

LoadRunner Tuning Module

Installation Guide

Version 7.8

LoadRunner Tuning Module Installation Guide, Version 7.8

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Mercury Interactive Corporation
1325 Borregas Avenue
Sunnyvale, CA 94089 USA
Tel: (408) 822-5200
Toll Free: (800) TEST-911, (866) TOPAZ-4U
Fax: (408) 822-5300

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If you have any comments or suggestions regarding this document, please send them via e-mail to documentation@merc-int.com.

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Before You Install

Welcome to LoadRunner Tuning Module, Mercury Interactive's tool for Tuning in Production testing. This guide describes everything you need to know to install the LoadRunner Tuning Module. It describes the LoadRunner Tuning Module package contents, the required system configuration, registration and backup procedures, and how to run the setup programs.

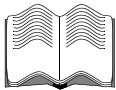
Before you begin to install the LoadRunner Tuning Module, review the following pre-installation procedures.

Checking Your Tuning Module Package

Make sure that your LoadRunner Tuning Module package contains the items described below. If any items are missing or damaged, contact Mercury Interactive or your local distributor.

CD-ROMS

Your LoadRunner Tuning Module package includes a Windows CD-ROM and a UNIX CD-ROM containing the LoadRunner Tuning Module program and associated files.



Documentation

The LoadRunner Tuning Module is supplied with a set of documentation that describes how to:

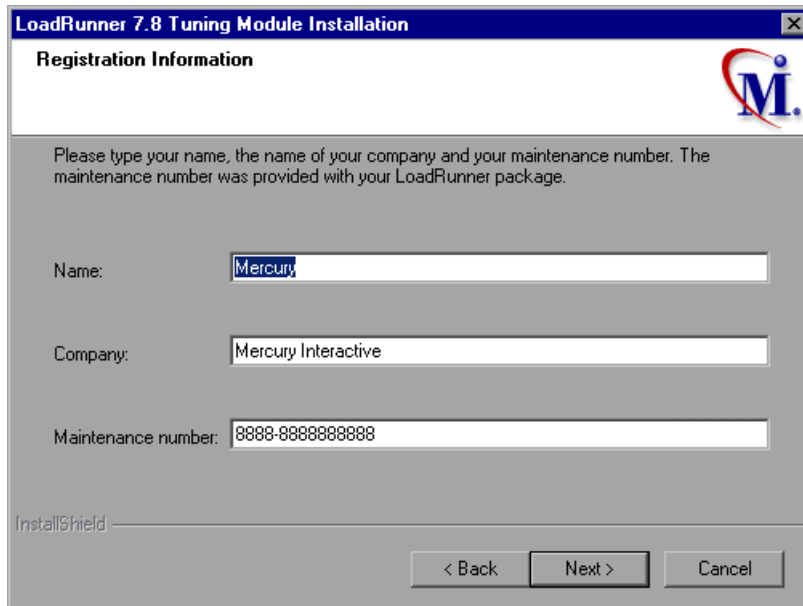
- ▶ install the LoadRunner Tuning Module
- ▶ create virtual user scripts
- ▶ use the LoadRunner Tuning Module Console
- ▶ analyze the results

Registering Your Copy of the LoadRunner Tuning Module

Register your copy of the LoadRunner Tuning Module to become a licensed user with all rights and privileges. Registered users have access to technical support and information on all Mercury Interactive products. You will also be eligible for updates and upgrades.

To register your copy of the Tuning Module, fill out the Mercury Interactive Software Registration card.

- If you are in the USA, fill out the USA Owners portion of the card. Send the card to the Sunnyvale, California address printed on the card. No postage is necessary.
- If you are outside the United States, fill out the Non-USA portion of the registration card and send it to the appropriate international address. Affix postage to the card before mailing.
- Remember to notify Mercury Interactive or your local representative if you move to a new address, so that you can continue to receive product information and updates.



The screenshot shows a dialog box titled "LoadRunner 7.8 Tuning Module Installation" with a sub-header "Registration Information" and the Mercury Interactive logo. The dialog contains a text area with instructions: "Please type your name, the name of your company and your maintenance number. The maintenance number was provided with your LoadRunner package." Below this are three input fields: "Name:" with the value "Mercury", "Company:" with the value "Mercury Interactive", and "Maintenance number:" with the value "8888-8888888888". At the bottom, there is an "InstallShield" label and three buttons: "< Back", "Next >", and "Cancel".

Note: You can also register your copy of the LoadRunner Tuning Module on Mercury Interactive's Customer Support site:
<http://support.mercuryinteractive.com>.

Where To Go From Here?

Your LoadRunner Tuning Module CD-ROMs include all the files that you need to install LoadRunner Tuning Module. Your actual setup procedure will differ depending on the environment that you will be testing using LoadRunner Tuning Module:

- If your environment consists of **only Windows-based** machines (i.e. the Console and all the Vusers will run on Windows-based machines), follow the setup procedure described in Part I of this guide.
- If your environment consists of **both Windows-based and UNIX-based** machines, follow the setup procedures described in Part I and Part II of this guide.

If your testing environment is...	See
Windows only	Part I
Windows and Unix	Part I and Part II

Terminology

Vuser	A virtual user—a LoadRunner Tuning Module-created user that emulates a human user.
Load Generator machine	The workstation used to host the LoadRunner Tuning Module Vusers.
Console machine	The machine used to host the LoadRunner Tuning Module Console.
Vuser Group	A collection of Vusers with common characteristics, such as the machine on which they run, or the client that they use.

Typographical Conventions

This book uses the following typographical conventions:

1, 2, 3	Bold numbers indicate steps in a procedure.
►	Bullets indicate options and features.
>	The greater than sign separates menu levels (for example, File > Open).
Stone Sans	The Stone Sans font indicates names of interface elements on which you perform actions (for example, “Click the Run button.”).
Bold	Bold text indicates method or function names
<i>Italics</i>	<i>Italic</i> text indicates method or function arguments, file names or paths, and book titles.
Arial	The Arial font is used for examples and text that is to be typed literally.
<>	Angle brackets enclose a part of a file path or URL address that may vary from user to user (for example, <i><Product installation folder>\bin</i>).
[]	Square brackets enclose optional arguments.

{ }

Curly brackets indicate that one of the enclosed values must be assigned to the current argument.

...

In a line of syntax, an ellipsis indicates that more items of the same format may be included.

Part I

Windows Installation

1

Introducing the LoadRunner Tuning Module Installation

Your LoadRunner Tuning Module compact disk includes a setup program that guides you through the process of installing LoadRunner Tuning Module's components.

You can install the LoadRunner Tuning Module Console, the virtual user components, or both.

System Requirements

In order to successfully run the LoadRunner Tuning Module, you need the following minimum system configuration.

Requirement	Console with Monitors	Virtual User Generator	Virtual Users	Analysis Module
Computer/ Processor	Pentium 350 MHZ or higher	Pentium 350 MHZ or higher	Pentium 1 GHz or higher	Pentium 350 MHZ or higher
Operating System	Windows NT® service pack 6a Windows 2000 including service packs 2 and 3 Windows XP Professional including service pack 1	Windows NT® service pack 6a Windows 2000 including service packs 2 and 3 Windows XP Professional including service pack 1	Windows NT® service pack 6a Windows 2000 including service packs 2 and 3 Windows XP Professional including service pack 1	Windows NT® service pack 6a Windows 2000 including service packs 2 and 3 Windows XP Professional including service pack 1

Requirement	Console with Monitors	Virtual Vuser Generator	Virtual Users	Analysis Module
Memory	128 MB or more	128 MB or more	At least 1 MB RAM for non-multithreaded Vuser or at least 512 KB multi-threaded Vuser	128 MB or more
Swap Space	Two times the total physical memory	Two times the total physical memory	Two times the total physical memory	Two times the total physical memory
Screen Resolution	1024*768 or higher			
Screen Colors	64K or higher			
Free Hard Disk Space	Installation: 300 MB	Installation: 300 MB	Installation: 130 MB	Installation: 100 MB
Browser	IE 5.0 sp2 or higher	IE 5.0 sp2 or higher	N/A	IE 4.x or higher Netscape Navigator 4.x or higher
MSXML	Version 3 service pack 2	Version 3 service pack 2	Version 3 service pack 2	Version 3 service pack 2

Note: Refer to <http://www.mercuryinteractive.com/products/protune/technical/> for the most updated installation requirements.

2

Installing the LoadRunner Tuning Module on Your Computer

You can perform the following types of installation:

- ▶ Full
- ▶ Load Generator only
- ▶ MI Listener only
- ▶ Tuning Agent only
- ▶ Custom (lets you specify which LoadRunner Tuning Module components to install)

Installation

Note: You must log on as an NT Administrator when performing an installation on Windows NT 4.0 or higher.

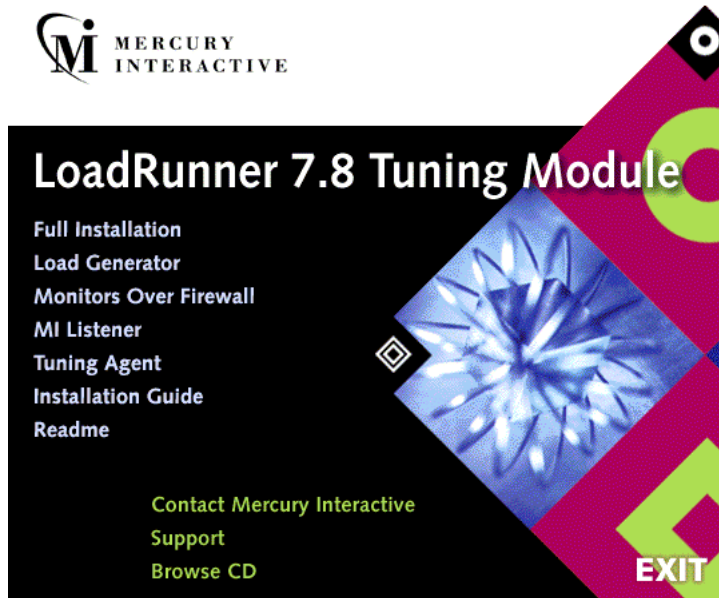
To install LoadRunner Tuning Module on your computer:

- 1** Insert the LoadRunner Tuning Module CD-ROM into a CD-ROM drive. If you are installing from a network drive, connect to that CD-ROM drive.
- 2** Click **Start**, and select **Run**.

- 3 Type the location that you are installing from, followed by *setup.exe*. For example, if your CD-ROM drive letter is M, type:

```
m:\win32\setup.exe
```

- 4 The LoadRunner Setup program begins and displays the main installation screen.



Full Installation provides the option to install the LoadRunner Tuning Module ContSOLE, Virtual User (including GUI) components, online documentation, script samples, Load Generator, Monitors Over Firewall, and MI Listener. Use this option for the machine that controls the Vusers.

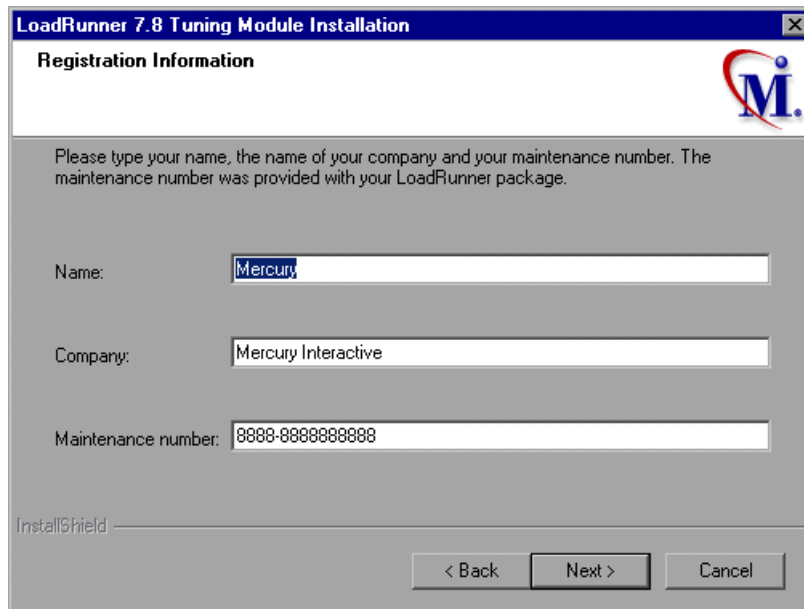
Load Generator installs only the components needed for running virtual users to generate load. Use this option for machines that are used only to generate load and not to control Vusers.

Monitors Over Firewall installs the components on the agent machine for monitoring over the firewall. For more information, refer to the Monitoring Over a Firewall chapter of the *LoadRunner Tuning Module Console User's Guide*.

MI Listener installs the components needed on the MI Listener machine used in running Vusers over a firewall and monitoring over a firewall. For more information about working with firewalls, refer to the *LoadRunner Tuning Module Console User's Guide*.

Tuning Agent installs only the tuner agent on a computer. The tuning agent is an application that allows the Console machine to tune the computer remotely. For more information about tuning agents and remote tuning, refer to the *LoadRunner Tuning Module Console User's Guide*.

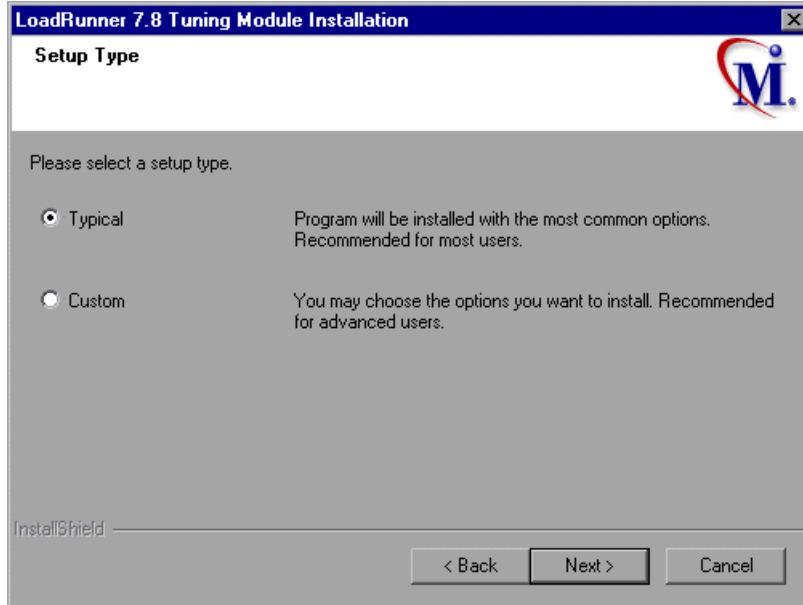
Click on **LoadRunner Tuning Module Full Installation**. The InstallShield Wizard begins and displays the software licensing agreement. Read the agreement and click **Yes** to accept it and to display the Registration Information dialog box.



The screenshot shows a dialog box titled "LoadRunner 7.8 Tuning Module Installation" with a sub-header "Registration Information". The dialog box contains a logo for Mercury Interactive (a stylized 'M' with a red swoosh) in the top right corner. Below the logo, there is a text prompt: "Please type your name, the name of your company and your maintenance number. The maintenance number was provided with your LoadRunner package." There are three text input fields: "Name:" with the value "Mercury", "Company:" with the value "Mercury Interactive", and "Maintenance number:" with the value "8888-8888888888". At the bottom left, it says "InstallShield". At the bottom right, there are three buttons: "< Back", "Next >", and "Cancel".

- 5** In the Registration Information dialog box, type your name, the name of your company, and your LoadRunner Tuning Module maintenance number. You can find the maintenance number in the maintenance pack shipped with LoadRunner Tuning Module. Click **Next**.

6 The Setup Type dialog box displays two setup options.

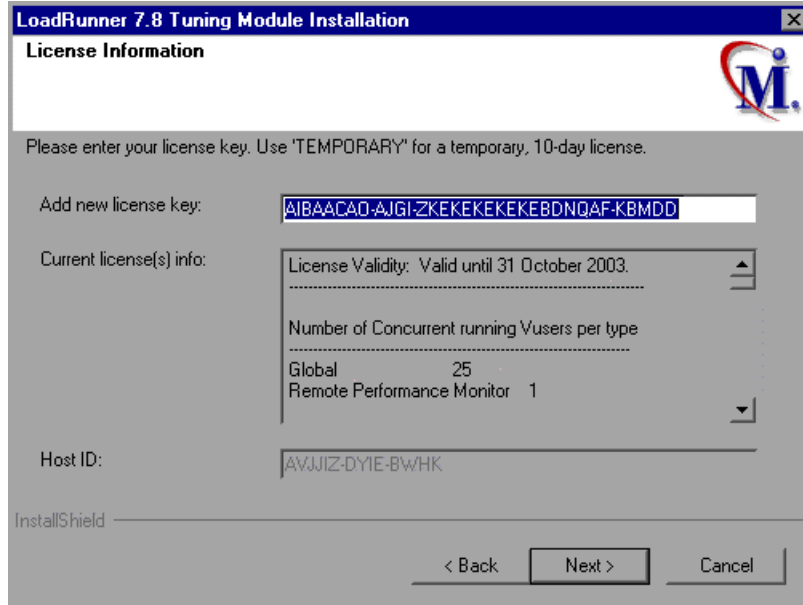


7 Select the type of installation that you want.

Typical Installation installs all commonly-used LoadRunner Tuning Module components, including the LoadRunner Tuning Module Console, Virtual User (including GUI) components, and online documentation. Use this option for the main tuning machine.

Custom Installation lets you install all the LoadRunner Tuning Module components, or select the components that you want to install. For details, see "Custom Installation Options," on page 16.

8 Click **Next** to display the License Information

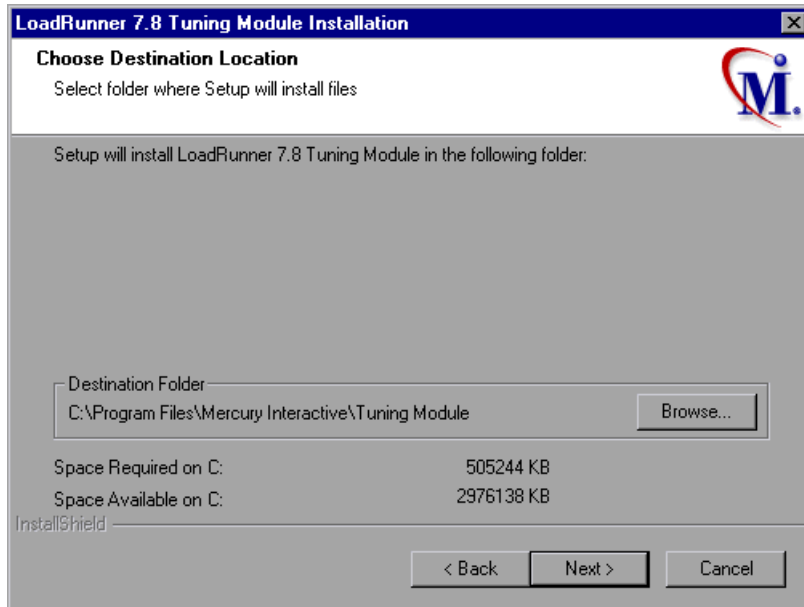


- 9** Enter the LoadRunner Tuning Module license code from your license agreement. If you are evaluating LoadRunner Tuning Module or waiting for a permanent license key, enter the license key 'TEMPORARY'. This will let you use up to 25 global Vusers and 1 Remote Performance Monitor for a period of 10 days.

Click **Next**.

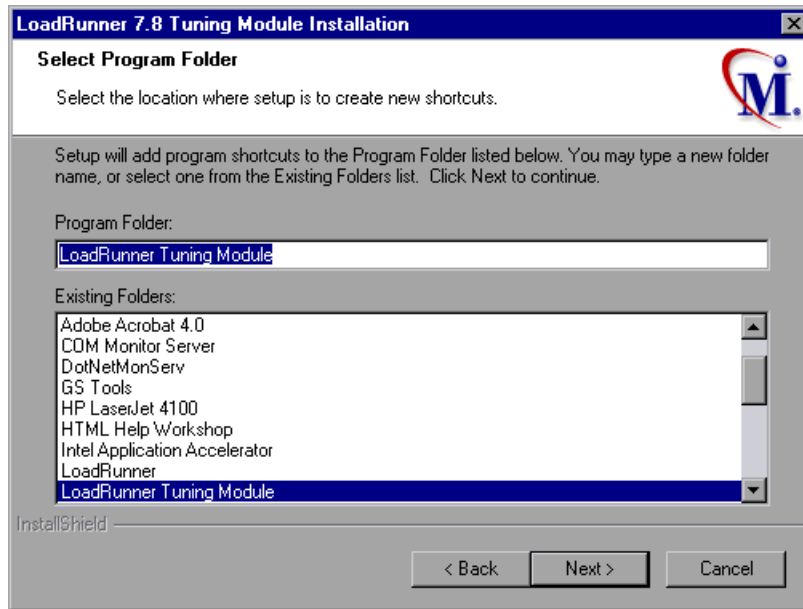
If you have a temporary license, LoadRunner Tuning Module issues a reminder indicating that you have 10 days to evaluate the product. Click **OK**.

- 10 In the Choose Destination Location dialog box, choose the location where you want to install LoadRunner Tuning Module. To select a different location, click **Browse**, choose a folder, and click **OK**.



Click **Next**.

- 11 In the Select Program Folder dialog box, specify a program folder, or accept the default folder, *LoadRunner Tuning Module*.

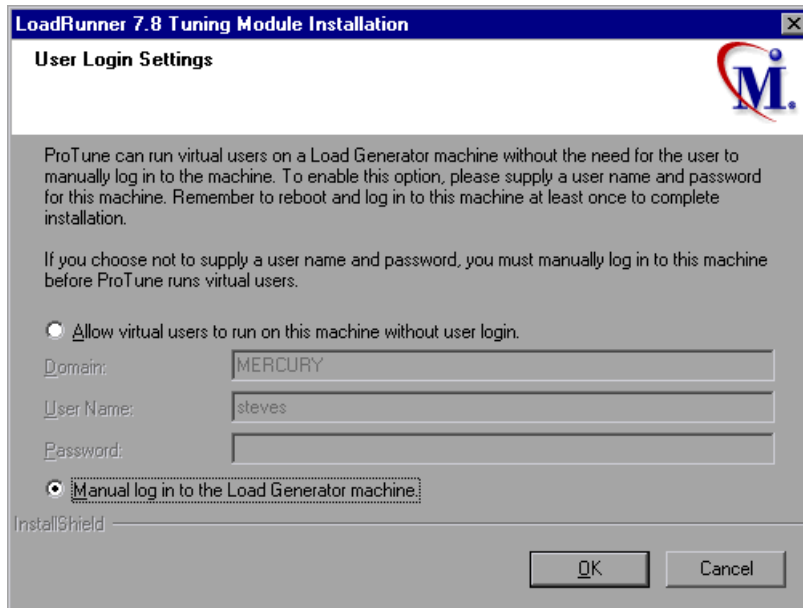


Click **Next**.

- 12** If you installed LoadRunner Tuning Module's online documentation, a message tells you to run the Acrobat Reader setup after the LoadRunner Tuning Module setup is complete. You use the Acrobat Reader to view the LoadRunner Tuning Module online documentation. To install Acrobat Reader select **Start > Programs > LoadRunner Tuning Module > Documentation > Acrobat Reader Setup**.

Note: The Acrobat Reader setup installs the Acrobat 5.05 Reader. If you already have this version of the Acrobat Reader installed, it is not necessary to run the Acrobat Reader setup.

- 13** Click **OK** to continue with the setup procedure.
- 14** In the User Login Settings dialog box, select a user login setting.



Select one of the following user login settings:

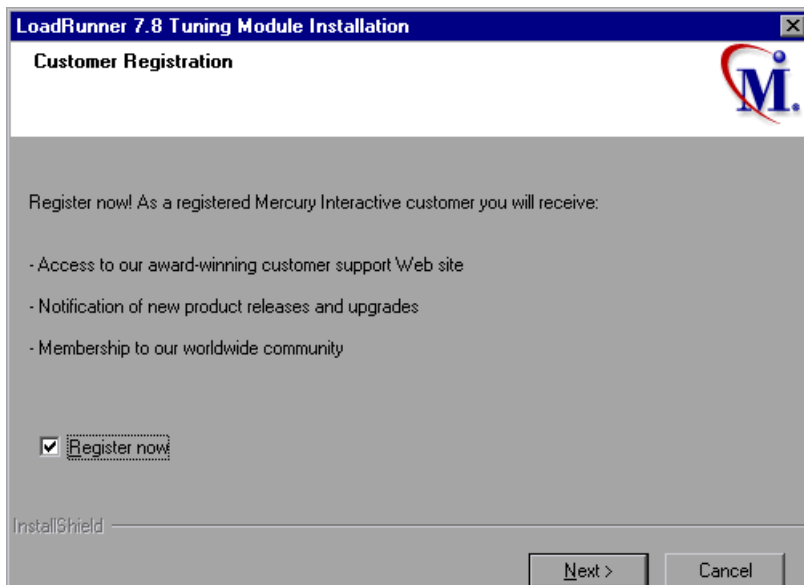
Allow virtual users to run on this machine without user login: The LoadRunner Tuning Module will automatically log in to the network from the Load Generator machine, so the virtual users can run without any manual intervention. Enter the network domain where the user machine resides, a user name, and password. Note that you must have administrator privileges.

Note: You must boot and log in to the system at least once after the LoadRunner Tuning Module installation before the automatic login can work.

Manual log in to the Load Generator machine: The user must manually log into the network from the Load Generator machine for each session of running Vusers.

Click **OK**.

- 15** In the Registration Information dialog box appears, click **Next** to complete the installation.



- 16** The setup program prompts you to restart your computer. You can delay restarting your computer until a later point.

Note: The following message may appear the first time you log on after a full LoadRunner Tuning Module installation: "HCL Inetd CPLInquire cpl 8af40c". This message relates to the HCL (Hummingbird Communications Ltd.) Inetd service, when Inetd is installed as a Windows NT service. Please close the message box and continue to start your computer.

The LoadRunner Tuning Module installation is now complete.

Completing the LoadRunner Tuning Module Installation Process

To complete the LoadRunner Tuning Module installation process:

- ▶ Select **Start > Programs > LoadRunner Tuning Module > Readme** to see what's new in LoadRunner Tuning Module, and any last-minute limitations.
- ▶ To install the Adobe Acrobat Reader 5.05, select **Start > Programs > LoadRunner Tuning Module > Documentation > Acrobat Reader Setup**.
- ▶ If your version of LoadRunner Tuning Module is supplied with a plug and you have not already installed the plug, do so now by inserting it into the parallel port.
- ▶ To create Vuser scripts for **Baan**, you need to specify the correct application server in the Baan user file:

The user file, u[username], is located under the Baan installation folder in bse/lib/user. Add the following line to the beginning of the user file:

```
std_program:ottstpteststand
```

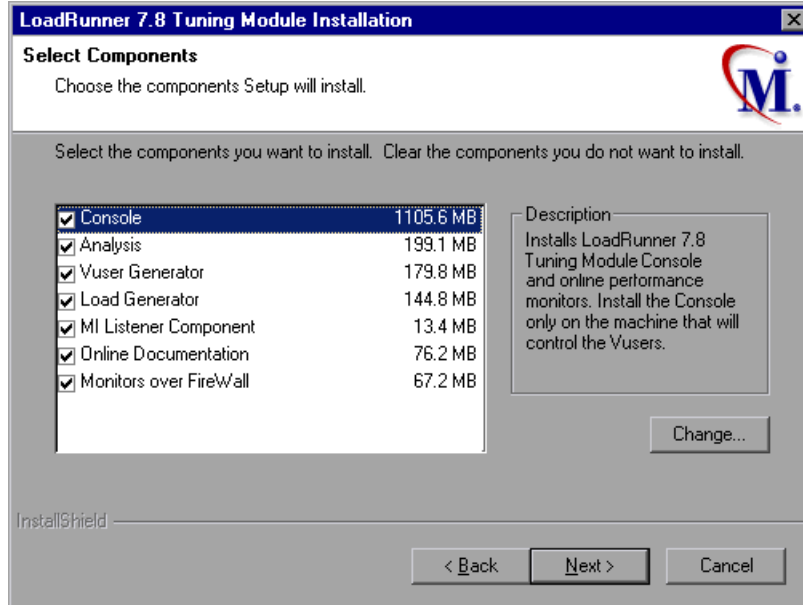
This tells LoadRunner Tuning Module to use the Test Standard Program when recording and running Vusers.

- To start LoadRunner Tuning Module, select **Start > Programs > LoadRunner Tuning Module > Console**.

Custom Installation Options

If you choose to perform a Custom installation of LoadRunner Tuning Module, the setup program allows you to select the LoadRunner Tuning Module components that you want to install. You can install the following LoadRunner Tuning Module components:

- ▶ **Console:** Controls the tuning session. Includes the online performance monitors. Install the Console only on the machine that will control the Vusers.
- ▶ **Analysis:** Graphs and reports for analyzing the performance.
- ▶ **Vuser Generator:** LoadRunner Tuning Module's tool for creating virtual user (Vuser) scripts, through recording. Vuser scripts emulate users without a graphical user interface by using direct function calls.
- ▶ **Load Generator:** The components for running virtual users (including Windows-based GUI Vusers) to generate load. Note: You must have WinRunner installed to run GUI Vusers.
- ▶ **MI Listener Component:** Components for the MI Listener machine used in running Vusers and monitoring over the firewall. For more information, refer to the Using Firewalls chapter of the *LoadRunner Tuning Module Console User's Guide*.
- ▶ **Monitors over FireWall:** Components on the agent machine for monitoring over the firewall. For more information, refer to the Using Firewalls chapter of the *LoadRunner Tuning Module Console User's Guide*.
- ▶ **Online Documentation:** All user guides in Acrobat format.



Clear the check boxes next to the components that you do not want to install, and select the check boxes next to the components that you want to install.

Click **Next** to proceed with the installation process.

3

Adding LoadRunner Tuning Module Components

After you install LoadRunner Tuning Module, you can run the setup program at any time to add LoadRunner Tuning Module components, such as samples, the Virtual User Generator, or the online documentation.

To add components:

- 1 Insert the LoadRunner Tuning Module CD-ROM into a CD-ROM drive.
- 2 Click the **Start** button, and select **Run**.
- 3 Type the location that you are installing from, followed by *setup.exe*. For example, if your CD-ROM letter is M, type:

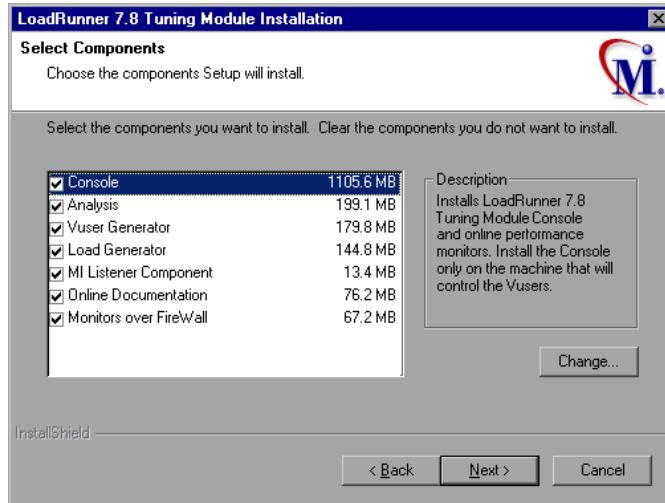
```
m:\win32\setup.exe
```

Click **OK**.

- 4 Select **LoadRunner Tuning Module Full Installation** on the initial LoadRunner Tuning Module Installation window.
- 5 The Installshield Wizard begins and displays the software licensing agreement. Read the agreement and click **Yes** to accept it. The LoadRunner Tuning Module setup program starts.
- 6 In the Registration Information dialog box, type your name, the name of your company, and your LoadRunner Tuning Module maintenance number. You can find the maintenance number in the maintenance pack shipped with the LoadRunner Tuning Module. Click **Next**.

7 Click **Custom Installation**, and then click **Next**.

Select the LoadRunner Tuning Module components that you want to add. Clear the check boxes next to the options that you do not want to add. Click **Next**.



8 The Adding Components process continues through the same steps as the initial installation starting from the License Information dialog.

9 Depending on which components you added, the setup program either prompts you to restart your computer or informs you that the setup is complete. You can delay restarting the computer until a later time.

4

Viewing and Modifying a License

You can modify your license at any time directly from the LoadRunner Tuning Module interface. This chapter describes:

- Viewing License Information
- Modifying a License
- Troubleshooting

Normally, you enter your license code during installation. The setup program prompts you for a license code. If you do not have your license code at the time of installation, you can use the temporary license by typing 'TEMPORARY' in the license key box. This grants you a 10-day license for 25 Vusers for any type of protocol. Contact Mercury Interactive Customer Support to obtain your permanent license key.

This chapter describes how to enter a license code if you did not enter it during installation, and how to upgrade an existing license.

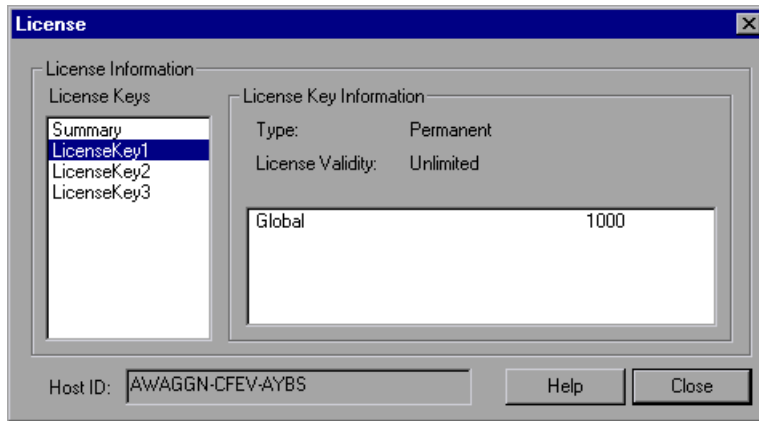
Viewing License Information

You can only view license information from the LoadRunner Tuning Module Console, not from the Virtual User Generator.

To view the current license information:

- 1** In the Console, choose **Help > About LoadRunner Tuning Module**, and click **License Info**. The License dialog box opens, displaying the license information.

- 2 Scroll through the License Keys box to determine the scope of your current license.



The license is defined for the number of Vusers.

The License Keys box lists all the available license keys.

The License Key Information box displays the license type and validity for the item selected in the License Keys box. Select **Summary** in the License Keys box to view the information for all your license keys. Select a specific key to view only the details for that key.

The following types of licenses are available:

- **Permanent:** The license never expires.
- **Time Limited:** The license is limited by a start date and an expiration date.
- **Temporary:** The license is granted for a pre-defined number of days after product installation.
- **Plugged:** The license requires a dongle.

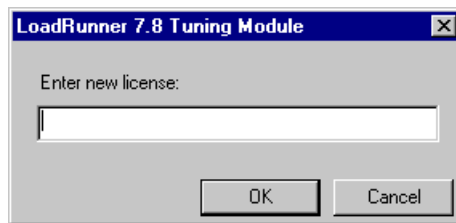
The Host ID box displays an ID for a specific machine. To receive a license key for a specific machine, contact Mercury Interactive's Customer Support.

Modifying a License

You can only modify license information from the LoadRunner Tuning Module Console, not from the Virtual User Generator.

To modify the current license information:

- 1** In the Console, choose **Help > About LoadRunner Tuning Module**. The About LoadRunner Tuning Module window opens.
- 2** Click the **New License** button. The New LoadRunner Tuning Module License dialog box opens.



- 3** Enter the new license number exactly as it was given to you. Click **OK**. If your license is limited for a specific amount of time, LoadRunner Tuning Module issues a message accordingly.
- 4** Click **OK** to close the About LoadRunner Tuning Module window.

Troubleshooting

If you have temporary license key, contact Mercury Interactive Customer Support to obtain a permanent license key.

If LoadRunner Tuning Module does not accept your license key, perform the following checks:

► Make sure you typed in the license code exactly as it was given to you. Your license code is case sensitive.

► If your LoadRunner Tuning Module license requires that you use a plug when running LoadRunner Tuning Module, and a message is issued stating that a plug is not installed, perform the following:

Login as Administrator.

Run `<LoadRunner_Tuning_Module_directory>/bin/hinstall.exe/i`.

Reboot the machine.

► If you receive a “permission denied” error message during Console start-up, you must grant “Full Control” permission for the Registry's HKEY_LOCAL_MACHINE key and in the WINNT folder (folder where Windows is installed):

To add Registry permissions:

- 1 Run `regedt32` to modify the registry.
- 2 Select the HKEY_LOCAL_MACHINE key.
- 3 Select **Security > Permissions**.
- 4 Add “Full Control” permission to the user that is running the Console.
- 5 Turn on the **Replace Permission on the Existing Subkeys** flag.
- 6 Click **OK**.

To add permissions on an NTFS file system:

- 1** Select the <System Drive>:\WinNT folder.
- 2** Invoke **Properties**.
- 3** Select the **Security** tab.
- 4** Click **Permissions**.
- 5** Add “Full Control” permission for the user.
- 6** Turn on the **Replace Permissions on Subdirectories** flag.
- 7** Click **OK**.

Part II

Installing UNIX Load Generators

5

Introducing the UNIX Installation

You can install LoadRunner Tuning Module to run virtual users on a UNIX platform. The UNIX virtual users interact with the LoadRunner Tuning Module Console, installed on a Windows machine. Refer to Part I of this Installation Guide for information about installing the LoadRunner Tuning Module Console. This chapter discusses the installation steps and system requirements for the LoadRunner Tuning Module UNIX Virtual User components.

UNIX Installation Steps

This guide describes the installation of LoadRunner Tuning Module Users on all of the supported UNIX platforms. When a section applies only to a specific platform, it is explicitly stated.

The main steps of the installation process are:

- Installing the program files
- Setting the environment

Once you complete the installation, refer to the additional documentation for details on working with LoadRunner Tuning Module.

Setting the Environment

Since LoadRunner Tuning Module virtual users emulate an actual user of your system, the environment on the virtual user machine must be configured for the vuser to run correctly. The environment variables are defined in the *.cshrc* file for cshell users, and the *.profile* file for Bourne and kshell users.

- ▶ The installation process determines the platform upon which the Vuser is running, and prepares a script to modify the *.cshrc* file for cshell users. Bourne and kshell users should manually modify the *.profile* file. Refer to Chapter 8, “Verifying Your Installation” for sample *.cshrc* and *.profile* files.
- ▶ The LoadRunner Tuning Module installation process helps you set the environment variable to indicate the location of the LoadRunner Tuning Module bin directory and any DLLs used by the underlying protocol. This environment variable is called LIBPATH on AIX, SHLIB_PATH on HP/UX, and LD_LIBRARY_PATH on Solaris and Linux.

System Requirements

Your actual memory requirements may vary, depending on your configuration. Note that the installation procedure uses additional memory which becomes free after the installation. To ensure a smooth installation of the UNIX components, it is recommended that you make sure there is sufficient storage space, process entries, swap space, etc. in the disk partition where you intend to install LoadRunner Tuning Module.

The following table describes the system requirements for each platform supported by Mercury Interactive for LoadRunner Tuning Module UNIX Vusers.

Platform	Hardware	Version
Solaris	Ultra Sparc	Solaris 2.6 or higher
HP	HP 9000 series 700, 800,	HP-UX 11.x or higher
IBM	IBM RS/6000	AIX 4.3.3 or higher
Linux	PC i486	Red Hat 6.0 or higher

Note that LoadRunner Tuning Module supports all X Servers.

Note: Refer to <http://www.mercuryinteractive.com/products/protune/technical/> for the most updated installation requirements.

System Resources

The following describes the system resources required for each platform or operating system. The actual resources may vary depending on the number of Vuser licenses purchased.

The resources for Vusers listed below apply to each virtual user. If you want to use the load generator to run multiple virtual users, you must multiply the figure by the number of virtual users.

Disk Space required for program installation	45 MB for Solaris 59 MB for HP 53 MB for IBM 26 MB for Linux
Memory Space each Vuser if run as thread	300 KB (at least). This amount may vary, depending on the operating system and platform, and does not include the memory used by the process.
Memory Space each Vuser if run as process	1.5 MB (2.5 MB for Solaris)
Swap Space	approximately 1:7 memory/swap ratio
Free Process Entries each Vuser if run as process	1
File Descriptors each Vuser if run as thread	2 (see below)

The **Memory Space** above describes a general C-Vuser type. Other types may take up more memory space. For example, each Web Vuser uses at least 500 KB.

A Load Generator additionally uses the following **File Descriptor** resources:

- ▶ 14 file descriptors for the LoadRunner Tuning Module launch service
- ▶ 20 file descriptors for the LoadRunner agent
- ▶ 30 file descriptors for each Vuser driver. By default, there is a driver for every 50 Vusers.

For example, to compute the number of file descriptors used in running 100 threaded Vusers the Load Generator requires:

14	for LoadRunner Tuning Module launcher
20	for LoadRunner agent
60	for 2 drivers (30 x 2, each one drives 50 Vusers)
200	for 100 Vusers (each Vuser requires 2)

Total: 294 File Descriptors

If Vusers are run as processes instead of threads, one driver is run per Vuser. Therefore, each Vuser requires 30 file descriptors.

You can increase the number of file descriptors, process entries, and amount of swap space by configuring the kernel, as described in this chapter.

Note: Most operating systems using LoadRunner Tuning Module 7.8 or higher have sufficient default file descriptors, process entries, and swap space, and rarely require reconfiguration.

Increasing Process Entries

Each Vuser requires several free process entries. To increase the number of process entries on your system, you must reconfigure the kernel.

Solaris 2.6

The following section describes how to reconfigure the kernel for Solaris operating systems.

- 1 Locate the */etc/system* file.
- 2 Set the maximum number of processes in the system file. Type:

```
set max_nprocs=number (e.g.712)
```

- 3 Execute the touch/reconfigure command. Type:

```
touch /reconfigure
```

- 4 Reboot the machine.

HP-UX

The following section describes how to reconfigure the kernel for HP platforms.

- 1 Login as root.
- 2 Invoke the *sam* tool to reconfigure the kernel. Type:

```
sam &
```

- 3 Select Kernel Configuration>Configurable Parameters.
- 4 Set the following parameters to the desired values:

nproc: The number of simultaneous processes—(# of Vusers * 2) + 200

maxuser: The number of maximum users—DB + RTE Vusers + 20

maxuprc: The number of processes per user—# of Vusers * 2

- 5 Reboot the machine.

IBM

The following section describes how to reconfigure the kernel for IBM platforms using the AIX operating system.

- 1 Display the current settings. Type:

```
lsattr -EHI sys0
```

- 2 Increase the maximum number of process entries per user. Type:

```
chdev -l sys0 -a maxuproc = number (e.g.500)
```

- 3 Set the *nproc*, *maxusers* parameters to the desired values.

Linux

The following section describes how to reconfigure the kernel for Linux platforms.

- 1 Locate the */etc/security/limits.conf* file.
- 2 Set the maximum number of processes in the limits file. Type:

```
hard nproc 8192
```

- 3 Reboot the machine.

Increasing File Descriptors

Each Vuser requires from 6 (non-GUI Vusers) to 27 (GUI Vusers) file descriptor entries. The procedure to increase the number of file descriptors differs between platforms and shells.

All Platforms

In these examples, the number of descriptors is increased to the maximum of 1024.

- 1 For sh and ksh users, type:

```
ulimit -n 1024
```

- 2 For csh users type:

```
limit descriptors 1024
```

Solaris

The following section describes some alternate procedures to increase file descriptors on Solaris operating systems. In these examples, the number of descriptors is increased to the maximum of 1024.

- 1 Use the *adb* command to increase file descriptors (all shells). Note that 400 HEX is the equivalent to decimal 1024. In the following example, *kernel* is the name of the kernel file, e.g., *kernel/unix*.

```
adb -w -k /kernel/dev/mem
rlimits+28?W 400
rlimits+28/W 400
```

- 2 You can also increase the maximum number of file processes by reconfiguring the kernel.

Login as root and set the *rlim_fd_max* parameter inside the */etc/system* file by typing:

```
set rlim_fd_max=1024
```

Save the file and reconfigure the system by typing:

```
touch /reconfigure.
```

After reconfiguring the system, reboot the machine.

HP-UX

The following section describes how to increase file descriptors for HP platforms.

- 1 Login as root.
- 2 Invoke the *sam* tool to reconfigure the kernel. Type:

```
sam &
```

- 3 Select Kernel Configuration > Configurable Parameters.
- 4 Set the *maxfiles* parameters to the desired values. This is the equivalent to file descriptors on Sun platforms.

maxfiles: The number of files open at a given time, typically set to 60. Change it to 500 -1024.

- 5 Reboot the machine.

Linux

The following section describes some alternate procedures to increase file descriptors on Linux operating systems. In these examples, the number of descriptors is increased to the maximum of 8192.

- 1 Add the following line to the */etc/security/limits.conf* file:

```
hard nfile 8192
```

- 2 Add the following line to the */etc/sysctl.conf* file.

```
fs.file-max = 8192
```

- 3 Reboot the machine.

Increasing Swap Space

Each Vuser requires swap space ranging from 200 KB to 4 MB. Before adding space to your system configuration, you should determine your paging requirements. For environments running programs with very large memory requirements, it is recommended to have paging space of four times the physical memory. If you do not have enough paging space, certain processes may be killed, and others will be unable to start.

Solaris

The following section describes how to increase swap space for machines running Solaris.

- 1 List the available paging areas. Type:

```
swap -l
```

- 2 Display the available swap space. Type:

```
swap -s
```

- 3 Create a new paging file. Type:

```
mkfile size path (e.g. mkfile 50m /extra/page_1)
```

- 4 Add the page file to the existing configuration. Type:

```
/usr/etc/swapon -a /extra/page_1 0 102400
```

- 5 Enable all swap areas listed in the file system configuration. Type:

```
/usr/etc/swapon -a
```

IBM

The following section describes how to increase swap space for machines running the AIX Operating System.

- 1 List the available paging areas. Type:

```
lsps -a
```

- 2 Display the available swap space. Type:

```
swap -s
```

- 3 Create a new paging file, using a value one quarter the size of the actual file size. For example, to create 200 MB of paging space in the chemvg volume group, type:

```
mkps -a -n -s 50 chemvg
```

- 4 To increase the size of an existing paging file, type:

```
chps -s number paging_file
```

(e.g `chps -s 10 page_01` adds 40 MB to `page_01`).

- 5 Add the page file to the existing configuration. Type:

```
swapon paging_area (e.g. swapon /dev/paging_01)
```

- 6 Enable all swap areas listed in the file system configuration file `/etc/swapspaces`. Type:

```
swapon -a
```


6

Installing Load Generators on UNIX

The LoadRunner Tuning Module is installed using the installation media provided with the LoadRunner Tuning Module distribution package. The installation uses a Java Runtime Environment (JRE).

The following sections describe installing the LoadRunner Tuning Module UNIX components from a UNIX CD-ROM device. If a UNIX machine with a CD-ROM device is not available, you can copy the UNIX components from the CD into a directory on your PC, and transfer them to a UNIX directory via ftp or an NFS mounting at a later stage.

Checking your Environment

- Verify that a CD-ROM device is attached to your local or remote machine.
- Find out which device driver is available for use with this drive. The device driver is usually located in the */dev* directory of the machine to which the drive is attached. Consult your system administrator for the name of your device.

Installing LoadRunner Tuning Module on Multiple Platforms

In order to run LoadRunner Tuning Module on multiple UNIX platforms, you need to install a separate version of LoadRunner Tuning Module, in a separate directory, for each platform. The installation directories must be accessible to all the platforms. At the end of installation, follow the instructions at the end of this chapter for modifying the environment variables to indicate the LoadRunner Tuning Module installation directories.

For example, in order to install LoadRunner Tuning Module on a site that has both Solaris and IBM machines, you could use the following directories:

- ▶ For LoadRunner Tuning Module Solaris: */tools/mercury/sol/TuningModule*
- ▶ For LoadRunner Tuning Module IBM: */tools/mercury/ibm/TuningModule*

If you intend to run multi-platform session steps, both directories should be NFS mounted. The Solaris machine should access the IBM installation directory and vice versa.

Running the Installation Program

Before you begin the installation program, make sure you see the install script, *install.sh* from the CD. Note that most operating systems require you to mount the CD-ROM drive to a local directory. For information about mounting a CD-ROM on IBM, see “Preparing to Install from a CD-ROM (IBM only)” on page 45.

There are two installation modes, UI (or AWT) mode and console mode.

- ▶ To run the installation in UI mode, make sure that the DISPLAY environment variable is properly configured.
- ▶ To run the installation in console mode, add the `-console` parameter to the command line. For example:

```
install.sh -console
```

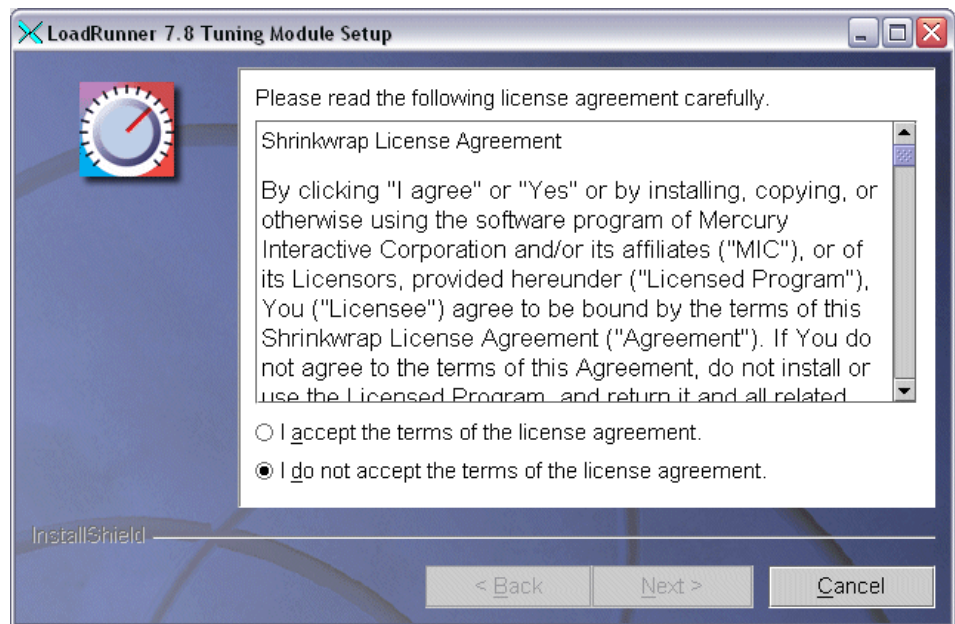
To run the LoadRunner Tuning Module installation program:

Note: The instructions below are for the UI mode.

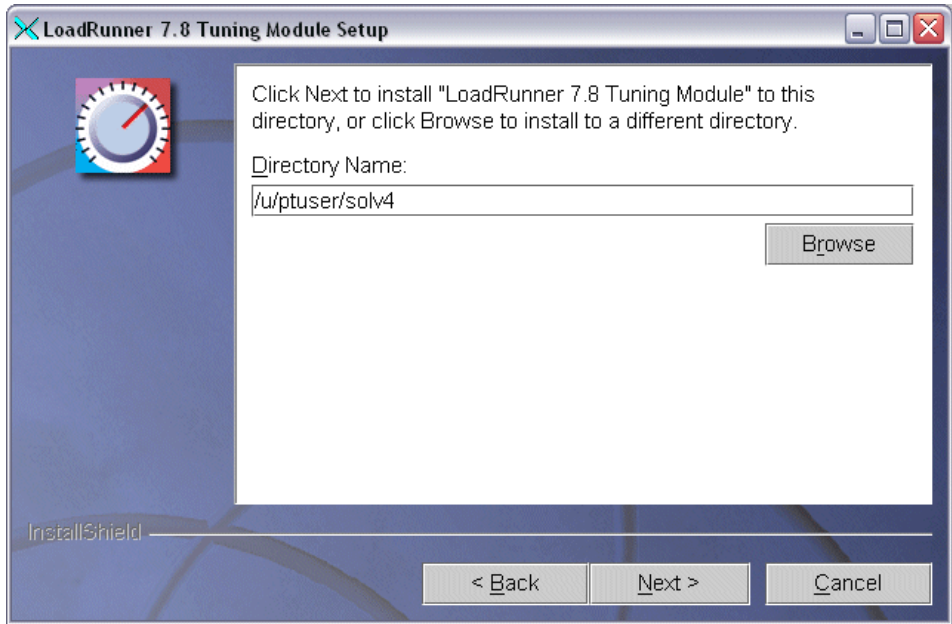
1 Type:

install.sh

The installation program begins and displays the license agreement.

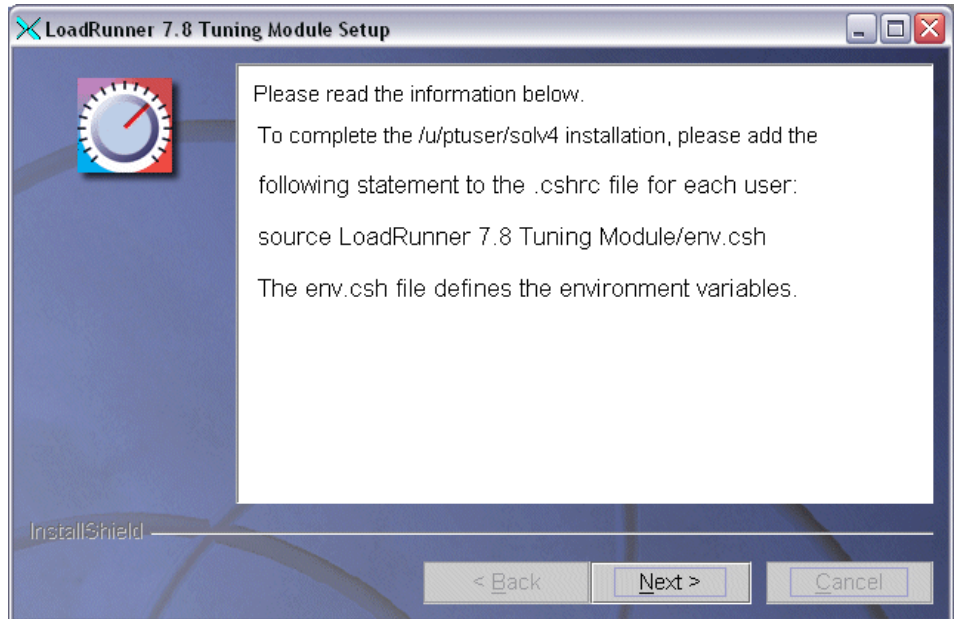


- 2 Read the agreement and select the option to accept it. The LoadRunner Tuning Module installation program begins and displays the installation location dialog box.



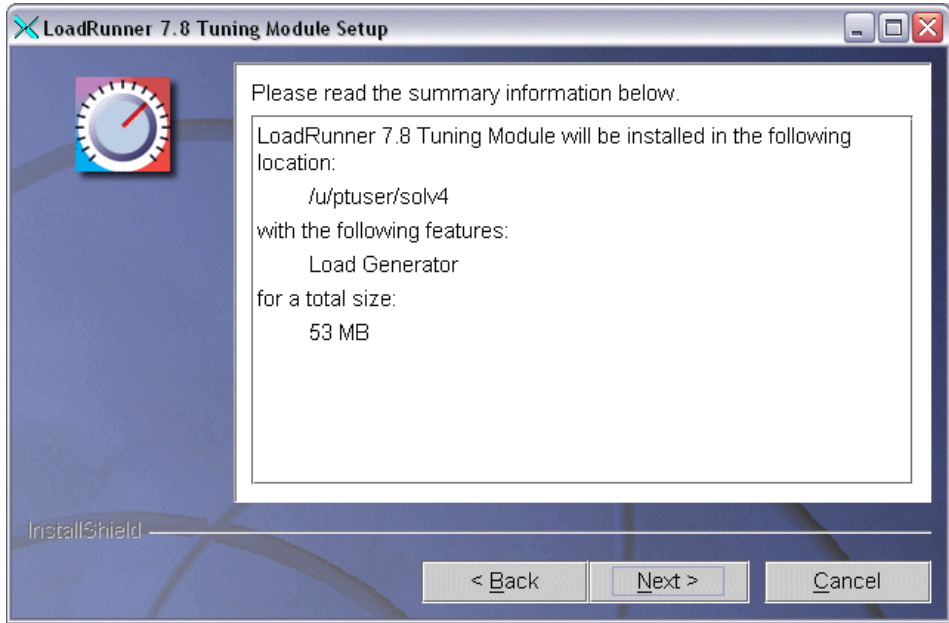
Choose the location where you want to install LoadRunner Tuning Module. To select a different location, click **Browse**, choose a directory, and click **OK**. Click **Next**.

- 3 A read-only dialog box with your installation settings appears.



To select different installation settings, click **Back**. To begin installation, click **Next**. The installation process begins.

- 4 At the end of the installation, a message appears about setting the LoadRunner Tuning Module environment variables. The next step outlines this procedure. First complete the automatic installation by clicking **Next**, and then clicking **Finish** in the screen that follows this message.



- 5 The installation process prepared a file called *env.sh* that contains environment variable definitions for your cshell environment. Open the *.cshrc* file for each LoadRunner Tuning Module user and add the following statement:

```
source /opt/TuningModule/env.sh
```

where */opt/TuningModule* is the LoadRunner Tuning Module installation directory.

Bourne shell and kshell users should refer to Chapter 7, “Post Installation” for instruction on modifying the *.profile* file.

- 6 Bring up a new terminal to run the *.cshrc* file. For more information about *.cshrc* files, see Chapter 7, “Post Installation.”

- 7 Be sure to run *verify_generator* to verify your Vuser installation. This is a confirmation step, to ensure that the specified directory and device name are correct, and that you have sufficient disk space. For information about the tests performed by *verify_generator*, see Chapter 8, “Verifying Your Installation.”

Preparing to Install from a CD-ROM (IBM only)

When installing LoadRunner Tuning Module on an IBM platform, you must mount the CD-ROM drive to access the installation program.

To mount the CD-ROM drive:

- 1 Insert the CD-ROM into the drive and log in or *su* as root.
- 2 Create the LoadRunner Tuning Module installation directory by typing:

```
mkdir -p /usr/cdrom/lrun
```

- 3 To add a CD-ROM file system, you need to use SMIT. To enter the program, type:

```
smit storage
```

- 4 From within SMIT, select **File Systems**.
- 5 Select **Add/Change/Show/Delete File Systems**.
- 6 Select **CD ROM File Systems**.
- 7 Select **Add a CDROM File System**.
- 8 Choose a DEVICE name. Note that device names for CD-ROM file systems must be unique.
- 9 Type in the following MOUNT POINT:

```
/usr/cdrom/lrun
```

- 10 Select the **Do** command, or click enter if you are using the ASCII interface.

11 Quit the SMIT program.

12 Type the following command in order to mount the CD-ROM file system:

```
smit mountfs
```

13 For the FILE SYSTEM Name, select either `/dev/cd0` or `/dev/cd1`.

14 Select the mount directory:

```
/usr/cdrom/lrun
```

15 Select `cdarfs` to set the TYPE of file system.

16 Select **Yes** to mount as a READ-ONLY system.

17 Select **Do** or **Enter** if you are using the ASCII interface.

18 Close your connection as the root user.

Running the Uninstall Program

The uninstall program, like the installation program, uses a Java Runtime Environment (JRE). You can also run the uninstall program in UI mode, or in console mode. To run the program in console mode, add the `console` parameter to the end of the command line.

To run the LoadRunner Tuning Module uninstall program:

1 To access the program, type:

```
cd <installation directory>/_uninst
```

2 Type:

```
uninstall.bin [-console]
```


7

Post Installation

After installing LoadRunner Tuning Module, prior to starting work, you should check that your environment is configured properly.

This chapter discusses:

- ▶ Setting Environment Variables
- ▶ Checking Authorizations
- ▶ Sample `.cshrc` and `.profile` Files

After you complete the post-installation configurations, run the LoadRunner Tuning Module verification utility to check your installation. For more information, see Chapter 8, “Verifying Your Installation.”

Setting Environment Variables

The LoadRunner Tuning Module installation procedure created a file, `env.sh` which sets the environment variables. Rather than manually updating your `.cshrc` file with the variable definitions, you include a statement to access `env.sh` at the end of the `.cshrc` file. This section describes the environment variables in your `env.sh` file. Note that if you are working with kshell or Bourne shell, you should manually set these variables in your `.profile` file. The syntax in the examples below are for cshell users. For kshell and Bourne shell users, see “LoadRunner Tuning Module Settings in the `.profile` File” on page 50.

- ▶ `M_LROOT`
- ▶ `PATH`
- ▶ `LD_LIBRARY_PATH` (Solaris, Linux), `LIBPATH` (AIX), `SHLIB_PATH` (HP-UX)

M_LROOT: Set M_LROOT to the LoadRunner Tuning Module installation directory. For example:

```
setenv M_LROOT /tools/LoadRunner_Tuning_Module
```

PATH: The location of LoadRunner Tuning Module's executable programs, the *bin* directory, must be added to the PATH variable.

```
set path = ($path $M_LROOT/bin)
```

LD_LIBRARY_PATH: The path should include the location of LoadRunner Tuning Module's dynamic libraries (\$M_LROOT/bin). To set the path, type:

```
setenv LD_LIBRARY_PATH ${LD_LIBRARY_PATH}:$M_LROOT/bin
/*Solaris and Linux*/
setenv SHLIB_PATH ${SHLIB_PATH}:$M_LROOT/bin/*HP Platforms */
setenv LIBPATH "${LIBPATH}:$M_LROOT/bin" /*IBM Platforms */
```

Check the dynamic libraries used by your application, and make sure that their path is also included in the appropriate dynamic library path environment variable (LD_LIBRARY_PATH, SHLIB_PATH or LIBPATH).

To check the dynamic libraries used by your application, type:

```
ldd my_application /* Sun and Linux platforms */
chrtr my_application /* HP platforms */
dump -H my_application /* IBM platforms */
```

Note: Remember that in order to use Oracle73, you need to add the path Oracle73 libraries to the dynamic libraries path environment variable.

Checking Authorizations

In order to execute Vusers on remote hosts, you must be authorized to execute a *remote shell*. To check your permissions on a host, type:

- For Solaris, Linux and IBM platforms:

```
rsh hostname ls
```

- For HP platform:

```
remsh hostname ls
```

If you do not have permission, consult the *.rhosts* file (man *rsh* or *remsh*).

Sample .cshrc and .profile Files

LoadRunner Tuning Module Settings in the .cshrc File

The following is an example of LoadRunner Tuning Module settings within a user's *.cshrc* file:

```
# LoadRunner Tuning Module settings #
#Chooses a path based on the location of the machine dependent LoadRunner
Tuning Module installation

switch ("uname")
  case SunOS:
    setenv M_LROOT {replace with LoadRunner Tuning Module Solaris
installation path}
    setenv LD_LIBRARY_PATH ${LD_LIBRARY_PATH}:${M_LROOT}/bin
    breaksw

  case HP-UX:
    setenv M_LROOT {replace with LoadRunner Tuning Module HP-UX
installation path}
    setenv SHLIB_PATH ${M_LROOT}/bin ${SHLIB_PATH}
    breaksw
```

```
case Linux:
    setenv M_LROOT {replace with LoadRunner Tuning Module SunOs
installation path}
    setenv LD_LIBRARY_PATH ${LD_LIBRARY_PATH}:${M_LROOT}/bin
breaksw

case AIX:
    setenv M_LROOT {replace with LoadRunner Tuning Module AIX installation
path}
    setenv LIBPATH ${M_LROOT}/bin:${LIBPATH}
    breaksw
endsw

set path = ($M_LROOT/bin $path)

# End LoadRunner Tuning Module setting #
```

LoadRunner Tuning Module Settings in the .profile File

The following is an example of LoadRunner Tuning Module settings within a user's .profile file for kshell and Bourne shell environments:

```
# LoadRunner Tuning Module settings #
#Chooses a path based on the location of the machine dependent LoadRunner
Tuning Module installation

case "$(uname)" in
    SunOS)
        M_LROOT={replace w/ LoadRunner Tuning Module Solaris installation path}
; export M_LROOT
        LD_LIBRARY_PATH=${M_LROOT}/bin ; export LD_LIBRARY_PATH
        ;;

    HP-UX)
        M_LROOT={replace w/ LR HP-UX installation path} ; export M_LROOT
        SHLIB_PATH=${M_LROOT}/bin ; export SHLIB_PATH
        ;;
```

```
AIX)
    M_LROOT={replace w/ LoadRunner Tuning Module AIX installation path} ;
export M_LROOT
    LIBPATH=${M_LROOT}/bin ; export LIBPATH
;;

Linux)
    M_LROOT={replace w/ LoadRunner Tuning Module Linux installation path}
; export M_LROOT
    LD_LIBRARY_PATH=${M_LROOT}/bin; export LD_LIBRARY_PATH
esac

PATH=${M_LROOT}/bin:${PATH}; export PATH

# End LoadRunner Tuning Module setting #
```


8

Verifying Your Installation

The LoadRunner Tuning Module has a setup verification utility *verify_generator*, that checks the LoadRunner Tuning Module setup. It checks environment variables and your *.cshrc* file to verify that they are set up correctly. The *verify_generator* utility checks the remote Vuser hosts.

It is strongly recommended that you run *verify_generator* after a Vuser installation, before attempting to invoke the Tuning Module.

The *verify_generator* Test

The utility checks the following items in the Vuser environment:

- at least 128 file descriptors
- proper *.rhost* permissions: *-rw-r--r--*
- the host can be contacted using *rsh* to the host. If not, checks for the host name in *.rhosts*
- *M_LROOT* is defined
- *.cshrc* defines the correct *M_LROOT*
- *.cshrc* exists in the home directory
- the current user is the owner of the *.cshrc*
- a LoadRunner Tuning Module installation does exist in *\$M_LROOT*
- the executables have executable permissions
- *PATH* contains *\$M_LROOT/bin*, and */usr/bin*
- the *rstatd* daemon exists and is running

verify_generator Option

The `verify` utility checks the local host for its communication parameters and its compatibility with all types of Vusers. If you intend to run all of the Vusers on one host, type:

```
verify_generator
```

`verify_generator` either returns 'OK' when the setting is correct, or 'Failed' and a suggestion on how to correct the setup.

The syntax of `verify_generator` is as follows:

```
verify_generator [-v]
```

-v

Provides detailed information about the checks.

Part III

Installing and Uninstalling Tuning Agents

9

Installing and Uninstalling Tuning Agents

This chapter explains how to install and uninstall a tuning agent on a host machine. You can install a tuning agent via the installation procedure or by copying files from the LoadRunner Tuning Module CD to the host machine.

Installing a Tuning Agent via the Installation Procedure

- 1 Insert the LoadRunner Tuning Module CD in a drive on the host machine and run the installation procedure.
- 2 Choose the **Tuner Agent** action in the installation procedure.

Installing a Tuning Agent by Copying Files

On a Windows host:

- 1 Extract the `perfagent.tar` file (located in the `\LoadRunner Tuning Module\console\bin` directory) to a directory (for example, to `C:\Program Files\Mercury Interactive\Performance Expert`).
- 2 Set the `PE_HOME` environment variable (in this example, `PE_HOME = C:\Program Files\Mercury Interactive\Performance Expert`).
- 3 Launch the tuning agent batch file. In this example, you would run the following file:

```
C:\Program Files\Mercury Interactive\Performance Expert\agent\bin\pe_agent.bat
```

You can skip step 2 by passing the path to the installation directory to `pe_agent.bat` in the command line, as in the following example:

```
% pe_agent.bat 0 true C:\Program Files\Mercury Interactive\Performance Expert
```

On a UNIX host:

- 1** Copy the `perfagent.tar` file (from the `\LoadRunner Tuning Module\console\bin` directory on the Windows machine where the Console is installed) to a directory on the UNIX machine (for example, to `/usr/local/perfexpert`), and extract it to that directory.
- 2** Set `PE_HOME` environment variable (in this example, `setenv PE_HOME /usr/local/perfexpert -- for CSH, ...`)
- 3** Launch the tuning agent batch file. In this example, you would run the following file:

```
/usr/local/perfexpert/agent/bin/pe_agent
```

You can skip step 2 by passing the path to the installation directory to `pe_agent` in the command line, as in the following example:

```
% pe_agent 0 true /usr/local/perfexpert
```

Uninstalling a Tuning Agent

The way you remove a tuning agent from a server depends on the way it was originally installed.

If you installed the tuning agent from the CD:

- Select **Start > Programs > Performance Expert > Uninstall Performance Expert Installation** and follow the onscreen instructions.

If you installed the tuning agent remotely from the Console machine, or by copying files from the Console machine to the remote machine:

- 1** Stop the tuning agent (refer to the chapter “Configuration Tab Functions” in the *LoadRunner Tuning Module Console User’s Guide*).
- 2** On the host machine, delete the tuning agent files from the appropriate location:
 - On a Windows machine, delete the directory `C:\Mercury Interactive\Performance Expert\agent`. If you don’t find the files there, you can find their location by checking the `PE_HOME` environment variable. Then delete the `PE_HOME` environment variable.
 - On a UNIX machine, delete the directory `/tmp/perfexpert`.

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Mercury Interactive Corporation
1325 Borregas Avenue
Sunnyvale, CA 94089
Tel. (408)822-5200 (800) TEST-911
Fax. (408)822-5300

Main Telephone: (408) 822-5200
Sales & Information: (800) TEST-911, (866) TOPAZ-4U
Customer Support: (877) TEST-HLP
Fax: (408) 822-5300

Home Page: www.mercuryinteractive.com
Customer Support: support.mercuryinteractive.com



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