on the Environment page
- ◆ Direct system messages to the Microsoft Windows NT Event Log by setting the Logging page
- ◆ Configure one or more `tlisten` processes to start automatically by setting the Listener page
- ◆ Maximize system performance by tuning the IPC Resources page setting

Accessing the Control Panel Applet

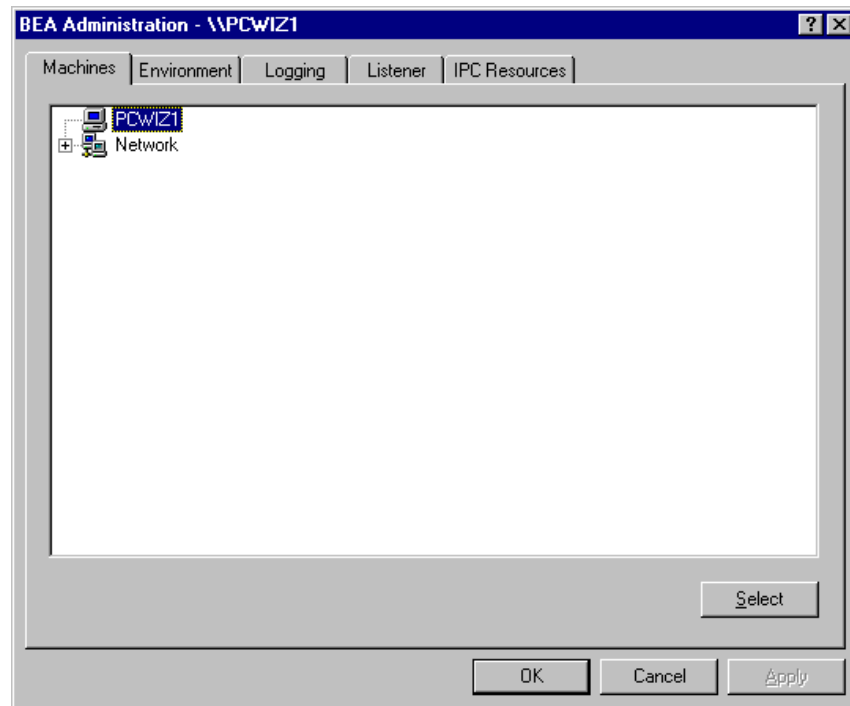
To access the control panel applet, proceed as follows:

1. Click Start—>Settings—>Control Panel. The Control Panel is displayed.



5 POSTINSTALLATION CONSIDERATIONS

2. Click the BEA Administration icon. The BEA Administration Control Panel is displayed.



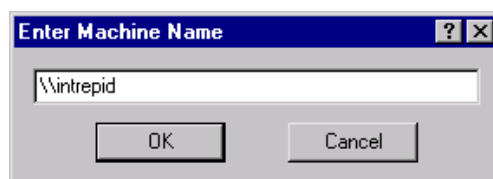
Accessing Machines on a Network

To display the Machines page of the Control Panel, click on the Machine tab.

The Machines Page enables the BEA M3 system administrator to access any machine on the Microsoft Windows Network running Microsoft Windows NT, where the administrator has login privileges. The system administrator can then set environment variables remotely; determine the location of BEA M3 event logging; add, start, or remove `tlisten` services; and tune IPC resources. To access a remote machine, the administrator locates the machine on a network tree.

If you know a machine's name, but not its work group, proceed as follows:

1. Click Select. The Enter Machine Name screen is displayed.



2. Enter the name of the remote machine on the Enter Machine Name window and click OK.

All subsequent actions on other folders in the control panel applet take place on the selected machine.

Modifying Environment Variables

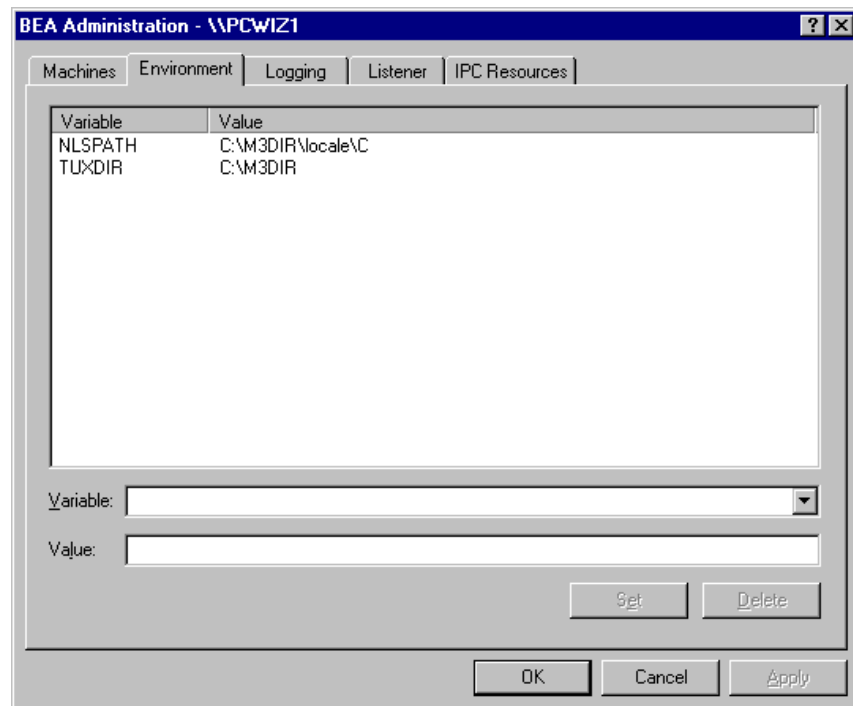
To display the Environment Page of the Control Panel, click on the Environment tab.

Modifying M3 environment variables is almost identical to modifying Microsoft Windows NT environment variables. The Variable field (see Figure 5-1) contains a list of the most commonly used M3 environment variables.

To modify the variables, proceed as follows:

1. To add or edit a variable, select the variable, enter its value in the Value field, and click Set.
2. To delete a variable, select the variable you want to delete, and click Delete.
3. Click OK or Apply to save any changes.

Figure 5-1 M3 Software for Microsoft Windows NT Environment Control Panel

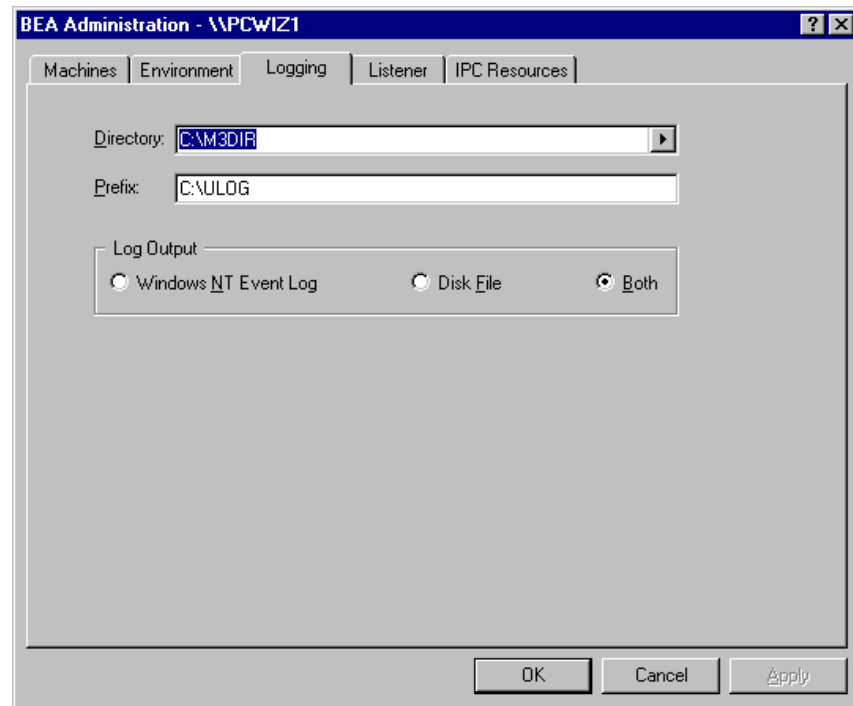


Directing M3 Messages to the Microsoft Windows NT Event Log

To display the Logging page (Figure 5-2) of the Control Panel, click on the Logging tab.

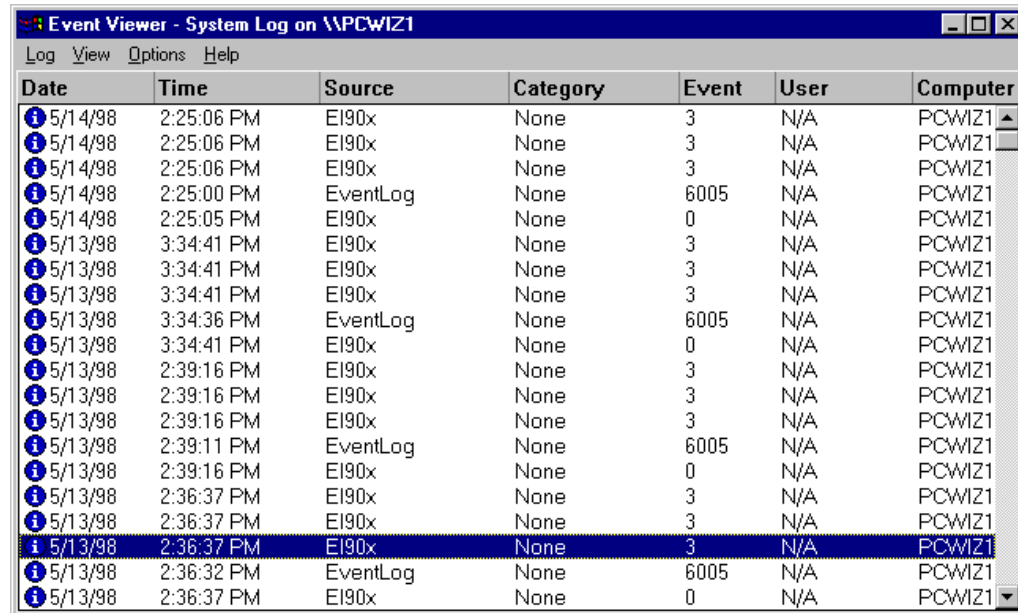
You can set the Logging Page to direct M3 system messages to the Microsoft Windows NT Event Log. You can select the Logging option (Microsoft Windows NT Event Log) or the traditional user log (Disk File), or both. If you want traditional user log (ULOG) messages, select the directory into which ULOG messages will be written, as well as the prefix for the file name. The default prefix is ULOG, and the default file name is ULOG.<mmdyy>.

Figure 5-2 M3 Software for Microsoft Windows NT Logging Control Panel



5 POSTINSTALLATION CONSIDERATIONS

To view Event Log entries, click Start—>Programs—>Administrative Tools—>Event Viewer. The Event Viewer window is displayed.



Date	Time	Source	Category	Event	User	Computer
5/14/98	2:25:06 PM	EI90x	None	3	N/A	PCWIZ1
5/14/98	2:25:06 PM	EI90x	None	3	N/A	PCWIZ1
5/14/98	2:25:06 PM	EI90x	None	3	N/A	PCWIZ1
5/14/98	2:25:00 PM	EventLog	None	6005	N/A	PCWIZ1
5/14/98	2:25:05 PM	EI90x	None	0	N/A	PCWIZ1
5/13/98	3:34:41 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	3:34:41 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	3:34:41 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	3:34:36 PM	EventLog	None	6005	N/A	PCWIZ1
5/13/98	3:34:41 PM	EI90x	None	0	N/A	PCWIZ1
5/13/98	2:39:16 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	2:39:16 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	2:39:16 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	2:39:11 PM	EventLog	None	6005	N/A	PCWIZ1
5/13/98	2:39:16 PM	EI90x	None	0	N/A	PCWIZ1
5/13/98	2:36:37 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	2:36:37 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	2:36:37 PM	EI90x	None	3	N/A	PCWIZ1
5/13/98	2:36:32 PM	EventLog	None	6005	N/A	PCWIZ1
5/13/98	2:36:37 PM	EI90x	None	0	N/A	PCWIZ1

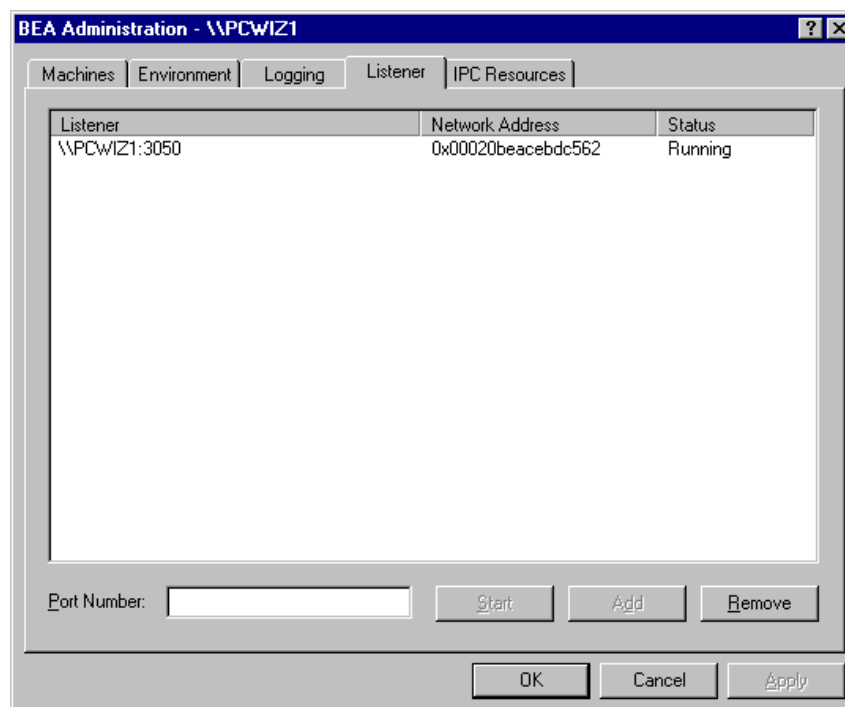
Configuring tlisten Processes to Start Automatically

To display the Listener page (Figure 5-3) of the Control Panel, click on the Listener tab.

You can configure one or more `tlisten` processes to start automatically when you boot your machine. To configure `tlisten` processes, proceed as follows:

1. On the Listener page, enter a port number in the Port Number field and click Add to add the service to the list.
2. After you click OK or Apply and reopen the control panel, you can start or stop `tlisten` services from the Listener page (see Figure 5-3). You can also use the Microsoft Windows NT control panel to start or stop a `tlisten` service or to configure the service to start automatically.

Figure 5-3 M3 Software for Microsoft Windows NT Listener Control Panel



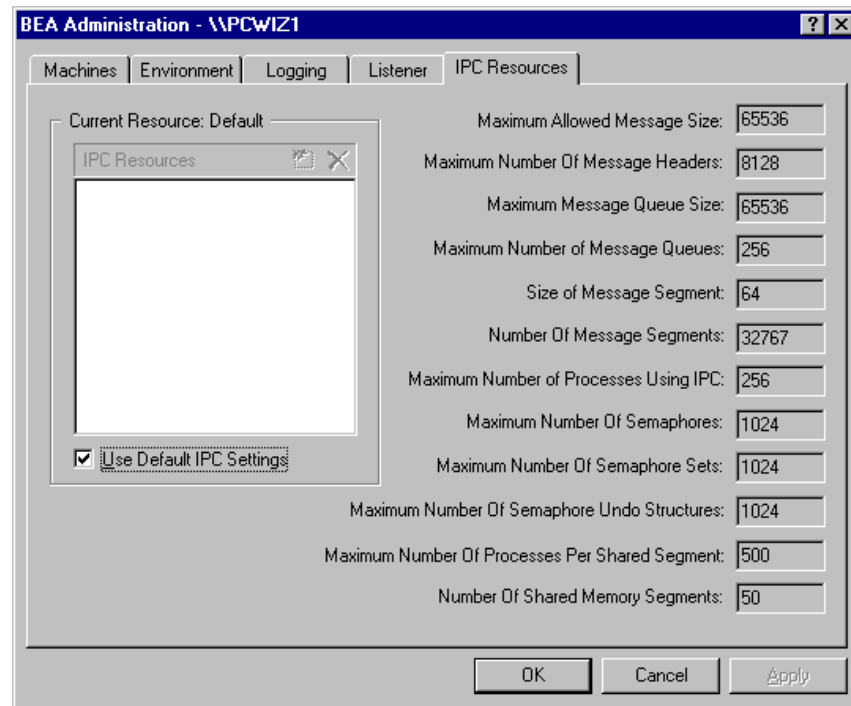
You can use the `tlisten` process to perform administrative actions in a server application across multiple machines. You must start the `tlisten` process on each machine before running the server application. Generally, you need one `tlisten` process for each server application running on the machine.

Maximizing System Performance

To display the IPC Resources page (Figure 5-4) of the Control Panel, click on the IPC Resources tab.

The M3 software for Microsoft Windows NT systems provides you with BEA TUXEDO IPC Helper (TUXIPC), an interprocess communication subsystem, that is installed with the product. On most machines, IPC Helper runs as installed; however, you can use the IPC Resources page of the control panel applet to tune the TUXIPC subsystem and maximize performance.

Figure 5-4 M3 Software for Microsoft Windows NT IPC Resources Control Panel



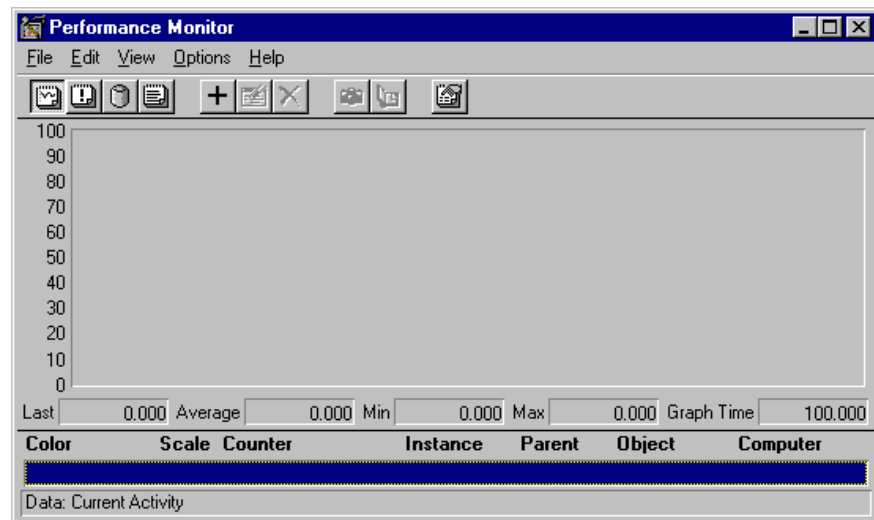
With the IPC Resources control panel, you can set a variety of IPC resources. To define IPC settings for your M3 machine, proceed as follows:

1. In the Current Resource Default box, click the Use Default IPC Settings check box to clear it.
2. Click the insert box.
3. Enter the name of your machine and press Enter.
4. Click the fields next to the IPC resources you want to set, enter the desired values, and click Apply. Clicking Apply saves the changes in the Registry Table. You must then stop and then restart the `tuxipc.exe` service for the changes to take effect.
5. Click OK to close the Control Panel.

You can view the performance of a running M3 server application on the NT Performance Monitor (Figure 5-5).

To start the Performance Monitor, click
Start—>Programs—>Administration Tools—>Performance Monitor on the NT taskbar. The Performance Monitor screen is displayed.

Figure 5-5 M3 Software for Microsoft Windows NT Performance Monitor



Setting Up Your Environment on UNIX Systems

On a UNIX system, before you can invoke M3 system commands, you need to set several environment variables. The Bourne shell script `m3.env`, located in the base directory you specified at installation time, serves as a model for setting these variables.

The following examples assume that you are using the Bourne shell:

- ◆ `TUXDIR` contains the full pathname of the directory in which you installed the M3 software. For example, if you installed the M3 software in `/var/opt/M3DIR`, enter the following:

```
TUXDIR=/var/opt/M3DIR; export TUXDIR
```


- ◆ `PATH` is the search path for commands. Include `$TUXDIR/bin` in your path. For example:

```
PATH=$PATH:$TUXDIR/bin; export PATH
```

- ◆ `LD_LIBRARY_PATH` (on Solaris systems), `SHLIB_PATH` (on HP-UX systems), and `LIBPATH` (on IBM-AIX systems) name the search path for dynamic shared libraries. These environment variables are needed only on systems that support dynamic shared libraries. Append `$TUXDIR/lib` to your existing library path. For example, on Solaris systems, set the path variable as follows:

```
LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$TUXDIR/lib; export  
LD_LIBRARY_PATH
```

- ◆ `TUXCONFIG` contains the full pathname of the binary configuration file of a specific M3 server application. Several M3 system commands require `TUXCONFIG` to be set appropriately. For example, if your application's binary configuration file is located in `/var/opt/m3appl/tuxconfig`, set and export `TUXCONFIG` as follows:

```
TUXCONFIG=/var/opt/m3appl/tuxconfig; export TUXCONFIG
```

Editing a UBBCONFIG File

Each M3 machine has a configuration file, commonly called the `UBBCONFIG` file, which specifies the system parameters that are dependent on the installation. Typically, the configuration file has a name that begins with `ubb` and ends with something mnemonic, such as `ubbsimple`. Usually, you must edit this file before you can boot the application.

As an example, Listing 5-1 shows the configuration file from the M3 University sample applications. This file, `Ubb_b_nt`, is delivered with the M3 software and is located in `M3DIR/samples/corba/university` (for UNIX systems) or `M3DIR\samples\corba\university` (for Microsoft Windows NT systems).

To edit the configuration file for your application, replace the strings provided for the following values:

```
IPCKEY
<machine_name>
APPPDIR
TUXCONFIG
TUXDIR
```

These values are highlighted as **boldface** text in Listing 5-1, “University Samples UBBCONFIG File,” on page 5-15. The values you need to provide are as follows:

IPCKEY

A numeric key that identifies the shared memory segment where the structures used by your application are located. The value must be greater than 32,768 and less than 262,143.

machine_name

The node name of the machine. To obtain the node name on a UNIX system, enter the `uname -n` command. If you are using a Microsoft Windows NT system and you do not know the node name of your machine, contact your system administrator. In the M3 University sample application shown in Listing 5-1, “University Samples UBBCONFIG File,” on page 5-15, the machine name is EIEIO.

APPPDIR = *string_value*

APPPDIR refers to directories in which application and administrative servers will be booted. The *string_value* is the absolute pathname of that directory, optionally followed by a colon-separated list of other directory pathnames, on the machine being defined.

TUXCONFIG = *string_value*

TUXCONFIG is the binary version of the UBBCONFIG file, produced by `tmloadcf(1)`. The *string_value* is the absolute pathname of the file or device of the TUXCONFIG file.

TUXDIR = *string_value*

Names the base directory of the M3 software. It must be an absolute pathname.

If you need to look up other values when editing your configuration file, the complete syntax can be found on the `ubbconfig(5)` reference page in the *BEA TUXEDO Reference*.

Note: The configuration file must be edited before you use the `tmloadcf(1)` command to verify the IPC requirements; otherwise, the `tmloadcf(1)` command fails with syntax errors. For instructions on how to determine IPC requirements, see the section “Verifying IPC Requirements” on page 5-18.

Listing 5-1 University Samples UBBCONFIG File

```
#-----
#
# ubb_b.nt
#
# NT template configuration file for the university sample
# application
#
# Also, check that the value of TUXDIR is correct.
# (this file contains typical values)
#
# For more information on the contents of this file, refer to the
# document "Administering the BEA M3 System"
#
# BEA Systems Inc. sample code
#
#-----
*RESOURCES
    IPCKEY      55432
    DOMAINID    university
    MASTER      SITE1
    MODEL       SHM
    LDBAL       N
#-----
*MACHINES
#   Specify the name of your server machine
#
    EIEIO
        LMID = SITE1
#   Pathname of your copy of this sample application.
#   Must match "APPDIR" in "setenv.cmd"
#
    "APPDIR = d:\m3work\checkin\basic"
#   Pathname of the tuxconfig file.
```

5 POSTINSTALLATION CONSIDERATIONS

```
# Must match "TUXCONFIG" in "setenv.cmd"
#
TUXCONFIG = "d:\m3work\checkin\basic\resultsb\tuxconfig"
# Pathname of the M3 installation.
# Must match "TUXDIR" in "setenv.cmd"
#
TUXDIR = "d:\M3dir"
MAXWSCLIENTS = 10
#-----
*GROUPS
  SYS_GRP
    LMID      = SITE1
    GRPNO     = 1
  ORA_GRP
    LMID      = SITE1
    GRPNO     = 2
#-----
*SERVERS
  DEFAULT:
    RESTART = Y
    MAXGEN = 5
# Start the TUXEDO System Event Broker. This event broker must
# be started before any servers providing the NameManager Service
#
TMSYSEVT
  SRVGRP = SYS_GRP
  SRVID  = 1
# TMFFNAME is a BEA M3 provided server that runs the
# object-transactional management services. This includes the
# NameManager and FactoryFinder services.
# The NameManager service is a BEA M3-specific service
# that maintains a mapping of application-supplied names to
# object references.
# Start the NameManager Service (-N option). This name manager
# is being started as a Master (-M option).
#
TMFFNAME
  SRVGRP = SYS_GRP
  SRVID  = 2
  CLOPT  = "-A -- -N -M"
# Start a slave NameManager Service
```

5-16 Installing the BEA M3 Software

```
#
TMFFNAME
    SRVGRP = SYS_GRP
    SRVID  = 2
    CLOPT  = "-A -- -N"
# Start the FactoryFinder (-F) service
#
TMFFNAME
    SRVGRP = SYS_GRP
    SRVID  = 3
    CLOPT  = "-A -- -F"
# Start the IR Server
#
TMIFRSVR
    SRVGRP = SYS_GRP
    SRVID  = 5
# Start the university server
#
univb_server
    SRVGRP = ORA_GRP
    SRVID  = 2
    RESTART = N
# Start the listener for IIOP clients
#
# Specify the host name of your server machine as
# well as the port. A typical port number is 2500
#
ISL
    SRVGRP = SYS_GRP
    SRVID  = 6
    CLOPT  = "-A -- -n //EIEIO:2500"
#-----
*SERVICES
#-----
```

Verifying IPC Requirements

The M3 system uses Interprocess Communications (IPC) resources heavily. On many platforms, the default values for the parameters that control the size and quantity of the various IPC resources are below the minimums needed to run even a modest M3 system application. Therefore, you may need to reset some of the parameters. After editing your configuration file, the next step is to determine whether the IPC resources suffice for the application.

To do this, enter the `tmloadcf(1)` command, specifying your edited configuration file as input:

```
tmloadcf -c ubbconfig
```

An example of the result for the University samples `UBBCONFIG` file is shown in Listing 5-2.

Listing 5-2 Output Produced by `tmloadcf -c`

```
ipc sizing (minimum /T values only)...
                        Fixed Minimums Per Processor
SHMMIN: 1
SHMALL: 1
SEMAP: SEMMNI

                        Variable Minimums Per Processor
                        SEMUME,      A      SHMMAX
                        SEMMNU,      *
Node  SEMMNS  SEMMSL  SEMMSL  SEMMNI  MSGMNI  MSGMAP  SHMSEG
-----
sftuxe    65      8      60    A + 1     28     56    403k

where 1 <= A <= 8.
```

The number of expected application clients per processor should be added to each `MSGMNI` value.

This output indicates that to run the University sample application, your system must have `SEMUME`, `SEMMNU`, and `SEMMNS` set to no less than 65. `SEMMSL` must be at least 8, and `SEMMNI` and `SEMMAP` must be at least 4 (assuming `A` is 3). `MSGMNI` must be at least 28, and `MSGMAP` must be at least 56. Finally, the product of `SHMMAX` and `SHMSEG` must be at least 403K bytes.

The IPC values are dependent on the client or server application, and the numbers in this example reflect a very small configuration. If other client or server applications that use IPC resources are running on the same machine with an M3 client or server application, the requirements of both applications must be satisfied. Also, every machine participating in an application must have sufficient IPC resources available.

If the current IPC resources are inadequate, you must increase the values of the associated IPC parameters. For instructions on determining and changing the current IPC values for your platform, see the section “Tuning Parameters” for your platform in Appendix A, “Platform Data Sheets.”

Creating the Universal Device List and TLOG

The Universal Device List (UDL) is like a map of the M3 file system. It is loaded into shared memory when the application is booted. The TLOG refers to a log in which information on transactions is kept until the transaction is completed.

Creating the UDL

To create the UDL, enter the following command before the application has been booted:

```
tmadmin -c  
crdl -z config -b blocks
```

where `-z config` specifies the full pathname for the device where the UDL should be created and `-b blocks` specifies the number of blocks to be allocated on the device. The value of `config` should match the value of the `TLOGDEVICE` parameter in the `MACHINES` section of the `UBBCONFIG` file.

Note: In general, the value that you supply for blocks should not be less than the value for `TLOGSIZE`. For example, if `TLOGSIZE` is specified as 200 blocks, specifying `-b 500` would not cause a degradation.

Creating the TLOG

Several parameters in the `MACHINES` section of the `UBBCONFIG` file are used to define a global transaction log (TLOG). The M3 system administrator must manually create the device list entry for the `TLOGDEVICE` on each machine where a TLOG is needed. The device list entry can be created either before or after `TUXCONFIG` has been loaded, but it must be done before the machine is booted.

To create an entry in the UDL for the `TLOGDEVICE`, create the UDL as described previously on each machine that will be involved with global transactions. If the `TLOGDEVICE` is mirrored between two machines, it is not necessary to create an entry on the paired machine. The Bulletin Board Liaison (BBL) then initializes and opens the TLOG during the boot process.

Starting the tlisten Process on UNIX Systems

When used in a distributed environment, the M3 system requires the capability to start, shut down, and administer processes on remote machines running M3 servers. The `tlisten(1)` process provides this facility. Once `tlisten` is running, `tmboot(1)`, for example, can start M3 servers on remote machines.

The `tlisten` process is a generic listener process that operates with either of the two network interfaces: Sockets or TLI. It runs as a daemon process, and it can be started in several ways, as follows:

- ◆ By the UNIX system administrator as part of a UNIX initialization (boot) script
- ◆ By the M3 system administrator as a `cron` job
- ◆ By the M3 system administrator starting `tlisten` manually from the command line

In all cases, the same basic invocation syntax is used:


```
TUXDIR=M3DIR; export TUXDIR
LD_LIBRARY_PATH=libpath:$LD_LIBRARY_PATH; export LD_LIBRARY_PATH
$TUXDIR/bin/tlisten -d devname -l nlsaddr -u appuid
```

Note: If your machine uses an environment variable other than `LD_LIBRARY_PATH` for the shared library path, specify that variable, instead.

The `-l` option is required. The `-d` option is not required. The value for `-d` represents the network device. The correct values for various platforms are shown in Table 5-1.

Table 5-1 Network Devices for tlisten

Platform	Device Name
Digital UNIX V4.0d	/dev/streams/xtiso/tcp
HP-UX V10.20 and V11.00	/dev/null
IBM-AIX V4.2.1	/dev/null
Solaris V2.5.1 and V2.6	/dev/tcp

The value for `-l` should be the same as that specified for the `NLSADDR` parameter in the `NETWORK` section of the configuration file. For information about determining the value of `NLSADDR`, see the `ubbconfig(5)` or `tlisten(1)` reference page in the *BEA TUXEDO Reference*, or the *Administering the BEA M3 System* manual.

Use the `-u appuid` option when the command is part of an installation script run by `root`. The value of `appuid` is the `UID` or login name of the M3 system administrator; the numeric version is the same as the value of the `UID` parameter in the `RESOURCES` section of the configuration file. Therefore, even though the `tlisten` process is started by `root`, it runs with the effective `UID` of the owner of the M3 installation. If `tlisten` is started by the M3 system administrator either manually or as a `cron` job, the `-u` option is unnecessary, because the job is already owned by the correct account.

Using the TYPE Parameter in the UBBCONFIG File

The `TYPE` parameter in the `MACHINES` section of the `UBBCONFIG` file specifies the invocation of the XDR (EXternal Data Representation) encode/decode routines when messages are passed between unlike machines. The term *unlike* applies even to machines of the same type if the compiler on each machine is different. In such a case, give each machine a unique `TYPE` string to force the message to go through the encode/decode routines.

Important Consideration About the Browser Installed with the Help System

If you did not have version 3.0 or above of the Netscape browser on your system when you installed the M3 software, it is likely that you have a BEA installed version of this browser.

The M3 online help requires that Netscape version 3.0 or above be present on the local system. The M3 product installation checks to see if the Netscape browser is already present on the local system. If the appropriate version of the browser is not found, the install script gives you the option of installing it to support the online help system.

Note: The Netscape browser that you can install during the M3 installation contains a level of encryption that is allowed to be exported from the United States. If you use this browser for anything other than the online help system, note that this browser is not the most secure version of the Netscape browser.

A Platform Data Sheets

This appendix contains detailed information about the platforms supported by the BEA M3 version 2.2 software. Each data sheet includes the following platform-specific information:

- ◆ A list of available M3 packages
- ◆ Hardware, software, network, and disk space requirements
- ◆ Instructions for mounting and accessing the CD drive
- ◆ Tuning parameters

Supported Platforms

The following table lists the supported platforms. Data sheets are provided for each platform.

Vendor	Operating System	Release/Version
Digital	Digital UNIX	4.0d (Alpha)
HP	HP-UX	10.20 and 11.00 (HP 9000 Series 800)
IBM	AIX	4.2.1 (RS/6000, SP2)

Vendor	Operating System	Release/Version
Microsoft	Windows NT	4.0 (Intel)
	Windows NT	4.0 (DEC Alpha)
	Windows 95	Not applicable
	Windows 98	Not applicable
Sun Microsystems	Solaris	2.5.1 and 2.6 (UltraSPARC)

Digital UNIX Version 4.0d on DEC Alpha

The following sections list requirements for the Digital UNIX platform.

Available BEA M3 Version 2.2 Packages

- ◆ M3 Full System (client and server) software
- ◆ M3 Client-Only software
- ◆ BEA Administration Console

Hardware Requirements

- ◆ DEC 2000, 2100, 3000, 4000, 7000, or 10000 series processor
- ◆ 64 MB of RAM
- ◆ Access to a compact disk (CD) reader

Software Requirements

- ◆ Digital UNIX 4.0d
- ◆ DEC C compiler Version 5.2-038 (This is required for an M3 development environment only.)
- ◆ DEC C++ compiler Version 5.5-004 (This is required for an M3 development environment only.)
- ◆ Netscape Enterprise Server 3.5.1
- ◆ Java Development Kit 1.1.5 with OS patch: DUX40BAS00005-19971009
- ◆ Oracle 7.3.3 for Digital UNIX (This is required for M3 client systems only; it is not required for server-only systems.)
- ◆ Oracle 8.0.3 for Digital UNIX (This is required for M3 server systems only; it is not required for client-only systems.)

Network Requirements

TCP/IP, using the SOCKETS network interface

Disk Space Requirements

Package	Disk Space
M3 Full System (server and client) software	78, 000 blocks (39 MB)
M3 client only	27,000 blocks (14 MB)

Mounting and Unmounting the CD

Mounting a CD requires the type `CDFS`. Because `CDFS` is a configurable kernel option, the following line must exist in the system configuration file:

```
options CDFS
```

If the system configuration file does not contain this line, modify the file and then rebuild the kernel.

To mount a CD, enter the following commands:

```
su
mkdir /cdrom
/usr/sbin/mount -r -t cdfs -o noversion /dev/rzunit#c /cdrom
```

where `unit#` is the unit number of your CD drive.

In almost all cases, the unit number of the CD drive on a new system is 4 (that is, `/dev/rz4c`). However, to ensure that you have the correct unit number of the drive, enter the following:

```
su
file /dev/rrz*c
```

The output identifies the CD drive as an RRD disk. The unit number of the drive is in the left column. For example:

```
/dev/rrz4c: character special (8/4098) SCSI #0 RRD43 disk #32 (SCSI
ID #4)
```

To unmount the CD, enter the following command:

```
umount /cdrom
```

where `cdrom` is the mounting point.

Tuning Parameters

You probably need to reconfigure the kernel before running BEA M3 software because the default values of some kernel parameters are too low. For instructions about reconfiguring, rebuilding, and rebooting, see the following documentation from Digital Equipment Corporation: the `doconfig(8)` man page and the *System Tuning and Performance Management* manual.

The following table shows the default settings for the parameters and the settings used for the M3 sample applications. Use the settings for the M3 sample applications as a starting point; however, your applications may require different settings.

Note: The parameters currently set on your system are located in `/sys/conf/<systemname>`. To display the parameters, log in as `root` and enter `/usr/bin/x11/dxkerneltuner` at the command prompt.

Digital UNIX Name	Traditional Name	Default Setting	Setting for M3 Sample Applications
shmmax	SHMMAX	4194304	8388608
shmseg	SHMSEG	32	32
shmmni	SHMMNI	100	128
semmns	SEMMNS	60	(SEMMNI*2)
semmni	SEMMNI	10	16
semmsl	SEMMSL	25	25
semume	SEMUME	10	10
semopm		10	10
semvmx		32767	32767
semaem		16384	16384
msgmni	MSGMNI	50	84
msgmax	MSGMAX	8192	8192

Digital UNIX Name	Traditional Name	Default Setting	Setting for M3 Sample Applications
msgmb	MSGMB	16384	16384
msgtql	MSGTQL	40	40
maxusers	maxusers	varies	32
maxproc	NPROC	20+8*maxusers	32-72 per user
maxuprc	MAXUP	64	(NPROC * 9) / 10

To determine the current value of a tunable parameter, examine the kernel configuration file located in the `/sys/conf` directory. This file typically has the same name as the node (machine) name.

To change the value of a tunable parameter, follow the instructions on the `dmconfig` man page.

To specify the value of a parameter that was previously unspecified, add a line such as the following to the kernel configuration file:

```
semmni 256
```

where `semmni` is the name of the parameter and `256` is its value.

HP-UX Version 10.20 and 11.0 on HP 9000 Series 800

The following sections list requirements for the HP-UX platform.

Available BEA M3 Version 2.2 Packages

- ◆ M3 Full System (client and server) software

- ◆ M3 Client-Only software
- ◆ BEA Administration Console

Hardware Requirements

- ◆ HP 9000 series 800
- ◆ 64 MB of RAM
- ◆ Access to a compact disk (CD) reader

Software Requirements

Software Requirements	HP-UX 10.20 ^a	HP-UX 11.0
C compiler ^b	HP C/ANSI compiler B3898AA_APZ B.10.20.01	HP Native C compiler HP92453-01 A.11.00.00
C++ compiler ^c	HP aC++ compiler B3910BA_APZ A.01.07.01	HP Native C++ compiler B3910B A.03.04 (970930)
Java and Java Developer's Kit	Netscape Enterprise Server 3.5.1 and JDK 1.1.5	Netscape Enterprise Server 3.5.1 and JDK 1.1.5
Database software	Oracle 7.3.4 for HP-UX	Oracle 8.0.4 for HP-UX

a. To run M3 on HP-UX 10.20, you must install accumulator patch PHCO_14645 and two pre-requisite patches: PHKL_8694 and PHKL_14173. If patch PHKL_14173 is not available, use patch PHKL_15247 instead.

b. Required for BEA M3 development environment only.

c. Required for BEA M3 development environment only.

Network Requirements

TCP/IP, using the SOCKETS network interface

Disk Space Requirements

Package	Disk Space
M3 Full System (client and server) software	49 MB
M3 Client-Only	18 MB

Mounting and Unmounting the CD

To mount a CD, enter the following commands:

```
su
mkdir /cdrom
mount -F cdfs -o cdcase /dev/dsk/cdrom_device /cdrom
```

where *cdrom_device* is listed in the output of the `ioscan -f -n` command.

To unmount the CD, enter the following command:

```
umount /cdrom
```

where *cdrom* is the mounting point.

Tuning Parameters

You probably need to reconfigure the HP-UX kernel before running the BEA M3 software because the defaults of some kernel parameters are too low. For instructions about reconfiguring HP-UX, see “Setting Up a System” in the *HP-UX System Administration Tasks Manual*.

The following table shows the default settings for the parameters and the settings used for the M3 sample applications. Use the settings for the M3 sample applications as a starting point: however, your applications may require different settings.

The parameters currently set on your system are located in `/stand/build/tune.h`.

HP-UX Name	Traditional Name	Default Setting	Setting for M3 Sample Applications
shmmax	SHMMAX	67108864	0x40000000
shmseg	SHMSEG	12	32
shmmni	SHMMNI	100	512
semmns	SEMMNS	128	(SEMMNI*2)
semmni	SEMMNI	64	NPROC*5
semmap	SEMA	semmni+2	1
semmnu	SEMMNU	30	(SEMMNI / 2)
semume	SEMUME	10	64
msgmni	MSGMNI	50	NPROC
msgmap	MSGMAP	2+msgtql	MSGTQL + 2
msgmax	MSGMAX	8192	32768
msgmnb	MSGMNB	16384	65535
msgssz	MSGSSZ	8	128
msgtql	MSGTQL	40	(NPROC * 10)
msgseg	MSGSEG	2048	(MSGTQL * 4)
maxusers	MAXUSERS	32	200
nproc	NPROC	20+8*maxusers	(MAXUSERS * 3) + 64
maxuprc	MAXUPRC	50	(NPROC * 9) / 10
maxfiles	NFILES	60	15 * NPROC + 2048

IBM-AIX Version 4.2.1 on RS/6000 and SP2

The following sections list requirements for the IBM-AIX platform.

Available BEA M3 Version 2.2 Packages

- ◆ M3 Full System (client and server) software
- ◆ M3 Client-Only software
- ◆ BEA Administration Console

Hardware Requirements

- ◆ IBM RS/6000 or SP2
- ◆ 64 MB of RAM
- ◆ Access to a compact disk (CD) reader

Software Requirements

- ◆ AIX Release 4.2.1
- ◆ C ++ for AIX Compiler 3.1.4.0 (This is required for a BEA M3 development environment only.)
- ◆ Netscape Enterprise Server 3.5.1
- ◆ Java Development Kit 1.1.5
- ◆ Oracle 7.3.3 for AIX (This is required for M3 client systems only; it is not required for server-only systems.)

- ◆ Oracle 8.0.3 for AIX (This is required for M3 server systems only; it is not required for client-only systems.)

Network Requirements

TCP/IP, using the SOCKETS network interface

Disk Space Requirements

Package	Disk Space
M3 Full System (client and server) software	40 MB
M3 Client-Only	16 MB

Mounting and Unmounting the CD

To mount a CD, examine the file `/etc/filesystems` to determine whether there is a standard place in which to mount a CD. If there is, enter the mount command and specify the directory named in the `/etc/filesystems` entry.

For example, to mount a CD if `/etc/filesystems` contains an entry that specifies `/cd` as the mount point for CDs, enter:

```
su
/etc/mount /cd
```

If `/etc/filesystems` does not contain a CD entry, enter:

```
su
mkdir /cd
/etc/mount -v cdrfs -r cd_device /cd
```

where `cd_device` is the name of the CD device file, typically `/dev/cd0`.

Alternatively, you can use the System Management Interface Tool (SMIT) to perform the mount. To use SMIT, enter:

```
smit mount
```

To unmount the CD, enter the following command:

```
umount /cdrom
```

where *cdrom* is the mounting point.

Tuning Parameters

No IPC configuration is required for AIX Release 4.2.1. To change the value of a kernel tuning parameter (`maxuproc` only), do the following:

1. Acquire superuser privileges.
2. Determine the values of all tuning parameters.
3. Change the parameter's value.
4. Reboot the system.

Microsoft Windows NT Version 4.0 on Intel

The following sections list requirements for the Microsoft Windows NT/Intel platform.

Available BEA M3 Version 2.2 Packages

- ◆ M3 Full System (client and server) software
- ◆ M3 Client-Only software
- ◆ BEA Administration Console

Hardware Requirements

- ◆ Pentium processor or better
- ◆ 64 MB of RAM
- ◆ Access to a compact disk (CD) reader

Software Requirements

- ◆ Microsoft Windows NT Version 4.0, Service Pack 3
- ◆ Microsoft Visual C++ Version 5.0, Service Pack 3
- ◆ Microsoft Visual Basic Version 5.0, Service Pack 3 (This is required only for client systems that run ActiveX client applications. It is not required for C++ client systems or server-only systems.)
- ◆ Netscape Enterprise Server 3.5.1 (This is required for Java clients only.)
- ◆ Java Development Kit 1.1.5 (This is required for Java clients only.)
- ◆ Oracle 7.3.3.0.0 for Windows (This is required for M3 client systems only; it is not required for server-only systems.)
- ◆ Oracle 8.0.3 Server for Intel NT (This is required for M3 server systems only; it is not required for client-only systems. It is necessary only if your applications interface with these resource managers or if you have an application that works with a database.)
- ◆ Microsoft SQL Srvr 6.5 (This is required for M3 server systems only; it is not required for client-only systems.)

Network Requirements

TCP/IP provided by Microsoft Windows NT (32-bit Winsock)

Disk Space Requirements

Package	Disk Space
M3 Full System (client and server) software	46 MB
M3 Client-Only	35 MB

Tuning Parameters

You may need to reconfigure the parameters shown in Figure 5-4, “M3 Software for Microsoft Windows NT IPC Resources Control Panel,” on page 5-10 before running the M3 software. For instructions about reconfiguring the parameters, see “Maximizing System Performance” on page 5-9.

Microsoft Windows NT Version 4.0 on DEC Alpha

The following sections list requirements for the Microsoft Windows NT/Alpha platform.

Available BEA M3 Version 2.2 Packages

- ◆ M3 Full System (client and server) software
- ◆ M3 Client-Only software
- ◆ BEA Administration Console

Note: The M3 software that runs on Microsoft Windows NT on DEC Alpha does *not* support ActiveX clients.

Hardware Requirements

- ◆ DECpc LXP150, AlphaServer 1000A
- ◆ 64 MB of RAM
- ◆ Access to a compact disk (CD) reader

Software Requirements

- ◆ Microsoft Windows NT server for Alpha 4.0, Service Pack 3
- ◆ Microsoft Visual C++ Risc Edition Version 5.0 for Alpha, Service Pack 3
- ◆ Microsoft Visual Basic Version 5.0, Service Pack 3 (This is required only for client systems that run ActiveX client applications. It is not required for C++ client systems or server-only systems.)
- ◆ Netscape Enterprise Server 3.5.1
- ◆ Java Development Kit 1.1.5
- ◆ Oracle 7.3.3.0.0 for Alpha NT (This is required only for M3 client systems; it is not required for server-only systems.)
- ◆ Oracle 8.0.3 Server for Alpha NT (This is required only for M3 server systems; it is not required for client-only systems.)

Network Requirements

TCP/IP using the SOCKETS network interface

Disk Space Requirements

Package	Disk Space
M3 Full System (client and server) software	46 MB
M3 Client-Only	35 MB

Tuning Parameters

You may need to reconfigure the parameters shown in Figure 5-4, “M3 Software for Microsoft Windows NT IPC Resources Control Panel,” on page 5-10 before running the M3 software. For instructions about reconfiguring the parameters, see “Maximizing System Performance” on page 5-9.

Microsoft Windows 95 and 98

The following sections list requirements for the Microsoft Windows 95 and 98 platforms.

Available BEA M3 Version 2.2 Packages

Only M3 Client-Only software is supported.

Hardware Requirements

- ◆ Pentium processor or better
- ◆ 32 MB of RAM

- ◆ Access to a compact disk (CD) reader

Software Requirements

- ◆ Microsoft Windows 95 plus Service Pack 1 or Microsoft Windows 98
- ◆ Microsoft Visual C++ Version 5.0, Service Pack 3
- ◆ Microsoft Visual Basic Version 5.0, Service Pack 3 (This is required only for client systems that run ActiveX client applications. It is not required for C++ client systems.)
- ◆ DCOM for Windows 95 Version 1.1 (This is required only on systems that are used as ActiveX clients.)

Network Requirements

TCP/IP provided by Microsoft Windows NT (32-bit Winsock)

Disk Space Requirements

The client-only software requires 35 MB of disk space.

Solaris Version 2.51 and 2.6 UltraSPARC

The following sections list requirements for the Solaris platform.

Available BEA M3 Version 2.2 Packages

- ◆ M3 Full System (client and server) software
- ◆ M3 Client-Only software
- ◆ BEA Administration Console

Hardware Requirements

- ◆ UltraSparc uniprocessor
- ◆ 64 MB of RAM
- ◆ Access to a compact disk (CD) reader

Software Requirements

- ◆ Sun SparcWorks Compiler 4.2 (This is required for the M3 development environment only.)
- ◆ Netscape Enterprise Server 3.5.1
- ◆ Java Development Kit 1.1.5
- ◆ Oracle 7.3.4.0.1 Enterprise Edition for SUN Sparc (This is required only for M3 client systems; it is not required for server-only systems.)
- ◆ Oracle 8.0.3 for SUN Sparc (This is required only for M3 server systems; it is not required for client-only systems.)

Network Requirements

TCP/IP, using the TLI network interface

Disk Space Requirements

Package	Disk Space
M3 Full System (client and server) software	47 MB
M3 Client-Only	18 MB

Mounting and Unmounting the CD

The Volume Management software automatically mounts CDs on
`/cdrom/cdrom0/s0`.

Tuning Parameters

You will probably need to reconfigure the kernel before running the BEA M3 software because the defaults of some kernel parameters are too low. Information regarding kernel configuration is provided in the Solaris `sysctl(1M)` manual page.

The following table shows the default settings for the parameters and the settings used for the M3 sample applications. Use the settings for the M3 sample applications as a starting point; however, your applications may require different settings.

The parameters currently set on your system are located in `/etc/<systemname>`.

Solaris Name	Traditional Name	Default Setting	Setting for M3 Sample Applications
shmsys:shminfo_shmmax	SHMMAX	131072	67108864
shmsys:shminfo_shmseg	SHMSEG	6	100
shmsys:shminfo_shmmni	SHMMNI	100	300
semsys:seminfo_semmns	SEMMNS	60	5048
semsys:seminfo_semmni	SEMMNI	10	5029
semsys:seminfo_semmsl	SEMMSL	25	2000
semsys:seminfo_semmap	SEMMAP	10	5024
semsys:seminfo_semmnu	SEMMNU	30	1024
semsys:seminfo_semume	SEMUME	10	128
msgsys:msginfo_msgmni	MSGMNI	50	1024
msgsys:msginfo_msgmap	MSGMAP	100	2048
msgsys:msginfo_msgmax	MSGMAX	2048	65535
msgsys:msginfo_msgmnb	MSGMNB	4096	65535
msgsys:msginfo_msgssz	MSGSSZ	8	256
msgsys:msginfo_msgtql	MSGTQL	40	2048
msgsys:msginfo_msgseg	MSGSEG	1024	8192
maxusers	maxusers	32	200
max_nprocs	NPROC	10+16*maxusers	(MAXUSERS*3)+64
maxuprc	MAXUP	max_nprocs-5	(NPROC * 9) / 10
semsys:siminfo	semusz		1024
semsys:siminfo	semvmx		32767

Solaris Name	Traditional Name	Default Setting	Setting for M3 Sample Applications
semsys:siminfo	semaem		16384

A

- administrative password 1-11
 - requirements 1-10
 - tlisten.pw file 1-10
- administrative privileges 3-3
- APPDIR 5-14, 5-15
- appuid 5-21

B

- BBL 5-20
- BEA Administration Console
 - browser requirements 4-3
 - CGI directory 1-10
 - CGI program 1-9
 - Control Panel 5-6
 - default file names 1-8
 - default pathnames 1-8
 - entry page 4-5
 - file system requirements 1-2
 - help files 1-9
 - HTML files 1-9
 - image files 1-9
 - Java files 1-9
 - LOGIN window 4-6
 - main window 4-7
 - servers required 4-3
 - starting 4-4
 - tuxadm directory 1-10
 - Web server 1-9
- BEA Administration Control Panel
 - Environment Page 5-5
 - IPC Resources page 5-10
 - Listener page 5-9
 - Logging page 5-7
 - Machines page 5-4
- BEA TUXEDO system/D 1-7
- Bourne shell 5-12
- browser requirements 4-3
- Bulletin Board Liaison 5-20

C

- cdfs A-8
 - kernel option A-4
- CGI directory 1-10
- control panel 5-1
- control panel applet 5-2

D

- Digital UNIX
 - cdfs kernel option A-4
- Disk Management Interface 1-4
- disk space requirements 2-8, 2-27

E

- environment variables
 - JDK_HOME 2-16
 - NETSCAPE 2-16
 - TUXDIR 3-9
- error messages
 - Cannot Install M3 IPC Helper Service.
2-3
 - Connect Failed 4-8
- Event Viewer window 5-8
- External Data Representation 5-22

H

- hardware requirements 4-2

I

- installation
 - time required 3-2
- installation screens
 - CGI directory 2-12
 - Choose Destination Location 2-9, 2-10
 - Enter Information 2-12
 - Insert License Disk 2-15
 - Install license 2-15

- Install performance monitor 2-14
- Installation Selection 2-8
- Installation successfully verified 2-14
- License File Successfully Installed 2-16
- License Utility 2-18
- M3 /WS Environment File 2-30
- M3 Application Directory 2-28
- Netscape Navigator not found 2-13, 2-30
- Registration Confirmation 2-7, 2-26
- Restart System 2-16, 2-31
- Select Program Folder 2-13, 2-27
- Set APPDIR environment variable 2-28
- Set WSENVFILE environment variable 2-29
- Setup 2-3
- Setup has successfully verified installation 2-31
- Setup is verifying installation 2-14, 2-31
- Software License Agreement 2-4, 2-24
- System Selection 2-7
- Tlisten Password 2-14
- Update AUTOEXEC.BAT 2-28
- User Information 2-5, 2-25
- Welcome 2-4, 2-23
- Interprocess Communications 1-11, 5-18
- IPC 1-11
- IPC parameters 1-12
- IPC requirements
 - calculating 1-18
- IPCKEY 5-14
 - value 5-14

L

- LD_LIBRARY_PATH 5-13, 5-21
- lic.txt file 2-15, 3-7
- license disk 2-15

M

- M3 software install time 2-3

- makefile 3-10

N

- Netscape browser 5-22

O

- operating system requirements 4-2

P

- Performance Monitor screen 5-12
- platforms supported 3-1, A-1
- product license disk 2-15, 3-8

R

- raw disk space
 - arranging 1-5

S

- semaphore parameters 1-12
- shared memory 1-16
- simpapp 2-19, 3-9
- superuser privileges 3-2
- support
 - documentation xiv
 - technical xiv

T

- tlisten 1-10, 5-20
- tlisten password 2-14, 3-6
- tlisten processes 5-8, 5-20
- tlisten.pw file 1-10, 4-8
 - setting permissions 1-10
- TLOG 5-19
- TLOGDEVICE 5-19
- TLOGSIZE 5-20
- tmboot 3-9

- tmloadcf 1-18, 5-15
- tmshutdown 2-32, 3-2, 3-10
- tuning parameters
 - semaphores 1-12
 - UNIX systems 1-11
- tuxadm
 - directory pathname 1-10
- TUXCONFIG 5-13, 5-14, 5-20
- TUXDIR 3-9, 5-12, 5-14
- tuxwsvr 4-3, 4-5
- tuxwsvr.ini file 4-5

U

- UBBCONFIG 1-18, 5-20
 - editing 5-13
 - example file 5-18
 - impact on size of TUXCONFIG file 1-7
 - MAXUP parameter 1-17
 - NLSADDR parameter 5-21
 - relation to TUXCONFIG file 5-14
 - SEMMNS parameter 1-12
 - TLOGDEVICE parameter 5-19
 - TYPE parameter 5-22
- uninstall procedure 2-32
- Universal Device List 5-19
- UNIX systems
 - messages and message queues 1-13
 - tuning parameters 1-17

V

- VTOC 1-5

W

- webgui.ini file 4-5, 4-8
- wlisten 1-10, 4-3, 4-4, 4-8

