

NI MATRIXx™

System Administrator Guide (Windows)

Worldwide Technical Support and Product Information

ni.com

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Appendix A

Technical Support and Professional Services

About This Manual

This manual provides information about installing and administering MATRIXx on a PC running Microsoft Windows XP/2000.

Conventions

The following conventions appear in this manual:

»

The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.



This icon denotes a note, which alerts you to important information.



This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash.

bold

Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names.

italic

Italic text denotes variables, emphasis, a cross-reference, or an introduction to a key concept. Italic text also denotes text that is a placeholder for a word or value that you must supply.

`monospace`

Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames, and extensions.

`monospace bold`

Bold text in this font denotes the messages and responses that the computer automatically prints to the screen. This font also emphasizes lines of code that are different from the other examples.

`monospace italic`

Italic text in this font denotes text that is a placeholder for a word or value that you must supply.

Related Documentation

You might find the following resources helpful as you use this manual. These resources are available by selecting **Help»MATRIXx Bookshelf**.

- *FLEXnet Licensing End User Guide*
- *MATRIXx Getting Started Guide*
- *SystemBuild User Guide*
- *Xmath User Guide*

System Requirements and Installation Overview

This chapter provides an overview of the system requirements for MATRIXx 8.x and information about installing MATRIXx.

System Requirements

Table 1-1 lists the system requirements for MATRIXx 8.x.

Table 1-1. MATRIXx System Requirements

| Component | Requirement |
|------------------|---|
| Operating System | Microsoft Windows XP/2000 |
| CPU | Pentium 4 or equivalent |
| RAM | 512 MB, 1 GB recommended |
| Disk Space | 188 MB for MATRIXx and/or 12 MB for the License Manager |
| Display | 1024 × 768 pixels |

MATRIXx also has the following additional requirements:

- Microsoft Internet Explorer 6 or later is required to use the *MATRIXx Help*.
- Adobe Reader 7.0 or later is required to use the *MATRIXx Bookshelf*.
- (Optional) If you want to link external C code to Xmath or SystemBuild, you must install Microsoft Visual C++ 6.0. To link external FORTRAN code, you must install DIGITAL Visual Fortran 6.0.



Note National Instruments does not support using other compilers with MATRIXx.

- (Optional) To use a floating license, a computer must be on a TCP/IP network.

Licensing

MATRIXx uses FLEXnet licensing utilities from Macrovision Corporation. For information about licensing, refer to the following resources:

- Chapter 3, *Licensing and Terminology*.
- Chapter 4, *FLEXnet Licensing Tools*.
- The *FLEXnet Licensing End User Guide*, available by selecting **Help»MATRIXx Bookshelf**.

Troubleshooting Information

For troubleshooting tips, refer to the *Troubleshooting Installation* section of Chapter 2, *Installation and Related Tasks*. For additional troubleshooting assistance, refer to the *Technical Support and Professional Services* appendix of this manual.

Software Structure

This section describes installation planning options and the directory structure of MATRIX.

Planning Options

Before starting the installation, you should make decisions about how and where you want to install MATRIXx tools. These issues must be addressed before you start the installation procedure detailed in Chapter 2, *Installation and Related Tasks*.

MATRIXx version 8.x must be installed in a different installation directory if you plan to keep versions prior to 6.x. The version 8.x installation will not affect an older version of MATRIXx software as long as you do not use the same parent directory. You do not have to do any extra work to keep the older version of MATRIXx, which will still use its own license manager.

Directory Structure

The directory structure shown in Figure 1-1 shows the MATRIXx product structure, which enables you to manage the software in a central location in a network environment. You can safely install MATRIXx version 8.x into a shared installation directory with MATRIXx 7.1.x.



Note All machines that will use MATRIXx software must be able to access the %MTXHOME% root directory. %MTXHOME% and *installation_directory* (referred to elsewhere in this document) are equivalent.

The commands used to invoke the MATRIXx suite of products can be found in the %MTXHOME%\bin directory.

From the root installation directory (%MTXHOME%), the MATRIXx installation has the directory structure shown in Figure 1-1.

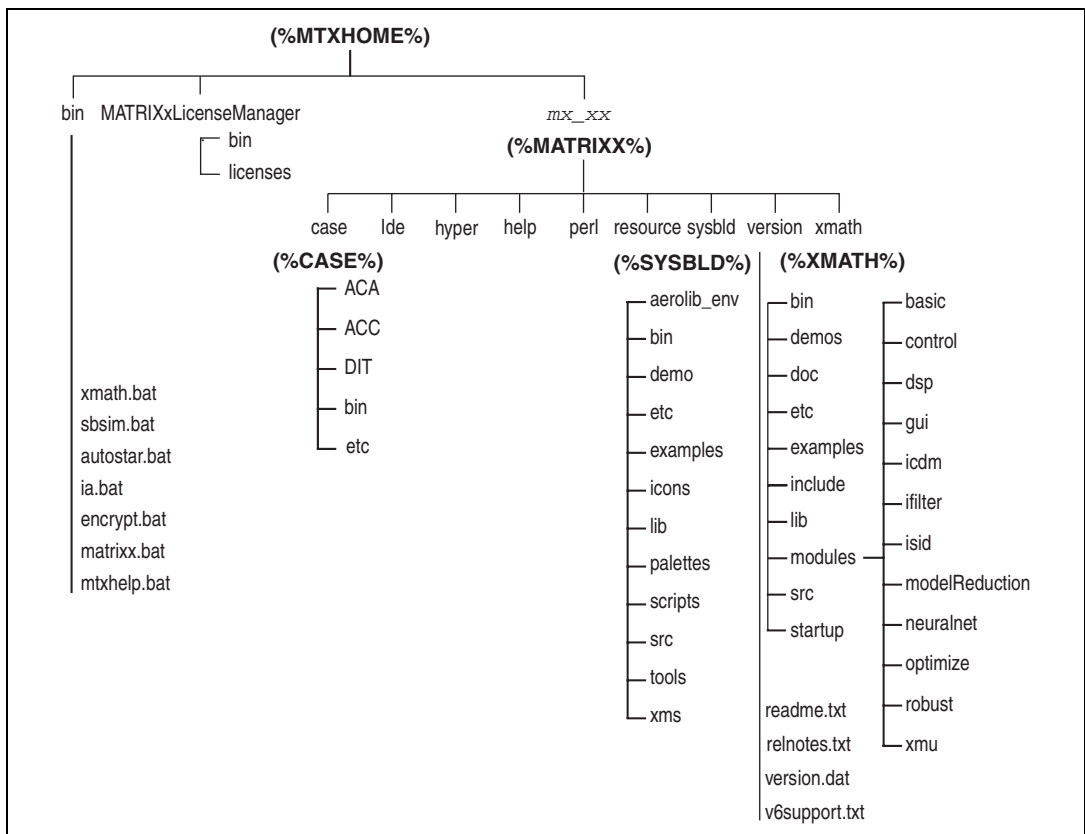


Figure 1-1. MATRIXx Installation Directory Structure

Installation and Related Tasks

This chapter describes how to install MATRIXx software and perform related tasks.

Installing MATRIXx 8.x

This section provides a detailed description of how to install MATRIXx product family version 8.x software on a standalone PC.

Complete the following steps before installing MATRIXx.

1. Obtain a reference number, authorization key, and checksum by sending an email to `matrixx@ni.com`. You need these items to complete the installation of MATRIXx.
2. Ensure the installation computer meets the system requirements as described in the *System Requirements* section of Chapter 1, *System Requirements and Installation Overview*.
3. Disable any virus-scanning software and close all programs on the installation computer.

Complete the following steps to install MATRIXx.

1. Insert the MATRIXx 8.x installation CD.
2. If the installation does not run automatically, run the `setup.exe` program.
3. Follow the instructions that appear on the screen.
4. When prompted to generate a new `MATRIXx_PKG_080000.lic` license file, click **Yes** if you do not already have a version 8.x license file. MATRIXx then prompts you for the reference number, authorization key, and checksum that you obtained from National Instruments.

If you intend to access a floating license file, click **No**. When the installation finishes, create a proxy license as described in the *Proxy License Files* section of Chapter 3, *Licensing and Terminology*.

5. If you are installing redundant license servers, complete the procedure described in the *Installing Redundant License Servers* section of this chapter.



Note The license server is not required for an Evaluation license. For other licenses, the license server can always be started later using the following command:

```
lmgrd -c license.dat -l debug.log
```

Installing Other Components

This section describes the installation procedures for installing optional MATRIXx components.

Installing the Standalone License Manager

The standalone license manager installation, which populates only the `MATRIXxLicenseManager\` subdirectory tree, is a subset of the full MATRIXx installation. It can provide the required licensing installation on single or redundant license servers.

Before running the installation program, you will need the NI reference number, authorization key, and checksum.

Complete the following steps to install the standalone license manager.

1. Insert the MATRIXx 8.x installation CD.
2. On the CD, browse to the `MTXNILM` directory.
3. Double-click `setup.exe`.
4. Select the **Install License Manager** setup type and follow the instructions that appear on the screen.

Each installation of MATRIXx installed in a separate location can access the license server via the proxy license file described in the [Proxy License Files](#) section of Chapter 3, *Licensing and Terminology*.

Installing Redundant License Servers

At a minimum, installing redundant license servers requires the installation of standalone license manager software and starting the license manager daemon on two other nodes in addition to the primary license server. Special license keys are required for a redundant license server configuration.

Complete the following steps to install a typical redundant license server configuration.

1. Perform a standalone license manager installation on the primary license server (refer to *Installing the Standalone License Manager* section) or a complete MATRIXx installation if you want this machine to also serve the MATRIXx application files (refer to the *Installing MATRIXx 8.x* section). Either procedure requires generating a license file and starting the license daemon.
2. On each of two secondary license servers, run either the standalone license manager installation (refer to the *Installing the Standalone License Manager* section) or a complete MATRIXx installation (if you want to replicate all the MATRIXx files), and then start the license daemon on each machine.



Note Rather than generating the license file on each secondary license server, copy `MATRIXx_PKG_080000.lic` from the `MATRIXxLicenseManager\bin\` directory of the primary server to the `MATRIXxLicenseManager\bin\` directory of each secondary server before starting the license daemons. Edit the `DAEMON` line of each secondary copy of the `MATRIXx_PKG_080000.lic` file to point to the daemon path that contains `nilm.exe` for that server.

Each separate installation of MATRIXx can access the license server with a proxy license file as described in the *Proxy License Files* section of Chapter 3, *Licensing and Terminology*.

Updating a License File

To update a license file, run the standalone license manager installation as described in the *Installing the Standalone License Manager* section of this chapter and select the **Update License File** setup type.

Installation-Related Tasks

This section provides information about tasks related to installing MATRIXx.

Setting Up a User Environment for Printing

The environment variable `%XMATH_PRINT%` defines the printer for MATRIXx. For information about defining environment variables, refer to the operating system documentation.

Running Multiple MATRIXx Versions

You can install multiple versions of MATRIXx version 6.x or later under a common directory. If you have multiple versions installed, the following command lets you run a selected version:

```
installation_directory\bin\command_name -v version
```

where *command_name* is *xmath*, *sbsim*, *autostar*, *ia*, *encrypt*, *matrixx*, or *mtxhelp*, and *version* is one of the versions in *installation_directory*\bin. The version string appears as a suffix on the launching scripts.

Recording Your Reference Number

To help National Instruments provide rapid support when you call, the installation procedure prompts you for the 10-character reference number. Your reference number is stored in the file %MTXHOME%\MATRIXxLicenseManager\bin\config.txt. If you do not have a reference number, you can obtain one from National Instruments and enter it into the first line of the config.txt file as follows:

```
REFERENCE NUMBER: 10_character_string
```

You can use the Xmath NIREFNUM command to display the reference number.

Moving the %MTXHOME% Directory Tree to Another Directory

If you want to move the %MTXHOME% directory tree to another directory after installing MATRIXx version 8.x, the preferred method is as follows:

1. Save the `MATRIXx_PKG_080000.lic` file (if required).
2. Uninstall the MATRIXx software after stopping the license daemon.
3. Reinstall MATRIXx in the new directory location.
4. Copy the `MATRIXx_PKG_080000.lic` file to the new directory location.
5. Restart the license daemon.

Troubleshooting Installation

The following sections provide some installation troubleshooting tips.

Temp Directory Usage During Install

InstallShield uses the Windows TEMP folder during installations. It is therefore important that sufficient disk space exist on the disk drive containing TEMP, which may be different from the drive where you are installing MATRIXx. An installation can fail when there is insufficient disk space on the TEMP drive. On rare occasions, an InstallShield install can fail due to remnants in the TEMP folder of a previously aborted install. You can avoid this problem by clearing the contents of the TEMP folder.

License Servers

The license server must be started unless you are using an Evaluation license or are using another network node as a floating license server. When the license server is properly started, the `lmgrd` and `nilm` processes should appear in the process list of the Windows task manager. You can use the MATRIXx License Server applet in the Windows Control Panel to start or stop the license server or to check its status. You can also check the contents of the license server diagnostic log file, `installation_directory\MATRIXxLicenseManager\bin\debug.log`, to see if the license server is running correctly. If the license server is running and you wish to use a different copy of the `MATRIXx_PKG_080000.lic` file, you should stop the license server first, copy the new `MATRIXx_PKG_080000.lic` file and then restart the license server.

If you try to perform one of the following licensing tasks and receive an error message, you may be able to correct it by identifying the cause as described in Table 2-1.

Table 2-1. Error Message Definitions

| Command | Error Message or Problem | Cause or Remedy |
|--------------------------|--|---|
| lmdiag | lmdiag reports that the host ID is correct, but the license daemon has not been started. | Kill all lmgrd processes started for the MATRIXx_PKG_080000.lic file (they are trying to use the same TCP/IP port) and start a new lmgrd process. |
| lmreread -c license_file | You cannot use lmreread to change server node names or port numbers. | You have changed the server name or port number. Kill the old daemon, then restart the license daemon. |

Uninstalling MATRIXx

You uninstall both the MATRIXx product and the MATRIXx License Server by using the Windows Control Panel. The uninstallation process depends on the licensing configuration you use.

If you installed MATRIXx using a node-locked license, you need to uninstall only the MATRIXx product. However, if MATRIXx communicates with a license server over a network, or if you installed the standalone license server, you must uninstall the MATRIXx License Server separately from the MATRIXx product. For information about the licensing configurations, refer to the [Licensing Overview](#) section of Chapter 3, [Licensing and Terminology](#).



Caution Uninstalling the License Server can disrupt the functionality of other National Instruments products on the same computer that depend on a License Server. For example, NI LabVIEW Remote Panels and the NI Volume License Manager depend on a License Server. If these products are on the same computer as the MATRIXx License Server, National Instruments recommends you do not uninstall the MATRIXx License Server.

If you are uninstalling both the License Server and the MATRIXx product, National Instruments recommends you uninstall the License Server before uninstalling the MATRIXx product.

Before uninstalling the License Server, you must stop the License Server service. Complete the following steps to stop this service.

1. Select **Start»All Programs»National Instruments»MATRIXx License Manager 8.x»LMtools**. This action launches the **LMTOOLS** dialog box.
2. Click the **Start/Stop/Reread** tab.
3. Click **Stop Server**. If this tool returns an error, the server might be stopped already.
4. Click the **Config Services** tab.
5. Click **Remove Service**.
6. Close the **LMTOOLS** dialog box.

You can now uninstall the MATRIXx License Server and then the MATRIXx product.

Licensing and Terminology

National Instruments uses the FLEXnet license manager, a product of Macrovision Corporation, to run the MATRIXx License Server. This server consists of the following two files, known as *daemons*, that administer licenses.

- **License manager daemon**—`lmgrd.exe`
- **Vendor daemon**—`nilm.exe`

These files are located in the `%MTXHOME%\MATRIXxLicenseManager\bin\` directory. Depending on the licensing configuration, these files must be running on the license server. This server can be either the installation computer or a remote computer. The License Server also includes tools to administer and use the license.

This chapter provides information about licensing and describes licensing-related terminology and tasks. If you have license manager questions beyond the scope of this document, refer to the *FLEXnet Licensing End User Guide*, available by launching MATRIXx and selecting **Help>MATRIXx Bookshelf**.

Licensing Overview

MATRIXx licensing supports the following configurations:

- Floating and node-locked licenses
- Redundant license servers (optional)
- Flexible license checkout

The following sections provide information about these configurations.

Floating and Node-Locked Licenses

License configurations for counted floating licenses, node-locked licenses, and evaluation licenses are available on Windows XP/2000 systems. To check out a floating license or counted node-locked licenses, a client system must be connected to a TCP/IP network. Evaluation and uncounted node-locked licenses do not require that you have a running license server or network support.

Windows XP/2000 systems can check out floating licenses from either a Windows XP/2000, Solaris, or Linux license server. To check out licenses from a network license server, a Windows system must reference a copy of the same `MATRIXx_PKG_080000.lic` file used by the network server, or it must reference a proxy license file (refer to the [Proxy License Files](#) section).

Redundant License Servers

Redundant license servers are a set of three nodes designated to serve the same license file. If any node fails, the other two nodes will still be available to serve the licenses for MATRIXx.

To support the redundant license server scheme, National Instruments requires the computer name and host ID for the three servers. Windows XP/2000 systems can check out floating licenses from redundant systems containing any combination of Windows, Solaris, and Linux servers.

NI issues redundant license server keys after you provide the host ID of the three servers. At a minimum, you need to run the standalone license server installation program and start the license server on each machine. Follow the instructions described in the [Installing Redundant License Servers](#) section of Chapter 2, [Installation and Related Tasks](#).

Figure 3-1 shows a typical redundant license-server configuration.

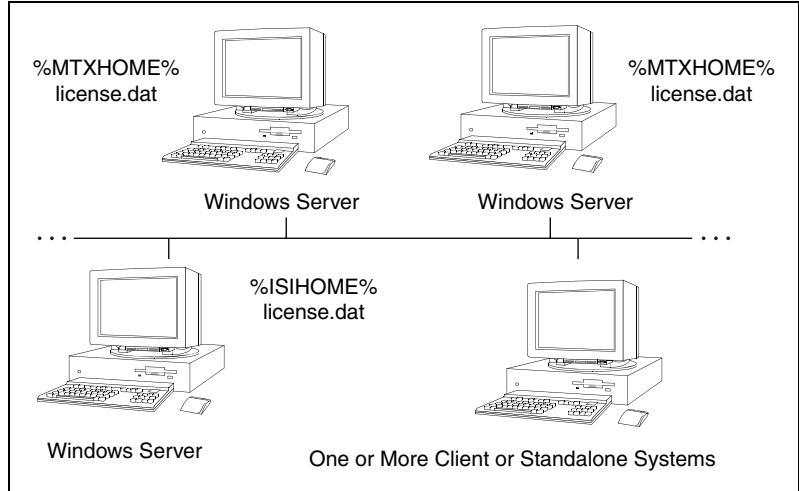


Figure 3-1. Typical Redundant License Server Configuration

Flexible License Checkout

With MATRIXx version 8.x licensing, a feature (product component) is checked out as you use it. A feature stays checked out until you exit that product component. For example, Xmath is checked out when first used and stays checked out until you exit Xmath. SystemBuild is checked out when you create or load a project and stays checked out until you close all projects. The flexible license checkout feature is also known as on-demand checkout.

Xmath Licensing Commands

Xmath has the following license-related commands:

- LICENSECHECKOUT for checking out features for future use.
- LICENSEUSER for displaying assigned licenses for any feature names specified.
- LICENSEINFO for displaying a license report for your site.
- LICENSEFILE for displaying the current license file search path.
- NIREFNUM for identifying your reference number.

All of these commands must be run from the **Xmath Commands** window. The following sections provide information about these commands.

LICENSECHECKOUT

LICENSECHECKOUT is an intrinsic command that checks out a license for the listed feature or features. Run LICENSEINFO to see a list of feature names. Features are specified as strings, and the name must be exactly as displayed by LICENSEINFO.

Although features are normally checked out on-demand, you can use LICENSECHECKOUT to reserve features for future use (for example, for a scheduled demo or presentation). They are checked in when you exit Xmath.

This command can be placed in a global or local startup.ms file to check out required features at startup. The syntax is as follows:

```
LICENSECHECKOUT feature1,feature2,...featureN
```

For example:

```
LICENSECHECKOUT "Xmath","Control","Sysid","Sysid2",  
"sysbld","case"
```

LICENSEUSER

The LICENSEUSER utility displays assigned licenses for any feature names specified. The default feature is Xmath if no argument is specified. LICENSEUSER accepts feature names in string form. To see a list of the feature names for products you have purchased (for example, aca indicates AutoCode Ada), issue the LICENSEINFO command. The syntax for LICENSEUSER is as follows:

```
LICENSEUSER feature1,feature2,...featureN
```

For example:

```
LICENSEUSER "xmath","aca"
```

LICENSEINFO

LICENSEINFO displays a license report for your site.

LICENSEFILE

The LICENSEFILE command displays the current license file search path.

NIREFNUM

The `NIREFNUM` command displays the reference number, which is also known as the customer identification number. You should have this number ready if you plan to call customer support.

Using Licensing

With concurrent licensing, you can have a different number of licenses for each module or application. An application or module is either available on a first-come, first served basis, or node-locked to a given CPU. Some common uses of licensing are as follows:

- To see all the features your site has purchased or to view the license expiration date, use the command `LICENSEINFO`.
- To see who is using a given feature, or to see if a feature is available, use the `LICENSEUSER` command and specify the desired feature.
- To see the current license file search path, use the command `LICENSEFILE`.
- To reserve features for future use (for example, for a scheduled demo or presentation), use the `LICENSECHECKOUT` feature.

The initial distribution of licenses is determined at the time of the installation; to change licensing, your system administrator must get a new key from National Instruments. To generate a new license file from this key, run the standalone license installation as described in the [Updating a License File](#) section of Chapter 2, *Installation and Related Tasks*.

License Files

The set of licensed features available for checkout by a `MATRIXx` user are contained in one or more license files, each containing encrypted feature lines.

The following default license files are used by the `MATRIXx` products:

- `\Licenses\MATRIXx_PKG_080000.lic`—This primary license file contains feature lines for built-in `MATRIXx` features. This file is generated during the installation process and uses the authorization information you obtain from National Instruments.

- `\Licenses\tplic.dat`—This optional file contains license feature lines for third-party MATRIXx components. The encrypted feature lines in this file and the instructions for using the file will typically be provided by your third-party supplier. Multiple features from different third-party suppliers can be placed in this file. Typically, this file will also contain the same `SERVER` and `DAEMON` lines as `MATRIXx_PKG_080000.lic`. This file is not modified during a MATRIXx or license manager installation, nor is it deleted by uninstall procedures.

The search paths used to locate these license files are set in the environment variable `%NILM_LICENSE_FILE%` by the MATRIXx product launching scripts. The above NI license file paths are prepended to any existing definition of `%NILM_LICENSE_FILE%`, thus allowing access to other MATRIXx or non-MATRIXx products also licensed by a FLEXnet license manager.

Normally, you can change only the following items in a license file.

- The host name (not the host ID).
- The port number on the `SERVER` line. If this port number is already in use, the license daemon `lmgrd` will report **Address In Use**. The default port number used in MATRIXx 8.x license files is 27011. A valid number is any unused port number between 1025 and 64000. The port number can be removed, and the FLEXnet license manager will serve on any available FLEXnet reserved port in the range 27000–27009. For redundant license servers, however, you must use a fixed port number.
- The path to the vendor daemon executable on the `DAEMON` line. The vendor daemon is named `nilm`.
- `name=value` pairs on a `FEATURE` line can be changed if `name` is lowercase.

Redundant license server files contain three `SERVER` lines. The first `SERVER` line defines the primary license server. The second and third lines define the secondary license servers.

Proxy License Files

If you are using a floating-license server, each licensing client needs a copy of the same license file used by the server. Alternatively, to avoid copying the license server file to each installation of MATRIXx, you can create a proxy license file in the `MATRIXxLicenseManager\bin\` directory of

each MATRIXx installation. This approach can be used for both single and redundant license server configurations. The proxy license file `MATRIXx_PKG_080000.lic` can be constructed by taking the `SERVER` line or lines from the license server file and then adding a line containing `USE_SERVER`. For example, a proxy license file for a single server configuration would be as follows:

```
SERVER host1 17003456 27011
USE_SERVER
```

A proxy license file for a redundant server configuration, for example, would be:

```
SERVER host1 17003456 27002
SERVER host2 17004355 27002
SERVER host3 17007ea8 27002
USE_SERVER
```

Unless your server nodes are changed, you will not have to update the license file for each individual MATRIXx installation when the server license file is updated.

Although a proxy license file is the preferred way to reference the actual license file used by a remote license server, you can also use a `port@host` definition for either of the environment variables `NILM_LICENSE_FILE`, where `port` is the license file port number and `host` is the hostname. Both are taken from the `SERVER` line of the actual license file.

The MATRIXx 8.x license manager uses the vendor daemon name `nilm` and the default port number `27011`. Because earlier versions of MATRIXx use different vendor daemon names and port numbers, you can install multiple licensed versions of MATRIXx on the same computer. The MATRIXx 6.x (`ISILM`) and MATRIXx 8.x (`NILM`) license manager can coexist with MATRIXx 5.x running on the same machine. Since version 6.x/8.x software must be installed in a different `%MTXHOME%` directory than MATRIXx 5.x, versions of the MATRIXx license manager for MATRIXx 5.x do not have to be stopped to install the new software. MATRIXx 6.x (`ISILM`) and MATRIXx 8.x (`NILM`) can share the same `%MTXHOME%` directory since their license directories are different. You need to kill the older license manager daemon (`lmgrd`) only if you choose to remove the old software.



Note Because of the addition of new features and new license manager functionality, license keys issued prior to MATRIXx 8.x cannot be used to regenerate a license file for version 8.x.

Licensing Requirements

In order to obtain a license, you must provide the computer name and host ID for each license server machine.

Finding the Computer Name

The computer name is defined at the time Windows is installed. For information about finding the computer name, refer to the operating system documentation.

Finding the Host ID

FLEXnet uses different machine identifications for different machine architectures. An Ethernet address is the preferred “host ID” for a Windows platform. An Ethernet address is a 6-byte quantity, with each byte specified as two hexadecimal digits. Specify all 12 hex digits when using an Ethernet address as a host ID.

The program `%MTXHOME%\MATRIXxLicenseManager\bin\lmhostid` displays the Ethernet host ID that FLEXnet expects to use on any given machine. For floating licenses, you must provide an Ethernet address. For node-locked licenses, an Ethernet address is preferred, but a disk volume serial number for drive C: can be used. A disk volume serial number is an eight-character string with the dash omitted.

For information about finding the Ethernet address of a computer, refer to the operating system documentation.

FLEXnet Licensing Tools

This chapter describes the FLEXnet utilities. This includes explaining how to troubleshoot common license manager problems and describes messages from the daemon log file. For more information about licensing, refer to the *FLEXnet Licensing End User Guide*, available by launching MATRIXx and selecting **Help»MATRIXx Bookshelf**.

FLEXnet Utilities

MATRIXx Product Family version 8.x uses FLEXnet for its license server. FLEXnet provides the following utilities to help manage the licensing activities on the network.

- `lmgrd`—Starts the license daemon.
- `lmstat`—Helps you monitor the status of all network licensing activities.
- `lmreread`—Causes the license daemon to reread the license file and start any new vendor daemons.
- `lmhostid`—Reports the host ID of a system.
- `lmdiag`—Lets you diagnose problems when you cannot check out a license.
- `lmver`—Reports the FLEXnet version of a library or a binary.
- `lmborrow`—Supports license borrowing.
- `lmutil`—FLEXnet license server management and administration.
- `lmtools`—Graphical user interface for FLEXnet utilities.

These commands are located in the `%MTXHOME%\MATRIXxLicenseManager\bin\` directory. The following sections provide information about each of these commands.

lmgrd

lmgrd is the main daemon program for FLEXnet. When you invoke lmgrd, it looks for the license file. The license file contains information about vendors and features.

The syntax is:

```
lmgrd -app [ -c license_file ] [ -t timeout ]
[ -s interval ] [ -b ] [ -l logfile ]
```

where:

| | |
|-----------------|---|
| -app | Is required for Windows systems. |
| -c license_file | Uses the specified license file. |
| -t timeout | Sets a timeout interval, in seconds, during which redundant daemons must complete their connections to each other. The default value is 10 seconds. A larger value may be desirable if the daemons are being run on busy systems or a heavily loaded network. |
| -s interval | Specifies the logfile timestamp interval, in minutes. The default is 360 minutes. |
| -l logfile | Specifies the pathname to the log file. If this option is not specified, the log will be sent to standard output. |
| -v | Prints the lmgrd version number. |

lmstat

The lmstat utility helps you monitor the status of all network licensing activities, including:

- Which daemons are running
- Users of individual features
- Users of features served by a specific daemon

Syntax is:

```
lmstat [-a] [-S [DAEMON]] [-f [feature]]
[-s [server_name]] [-t value] [-c license_file] [-A]
[-l [regular expression]]
```

where:

| | |
|----------------------------------|---|
| -a | Displays everything. |
| -A | Lists all active licenses. |
| -c <i>license_file</i> | Uses <i>license_file</i> . |
| -S [<i>DAEMON</i>] | Lists all users of the specified daemon's features. |
| -f [<i>feature_name</i>] | Lists users of the specified feature(s). |
| -l [<i>regular expression</i>] | Lists users of matching license(s). |
| -s [<i>server_name</i>] | Displays status of server node(s). |
| -t <i>value</i> | Sets <code>lmstat</code> time-out to <i>value</i> . |

lmreread

The `lmreread` utility causes the license daemon to reread the license file and start any new vendor daemons that have been added. Additionally, all pre-existing daemons will be signaled to reread the license file for changes in feature licensing information. Syntax is:

```
lmreread [-c license_file]
```



Note If you use the `-c` option, the license file specified will be read by `lmreread`, not by `lmgrd`; `lmgrd` rereads the file it read originally. Also, `lmreread` cannot be used to change server node names or port numbers. Vendor daemons will not reread their option files as a result of `lmreread`.

lmhostid

The `lmhostid` utility reports the host ID of a system. Syntax is:

```
lmhostid [ether | long]
```

The output of this command appears as follows:

```
lmhostid - Copyright (c) 1989, 199x Highland Software,
Inc. The FLEXnet host ID of this machine is "69021c89"
```

The `ether` option causes `lmhostid` to print the Ethernet address on Hewlett-Packard (HP) systems. On HP systems the `long` option prints the value of the HP ID module. These options are only available in

FLEXnet v2.21 or later. The default is long for FLEXnet v2.21 or earlier, and `ether` for FLEXnet v2.4 or later.

lmdiag

`lmdiag` allows you to diagnose problems when you cannot check out a license.

Usage is:

```
lmdiag [-c license_file] [-n] [feature]
```

where `-c license_file path` to file to diagnose. `-n` run in noninteractive mode; `lmdiag` will not prompt for any input in this mode. In this mode, extended connection diagnostics are not available. Feature diagnose this feature only.

If no feature is specified, `lmdiag` will operate on all features in the license file(s) in your path. `lmdiag` will first print information about the license, then attempt to check out each license. If the checkout succeeds, `lmdiag` will indicate this. If the checkout fails, `lmdiag` will give you the reason for the failure. If the checkout fails because `lmdiag` cannot connect to the license server, then you have the option of running “extended connection diagnostics.”

These extended diagnostics attempt to connect to each port on the license server node, and can detect if the port number in the license file is incorrect. `lmdiag` will indicate each port number that is listening, and if it is an `lmdiag` process, `lmdiag` will indicate this as well. If `lmdiag` finds the vendor daemon for the feature being tested, then it will indicate the correct port number for the license file to correct the problem.

lmver

`lmver` reports the FLEXnet version of a library in binary. Usage is:

```
lmver [filename]
```

where *filename* can be `nilm.exe` or `lmgrd.exe`.

lmborrow

`lmborrow` supports borrowing of licenses that contain the `BORROW` attribute. It must be run on the machine where licenses are borrowed. It is used to perform the following:

- Initiating borrowing by setting the borrow period
- Clearing the borrow period
- Determining borrow status
- Returning a borrowed license early

Initiating Borrowing

To initiate borrowing, the user sets the borrow period by running `lmborrow` from the command line or through LMTOOLS:

```
lmborrow {vendor | all} enddate [time]
```

where:

| | |
|-----------------------------|---|
| <code>vendor</code> | The vendor daemon name that serves the licenses to be borrowed, or <code>all</code> specifies all vendor daemons in that license server. |
| <code>enddate [time]</code> | Date the license is to be returned in <code>dd-mmm-yyyy</code> format. <code>time</code> is optional and is specified in 24-hour format (<code>hh:mm</code>) in the FLEXnet-licensed application's local time. If <code>time</code> is unspecified, the checkout lasts until the end of the given end date. |

For example:

```
lmborrow sampled 20-aug-2001 13:00
```

This command has the effect of setting `LM_BORROW` with the borrow period in either registry.

To borrow licenses for the desired vendor, *on the same day and the same machine* that the user runs `lmborrow`, run the application(s) to check out the license(s). If you run the application(s) more than once that day, no duplicate licenses are borrowed. No licenses are borrowed if the application is run on a day different than the date borrowing is initiated.

In addition to the `lmborrow` utility, there are other ways to initiate borrowing:

- Using the borrowing interface in application, if provided in the application.
- Setting the `LM_BORROW` environment variable directly.

Clearing the Borrowed License Setting

To clear the `LM_BORROW` setting in the registry issue the command:

```
lmborrow -clear
```

Clearing the `LM_BORROW` setting stops licenses from being borrowed until borrowing is initiated again. A user might run `lmborrow -clear` after he has borrowed licenses for features that are used offline if—before disconnecting from the network—he wants to run an application that checks out additional features, served by `vendor`, that are not meant to be borrowed. Clearing `LM_BORROW` does *not* change the status for already-borrowed licenses.

Determining Borrowed License Status

To print information about borrowed features, issue the following command on the machine from which they are borrowed:

```
lmborrow -status
```

The borrowing system does not have to be connected to the network to determine the status.

Returning a Borrowed License Early

To return a borrowed license early, first reconnect the borrowing system back to the network and then, from the same machine that initiated the borrowing, issue the command:

```
lmborrow -return [-c license_file_list]
                [-d display] feature
```

where:

- c *licsne_file_list* Use the specified license file(s). In some configurations, the license file needs to be specified in order to return the license file early.

-d display Used to specify the display from which the borrow was initiated. Required if you current display is different than what was used to initiate the borrow. On Windows, it is the system name or, in the case of a terminal server environment, the terminal server client name.

feature The name of the borrowed feature to be returned early. Use `lmborrow -status` to get a list of borrowed feature names.

Returning the license early has the effect of clearing the `LM_BORROW` setting for the vendor daemon that serves the returned license.

If the borrowing system is not placed back on the network before attempting the early return, the license is not returned and `LM_BORROW` is kept intact. Additionally, an error message is issued to the end user with notification that the system needs to be connected to the network.

lmutil

The following are valid arguments for most `lmutil` utilities:

-c license_file_path Most `lmutil` utilities need to know the path to the license file. This is specified with a *-c license_file_path* argument, or by setting the `LM_LICENSE_FILE` environment variable. Otherwise, the default location is used. The utilities also honor all `VENDOR_LICENSE_FILE` environment variables. Some utilities take more than one license file path in a license-file list separated by semi-colons. Pathnames which include spaces have to be enclosed in double quotes.

-v Prints the FLEXnet version of the utility.

-verbose Prints the description for all errors found. The output from the utilities may be harder to read with this option, but is useful for diagnostics. (v6.0+ only)

Imtools

For the 32-bit Windows platforms, a graphical user interface to the license manager tools is provided called LMTOOLS. Always use the newest version of LMTOOLS as possible; it is available for download from www.macrovision.com.

Some of the functions LMTOOLS performs include:

- Starting, stopping, and configuring FLEXnet license servers
- Getting system information, including hostids
- Getting server status

LMTOOLS has two modes in which to configure a license server:

- Configuration using a license file
- Configuration using services

Configuration Using License File

Operations are performed on a particular license file. The file can be either local or remote. In this mode, you cannot start the `lmgrd` process, but you can do everything else. To configure this mode, perform the following:

1. Invoke LMTOOLS.
2. Click the **Configuration using License File** radio button.
3. Enter one or more the license file names or `port@host` specifications.

Configuration Using Services

Operations are performed on a service, which allows starting `lmgrd` processes local to the system on which LMTOOLS is running. On XP/2000, you configure a Windows Service.

Resolving Problems

This section offers some general debugging tips, and discusses information you should gather before contacting support. The [Troubleshooting License Manager Problems](#) section lists common license manager problems users have encountered before.

General Debugging Tips

The following are tips for debugging:

- Examine the
`%MTXHOME%\MATRIXxLicenseManager\bin\debug.log` file.
- If you cannot check out a feature, run:
`%MTXHOME%\MATRIXxLicenseManager\bin\lmdiag -c
 %MTXHOME%\MATRIXxLicenseManager\Licenses\
 MATRIXx_PKG_080000.lic`.
- If the license daemon appears to have started correctly (which you should be able to determine from the `ni.log` file), try running `lmstat` to see if that program has the same problem as your application.
`lmstat -a -c
 %MTXHOME%\MATRIXxLicenseManager\Licenses\MATRIXx_
 PKG_080000.lic`

Support Issues

When you make a support call, please be prepared to answer the following questions:

- What kind of machine is your license daemon running on? What version of the operating system is the application running on?
- What version of FLEXnet does the program use? Use the following command on your `nilm` vendor daemon and application:
`%MTXHOME%\MATRIXxLicenseManager\bin\lmver
 %MTXHOME%\MATRIXxLicenseManager\bin\nilm.exe`
- What error or warning messages appear in the log file? Did the daemon start correctly? Look for a message such as:
`server xyz started for: feature1 feature2.`
- What is the output from running `lmstat -a`?
- Are you running other products which are also licensed by FLEXnet? National Instruments does not support combined license files.

Troubleshooting License Manager Problems

This section lists areas of FLEXnet administration that have given customers difficulty in the past. Categories are *Host ID Problems*, *Connection Problems*, and *Other Client Problems*.

Host ID Problems

symptom When I run the license manager on my machine, it tells me it is the wrong host ID.

cause The vendor daemon checks the host ID listed on the `server` line in the license file; if it does not match the host ID of the machine it is running on, this message will be printed.

Possible causes include:

- You are trying to run the license daemon on a different machine from the machine the file was made for.
- The host ID of the machine you are running on changed (for example, the HP ID module was moved, or the CPU board was replaced).
- The host ID in the license file was modified.

solution Verify that the host ID of the machine where the vendor daemon (or node-locked client program) is being run matches the host ID specified in the license file (on the `server` line for the vendor, or on the `feature` line for a node-locked client). You can run the `lmhostid` program to see what FLEXnet thinks the host ID is. You cannot modify the host ID in the license file. If the host ID of your server machine changes, you will have to get a new license file from your software vendor.

Connection Problems

symptom The application program (or `lmstat`) cannot connect to the server to check out a license.

cause The FLEXnet routines in the application are unable to make a TCP connection to the server and port specified in the license file. Possible reasons for this are:

- The wrong license file is being referenced by the application program.
- The server machine specified in the license file is down.
- The vendor daemon specified in the license file is not running.
- The `hostname` in the license file is not recognized by the system.
- The network between the client machine and the server machine is down.
- TCP is not running on your machine.

solution Verify that the application is using the proper license file. Verify that the specified server machine is up and reachable by executing another command that uses TCP, such as `rsh` or `rlogin`, from the client to the server. Verify that the vendor daemon is running (you can use the `ps` command on the server to look for it). Examine the license log file to see if any problems are reported, particularly messages indicating that the vendor daemon has quit. Run `lmstat -a` from the server machine to verify that the vendor daemon is alive. Run `lmstat -a` from the client machine to verify the connection from client to vendor daemon across the network. Try using `telnet hostname portnum` where `hostname` and `portnum` are the same as on the `server` line in your license file.

Other Client Problems

- symptom** When I run my application program (or vendor daemon), I get the error **bad code**.
- cause** Possible causes for this are:
- The license file was modified (either the host ID on a `server` line or anything on the `feature` line was changed).
 - The vendor used the wrong version of his license creation program to generate your license file (or there is a bug in that process).
- solution** You cannot modify the license file. If you need to change something in your license file, you must get a new license from National Instruments.
- symptom** When the second user tries to check out a license, the vendor daemon prints an error concerning `Parameter mismatch` in the log file and refuses the license.
- cause** The most likely cause of this problem is that you are simultaneously trying to run two different versions of the application program, and the software vendor has not specifically set up the new version for this kind of compatibility. Check the license server log file for a **comm version mismatch** warning message; this indicates that someone is running a V1.5 client with a V2.1 or later license server.
- solution** Run only the new version of the application (or only the old version).

Other Server Problems

- symptom** When I start `lmgrd`, it says `Retrying socket bind (address in use: port xxxx)`.
- cause** The license server listens on the port `xxxx` that has already been used by another server program. 99.44% of the time, if it's in use, it's because `lmgrd` from NI or another vendor is already running on the port—or was recently killed, and the port isn't freed yet.
- solution** In the `MATRIXx_PKG_080000.lic` file NI has put 27000 at the end of the `SERVER` line as the port number. You can remove it to let `lmgrd` scan for a free port from 27000 to 27009. You can also specify a port number selected by yourself for other concerns like farewell.



Caution The portscan feature of `lmgrd` is only available for FLEXnet v6+ licenses. You cannot drop the port numbers when configuring redundant servers.

- symptom** When I start up `lmgrd`, it says `exec1 failed on my vendor daemon`.
- cause** `lmgrd` uses `exec1` to start each vendor daemon running. If there is a problem starting the vendor daemon, this message is output to the log file. This error is typically caused by one of the following:
- There is no executable at the location referred to by the license file (and printed out in the log file).
 - The executable does not have the proper protection to be run (the file does not have the `x` bit set, or one of the directories in the path is not readable).
 - There was an error building the executable, and it cannot be run.
 - The executable is for a different machine architecture.
- solution** Verify that the path to the vendor daemon is absolute, and that it points to the executable program itself, not the containing directory (for FLEXnet v1.5). Ensure that the file exists by doing an `ls -l` of the vendor daemon `filename(s)` specified in the log file. Make sure you do this as the same user that started `lmgrd`. Verify that the file is executable. Run the vendor daemon directly from the command line. If the

vendor daemon is properly linked, it will tell you that it must be run from `lmgrd`; if it crashes or fails to execute, then it is not properly linked.

- symptom** The license server keeps reporting `lost lock` errors in the log file and exiting.
- cause** The lockfile is being removed by someone else. There could be another daemon running, or the system administrator (or a script) could have deleted the file.
- solution** Check to see if there is more than one copy of the daemon running. Check for more than one `lmgrd` running as well, since it will restart your vendor daemon when it is killed. If more than one `lmgrd` is running, kill them all, then kill any remaining vendor daemons and start one fresh copy of `lmgrd`. Check to see whether a shell script is running that cleans out `tmp`. If so, try modifying it so that it does not delete zero length files.

Daemon Log File

Daemons generate log files with `DAEMON NAME` messages where:

`DAEMON NAME` Either license daemon or the string from the `DAEMON` line that describes your daemon. In the case where a single copy of the daemon cannot handle all of the requested licenses, an optional underscore followed by a number indicates that this message comes from a forked daemon.

`message` The text of the message.

The log file, available as `%MTXHOME%\MATRIXxLicenseManager\bin\debug.log`, can be used to:

- Inform users when they need to purchase additional application software licenses.
- Diagnose configuration problems.
- Diagnose daemon software errors.

Informational Messages

These messages are only informational and do not necessarily indicate an error or a problem.

Table 4-1. Informational Messages and Meanings

| Message | Meaning |
|--|---|
| Connected to <i>node</i> . | This daemon is connected to its peer on node <i>node</i> . |
| CONNECTED, master is <i>name</i> . | The license daemons log this message when a quorum is up and everyone has selected a master. |
| DENIED: <i>N feature</i> to <i>user</i> (<i>N licenses</i>). | <i>user</i> was denied access to <i>N</i> licenses of <i>feature</i> . |
| EXITING DUE TO SIGNAL <i>nnn</i> . EXITING with code <i>nnn</i> . | All daemons list the reason that the daemon has exited. |
| EXPIRED: <i>feature</i> . | <i>feature</i> has passed its expiration date. |
| IN: <i>feature</i> by <i>user</i> (<i>N licenses</i>). | <i>user</i> has checked back in <i>N</i> licenses of <i>feature</i> . |
| License Manager server started. | The license daemon was started. |
| Lost connection to <i>host</i> . | A daemon can no longer communicate with its peer on node <i>host</i> , which can cause the clients to have to reconnect, or cause the number of daemons to go below the minimum number, in which case clients may start exiting. If the license daemons lose the connection to the master, they will kill all the vendor daemons; vendor daemons will shut themselves down. |
| Lost quorum. | The daemon lost quorum, so it will only process connection requests from other daemons. |
| MULTIPLE <i>xxx</i> servers running. Please kill, and restart license daemon. | The license daemon has detected that multiple copies of vendor daemon <i>xxx</i> are running. The user should kill all <i>xxx</i> daemon processes and restart the license daemon. |
| OUT: <i>feature</i> by <i>user</i> (<i>N licenses</i>). | <i>user</i> has checked out <i>N</i> licenses of <i>feature</i> . |
| RESERVE <i>feature</i> for HOST <i>name</i> . RESERVE <i>feature</i> for USER <i>name</i> . | A license of <i>feature</i> is reserved for either user <i>name</i> or host <i>name</i> . |

Table 4-1. Informational Messages and Meanings (Continued)

| Message | Meaning |
|---|---|
| REStarted <i>xxx</i> (internet port <i>nnn</i>). | Vendor daemon <i>xxx</i> was restarted at internet port <i>nnn</i> . |
| Retrying socket bind (address in use). | The license servers try to bind their sockets for approximately 6 minutes if they detect “address in use” errors. |
| Selected (EXISTING) master node. | This license daemon has selected an existing master (node) as the master. |
| SERVER shutdown requested. | A daemon was requested to shut down through a user-generated kill command. |
| [NEW] Server started for: <i>feature-list</i> . | A (possibly new) server was started for the features listed. |
| Shutting down <i>xxx</i> . | The license daemon is shutting down the vendor daemon <i>xxx</i> . |
| SIGCHLD received. Killing child servers. | A vendor daemon logs this message when a shutdown was requested by the license daemon. |
| Started <i>name</i> . | The license daemon logs this message whenever it starts a new vendor daemon. |
| Trying connection to <i>node</i> . | The daemon is attempting a connection to <i>node</i> . |

Configuration Problem Messages

Table 4-2. Configuration Problem Messages and Meanings

| Message | Meaning |
|--|---|
| hostname: Not a valid server host, exiting | This daemon was run on an invalid hostname. |
| hostname: Wrong hostid, exiting | The host ID is wrong for <i>hostname</i> . |
| BAD CODE for <i>feature-name</i> | The specified feature name has a bad encryption code. |
| CANNOT OPEN options file <i>file</i> | The options file specified in the license file could not be opened. |

Table 4-2. Configuration Problem Messages and Meanings (Continued)

| Message | Meaning |
|---|--|
| license daemon: lost all connections | This message is logged when all the connections to a daemon are lost, which often indicates a network problem. |
| lost lock, exiting | Error closing lock file. |
| Unable to re-open lock <i>file</i> | The vendor daemon has a problem with its lock file, usually because of an attempt to run more than one copy of the daemon on a single node. Locate the other daemon that is running via a <code>ps</code> command, and kill it with <code>kill -9</code> . |
| NO DAEMON line for <i>daemon</i> | The license file does not contain a <i>DAEMON</i> line for <i>daemon</i> . |
| No <i>license</i> service found | The TCP <i>license</i> service did not exist. |
| No license data for <i>feat</i> , feature unsupported | There is no feature line for <i>feat</i> in the license file. |
| No features to serve! | A vendor daemon found no features to serve. This could be caused by bad data in the license file. |
| UNSUPPORTED FEATURE request: <i>feature</i> by user | The <i>user</i> has requested a feature that this vendor daemon does not support. This can happen for a number of reasons: the license file is bad, the feature has expired, or the daemon is accessing the wrong license file. |
| Unknown host: <i>hostname</i> | The hostname specified on a <i>SERVER</i> line in the license file does not exist in the network database. |
| NO DAEMON lines, exiting | The license daemon logs this message if there are no DAEMON lines in the license file. Since there are no vendor daemons to start, there is nothing to do. |
| NO DAEMON line for name | A vendor daemon logs this error if it cannot find its own DAEMON name in the license file. |

Daemon Software Error Messages

Table 4-3. Daemon Software Error Messages and Meanings

| Message | Meaning |
|-----------------|--|
| select: message | An error in a select system call was detected. |
| Server exiting | The server is exiting. This is normally due to an error. |



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