



LoadRunner

Software Version: 12.60-12.63

Installation Guide

Go to **HELP CENTER ONLINE**

<http://admhelp.microfocus.com/lr/>

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Welcome to LoadRunner

Welcome to the LoadRunner Installation Guide.

LoadRunner, a tool for performance testing, stresses your application to isolate and identify potential client, network, and server bottlenecks.

This guide describes how to install and set up LoadRunner.

LoadRunner Help Center

For context sensitive help within the LoadRunner products, click F1 within a dialog box or use the Help menu.

You can access the LoadRunner Help Center on the web (<https://admhelp.microfocus.com/lr/>), or use the locally installed Help Center. To switch between online and local modes, select **Help > Help Center Options > Open Online** or **Open Locally**.

Note:

- To view the Help Center in Internet Explorer or within VuGen, you need to enable JavaScript (Active scripting) in your browser settings (**Tools > Options > Security > Internet > Custom Level**).
- If the online Help Center is unavailable at the start of a LoadRunner application session, the **Open Online** option may be disabled during the whole session with that application.

Accessing PDF Files

To access LoadRunner Help in PDF format:

- In Windows operating systems prior to Windows 8: After installing LoadRunner, click **Start > All Programs > Micro Focus > LoadRunner > Documentation** and select the relevant document.
- In icon-based desktops such as Windows 8, search for **Guide** and select the appropriate user guide.

Useful Links

The following online resources provide more information for LoadRunner users:

Resource	URL
Help Center	LoadRunner Help Center (select the relevant version)

Resource	URL
Software Site	https://www.microfocus.com/
Software Support	https://software.microfocus.com/en-us/software/customer-technical-support-services
Knowledge Base and Manuals Library	https://softwaresupport.softwaregrp.com/group/software-support/
Community Forums	https://community.softwaregrp.com/t5/LoadRunner-Performance-Center/ct-p/sws-LoadRunner
Blogs	https://community.softwaregrp.com/t5/LoadRunner-and-Performance/bg-p/sws-585#.WkNITt-WZaQ
Resources Site	https://software.microfocus.com/en-us/resources/loadrunner
Integrations and Solutions	https://community.softwaregrp.com/
Twitter	https://twitter.com/hashtag/Loadrunner
LinkedIn	https://www.linkedin.com/groups/1879289
Facebook	https://www.facebook.com/groups/MFLoadRunner/

LoadRunner Components

The LoadRunner **full** installation includes the following components:

- **Virtual User Generator (VuGen).** LoadRunner's tool for creating virtual user (Vuser) scripts, primarily through recording. Vuser scripts emulate users without a graphical user interface by using direct function calls.
- **Controller.** Controls the execution of scenarios and Vusers. Includes the online monitors which monitor and display information about the test execution. The Controller must be installed on the computer used to control the Vusers.
- **Analysis.** Graphs and reports for analyzing the load test.
- **Load Generator.** Component for running Vusers (including Windows-based GUI Vusers) to generate load. The load generator can be installed on Windows or Linux platforms, using the installer or via Docker.
- **MI Listener Component.** Component for the MI Listener machine used in running Vusers and monitoring over the firewall. For more information, refer to the "Working with Firewalls in LoadRunner" in the [LoadRunner Help Center](#) (select the relevant version).
- **Monitors over Firewall.** Component on the agent machine for monitoring over the firewall. For more

information, refer to "Working with Firewalls in LoadRunner" in the [LoadRunner Help Center](#) (select the relevant version).

- **TruClient.** Component for recording and developing test scripts for web-based applications. For more information, see the [TruClient Help Center](#) (select the relevant version).

All of the standalone installations (for example, for VuGen or the load generator) can be found in the LoadRunner installation package's **Standalone Applications** folder.

All of the additional components (such as the Citrix Agent and so on) can be found in the installation package's **Additional Components** folder.



Tip: You can also download VuGen, TruClient, TruWeb, VTS, and more, for free from [ADM Marketplace](#).

Help Improve LoadRunner

You can help us improve the quality, reliability, and performance of LoadRunner by participating in the VuGen improvement program. When you join the program, LoadRunner collects anonymous information about your software and hardware configuration, and about how you use LoadRunner.

LoadRunner does not collect any personally identifiable information, or any information about your company environment or the code of your scripts.

You can join the program by selecting the **Participate in VuGen improvement program** check box included in the initial LoadRunner or VuGen Setup window, displayed at the beginning of installation.

You can also join or leave the improvement program from within VuGen. Select **Tools > Options > General > Usage Data Collector**.

System Requirements

This chapter includes:

- [System Requirements](#) 8
- [Prerequisite Software for Installation on Windows](#) 8
- [Installation Notes and Limitations](#) 9

System Requirements

The system requirements necessary for running LoadRunner on a Windows system, or for running a load generator on a Windows or Linux system, are listed in the [System Requirements](#).

System requirements for other related components:

- **Diagnostics:** For system requirements, see Diagnostics system requirements at <https://softwaresupport.softwaregrp.com/km/KM02816022>.
- **Network Virtualization:** For system requirements and installation instructions, see the [Network Virtualization for LoadRunner and Performance Center Help](#) (select the relevant version) or the Network Virtualization installation guide in the **<LoadRunner installation package>\Additional Components\Network Virtualization** folder. You can install Network Virtualization during the LoadRunner installation, or at a later time.

Prerequisite Software for Installation on Windows

Before installing LoadRunner, make sure the prerequisite software is installed on the LoadRunner machine. Some of the prerequisite software is automatically detected and installed by the installer; other prerequisite software must be installed manually.

- [Automatically detected and installed by the installer](#)
- [Manual installation for Windows updates](#)

Automatically detected and installed by the installer

When you run the installation wizard, the wizard detects which prerequisite software is already installed on the machine and which software is missing. When you continue with the installation, all missing prerequisite software is installed.

The following prerequisite software must be installed:

- Microsoft Windows Installer 3.1
- Windows Imaging Component. This is a prerequisite for .NET Framework 4.0
- .NET Framework 4.6.2
- Microsoft Core XML Services (MSXML) 6.0
- Microsoft Visual C++ 2015 Redistributable Package - x86 and x64

Note:

- If Visual C++ 2017 Redistributable is already installed Visual C++ 2015 Redistributable will not be installed. Visual C++ 2017 Redistributable should be compatible in most cases. For more details, see the [Microsoft documentation](#).
- If installation of Visual C++ 2015 Redistributable Update 3 fails, install [KB2999226](#) manually.

- Microsoft Data Access Components (MDAC) 2.8 SP1 (or later)

Manual installation for Windows updates

Before installing any of the LoadRunner components, make sure that the full set of Windows updates has been installed. If this was not done automatically, you must install them manually.

Note: Before installing any of the Windows updates, disable UAC (User Account Control) and restart the computer. For details on how to disable UAC, see the [Microsoft Windows documentation](#).

You can find the list of Windows updates in the [System Requirements](#).

Installation Notes and Limitations

Note: See the LoadRunner Readme for additional notes and limitations.

Security review	We strongly recommend that you install LoadRunner components on dedicated machines that do not contain, or provide access to, sensitive information; and that you do a thorough security review of the network topology and access levels in your testing environment.
Permission requirements	The Installation process for all LoadRunner components, requires a full administrator account (root account for Linux systems) for all operating systems. After installation, all of the LoadRunner applications and components can run under a standard user account (an administrator account is not required), with UAC and DEP enabled.

<p>Running Web Services Vusers on Windows</p>	<p>If you are installing a standalone load generator on a Windows 8.1 or Windows 2012 (R2) machine, and you intend to run Web Services Vusers, .NET 3.5 must be turned on, and WSE 2.0 SP3 and WSE 3.0 must be installed.</p> <ol style="list-style-type: none">1. Turn on .NET 3.5 Windows. (See MSDN for details.)2. Install the WSE components from the LoadRunner installation package's folders—lrunner\Common\wse20sp3 and lrunner\Common\wse30)—or download these components from the Internet: WSE 2.0 SP3: https://www.microsoft.com/en-us/download/details.aspx?id=23689 WSE 3.0: https://www.microsoft.com/en-us/download/details.aspx?id=14089
<p>LoadRunner and UFT coexistence</p>	<p>If you install LoadRunner and UFT on the same machine, and then uninstall one of them, the remaining software program may not function correctly.</p> <p>Resolution: Run a Repair of the software program you want to use on the machine.</p>
<p>Virtual environments</p>	<p>The architectures provided by virtualization vendors are rapidly evolving. LoadRunner is expected to function as designed in these changing environments, as long as the third-party vendor guarantees full compatibility of the virtualized environment with the LoadRunner-approved hardware requirements. If you follow the system requirements and support matrix to create the virtual machine, LoadRunner will work correctly.</p> <p>Working on top of a virtual machine may require access to the virtualization server hardware/monitoring environment, to ensure the virtualization server is not saturated; otherwise, this might obscure the virtual machine's measurements and lead to false results.</p>

Installing LoadRunner on Windows

This chapter describes how to install either the full version of LoadRunner or a LoadRunner component on a Windows platform.

Note: You can install the Windows load generator using the installer (UI based or silent), as described in this section, or through a Docker container—for more information, see [Deploy Dockerized Load Generators on Linux](#).

This chapter includes:

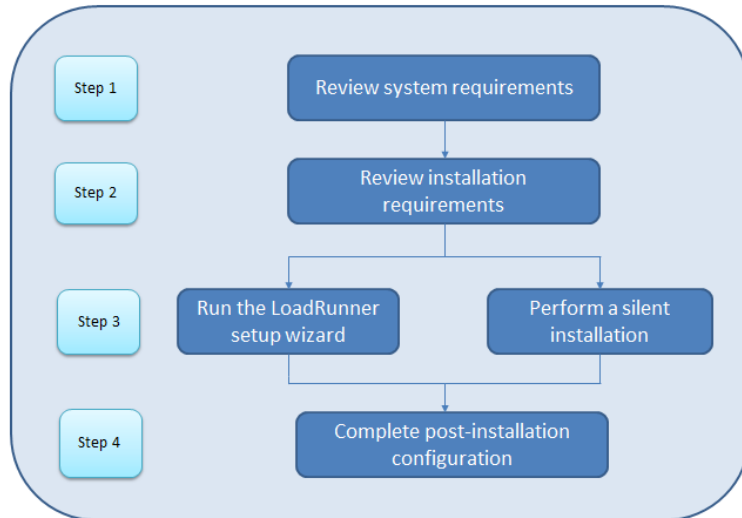
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Installation Workflow

Your LoadRunner installation package includes a setup wizard that guides you through the process of installing the LoadRunner components.

The final stage of the installation includes the optional installation of Network Virtualization. Installing Network Virtualization enables you to generate the NV Insights report (replaces the NV Analytics report) from LoadRunner. The NV Insights report provides an in-depth analysis of how your application performs with different loads over various types of networks (virtual locations) and includes suggestions for optimizing your application's performance.

Installing LoadRunner on a Windows system involves the steps shown below:



1. Review system requirements

Before you install LoadRunner, make sure that your system meets the hardware and software requirements. For details, see [System Requirements](#).

Prerequisite software: When you run the LoadRunner installation wizard, the wizard detects which prerequisite software is already installed on the machine and which software is missing. When you continue with the installation, all missing prerequisite software is installed. For details, see [Prerequisite Software for Installation on Windows](#).

2. Review installation requirements

Before you begin the installation, make sure you meet the following installation requirements:

- You must have full local administrative rights on the designated machine.
- Installation must be performed at the destination machine. LoadRunner does not support installation via terminal service.
- For the full list of components that can be installed on the same physical machine at the same time, see the [System Requirements](#).

Note: It is recommended that you close all anti-virus applications, such as McAfee or Aladdin's eSafe, before installing LoadRunner.

3. Perform the installation

- a. If you were working with a previous version of LoadRunner, review the upgrade instructions. For details, see [Upgrade to LoadRunner 12.63](#).
- b. Run the setup wizard to install the full version of LoadRunner, LoadRunner standalone components, or additional components on a Windows system. For details, see [Install LoadRunner on Windows](#).

Then run any patch installations if necessary.

To perform a silent installation, see [Install LoadRunner Silently](#).

- c. After you complete the LoadRunner installation, you can install a localized version to view the LoadRunner, VuGen Standalone, and Analysis Standalone user interface in your local language. For details, see [Install a LoadRunner Language Pack](#).

4. Complete post-installation configuration

- Configure LoadRunner to run Vusers on a load generator machine without the need to log on manually. For details, see [Configure User Login Settings](#).
- Manage LoadRunner licenses. For details, see [Managing Licenses](#).

Install LoadRunner on Windows

This section describes how to install LoadRunner on Windows using the setup wizard.

For details on how to perform a silent installation, see [Install LoadRunner Silently](#).

Installation Wizard Information

Review the following information to help you successfully install your LoadRunner component.

- Load Generator standalone can be installed on a local machine, or provisioned in a cloud account. See the *LoadRunner User Guide* for information on managing load generators on the cloud.
- During installation, you can select the **Start LoadRunner Agent after installation** option, which starts the LoadRunner Agent on the load generator immediately after installation. The Agent enables communication between the load generator and the Controller. For more details on the LoadRunner Agent, see the *LoadRunner User Guide*.
- During the installation of **Load Generator** standalone, **MI Listener**, or **Monitors over Firewall** components, the setup wizard prompts you to select whether you want the installed agent to run in LoadRunner mode or Performance Center mode. The differences are as follows:

LoadRunner mode	Performance Center mode
The agent runs as a regular process.	The agent runs as a service under a special account named IUSR_METRO . This is a local Windows account, created during the installation process in Performance Center mode. (Some additional Performance Center configuration is also added on the Load Generator standalone machine.)
You must log in to the computer before the process can start.	As a service, the agent is launched automatically when the operating system starts.

- If you are installing Load Generator standalone for use with Business Process Monitoring (BPM), select LoadRunner mode unless you have a specific requirement to run the agent as a service.

- In LoadRunner/BPM mode you can delete the IUSR_METRO account using the Windows **Local Users and Groups** console. Deleting IUSR_METRO in LoadRunner/BPM mode will not affect functionality.
- In Performance Center mode, you can delete the IUSR_METRO account only if the Performance Center system user was configured to a different Windows account; otherwise the host will not function correctly.
- During installation of **LoadRunner Full Setup, Load Generator, Monitor over Firewall, and MI Listener**, you can optionally install CA and TLS (SSL) certificates for LoadRunner by selecting the **Specify a certificate that will be used by the LoadRunner Agent** option. These certificates are used for authentication and secure communication respectively. Both certificates should be in *.cer (X.509) format.
 - CA certificate: You can enter the path to an existing certificate, or leave it blank to skip the step. If you want to install the CA certificate, it should be generated in advance.
For details about generating a CA certificate, see the section about configuring secure communication in the *LoadRunner User Guide*.
 - TLS certificate: You can select it from an existing certificate file. Alternatively, it can be generated automatically if you provide the CA certificate containing the private key.
For more information about working with certificates in LoadRunner, see the section about Secure Communication in the *LoadRunner User Guide*.

Running the Installation

The following procedure guides you through the Windows installation process.

To install LoadRunner or an additional component:

1. Before installing:
 - Review the pre-installation information, including the system requirements and prerequisite software, described in [System Requirements](#).
 - If you plan to install Network Virtualization, make sure that your system meets the requirements, as described in the [Network Virtualization for LoadRunner and Performance Center Help](#) (select the relevant version), or in the NV installation guide which can be downloaded from the **\Additional Components\Network Virtualization** folder of your LoadRunner installation package. (You can install Network Virtualization during the LoadRunner installation, or at a later time.)

Note: If you install Network Virtualization as part of the LoadRunner Windows installation, you may need to restart the machine after setup.

- Make sure you have full, local administrative rights on the designated machine.
 - Make sure the Windows Update process is not running.
2. Perform the following on the installation machine:

- Uninstall any previous Shunra version.
- Disable UAC (User Account Control) - for details, refer to your Microsoft Windows documentation.

Then reboot the machine. (Installation may fail if this is not done.)

3. To prevent DEP (Data Execution Prevention) from interfering with the installation, enable it for essential Windows programs and services only.

For details on how to change DEP settings, refer to your Microsoft Windows documentation.

4. Run the **setup.exe** file in the root folder of the installation package.

The LoadRunner installation program begins and displays the installation options.

5. Select the required installation option.

From the installation menu page, select one of the following installation options:

- **LoadRunner Full Setup.** Installs the main LoadRunner components, including Controller, Virtual User Generator (VuGen), Analysis, Load Generator, and TruClient. Use this option for the machine that runs the load testing scenarios.

Note: The LoadRunner Setup wizard can install either LoadRunner or Performance Center. Make sure to select **LoadRunner**.

For details on the components that are included in the full installation, see [LoadRunner Components](#).

- **VuGen.** Installs a standalone version of VuGen (includes TruClient).
- **Analysis.** Installs a standalone version of LoadRunner Analysis.
- **Load Generator.** Installs the components needed for running Vusers to generate load. Use this option for machines that are used to generate load only, 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 “Working with Firewalls in LoadRunner” chapter in the *LoadRunner User 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, refer to the “Working with Firewalls in LoadRunner” chapter in the *LoadRunner User Guide*.
- **TruClient.** Installs the standalone TruClient application for recording and developing test scripts for web-based applications.

Note: If you install the TruClient standalone on a machine, you cannot install any of the other LoadRunner components, except for the standalone Analysis.

To use TruClient on a LoadRunner machine, install the LoadRunner full setup, which includes the TruClient component.

- **Language Packs.** This option is available only when installing on native non-English operating

systems. Enables you to install a patch for localized LoadRunner user interface, on top of the English version. For details, see [Install a LoadRunner Language Pack](#).

- **Additional Components.** Opens the Additional Components folder located in the root folder of the installation package. For details of the additional components that you can install, see the **Advanced > Additional Components** section in the [LoadRunner Help Center](#) (select the relevant version) .
6. Specific software, for example, Microsoft Visual C++, needs to be installed before you can install LoadRunner. If the prerequisite software is not already installed on your computer, a dialog box opens displaying the list of prerequisite programs that are required.

Click **OK** to install the listed software before continuing with the LoadRunner installation. If you click **Cancel**, the LoadRunner setup wizard exits because LoadRunner cannot be installed without the prerequisite software.

Note: For the full list of prerequisite software, see [Prerequisite Software for Installation on Windows](#).

7. Perform the installation.

The LoadRunner Setup Wizard opens, displaying the Welcome page.

Follow the instructions in the wizard to complete the installation. Refer to the information in [Installation Wizard Information](#) to ensure a successful installation.

Note: The installation path for LoadRunner or LoadRunner components cannot contain non-English characters.

8. After the installation is complete, you can choose to install Network Virtualization (NV).

In the setup wizard, select:

- **Typical mode** for an automatic installation.
- **Custom mode** to change the installation folder, data folder, and the port.

For more details, see the installation section of the [Network Virtualization for LoadRunner and Performance Center Help](#) (select the relevant version), or see the NV installation guide which can be downloaded from the **\Additional Components\Network Virtualization** folder of your LoadRunner installation package.

9. If there is a patch:

- a. Run the patch installation file provided with the installation package.
- b. Follow the onscreen installation and deployment instructions.

Note:

- To repair the installation, run the **setup.exe** file located in the root directory of the LoadRunner installation package, select **LoadRunner Full Setup**, and then select the **Repair** option in the setup wizard.

- You can configure LoadRunner to run Vusers on a load generator machine without the need for the user to manually log in to the machine. For more information, see [Configure User Login Settings](#).
- For a list of the components that were registered during setup, such as **DLL** and **OCX** files, see the **RegisteredComponents_Micro Focus LoadRunner.txt** file in the **build_info** folder of the installation.

Install LoadRunner Silently

A *silent installation* is an installation that is performed without the need for user interaction. You use the command line to run the setup files. For details, see [Installation Command Line Options](#).

Note:

- Before you install LoadRunner, review the pre-installation information, including the system requirements and prerequisite software, described in [System Requirements](#).
- All machines on which you install LoadRunner require administrator privileges.
- Use standard MSI command line options to define installation properties. For example, use `INSTALLDIR` to specify an alternate installation folder.
- To prevent the LoadRunner Agent on the load generator from starting immediately after installation, add the following to the command line command: `START_LGA=0`. The Agent enables communication between the load generator and Controller. For more details on the LoadRunner Agent, see the [LoadRunner Help Center](#) (select the relevant version).

To perform a silent installation of LoadRunner

1. Run one of the following commands from the command line:

- To install all of the LoadRunner components including the prerequisite software in a single command:

```
<Installation_disk>\lrunner\<<your_language_folder>\setup.exe /s
```

- To first install all of the prerequisites, and then LoadRunner, run the following commands:

```
<Installation_disk>\lrunner\<<language_folder>\setup.exe  
/InstallOnlyPrerequisite /s
```

```
msiexec.exe /qn /i "<Installation_disk>\lrunner\MSI\LoadRunner_x64.msi"
```

- By default, Network Virtualization is installed during the LoadRunner installation. To facilitate

this installation, add the following to the installation command:

```
REBOOT_IF_NEED=1
```

- To prevent the installation program from installing Network Virtualization, add the following to the installation command:

```
NVINSTALL=N
```

- To install a LoadRunner standalone application:

```
<Installation_disk>\Standalone Applications\Setup<component_name>.exe /s /a /s
```

- To install additional components:

```
<Installation_disk>\Additional Components\<setup_file_path> /s /a /s
```

2. If you are installing an [upgrade](#), run the following command:

```
msiexec.exe /update <full path to msp file> [/qn] [/!*vx <full path to log file>]
```

The msp files are located in the installation package.

Installation Command Line Options

You can use the Windows command line to install the full LoadRunner package, standalone applications, and Additional Components using the Wrapper file (Setup.exe) and "Package for the web" files (<PFTW>.exe).

- The full LoadRunner installation can be launched using the Setup.exe file.
- The installations of standalone applications and additional components can be launched via PFTW files.

Installing the full LoadRunner package from the Wrapper file

You can install the full LoadRunner package from the installation wrapper file, **Setup.exe**, located in \runner\<<your_language> folder of your LoadRunner installation package. The following command line options are available:

Option	Description
/s	Runs the installation in the background (silently), with no user interaction.
/qb	Runs the installation in unattended mode, with limited user interaction.

Option	Description
/InstallOnlyPrerequisite	<p>Installs only the prerequisites – does not install any LoadRunner components.</p> <p>By default, the setup program checks that your machine has the required prerequisites, and installs them if necessary, before installing the LoadRunner components.</p>

You can set public properties for the command line installation, using the following syntax:

```
setup.exe PROPERTY_NAME="value"
```

The following properties are available:

Property name	Description
INSTALLDIR=" <i>your_path</i> "	Specifies the location where the application will be installed.
REBOOT_IF_NEED	<p>1: Reboots the machine after installation, if required. This is recommended if you include the installation of NV (Network Virtualization).</p> <p>0: Does not reboot the machine after installation.</p> <p>Default: 0</p>
NVINSTALL	<p>Empty string: Excludes the installation of the NV component.</p> <p>Y: Includes the installation of the NV component.</p> <p>Default: Y</p>
INSTALL_NV_MODE	<p>1: Sets the NV installation mode to Typical.</p> <p>2: Sets the NV installation mode to Custom.</p> <p>Default: Typical</p>
INSTALL_DIR=" <i>your_path</i> "	Specifies a path for the installation.
START_LGA	<p>Empty string: Instructs the machine not to start the Load Generator after installation.</p> <p>1: Instructs the machine to start the Load Generator after installation.</p> <p>Default: 1</p>

Property name	Description
IS_RUNAS_SERVICE	0: Runs the Load Generator's agent as a process. 1: Runs the Load Generator's agent as a service. Default: 1
IMPROVEMENTPROGRAM	0: Disables the VuGen Improvement Program. 1: Enables the VuGen Improvement Program. Default: 1

Example: The following command performs the installation silently and then reboots the machine if necessary:

```
DVD\lrunner\en\setup.exe /s REBOOT_IF_NEED="1"
```

Installing a Standalone Application or an Additional Component from a PFTW file

You can install a LoadRunner standalone application or one of the additional components, via the PFTW (Package for the web) files that are included with the LoadRunner installation media. The installation files are located under the **Standalone Applications** or **Additional Components** folders on the installation media. You can double-click on the packaged file or run it from the command line, using the following options:

Option	Description
/s	Runs the installation in the background (silently), with no user interaction.
/e	Only extracts the installation files; does not run them.
/f	Specifies the path of a temporary folder for file extraction. For example: /f "c:\my_temp_folder" If you leave out this option, the default temporary folder is used.
/a	Allows you to pass parameters or properties to the autorun file, such as setup.exe. Use the properties defined above for the Setup.exe file.

Example: The following command silently runs a Load Generator setup, installs the application in a specified folder, and starts the Load Generator agent after the installation:

```
SetupLoadGenerator.exe /s /a INSTALLDIR="c:\Micro Focus\LGSA" START_LGA="1"
```

Deploy Dockerized Load Generator on Windows

This section describes how to run a Dockerized load generator on a Windows platform.

Docker is a platform that allows you to develop, ship, and run applications via a container. For details regarding Docker, see <https://docs.docker.com>.

Note:

- The load generator for Docker on Windows feature is provided as a tech preview version, for Web - HTTP/HTML and Java protocols.

Prerequisites

- Install Docker on the target machine, along with its dependencies, and set up the target machine environment as required. Currently, only the 64-bit version is supported. For installation details, see <https://docs.docker.com/install/>.
- Pull the Windows load generator Docker image (tech preview version) from the Docker hub, [Windows Dockerized Load Generator](https://hub.docker.com/r/performance-testing/load_generator_windows/) (https://hub.docker.com/r/performance-testing/load_generator_windows/), using the following command and appropriate **<tag version number>**, for example, 12.60:

```
docker pull performance-testing/load_generator_windows:<tag version number>
```

Run a Dockerized load generator using the predefined image

Use the ready-to-use image to run a load generator on Docker for Windows.

Note: If you need customization for your container, for example, for Java or to run under a specific user, see [Run a Dockerized load generator using a custom image](#).

To run a Dockerized load generator:

Run the load generator container using the following command:

```
docker run -id -p <host_port>:54345 performance-testing/load_generator_windows:<tag version number>
```

Note: Check that the `<host_port>` on the machine is available and allows incoming requests. You

will specify this port on the Controller side when connecting to this load generator.

Run a Dockerized load generator using a custom image

If your environment requires customized settings for running the container, you can create a Dockerfile to build a custom image for Docker on Windows.

Examples for custom images:

- To use a specific user account for the processes under which the Vusers are running, to provide support for accessing network resources like script parameter files. After running, the container should be able to verify the user.
- To run Java protocols on Windows load generator containers.
- To define environment variables for proxy server host and port.

To run a custom Dockerized load generator:

1. Create a new folder, and within it create a file named **dockerfile**. Paste the following **FROM** line into the file, using the appropriate LoadRunner version for the **<tag version number>**, and add the relevant customization lines:

```
FROM performancetesting/load_generator_windows:<tag version number>  
<Customization lines>
```

For customization examples, see [Examples of customized content for Dockerfiles](#)

Tip: For information on commands that can be used in Docker files, see <https://docs.docker.com/engine/reference/builder/>.

2. Save the Dockerfile.
3. Open a command line at the **dockerfile** folder path and run the following command, using the name you want for your custom image:

```
docker build -t <custom image name> .
```

4. Create a container for each load generator you want to use, by running the following command (or use any Docker orchestrator tool for running containers):

```
docker run -id -p <host_port>:54345 <custom image name>
```

If the custom image in step 3 was built with a tag then include it in the command:

```
docker run -id -p <host_port>:54345 <custom image name>:<tag version
```

```
number>
```

Note: Check that the <host_port> on the machine is available and allows incoming requests. You will specify this port on the Controller side when connecting to this load generator.

Examples of customized content for Dockerfiles

Example for Vusers under a specified user account

The following gives an example of dockerfile content for running the Vusers under a specified user account with network access to shared locations. Replace the values between <> with credentials for a valid user account in your environment, with network access to the shared resources.



Example:

```
#escape=`  
FROM performancetesting/load_generator_windows:<tag version number>  
RUN c:\LG\launch_service\bin\magentservice.exe -remove  
RUN c:\LG\launch_service\bin\magentservice -install <domain>\<user name>  
<password>
```

Example for running Java protocols

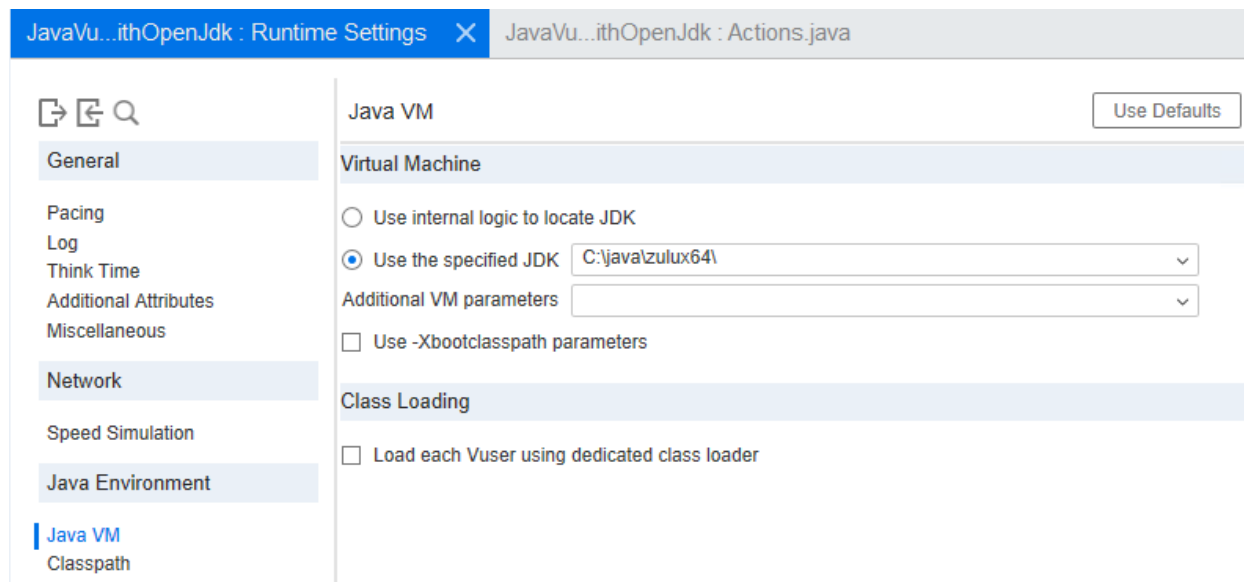
The following gives an example of dockerfile content to run Java protocols:



Example:

```
#escape=`  
FROM performancetesting/load_generator_windows:<tag version number>  
COPY .\<folder contains JDK> <target path in the container>
```

The path to the target JDK directory defined in the **COPY** line for the **<target path in the container>** must also be added to the **Java VM** runtime settings page:



Note: For Java 64-bit protocol testing, include the following command line in the dockerfile, in order to add the path to the **bin** folder for the JDK 64-bit to the machine PATH environment variable:

```
RUN powershell [Environment]::SetEnvironmentVariable(\"Path\", $env:Path +  
\";\<target JDK path in the container>\bin\", [EnvironmentVariableTarget]::Machine)
```

After Running the Load Generator Containers

Add the load generators containers to scenarios. For details, see [Configure Dockerized Load Generators](#) in the LoadRunner Help Center.

Tips and Guidelines

- Dockerized load generators, run from the predefined image, are not supported when running over a firewall.
- Use `docker ps` to list the containers that are running.
- To stop the load generator service:
 - Use `docker stop <load generator container name or ID>` if you want to reuse the same load generator.
 - Use `docker rm -f <load generator container name or ID>` in order to remove the load generator container.
- To access the host network directly, use `--net=host` in place of `-p <host_port>:54345`. We recommend you use this flag if the AUT generates a lot of network activity.

Configure User Login Settings

By default, you need to manually log on to a computer before LoadRunner can run Vusers on that computer. However, you can configure LoadRunner to run Vusers on a load generator machine without the need to manually log on to the machine.

To configure user login settings:

1. Do one of the following:
 - From the Windows Start menu, go to, **Micro Focus > LoadRunner > Tools > Agent Runtime Settings Configuration**.
 - In icon-based desktops such as Windows 8, search for **Agent** and select the **Agent Runtime Settings Configuration** item.

The LoadRunner Agent Runtime Settings dialog box opens.

2. Select one of the following options:
 - **Allow virtual users to run on this machine without user login.** LoadRunner automatically logs on to the network from the load generator machine, so the Vusers can run without any manual intervention. Enter the network domain where the user machine resides, a user name, and password.

Note: When created, the LoadRunner Agent service starts with the **LocalSystem** account (not as a specified user). The specified credentials are used by the Agent service to start the *mdrv.exe* process when you run the script.

- **Manual log in to this machine.** The user must manually log on to the network from the load generator machine for each session of running Vusers.

3. Click **OK**.

Note: You must reboot and log on to the system at least once after the LoadRunner installation before the automatic login can work.

Install a LoadRunner Language Pack

The language packs enable you to view the LoadRunner user interface in your local language. You install the language pack for the relevant LoadRunner component: LoadRunner full, VuGen standalone, or Analysis standalone from the LoadRunner installation package.

For a list of supported languages, see the [System Requirements](#).

The language packs are supported for native non-English operating systems only.

Important: The native language of the operating system must be the same as the language pack you are installing. For example, the Spanish language pack must be installed on a machine with a

native Spanish operating system.

To install a language pack:

1. Make sure that LoadRunner English is already installed.
2. In the root folder of the LoadRunner installation package, run **setup.exe**. The LoadRunner installation program begins and displays the installation options.
3. Click **Language Packs**. The Language Packs folder in the installation package opens.
4. Navigate to the folder for the language and component you want to install and run the installation file. For example, to install the French language pack on a VuGen standalone machine, the path is **..\Language Packs\French\VugenSA\Vugen_FRA.msp**. Follow the online instructions.

Upgrade to LoadRunner 12.63

LoadRunner 12.63 is a patch installed over 12.60, 12.61, or 12.62.

- **Upgrading from version 12.60, 12.61, or 12.62:** Run the patch installation file provided with the installation package. Follow the on-screen installation and deployment instructions.
The 12.63 Patch Readme (supplied with the installation package) details which components require installation of the 12.63 patch.
- **Upgrading from a version earlier than 12.60:** Install LoadRunner 12.60 as described in [Install LoadRunner on Windows](#). The installation process detects the older version, and gives you the option to upgrade or exit the installation.
Then install the 12.63 patch, as described above.

Note:

- When upgrading from version 12.55 or earlier, if you used custom certificates in your previous installation of LoadRunner, install them again when prompted for certificates during setup. Otherwise, the setup program will overwrite them using the defaults.
- When upgrading from a version earlier than 12.60: Due to changes in LoadRunner licensing in version 12.60, you need to replace your current license to enable working with the upgraded LoadRunner. To obtain and install a new license, see [Install LoadRunner Licenses](#) in the LoadRunner Help Center.
- For the silent upgrade, see [Install LoadRunner Silently](#).

Installing the Load Generator on Linux

LoadRunner uses load generators to run Vusers. There are two versions of the LoadRunner Load Generator. One version runs Vusers on Windows platforms, and the other version runs Vusers on Linux platforms. You use a Windows-based Controller to control both the Windows-based and the Linux-based Vusers.

This chapter describes how to install the Load Generator on a Linux platform. For details on how to install the Load Generator on a Windows platform, see [Installing LoadRunner on Windows](#).

Note:

- You can install the Linux load generator using the installer (UI based or silent), as described in this section, or through a Docker container—for more information, see [Deploy Dockerized Load Generators on Linux](#).
- For troubleshooting information, see [Troubleshoot the Load Generator Linux Installation](#).

This chapter includes:

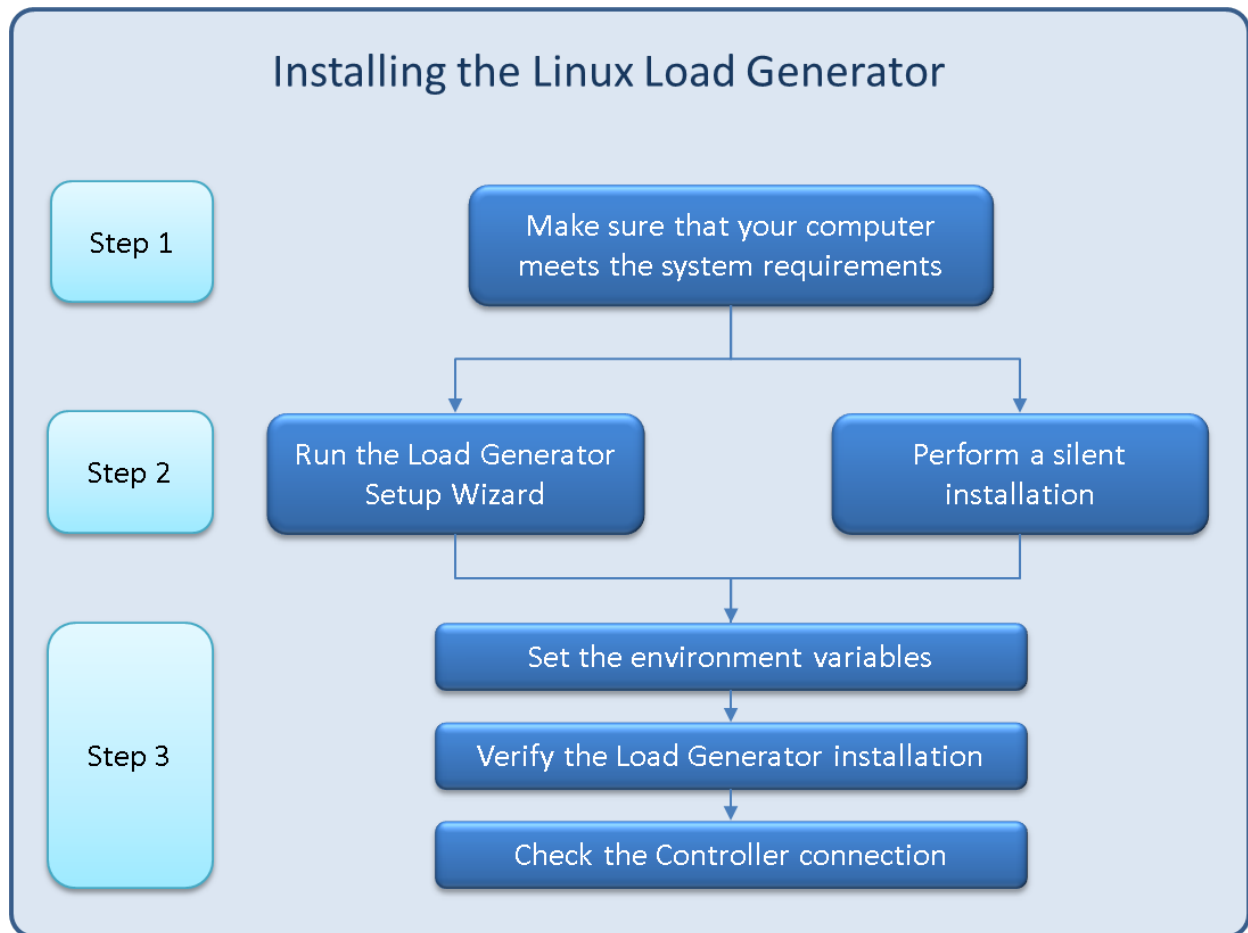
- [Installation Workflow](#) 27
- [Install a Load Generator on Linux with the Setup Wizard](#) 29
- [Silent Load Generator Installations on Linux](#) 31
- [Deploy Dockerized Load Generators on Linux](#) 31
- [Configure the Linux Environment](#) 35
- [Improve Load Generator Performance](#) 38
- [Uninstall the Load Generator from a Linux Machine](#) 40
- [Troubleshoot the Load Generator Linux Installation](#) 42

Installation Workflow

You can install the LoadRunner load generator component on a Linux platform to run Vusers. The Linux-based Vusers interact with the LoadRunner Controller, installed on a Windows platform.

The load generator can be installed on a local Linux machine, or provisioned in a cloud account. See the *LoadRunner User Guide* for information on managing load generators on the cloud.

The following diagram shows the primary steps in installing the load generator on a Linux platform using the standard installation program:



1. Review the system requirements

Before you install the load generator on a Linux platform, make sure that your system meets the requirements, as described in [System Requirements](#).

If you plan to install Network Virtualization, make sure that your system meets the requirements, as described in the [Network Virtualization for LoadRunner and Performance Center Help](#) (select the relevant version), or the NV installation guide in the **\Additional Components\Network Virtualization** folder of your LoadRunner installation package.

Note: To replay ODBC Protocol scripts on Linux machines, unixODBC v.2.3.1 or higher is required.

2. Run the setup

Note:

- It is recommended that you close all anti-virus applications, such as McAfee or Aladdin's eSafe, before installing LoadRunner.

- If Load Generator version 12.55 or earlier is installed, you must first uninstall it. For details, see [Uninstall Load Generator 12.55 or earlier](#).

- **Wizard installation:** Start the setup using the Load Generator Setup Wizard. For more information, see [Install a Load Generator on Linux with the Setup Wizard](#).
- **Silent installation:** To perform a silent installation, see [Silent Load Generator Installations on Linux](#).

3. Configure your environment

After the installation, before you can begin working with the load generator you need to configure your environment. This involves setting the appropriate environment variables, checking access to the load generator, and verifying the installation. See [Configure the Linux Environment](#).

Install a Load Generator on Linux with the Setup Wizard

This section describes how to install the load generator on a Linux platform using the setup wizard..

Note:

To perform the installation through a Docker container, see [Deploy Dockerized Load Generators on Linux](#).

To perform a silent installation, see [Silent Load Generator Installations on Linux](#).

This section includes:

- [Before you start](#)
- [Run the installation wizard](#)

Before you start

- During installation, you can optionally install CA and SSL certificates for the load generator. These certificates are used for authentication and secure communication respectively. Both certificates should be in *.cer (X.509) format.
 - For a CA certificate: You can enter the path to an existing certificate, or leave the path blank to skip the step. If you want to install the CA certificate, it should be generated in advance.
 - For an SSL certificate: You can select it from an existing certificate file. Alternatively, it can be generated automatically if you provide the CA certificate containing the private key.

For details on generating a CA certificate, see the section about creating and installing digital certificates in the *LoadRunner User Guide*.

For more information on working with certificates in LoadRunner, see the section about configuring client-server authentication in the *LoadRunner User Guide*.

Run the installation wizard

To install the load generator:

1. Switch to super user.
2. If Load Generator version 12.55 or earlier is installed on the machine, you must uninstall it manually. For details, see [Uninstall Load Generator 12.55 or earlier](#).

If you do not uninstall the load generator, you will get an error during the installation.

Tip: If Load Generator 12.56 or later is installed, the setup wizard uninstalls it during the installation process, then reinstalls it.

3. Change directory to `<path_to_installer_dvd>/load_generator_linux_x64/`.
4. Launch the setup wizard:

For:	Type:
[sh and bash shells]	<code>source ./installer.sh</code>
[csh and tcsh shells]	<code>source ./installer.csh</code>
If the source command is not supported by the current shell, use the "dot" command.	For example: <code>. ./installer.csh</code>

Note: It is recommended that you use the **source** command to run the setup wizard, as shown above. If you run the setup wizard without using this command, you must manually set the environment variables for the current shell session. For details, see [Set the Environment Variables](#).

The Load Generator Setup Wizard checks that the required prerequisite software is installed on the computer. If any prerequisite software is missing, a message is displayed, and the setup wizard aborts. Install the required package. Then rerun the setup wizard.

5. Follow the online instructions to install the load generator. For more help during installation, see [Troubleshoot the Load Generator Linux Installation](#).
6. Exit super user or switch to another user.
7. Configure your environment as described in [Configure the Linux Environment](#).

Silent Load Generator Installations on Linux

This section describes how to perform a silent installation of the load generator on a Linux machine.

Note: You must have super user privileges.

To perform a silent installation of the load generator:

1. If a load generator is installed on the machine, you must first uninstall it—otherwise the silent installation will fail. To uninstall the load generator, see [Uninstall the Load Generator from a Linux Machine](#).
2. Change directory to /<path_to_installer_dvd>/load_generator_linux_x64/.
3. Run the following command to silently install the load generator:

```
source ./installer.sh -i silent
```

Note: It is recommended that you use a **source** command to perform a silent installation, as shown above. If you perform the installation without using the **source** command, you will need to set up the environmental variables after installing the load generator. For details, see [Set the Environment Variables](#).

If the **source** command is not supported by the current shell, use the "dot" command. For example, `./installer.sh -i silent`.

If you encounter an error during the installation, see [Troubleshoot the Load Generator Linux Installation](#).

By default, the load generator will be launched at the end of the installation. If you do not want to automatically launch the load generator, add the following command-line option:

```
source ./installer.sh -i silent -DSTART_PRODUCT_AFTER_INSTALL=No
```

Deploy Dockerized Load Generators on Linux

This section describes how to run a Dockerized load generator on a Linux distribution.

Docker is a platform that allows you to develop, ship, and run applications via a container. For details regarding Docker, see <https://docs.docker.com>.

Prerequisites

- Install Docker on the target machine, along with its dependencies, and set up the target machine environment as required. Currently, only the 64-bit version is supported. For installation details, see

<https://docs.docker.com/install/>.

- Obtain the predefined load generator Docker image. Pull from the Docker hub, [Linux Dockerized Load Generator](https://hub.docker.com/r/performancecetesting/load_generator_linux/) (https://hub.docker.com/r/performancecetesting/load_generator_linux/), using the following command and appropriate **<tag version number>**, for example, 12.60:

```
docker pull performancecetesting/load_generator_linux:<tag version number>
```

Run a Dockerized load generator using the predefined image

Use the ready-to-use image to run a load generator on Docker for Linux.

Note: If you need customization for your container, for example, for proxy servers, see [Run a Dockerized load generator using a custom image](#).

To run a Dockerized load generator:

Run the load generator container using the following command:

```
docker run -id -p <host_port>:54345 performancecetesting/load_generator_
linux:<tag version number>
```

Note: Check that the `<host_port>` on the Linux machine is available and allows incoming requests. You will specify this port on the Controller side when connecting to this load generator.

Example using SSH

The following gives a simple C# code example for running multiple load generator containers using SSH. There are container orchestrator tools which do the same, for example, Kubernetes, OpenShift, Docker Swarm, and more.

```
using (var client = new SshClient(dockerHost, dockerHostUserName, dockerHostPasswd))
{
    client.Connect();
    for (int i = 0; i < numContainers; i++)
    {
        string command = "docker run -id -p " + lgInitialPort + i) + ":54345
performancecetesting/load_generator_linux:<tag version number>";
        var terminal = client.RunCommand(command);
        if (terminal.ExistStatus != 0)
        {

```



```
        throw new Exception("Failed to create new Docker container");  
    }  
    Console.WriteLine("Docker LG with external port" + lgInitialPort + i + "created.");  
}  
client.Disconnect();  
}
```

Run a Dockerized load generator using a custom image

If your environment requires customized settings for running the container, for example for proxy servers, you can create a Dockerfile to build a custom image.

Note: Another alternative for customized settings: Start the container; once it is running, set up the load generator environment variables, then start the load generator manually inside the container.

To run a custom Dockerized load generator:

1. Create a new folder, and within it create a file named **dockerfile**. Paste the **FROM** line, plus the required customization lines, into the file, using the appropriate LoadRunner version for the **<tag version number>**:

Note: This customization example is for proxy: It defines an environment variable for the proxy server host and port in the target image.

```
FROM performancetesting/load_generator_linux:<tag version number>  
ENV http_proxy http://my_proxy_name:port
```

Note: The above customization example is for a proxy. It defines an environment variable for the proxy server host and port in the target image.

2. Save the Dockerfile.
3. Open a command line at the **dockerfile** folder path and run the following command, using the name you want for your custom image:

```
docker build -t <custom image name> .
```

4. Create a container for each load generator you want to use, by running the following command:

```
docker run -id -p <host_port>:54345 <custom image name>
```

If the custom image in step 3 was built with a tag then include it in the command:

```
docker run -id -p <host_port>:54345 <custom image name>:<tag version number>
```

Note: Check that the <host_port> on the Linux machine is available and allows incoming requests. You will specify this port on the Controller side when connecting to this load generator.

After running the load generator containers

Add the load generators containers to scenarios. For details, see [Configure Dockerized Load Generators](#) in the LoadRunner Help Center.

Tips and guidelines

- Dockerized load generators, run from the predefined image, are not supported when running over a firewall. (Workaround for advanced users: You can develop your own Docker image with MI Listener support.)
- Use `docker ps` to list the containers that are running.
- To stop the load generator service:
 - Use `docker stop <load generator container name or ID>` if you want to reuse the same load generator.
 - Use `docker rm -f <load generator container name or ID>` in order to remove the load generator container.
- The Dockerfile container has an ENTRYPOINT section. The container first runs the commands in ENTRYPOINT. It sets up the environment and then starts the load generator. The command uses a While loop to wait for input, in order to keep the container from exiting. This behavior prevents you from accessing the container while it is running. Make sure to add `-i` while starting the container; otherwise the While loop will consume an excessive amount of CPU.
- If you need entry into the container, add an argument such as `--entrypoint=/bin/bash` when starting the container. After entering the container, set the load generator environments and start the load generator. You can then switch to the host using CTRL+p and CTRL+q while keeping the container running in the background. To access the container again, use the `docker attach container_id` command.
- To access the host network directly, use `--net=host` in place of `-p <host_port>:54345`. We recommend you use this flag if the AUT generates a lot of network activity.

Configure the Linux Environment

This section describes the configuration steps you need to complete after installing the load generator, before you can begin working with the load generator.

To complete the setup process after installing the load generator:

1. Set the appropriate environment variables.
See [Set the Environment Variables](#).

Note: If you used a **source** command to install the load generator, the setup wizard automatically sets the appropriate environment variables, and there is no need to perform this step.

2. Verify the load generator installation.
See [Verify the Linux Installation](#).
3. Start the load generator.

```
.cd /opt/MF/MF_LoadGenerator/;source env.csh;cd bin;./m_daemon_setup -install
```

4. Check that the Controller is able to access the load generator.
For details, see [Check Controller Connection](#).

Set the Environment Variables

Note: This topic is applicable only if you ran the Load Generator Setup Wizard without using a **source** (or "dot") command. If you used these commands, there is no need to perform any of the procedures described below.

To enable the load generator to run, the following environment variables must be defined:

- **M_LROOT.** The location of the Linux load generator root folder.
- **PATH.** The location of the Linux load generator **bin** directory.
- **PRODUCT_DIR.** The location of the Linux load generator root folder.

The Load Generator Setup Wizard performs the following tasks relating to the environment variables:

- Adds the environment variable definitions to the system-wide startup scripts.
If the variable definitions were not correctly set during the setup, see [Troubleshoot the Load Generator Linux Installation](#) for possible solutions.
- Sets environment variables for the current shell session if the **source** command was used to run the setup wizard.

This topic describes how to set the environment variables for the current shell session if a **source** command was not used to run the setup wizard.

To determine if environment variables are set, run **verify_generator** (see [Run verify_generator](#)) or use the following command:

```
echo $M_LROOT
```

If the name of the load generator root folder is returned, then the environment variables are correctly set for current shell. If the name of the load generator root folder is not returned, then manually set the variables as described below.

To manually set the environment variables for the current shell session (if the **source** command was not used to run the setup wizard), execute one of the following commands:

- Bash users:

```
source <Load Generator root>/env.sh
```

- C Shell users:

```
source <Load Generator root>/env.csh
```

Verify the Linux Installation

The load generator installation includes a setup verification utility, **verify_generator**, that checks the load generator setup on your Linux machine. The verification utility checks environment variables and your startup scripts (**/etc/csh.cshrc**, **\${HOME}/.cshrc** or **/etc/profile**, **\${HOME}/.profile**) to verify that they are set up correctly.

It is strongly recommended that you run **verify_generator** after installing the load generator, before attempting to invoke the load generator. For details on how to run the **verify_generator** utility, see [Run verify_generator](#).

The **verify_generator** utility checks the following:

- All the prerequisite software is installed. (This check is performed for 64-bit installations only.)
- There are at least 128 file descriptors
- The **.rhosts** permissions have been defined properly: **-rw-r--r--**
- The host can be contacted by using **rsh** to the host. If not, it checks for the host name in **.rhosts**
- **M_LROOT** is defined
- **.cshrc** or **.profile** defines the correct **M_LROOT**
- **/etc/csh.cshrc**, **\${HOME}/.cshrc** or **/etc/profile**, **\${HOME}/.profile** defines the correct **M_LROOT**
- **.cshrc** or **.profile** exists in the home directory
- The current user is the owner of the **.cshrc** or **.profile**
- A Linux load generator installation exists in **\$M_LROOT**

- The executables have executable permissions
- PATH contains **\$M_LROOT/bin** and **/usr/bin**

Run verify_generator

It is recommended that you run the **verify_generator** utility after installing the load generator, before attempting to invoke the load generator. For details on what is checked by the **verify_generator** utility, see [Verify the Linux Installation](#).



Note:

- To run this command, you must be a "normal" user and not root user.
- Before you run the **verify_generator** utility, make sure that you have set the DISPLAY environment variable on your machine.

To run verify_generator:

1. From the **<Load Generator root>/bin** folder, run the following command:

```
./verify_generator
```

For example:

```
/opt/MF/MF_LoadGenerator/bin/verify_generator
```

If you want to receive detailed information about the checks, you can use the **-v** option, as follows:

```
./verify_generator -v
```

2. View the results.
 - If the settings are correct, **verify_generator** returns **OK**.
 - If any of the settings are incorrect, **verify_generator** returns **Failed**, and suggestions on how to correct the setup.

Check Controller Connection

If LoadRunner Controller will connect remotely to the load generator using **rsh** (remote shell), you need to make sure that the load generator can be remotely accessed by Controller.

1. On the load generator machine, locate the **.rhosts** file which is located in the user home directory.
2. In the **.rhosts** file, verify that Controller is included in the list of machines. If it is not listed, add it to the list.

If Controller still cannot connect to the load generator, contact your system administrator.

Connecting to a Linux Load Generator without using rsh

You can configure Controller to connect to the load generator without using **rsh**. In this case, you need to activate the agent daemon on the load generator, as described below.

This section describes how to connect to a Linux load generator without using **rsh**.

1. On the Linux load generator, run the agent daemon by entering the following command from **<Load Generator root>/bin**:

```
./m_daemon_setup -install
```

This runs a daemon called **m_agent_daemon**, and if successful, you receive a message: **m_agent_daemon <process ID>**.

The agent now keeps running, even if the user is logged off. You can stop the agent by using the command explained in step 9 below, or by rebooting the machine.

Note: If you look at the **m_agent_daemon[xxx].log** log file in the temp directory, you may see communication errors, even if the installation succeeded.

2. In the Controller, select **Scenario > Load Generators**. The Load Generators dialog box opens.
3. Click **Add**. The Load Generators dialog box opens.
4. In the **Name** box, enter the name of the computer on which the load generator is running.
5. From the **Platform** list, select **Linux**.
6. Click **More**.
7. Click the **Linux Environment** tab, and make sure that the **Don't use RSH** check box is selected.
8. Connect as usual.
9. To stop the agent daemon, run the following command from the **<LoadRunner root>/bin** directory:

```
./m_daemon_setup -remove
```

This stops the **m_agent_daemon** daemon, and if successful, you receive the message: **m_agent_daemon is down**.

Improve Load Generator Performance

This section includes recommendations for improving load generator performance. You can increase the number of file descriptors, process entries, and amount of swap space by configuring the kernel.

Note: Most operating systems using the Linux load generator have sufficient default file descriptors, process entries, and swap space, and rarely require reconfiguration.

This section includes:

- [Increase File Descriptors](#) 39
- [Increase Process Entries](#) 40
- [Increase Swap Space](#) 40

Increase File Descriptors

A load generator uses the following File Descriptor resources:

- 14 file descriptors for the launch service
- 20 file descriptors for the agent
- 30 file descriptors for each Vuser driver. By default, there is a driver for every 50 Vusers.
- File descriptors for the running Vusers. Each Vuser requires two descriptors.

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

Descriptors	Purpose of the descriptors
14	For the launcher
20	For the 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.

The procedure to increase the number of file descriptors differs between shells.

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

- For sh and ksh users, type:

```
ulimit -n 1024
```

- For csh users, type:

```
limit descriptors 1024
```

Below is an alternate procedure to increase file descriptors. In this example, 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.

Increase Process Entries

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

This 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.

Increase Swap Space

Each Vuser requires swap space ranging in size 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.

Uninstall the Load Generator from a Linux Machine

This section describes how to uninstall the load generator from a Linux machine.

This section includes:

- [Uninstall Load Generator 12.55 or earlier](#)
- [Uninstall Load Generator 12.56 or later](#)

Uninstall Load Generator 12.55 or earlier

You can uninstall Load Generator 12.55 or earlier versions using a manual command or silently.

To uninstall Load Generator version 12.55 or earlier:

1. Make sure that you are logged in as the same user who installed the load generator.
2. Make sure that the **m_agent_daemon** process is not running on the machine. If it is running, kill its process:

```
cd /opt/HP/HP_LoadGenerator/bin;./m_daemon_setup -kill;su -;
```

3. Change the current directory to the installation directory:

```
cd <path_to_installation_folder>/_HP_LoadGenerator_Installation
```

4. Switch to super user.
5. Uninstall the load generator:

- **Manual uninstall:** run the following command:

```
sh ./Change_HP_LoadGenerator_Installation
```

- **Silent uninstall:** Run the following command:

```
sh ./Change_HP_LoadGenerator_Installation -i silent
```

Uninstall Load Generator 12.56 or later

You can uninstall Load Generator 12.56 or later using the setup wizard or a manual command, or silently.

To uninstall Load Generator version 12.56 or later:

1. Make sure that you are logged in as the same user who installed the load generator.
2. Make sure that the **m_agent_daemon** process is not running on the machine. If it is running, kill its process:

```
cd /opt/MF/MF_LoadGenerator/bin;./m_daemon_setup -kill;su -;
```

3. Change the current directory to the installation directory:

```
cd <path_to_installation_folder>/_MF_LoadGenerator_Installation
```

4. Switch to super user.
5. Uninstall the load generator:

- **Manual uninstall:** Run the following command:

```
sh ./Change_MF_LoadGenerator_Installation
```

- **Silent uninstall:** Run the following command:

```
sh ./Change_MF_LoadGenerator_Installation -i silent
```

Troubleshoot the Load Generator Linux Installation

This section describes troubleshooting tasks relating to the setup of the Linux load generator.

This section includes:

- [Environment variables were not set correctly in the system-wide startup scripts](#)
- [Error when installing the Load Generator on a Linux platform](#)
- [Error when running Load Generator on RedHat Enterprise Linux 5.x with SELinux enabled](#)
- [Environment variables are not unset after uninstalling the load generator](#)
- [Unable to run Vusers on the load generator](#)

Environment variables were not set correctly in the system-wide startup scripts

To enable the load generator to run, the system-wide startup scripts must be modified to set specific environment variables. The required modifications to the startup scripts are made by the Load Generator Setup Wizard. If the startup scripts were not correctly modified during the setup of the load generator, you can manually make the required changes to the startup scripts as described below. The required changes differ slightly between C shell users, and Bourne and Korn shell users.

- **Manually modifying the startup scripts for C shell users**

During the load generator installation process, the setup wizard creates the **env.csh** script. This script includes the commands to set the required environment variables for C shell users. A sample **env.csh** script is shown below.

```
setenv PRODUCT_DIR <Load Generator installation directory>
setenv M_LROOT ${PRODUCT_DIR}
  if ( ! $?PATH ) then
    setenv PATH ""
  endif
setenv PATH ${M_LROOT}/bin:${PATH}"
```

Add the following line to the **/etc/csh.cshrc** or **~/.cshrc** startup script to execute the **env.csh** script during the shell startup:

```
source <Load Generator installation directory>/env.csh
```

For example:

```
source /opt/MF/MF_LoadGenerator/env.csh
```

The effect of making the above modification to the startup script is similar to the modifications that are made by the setup wizard. A sample of the modifications that the setup wizard makes to the **/etc/csh.cshrc** startup script is shown below:

```
# New environment setting added by MF_LoadGenerator on Wed Jan 30 16:20:10 IST 2019
2.
# The unmodified version of this file is saved in /etc/.login1557000131.
# Do NOT modify these lines; they are used to uninstall.
setenv PRODUCT_DIR "/opt/MF/MF_LoadGenerator"
# End comments by InstallAnywhere on Wed Jan 30 16:20:10 IST 2019 2.
# New environment setting added by MF_LoadGenerator on Wed Jan 30 16:20:10 IST 2019
5.
# The unmodified version of this file is saved in /etc/.login1557000131.
# Do NOT modify these lines; they are used to uninstall.
setenv M_LROOT "/opt/MF/MF_LoadGenerator"
# End comments by InstallAnywhere on Wed Jan 30 16:20:10 IST 2019 5.
# New environment setting added by MF_LoadGenerator on Wed Jan 30 16:20:10 IST 2019
8.
# The unmodified version of this file is saved in /etc/.login1557000131.
# Do NOT modify these lines; they are used to uninstall.
if ( ! $?PATH ) then
setenv PATH ""
endif
setenv PATH "/opt/MF/MF_LoadGenerator/bin:${PATH}"
# End comments by InstallAnywhere on Wed Jan 30 16:20:10 IST 2019 8.
```

- **Manually modifying the startup scripts for Bourne and Korn shell users**

During the load generator installation, the setup wizard creates the **env.sh** script. This script includes commands to set the required environment variables for Bourne shell and Korn shell users.

Add the following line to the **/etc/profile** or **~/.profile** startup script to execute the **env.sh** script during the shell startup:

```
source <Load Generator installation directory>/env.sh
```

For example:

```
source /opt/MF/MF_LoadGenerator/env.sh
```

The effect of making the above modification to the startup script is similar to the modifications that are made by the setup wizard. A sample of the modifications that the setup wizard makes to the **/etc/profile** startup script is shown below:

```
# New environment setting added by MF_LoadGenerator on Fri Jan 16 11:14:24 IST 2019
1.
# The unmodified version of this file is saved in /etc/profile1806316421.
# Do NOT modify these lines; they are used to uninstall.
PRODUCT_DIR=/opt/MF/MF_LoadGenerator
export PRODUCT_DIR
# End comments by InstallAnywhere on Fri Jan 16 11:14:24 IST 2019 1.
# New environment setting added by MF_LoadGenerator on Fri Jan 16 11:14:24 IST 2019
4.
# The unmodified version of this file is saved in /etc/profile1806316421.
# Do NOT modify these lines; they are used to uninstall.
M_LROOT=/opt/MF/MF_LoadGenerator
export M_LROOT
# End comments by InstallAnywhere on Fri Jan 16 11:14:24 IST 2019 4.
# New environment setting added by MF_LoadGenerator on Fri Jan 16 11:14:24 IST 2019
7.
# The unmodified version of this file is saved in /etc/profile1806316421.
# Do NOT modify these lines; they are used to uninstall.
PATH="/opt/MF/MF_LoadGenerator/bin:${PATH}"
export PATH
# End comments by InstallAnywhere on Fri Jan 16 11:14:24 IST 2019 7. LoadRunner
settings #PATH=${M_LROOT}/bin:$PATH; export PATH
```

Error when installing the Load Generator on a Linux platform

When you use the **source installer.sh** command to install Load Generator version 12.63 on a Linux machine on which Load Generator version 12.63 was previously installed, you may receive the following error message:

"An error occurred while trying to manage the selected instance."

Solution:

1. Open the registry file `/var/.com.zerog.registry.xml` and locate the element **"product"** with attribute **"name"="MF_LoadGenerator"**.

For example:

```
<product name="MF_LoadGenerator" id="77f695c1-1f0c-11b2-883d-c486a85f6555"
version="12.56.0.0" copyright="2018" info_url="http://www.microfocus.com" support_
url="http://www.microfocus.com" location="/opt/MF/MF_LoadGenerator" last_modified="2019-01-
21 13:12:14">
```

2. Record the value of the **"location"** attribute.
3. Remove the entire directory that is referred to by the **"location"** attribute.
4. Delete the registry file `/var/.com.zerog.registry.xml`.
5. Rerun the `source installer.sh` command.

Error when running Load Generator on RedHat Enterprise Linux 5.x with SELinux enabled

During use of the load generator on RHEL 5.x, you might receive the following error:

"m_agent_daemon: error while loading shared libraries: /opt/MF/MF_LoadGenerator/bin/liblwc_cryptolib.so: cannot restore segment prot after reloc: Permission denied."

This problem occurs because SELinux is installed and enabled on the machine. SELinux is preventing the specified shared library from loading.

Solution:

There are two possible workarounds:

1. Before using the load generator, disable SELinux using the command `"setenforce 0"`.
2. If you want to keep SELinux enabled, you can change the security context of all problematic libraries (for example, `<Path_to_LoadGenerator>/bin/*.so` to `"textrel_shlib_t"`).
To do this, execute the command: `"chcon -t textrel_shlib_t <Path_to_LoadGenerator>/bin/*.so"`

Environment variables are not unset after uninstalling the load generator

When you uninstalled the Linux load generator, the setup wizard might not have unset the load generator environment variables (`M_LROOT`, `PRODUCT_DIR`, and `PATH`) for the current shell. To unset the environment variables, close the current shell session and invoke a new one, or manually unset the variables as described below:

- To unset the M_LROOT and PRODUCT_DIR variables:
 - [bash shells] Use the **unset** command.
 - [csh shells] Use the **unsetenv** command.
- To update the PATH variable to exclude the load generator binary directory, type:
 - [bash shells] PATH=<required list of paths>; export PATH
 - [csh shells] setenv PATH <required list of paths>

Unable to run Vusers on the load generator

If you are unable to run Vusers on the load generator, no specific error is reported, and the Vuser protocol requires a third-party application or client to be present on load generator side, check the dynamic libraries used by the application. This will enable you to establish if any shared objects cannot be found. A shared object that cannot be found may indicate either a missing prerequisite package or an environment variable issue.

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

```
ldd application_name
```

For example, type `ldd mdrv` to determine if all the dependencies of the **mdrv** executable can be found. If any dependencies are not found, run **verify_generator** as described in [Run verify_generator](#).

Note: If you are running Vusers for a protocol that requires a client installation (for example, Oracle), make sure that the path for the client libraries is included in the dynamic library path environment variable (LD_LIBRARY_PATH or SHLIB_PATH).

Managing Licenses

This chapter includes:

- [About LoadRunner licenses](#) 47
- [Install LoadRunner licenses](#) 49
- [LoadRunner License Utility](#) 51
- [Troubleshooting licenses](#) 53

About LoadRunner licenses

To run Vusers with Controller there must be a valid LoadRunner license installed on the Controller machine.

You use the LoadRunner License Utility to manage your LoadRunner licenses. The LoadRunner License Utility enables you to:

- View the details of licenses that are currently installed
- Install additional licenses

Tip: Use the [Micro Focus SW Usage Hub tool](#) to track license usage across your network.

License types

The following types of licenses are available:

Type	Description
Perpetual	This license does not expire - there is no time limit to the license validity.
Evaluation	This license enables potential customers to evaluate LoadRunner functionality.
Time Limited	This license is valid for a limited period only.
VUDs	<p>This license is issued with a limited capacity. The capacity is defined by the measurement <i>Vuser-days</i> or <i>VUDs</i>.</p> <p>For example, the capacity of a VUD license may be 1000 VUDs. Each day that the Controller is used to run Vusers, the maximum number of Vusers that ran simultaneously on that day is deducted from the remaining license capacity. If a maximum of 200 Vusers ran on day 1, then 800 VUDs will remain in the license. For more information, see VUD licenses.</p>

License bundles

There are several types of LoadRunner license bundles available.

The **Community** license is free of charge. It includes:

- 50 Vusers
- Access to all the protocols, with the exception of GUI (UFT)

Other bundles allow you to run additional Vusers on selected protocols. For more information, see the [License Bundles](#) documentation.

Note: When using Noise Scenarios, for each valid license you can run 10 noise generator-type Vusers.

VUD licenses

A **VUD license** is a Vuser-day license, issued with a limited capacity per Vuser day.

- For the calculation of VUDs consumed in a VUD license, you can specify at what time each new day begins. LoadRunner determines the maximum number of Vusers that ran during the 24-hour period after the start time.
- To change the time at which a new day begins, click the **VUDs will begin at time** link in the LoadRunner License Utility.
- A VUD license may have an expiration date and therefore be time-limited.
- If you have both a non-VUD license (eg, Time Limited license) and a VUD license for a particular Vuser protocol, LoadRunner always uses the non-VUD license before consuming the VUD license. That is, if 500 Vusers were run on a particular day and there is a non-VUD license for 400 Vusers, then 100 VUDs are deducted from the VUD license.
- A Vuser is included in the VUD count as soon as the Vuser reaches the **Initialization** status in a scenario. Consumed VUDs are deducted from the available VUD capacity at the start of the following day.

For example, suppose you purchased 100 VUDs for the Web 2.0 bundle:

- At some point of time, T, on the date D, you start a scenario, with X Web -HTTP/HTML Vusers, where X is less than or equal to 100.
- During the next 24 hours you can start and stop any number of scenarios, as long as the number of Vusers in each of scenarios is less than or equal to 100.
- When point T on the date D + 1 arrives (exactly 24 hours after the first scenario launch), the Controller looks back at the previous 24-hours interval, locates the largest amount of Vusers that were ran simultaneously and subtracts it from 100. For example, if during the last 24 hours you ran three scenarios, with 20, 40 and 30 Vusers, the Controller will detect the use of 40 VUDs and leave you with 60.
- If a certain scenario is in progress during the time of the calculation (at the time T), it will be included in the calculation for both days on which it ran. For example, if you launch a scenario

with 40 Vusers and it runs for 30 hours, then you will have used 40 VUDs for two days, and at the time T on the date D + 2 you will be left with $100 - 40 - 40 = 20$ VUDs.

- If a scenario runs for more than one day, the maximum VUD usage is calculated and deducted based on the day that the scenario began.

License consumption

- A multi-protocol Vuser runs only if licenses are available for all protocols in the Vuser script.
- If a multi-protocol script contains protocols from several bundles, you need licenses for both bundles to run the Vuser script. The license for each Vuser is subtracted from all relevant bundles. If, at a certain point, the license of one of the bundles runs out, the Vuser will start to fail, even if there are still valid licenses for some of the other protocols.
- If you purchased licenses for several different bundles (such as Web 2.0 and Oracle E-business) or several different license types (such as Time Limited and VUD) that share common protocols, and you want to run Vusers that belong to both bundles/types, the licenses are consumed in the following order:
 - a. **License type:**
 - i. Evaluation license
 - ii. Time Limited license
 - iii. VUD license
 - b. **Protocol amount:** The bundle with the smaller number of protocols will be consumed before the bundle with a larger number of protocols.
 - c. **Capacity:** The license with the larger capacity will be consumed before the license with the lower capacity.

Install LoadRunner licenses

To run Vusers from Controller, you must install the appropriate LoadRunner licenses on the Controller machine. For more information, see [About LoadRunner licenses](#).

Use the [LoadRunner License Utility](#) to install LoadRunner licenses.

In this topic:

- [LoadRunner Community license \(free\)](#)
- [Paid LoadRunner license](#)

LoadRunner Community license (free)

To install a LoadRunner Community license:

1. Open the LoadRunner License Utility: from the Windows Start menu, go to **Micro Focus > LoadRunner > License > LoadRunner License Utility**.
2. Obtain the license:

- a. Click **Sign up for free license**.
- b. Enter your details.
 - All the details are mandatory.
 - The email address must be valid and accessible.
- c. Accept the terms of service, and click **Sign up**.

A message containing the license data and an activation code is sent to the email address you provided.

3. If this is the first time you are signing up for a free license, follow the license activation instructions in the email you received.

If you are a returning user, the relevant parts of the license are automatically activated and added to the License Summary.

4. If Controller is running, restart it.

Paid LoadRunner license

If you have a valid order number or subscription (SAID), use your license file or key to install the license or licenses on your LoadRunner machine.

1. Prerequisite: Obtain your license file or license key

- **License file.** A license file contains the license keys for one or more licenses. When you use a license file to install the new licenses, the LoadRunner License Utility reads the license file and extracts all the license keys that are included in the license file. You can then select which of the available licenses to install. You may choose to use a license file to install LoadRunner licenses because the license file enables you to install multiple licenses simultaneously.
- **License key.** A license key enables you to install just a single license at a time. You may receive the license key directly from your customer service representative, or the license key may be included in a license file that you received.

If you do not have a license file or key, you can obtain one from the Software License and Downloads Portal as follows:

- a. Go to the [Software Licenses and Downloads Portal](#) and follow the onscreen instructions.
- b. If you are an existing customer, click the **Update** link to get a new license key for the latest version.

For more information, see the instructions provided in the portal's [Contact Us / Self Help](#) page, or [contact licensing support](#) to request assistance if required.

2. Install the license

- a. Open the LoadRunner License Utility: from the Windows Start menu, go to **Micro Focus > LoadRunner > License > LoadRunner License Utility**.
- b. Click **Install New Licenses**, and select an option for installing your license:

Using a license file ...	<ol style="list-style-type: none">i. Click the Browse button to the right of License file, and locate your license fileii. Click View License File Content to display details of the licenses that are included in the license file.iii. Select the licenses to install.
Using a license key...	<ol style="list-style-type: none">i. Click Install a license using a license key.ii. Enter your license key.

- c. Click **Install**.
- d. Click **Close**. In the License Summary table, make sure that the new licenses appear in the list of installed licenses.
- e. If Controller is running, restart it.

LoadRunner License Utility

You use the LoadRunner License Utility to install LoadRunner licenses, and to view your license information.

The **Community** license provides 50 Vusers at no cost. These Vusers are valid for all protocols except for GUI (UFT).




To launch the LoadRunner License Utility, from the Windows **Start** menu, go to **Micro Focus > LoadRunner > License > LoadRunner License Utility**.

The LoadRunner License Utility displays the following information:

Host ID	Identifies the computer on which the Controller is installed. You may need to provide the Host ID when purchasing new LoadRunner licenses.
----------------	--

License Summary


Displays a list of the licenses that are installed on the computer. Click on any license in the table to display additional details about the license. The **Vuser protocols included in the selected license** box displays a list of the Vuser protocols that are included in the selected license.

- **Status.** Indicates the status of the license.
 - **Valid**  . Indicates that the license is current and functional.
 - **Invalid**  . Indicates that the license is no longer valid. For one of the following reasons:
 - A **Time Limited** license expiration date has passed.
 - The remaining capacity of a **VUD** license is zero.
- **To be Expired**  . Indicates that the license will expire within 30 days.

By default, the License Summary table does not show invalid licenses. Select the **Show invalid licenses** check box to show invalid licenses.

- **Locked.**
 - **Locked.** Indicates that the license can be installed only on the machine for which it was generated (with a unique HostID), and not on any other machine.
 - **Unlocked.** Indicates that the license can be installed on any computer.
- **License Bundle.**

Indicates the name of the Vuser protocol bundle to which the license applies. The license enables the Controller to run Vusers of any protocol that is included in the protocol bundle. To display a list of the Vuser protocols that are included in a bundle, click the license in the **License Summary** table. A list of the associated Vuser protocols is displayed at the bottom of the LoadRunner License Utility.

Note: A **Partner License** icon  that appears to the left of a license bundle indicates that the license is for a LoadRunner partner, and not for standard Vuser protocols. Partner licenses enable third-party applications to be controlled by the LoadRunner Controller.
- **Type.** Indicates the type of license. For more information, see [License types](#).

	<ul style="list-style-type: none">• Expiration Date. Indicates the date and time when the Time Limited or VUDs license expires.• Capacity.<ul style="list-style-type: none">• Time Limited: Indicates the maximum number of Vusers (of the type specified by the license bundle) that can be run simultaneously from Controller.• VUDs: Indicates the number of VUDs that remain in the license.
Show invalid licenses	When selected, displays LoadRunner licenses that are installed that are invalid.
Vuser protocols included in the selected license	Displays the Vuser protocols that are included in the selected license.
VUDs will begin at <time>	Opens a dialog box where you can select when VUDs should begin.
Install New Licenses	Opens the New License dialog box which enables you to install new LoadRunner licenses.
Sign up for free license	Opens a dialog box where you can subscribe for a free Community license.

Troubleshooting licenses

- If the computer system time is earlier than the starting time of the license, the license will not be valid. To overcome this, generate the license with appropriate starting time or wait until the starting time of the license.
- If you have a temporary license, contact your customer service representative to obtain a Time Limited license.
- If LoadRunner does not accept your license key, perform the following checks:
 - Make sure you typed in the license key exactly as it was given to you.
 - The license key must include the required spaces.
 - The license key is case sensitive.
 - If you receive a permission denied error message during Controller startup, you must grant **Full Control** permission for the Registry's HKEY_LOCAL_MACHINE key as described below.

To add registry permissions:

- i. Run **regedit** to modify the registry.
- ii. Select the HKEY_LOCAL_MACHINE key.
- iii. Select **Security > Permissions**.

- iv. Add **Full Control** permission to the user that is running the Controller.
- v. Click **OK**.

Send Us Feedback



Let us know how we can improve your experience with the Installation Guide.
Send your email to: docteam@microfocus.com