

Getting Started

Citrix Load Manager

Version 1.0

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CHAPTER 1

Welcome



Citrix Load Manager, version 1.0 (Load Manager) is a component of Citrix MetaFrame XP Application Server for Windows, version 1.0 (MetaFrame XP) that administrators can use to manage server and published application loads on MetaFrame XP servers.

This chapter describes what Load Manager is, the documentation provided with Load Manager, and includes additional resources to find more information about Load Manager and related Citrix products.

Important Please be sure to read the **Readme.txt** file for Load Manager in the root directory of the MetaFrame XP CD-ROM. This file contains important information that includes last-minute documentation updates and corrections.

Citrix provides a variety of information resources online, including a complete product documentation library, documentation updates, and technical articles on the Citrix Web site at <http://www.citrix.com>.

What Is Load Manager?

With Load Manager, an administrator can set up, monitor, and adjust the server and published application loads in a server farm so that users can run the published applications they need quickly and efficiently.

Load Manager allows you to:

- **Balance published application loads (resource usage) across multiple Citrix servers in a server farm.** When a user launches a published application enabled for load management, Load Manager routes the user to the published application on the server in the farm with the lightest load. By balancing published application and server loads, administrators can maximize the efficiency with which a server farm operates, reducing latency while increasing response time to the user.

- **Monitor application loads across Citrix server farms.** Using Citrix Management Console, you can monitor loads on servers that contain published applications. If you find that the load is too heavy, you can adjust the Load Manager settings easily.
- **Check disk data.** Load Manager can check processes such as disk operations and disk input and output on servers that contain published applications.
- **Set the date and time for load management.** Using Citrix Management Console, administrators can adjust load management availability on a server by date and time.
- **Span subnets.** Load Manager runs efficiently in enterprises that contain multiple server farms within a single network or multiple subnetworks. Load Manager can improve the performance of an enterprise server farm by providing increased scalability across MetaFrame XP servers.
- **Log on from remote clients.** You can log on to a MetaFrame XP server from an Independent Computing Architecture (ICA) Client device or any machine that contains the Citrix Management Console on another subnet and adjust server or published application loads remotely.

How Does Load Manager Work?

When an ICA Client user requests a published application that uses Load Manager, Load Manager determines the server with the lightest load for that published application based on server load levels. An ICA Client user then requests the published application to run. The ICA Client user can launch the published application with no knowledge of what just occurred in the background, because load calculations are transparent to them. Users don't really care which server launches a requested published application; they just want the published application to open and run as quickly as possible.

See the *MetaFrame XP Administrator's Guide* for information about how to configure published applications.

The Major Components of Load Manager

You can manage server and user loads in a MetaFrame XP console called Citrix Management Console. You can set unique methods for calculating various server loads by adjusting the *rules* settings (high and low thresholds) in *load evaluators* (evaluators).

Rules

Load Manager provides a list of rules to measure statistics for high (full) or low (no) loads on load managed servers or load managed published applications. Rules determine what server or published application statistics to evaluate for the load calculation.

For example, if the Server User Load rule's full load is set to 100 users and the server usage is over 80 on a load evaluator that is attached to Server1, a Load Manager Monitor tool in Load Manager shows that the server is below its full load capacity.

Based on these results, you can lower the Server User Load rule setting in other load evaluators attached to other servers so Server1 is used more often and may eventually reach its full load.

When you lower the threshold on a server by changing a rule in the load evaluator, the threshold can be reached more quickly, depending on the number of active ICA Client sessions there are. The load-managed server then drops from an internal list of available servers and the next available server is used to load manage the requested published application.

If you raise the threshold in a rule, the load limit is higher. For example, if the Server User Load rule threshold is raised to 150, 150 users can log in to the server attached to it until the full load of 150 is reached, then the server drops from the list.

Load Evaluators

To configure server load measurements, you can use the Citrix-provided default load evaluators, Default or Advanced, or create a new load evaluator, group one or more rules in that load evaluator, give the load evaluator a name and a description, and attach (or enable) the load evaluator to a server or a published application.

It is suggested that you start by using the Citrix load evaluators and copy them to a new load evaluator if you want to change rules or settings.

Each server runs the chosen published application when requested by an ICA Client user. When the client device makes the request, the loads calculated by the load evaluators are examined by Load Manager to determine the least loaded server before reporting it to MetaFrame XP.

Load evaluators can vary on each server and each load evaluator can contain any combination of rule types and values. This gives you added flexibility when calculating loads for each server in the server farm.

Load Manager Monitor

To determine the effects the load evaluator settings have on load-balanced servers or published applications, use Load Manager Monitor in the Citrix Management Console.

Load Manager Requirements

Before you begin to install and use Load Manager, review the following requirements.

Citrix Server Requirements

A load-managed server requires:

- **Windows NT Server 4.0 or Windows 2000 Server.** Load Manager installs with MetaFrame XP on Windows NT Server 4.0 Terminal Server Edition or Windows 2000 Server with Terminal Services. Windows NT Server 4.0 or Windows 2000 and MetaFrame XP provide the ability to host multiple simultaneous client sessions on these Microsoft platforms.
- **MetaFrame XP Application Server for Windows, version 1.0.** Load Manager cannot run without MetaFrame XP.
- **Published applications.** All the applications you plan to use with Load Manager must be published first in MetaFrame XP. Whether you manage a small or large server farm, Load Manager helps ensure that users won't have problems accessing published applications when they need them.

If a published application isn't load managed and too many users attempt to launch the published application, the published application may run slowly because the ICA sessions haven't been directed to other servers with lower loads.

Citrix Farm Requirements

Load Manager in server farms requires:

- A Load Manager assigned or pooled license added for every Load Manager enabled server that you want to include for published application and server load management.
- MetaFrame XP administrator rights. You must be a Citrix administrator to run MetaFrame XP and Load Manager.
- The same protocol stack (such as TCP/IP or IPX) on each server in the server farm.

See the MetaFrame XP *Administrator's Guide* for information on setting up server farms.

How Does Load Manager Enhance MetaFrame XP?

MetaFrame XP provides a high-performance, cost-effective, secure way to deploy business-critical applications throughout the enterprise regardless of client device or network connection. MetaFrame XP provides the best level of application service in multi-server farms where applications are published on as many servers as needed. Load Manager, an important feature of MetaFrame XP, assigns the best server from which a published application runs. This process keeps loads lower for greater server and published application speed and efficiency. Information Services (IS) professionals find Load Manager to be an invaluable tool, because it identifies servers with high loads and provides increased server and network performance by spreading out loads more evenly.

The Load Manager Monitor tool makes it easier for an administrator to view trouble spots on servers in the server farm so they can change load thresholds easily if bottlenecks exist.

MetaFrame XP and Load Manager rely on the Independent Management Architecture (IMA) for server connections. See the MetaFrame XP *Administrator's Guide* for information about IMA.

How Does Load Manager Perform in a Mixed MetaFrame Environment?

If you use MetaFrame 1.8 and MetaFrame XP servers in the same server farm, in interoperability mode, MetaFrame XP takes over the master ICA Browser function for an existing MetaFrame 1.8 server farm if both farms have the same name. This blending allows load management and license pooling among server farms to work.

Because the architecture between the two products is different, (MetaFrame 1.8 uses the ICA Browser and MetaFrame XP uses IMA) MetaFrame XP reverts to using Load Balancing Services 1.0 to manage loads. Load evaluators created in the Citrix Management Console do not recognize MetaFrame 1.8 servers.

See the MetaFrame XP *Administrator's Guide* for information about interoperability mode.

Who Should Read this Manual

This manual is for system administrators responsible for installing and configuring Load Manager on MetaFrame XP servers.

How to Use this Guide

To get the most out of *Citrix Load Manager Getting Started*, review the table of contents to familiarize yourself with the topics discussed.

This guide contains the following sections:

Chapter	Contents
Chapter 1, “Welcome” on page 1	Gives you a concise summary of the features and benefits of using Load Manager for servers and server farm monitoring and includes Load Manager requirements.
Chapter 2, “Learning About Load Manager” on page 11	Gives you installation and licensing information, plus provides a detailed list of features and information on server sizing.

Finding More Information About Load Manager and MetaFrame XP

The Citrix Load Manager package includes electronic documentation and online application help.

The documentation included with Load Manager is available in the DOC directory on the MetaFrame XP CD-ROM.

On a MetaFrame XP server, documentation is installed in a **Documentation** folder. You can display the contents of this folder by choosing **Citrix > Documentation** from the **Start** menu.

Your MetaFrame XP package includes a printed booklet that contains an overview of the product, Citrix support information, and other information.

Using PDF Documentation

To use the Load Manager documentation, *Citrix Load Manager Getting Started* that is provided in a PDF file, you need to have the Adobe Acrobat Reader program. The Reader program lets you view, search, and print the documentation files.

If you need to obtain the Reader program, you can download it for free from Adobe System’s web site (**<http://www.adobe.com>**). The self-extracting file includes installation instructions.

Using Online Help

Online help is available for Citrix Management Console and the other components that are included in MetaFrame XP, such as Load Manager.

You can access online help from the Help menu of each program; the program must be running for you to view its online help. You can use shortcuts to launch Load Manager utilities and Citrix Management Console. Shortcut icons are located in the MetaFrame XP folder. To open this folder, click the **Start** menu and choose **Programs > Citrix > MetaFrame XP**.

Online help for Citrix Management Console is in JavaHelp format and requires Java Run-Time Environment (JRE), which Load Manager installs by default on the server. Online help for server utilities and the Windows ICA Clients is in WinHelp format, which is available by default on all Windows systems. Online help for other ICA Clients uses standard help formats for their platforms.

The Load Manager help files provide steps, conceptual information, and examples on how to use Load Manager. Click the Help button in the Citrix Management Console to access Load Manager help information or press F1. When you open Help, the Load Manager entries appear at the bottom of the Table of Contents under Load Manager.

Documentation Conventions

Load Manager documentation uses the following typographic conventions for menus, commands, keyboard keys, and items in the program interface:

Convention	Meaning
Boldface	Commands, names of interface items such as text boxes and option buttons, and user input.
<i>Italics</i>	Placeholders for information or parameters that you provide. For example, <i>filename</i> in a procedure means you type the actual name of a file. Italics also are used for new terms and the titles of books.
UPPERCASE	Keyboard keys, such as CTRL for the Control key and F2 for the function key is labeled F2.
►	Step-by-step procedural instructions

Finding Information About Windows Servers

Most compatibility guidelines for Windows NT Server 4.0, Terminal Server Edition, and Windows 2000 Servers can be applied to MetaFrame XP because MetaFrame XP is designed to run with these products.

For example, MetaFrame XP supports the deployment of Win32, Win16, DOS, OS/2 1.x (text only), and POSIX applications. The ICA technology included in MetaFrame XP extends the capabilities of Windows servers and, in some cases, requires additional setup and configuration for best application performance.

- For Windows 2000, information on application compatibility and deployment issues is available at the Microsoft web site at:
<http://www.microsoft.com/Windows2000>
- For Windows NT 4, Terminal Server Edition, information on application compatibility and deployment issues is available at:
<http://www.microsoft.com/ntserver>

For instructions on installing and using Windows servers, see the Microsoft documentation included in your Windows package and the Microsoft web site (<http://www.microsoft.com>).

Citrix on the World Wide Web

The Citrix web site, at <http://www.citrix.com>, offers a variety of information and services for Citrix customers and users. From the Citrix home page, you can access Citrix online Technical Support Services and other information designed to assist MetaFrame XP and Load Manager administrators, including the following:

- Citrix Documentation Library containing the latest documentation for all Citrix products
- Downloadable Citrix ICA Clients (available at <http://download.citrix.com>)
- Program information on Citrix Preferred Support Services options
- An FTP server containing the latest service packs, hotfixes, utilities, and product literature for download
- An online Solution Knowledgebase containing an extensive collection of application notes, technical articles, troubleshooting tips, and white papers
- Interactive online Solution Forums for discussion of technical issues with other users
- Frequently Asked Questions pages with answers to common technical and troubleshooting questions

- Information about programs and courseware for Citrix training and certifications
- Contact information for Citrix headquarters, including worldwide, European, Asia Pacific and Japan headquarters

Reader Comments

We strive to provide accurate, clear, complete, and usable documentation for Citrix products. If you have any comments, corrections, or suggestions for improving our documentation, we want to hear from you.

You can send e-mail to the documentation authors at documentation@citrix.com. Please include the product name and version number, and the title of the document in your message.

Learning About Load Manager



Overview

This chapter explains why Load Manager is important to the success of server or published application performance in your server farm. It also lists the system requirements for Load Manager and the general tasks you need to perform before you start to use Load Manager.

The topics in this chapter include:

- The benefits of Load Manager
- What you need to know
- Installation and licensing requirements
- Logging into Citrix Management Console and using Load Manager
- Uninstalling Load Manager

Why Load Manager Benefits You

Because of product enhancements, new software architecture, and portability, Load Balancing Services has evolved into Load Manager—a new load management component that runs in MetaFrame XP.

Load Manager provides:

- **Maximized system efficiency.** Load Manager balances published application loads across your Citrix server farms based on server or published application load limits set in load evaluators. This feature allows more efficient data flow in your enterprise server farm environment.
- **Citrix default load evaluators.** Load Manager includes two load evaluators that work well in most server farm environments, simplifying your current load configuration without modification until you learn more about Load Manager. The Default load evaluator is attached to your server automatically when you enable and license Load Manager.
- **Customization.** Load Manager includes a set of rules that you can add to your load evaluators, increasing the success of the server and published application performance requirements in your server farm environment.
- **Real-time monitoring.** The Load Manager Monitor tool, located in the Citrix Management Console, lets you view the effects of your rules after you attach them to a server or published application and observe their activity.

What You Need to Know About Load Manager

Before you start to configure and use Load Manager, keep the following guidelines in mind.

Balancing Server Loads

Even though Load Manager installs with MetaFrame XP, you must add and activate a Load Manager license on at least one MetaFrame XP server that participates in load configuration and load monitoring. Servers that do not contain Load Manager licenses are ignored by load management. You can enable and license additional servers in the server farm for load management after you enable a license on your first server.

Load Manager includes two default load evaluators. A load evaluator called *Default* is attached automatically to each MetaFrame XP server that you add and assign a license to, so every server with Load Manager installed and licensed always manages loads.

How Load Manager Determines Where to Start an ICA Session

When an ICA Client user selects a published application to run, the ICA Client contacts the server farm to locate the address of a server that hosts the published application. Within the farm, an internal list of host servers is maintained. Load Manager selects one of the servers based on the lowest load and returns the address of that server to the ICA Client. The ICA Client starts a session on that server and launches the published application.

Each MetaFrame XP server is included in the calculation regardless of the network protocol unless the server exceeds its full load (depending on how the rules are set in the load evaluator), at which time the server drops from the internal list. The server is no longer available for load management until its load has been reduced (for example, users log from the server or server processes consume less CPU time), when it is automatically added to the list again. Servers are continuously added to the list and taken off the list as server and user load activity varies.

Load Manager dynamically calculates the ranges between a full load and no load even though the high and low thresholds are set.

About Rules

A rule is a small module of executable code that queries specific conditions and performance metrics for servers or published applications. Rules typically keep track of server and published application usage. A set of rules (one or more) makes up a load evaluator.

In many rules, you can set two thresholds: full load or no load. Load Manager recognizes and uses the values in between full or no load, but when the thresholds are met or exceeded (depending on the rule), Load Manager does not continue to manage loads using that rule. In some rules, you set server availability days and times (such as Scheduling) or you set TCP/IP address ranges (such as IP Range). Each rule has its own unique set of parameters.

In load evaluators that you create, copy, or change, you can modify or delete rules any time. Each rule is a component of how your total load configuration task works, and the threshold of a rule reflects a specific server parameter. For example, the Memory Usage rule monitors the ratio of available memory to total physical memory on your server.

You can apply rules to load evaluators for either server performance or for published application performance. You can use all of the rules in Load Manager for either servers or published applications, but some rules, such as CPU Utilization, work better in load evaluators created for servers. Most of the rules apply to servers rather than published applications.

The rules included in Load Manager are:

- **Application User Load.** Use this rule for published applications.
- **Context Switches.** Use this rule for servers.
- **CPU Utilization.** Use this rule for servers.
- **Disk Data I/O.** Use this rule for servers.
- **Disk Operations.** Use this rule for servers.
- **IP Range.** Use this rule for servers or published application.
- **License Threshold.** Use this rule for servers.
- **Memory Usage.** Use this rule for servers.
- **Page Fault.** Use this rule for servers.
- **Page Swap.** Use this rule for servers.
- **Scheduling.** Use this rule for servers or published applications.
- **Server User Load.** Use this rule for servers.

Tip It is suggested that you start by creating load evaluators with a few rules in them until you understand the results of load management on servers and published applications; use a simple configuration.

See the online Help in the Citrix Management Console for more information on how to use rules.

About Load Evaluators

A load evaluator includes a set of rules. Load Manager calculates a load evaluator by the value of the rule with the highest load. The server load is calculated by the load evaluator with the highest load.

You can create or change load evaluators so that they perform specific load management tasks.

Note The Citrix-provided load evaluators, Default and Advanced, cannot be modified or deleted.

For example, you can create a load evaluator just for server usage (such as the Server User Load rule in the Default load evaluator) that keeps track of users logging on to a server. You can set up as many load evaluators as you need for optimum server or server farm performance as long as you attach only one load evaluator to each server in your farm.

In addition, you can attach a load evaluator that contains the Application User Load rule or other rules to each published application. This load evaluator keeps track of users who attempt to launch a published application; it shouldn't be the same load evaluator that you attach to the server.

Tip It is suggested that you either use the default load evaluators for the servers in your server farm or create a few load evaluators and add a few rules to them. You don't want to overload your server farm with several different load evaluators and several rules in each load evaluator.

The following load evaluators have been created for your convenience and are included in Citrix Management Console when you click **Load Evaluators** in the tree and then click the **Contents** tab:

- **Advanced.** The rules in this load evaluator represent server performance, such as disk I/O, CPU utilization, disk operations, memory usage, and so on.
- **Default.** The rule in this default load evaluator represents the number of users logged onto a MetaFrame XP server. This load evaluator contains one rule, Server User Load, that reports a full load when 100 users log on to the attached server.

Important The Default load evaluator manages loads for your server until you replace it with another load evaluator.

See the online Help in the Citrix Management Console for more Load Manager information.

Activating Load Evaluators

The Default load evaluator attaches to your server when you enable load management.

Load Manager lets you *attach* a load evaluator that you created to a server or a published application. You can attach one load evaluator to the server and one load evaluator to each published application on the same server. For example, you can keep the Default load evaluator attached to your server and attach an AppLE load evaluator to each of your published applications on that server.

Load Manager determines the load evaluator (either the load evaluator attached to the server or published applications on that server) with the highest threshold on the server and then determines the server in the server farm with the lightest load for load management.

Viewing Load Evaluators

Load Manager makes it easy to view the load evaluators attached to your servers or published applications. Use the Usage Reports tab to view your servers, applications, or load evaluators plus the properties of each.

Monitoring Server Loads

The Load Manager Monitor tool in the Citrix Management Console checks recent loads using a graph format. The evaluator loads continuously change, based on the rules you set in a load evaluator and how much load activity there is.

You can open Load Manager Monitor and observe load results on a server while you perform other desktop administrative tasks in MetaFrame XP.

See the online Help in the Citrix Management Console for more information.

Running a Session Log

The Log tab in the Citrix Management Console displays messages about ICA connections for troubleshooting purposes.

All messages from ICA connection requests and resolutions display in this view. You can enable or disable logging, save your logged messages, and empty the log.

Installing Load Manager and Adding the License

The Load Manager product and license installs with the MetaFrame XP product and license.

Before you add MetaFrame XP licenses (which includes Load Manager), decide which servers you want to load manage and then activate the licenses on those servers.

Determining Which Servers Require Load Manager

Determining which servers you want to load manage depends on how critical the performance of those servers is in your server farm.

Here are some examples:

- You can determine how many users are launching published applications or know when a published application is not available on certain servers. You may want some servers to contain a load evaluator for heavy server loads and for one published application.
- Maybe some published applications that are unique to just a few users do not need to be load managed.
- You want to schedule one of your servers to run a disk repair utility over the next weekend. You'll want to power down the server to run the utility. You can schedule to have the server and published applications removed from the server list during the hours you specify for that weekend.

The best way to find out what to load manage and what not to load manage is to experiment with the Citrix load evaluators, then make small changes to the settings in new load evaluators if necessary.

Adding and Activating the License

Load Manager uses the same activation code-based licensing system that MetaFrame XP uses. Every licensed Citrix product has an associated serial number. When you install MetaFrame XP and Load Manager, you enter the product's serial number from the product's packaging to generate a license number. You must use this license number to generate an activation code to activate the license.

Licensing MetaFrame XP and Load Manager is a two-step process: you add the license, then activate it. The same procedure applies to Load Manager that you use to active your MetaFrame XP license.

➤ To add a MetaFrame XP license

1. Log on to server farm and Citrix Management Console.
2. In the Citrix Management Console tree, right-click **Licenses** and click **Add License**.
3. In the **Add License** dialog box, add the MetaFrame XP serial number and click **OK**.
4. Click **Yes** to confirm.
5. Go to Step 3 in the next procedure if you want to activate your MetaFrame XP license now, or follow the next procedure if you want to activate the license later.

➤ To activate a MetaFrame XP license

1. In Citrix Management Console, click **Licenses**.

2. From the **License Numbers** tab, right-click the license you want to activate and click **Activate**.
3. In the **Activate License** dialog box, click **Copy to Clipboard** to copy the displayed license number. Do not close the Citrix Management Console window.
4. Use the Web browser to access the Citrix Product Activation System at <http://www.citrix.com/activate>.
5. Follow the instructions on the Web page and paste the copied license number when prompted. The Citrix Product Activation System displays the activation code on the Web page.
6. Copy the activation code from the Web page by highlighting it and pressing CTRL+C.
7. In the **Activate License** dialog box of Citrix Management Console, paste the activation code into the Activate Code field and click **OK**.

In the License Numbers tab, the status of the license number changes to Activated.

For complete information about licensing and how to add and activate licenses, see “MetaFrame XP Licensing” in the *MetaFrame XP Administrator’s Guide* or in the Citrix Management Console online Help.

Running Load Manager on the Desktop

Use Citrix Management Console to create, modify, duplicate, or delete your load evaluators, and use other Load Manager features.

➤ To run Load Manager on the desktop

1. Log on to your MetaFrame XP server.
2. Double-click the Citrix Management Console icon or click **Start > Programs > Citrix > Citrix Management Console**.
3. At the **Logon To farm Farm** dialog box, log in to your server farm.
4. Click **OK**.

See the online Help in the Citrix Management Console for information about how to administer Load Manager.

Uninstalling Load Manager

Because Load Manager is included with MetaFrame XP, if you uninstall MetaFrame XP, you also uninstall Load Manager.

Note If you don't want to use Load Manager for a published application on a particular server, either do not publish the application to that server or disable the server and Load Manager will not manage that application's load. You cannot remove Load Manager from servers; you only disable it.

Before uninstalling MetaFrame XP and Load Manager, make sure your users log off their ICA sessions and exit all programs running on the server.

You can remove MetaFrame XP from your server using Add/Remove Programs in Windows NT Server 4.0 or Windows 2000 Server.

➤ **To remove Load Manager**

1. From the **Start** menu, click **Settings > Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Remove the utility for your operating system.
 - On Windows NT Terminal Server Edition, select **Citrix MetaFrame XP 1.0** and click **Add/Remove**.
 - On Windows 2000 Servers, click **Change or Remove Programs**, select **Citrix MetaFrame XP 1.0**, and click **Change/Remove**.
4. Follow the prompts to uninstall MetaFrame XP and Load Manager.

See the *MetaFrame XP Administrator's Guide* for information about uninstalling MetaFrame XP.

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