

Administrator's Guide

Citrix® Resource Manager

For Citrix MetaFrame XPe
Citrix Systems, Inc.

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Document Code rm.ag.rcd.1f.20010208

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Introduction to Resource Manager



About this guide

This Guide is intended for network administrators, and is designed to provide you with a summary of the main ways in which you can use Resource Manager in your network environment.

This chapter introduces the basic concepts and the documentation that is supplied with Resource Manager. The following topics are included:

- A brief introduction to Resource Manager
- A summary of the tasks you can perform with Resource Manager
- Quick instructions on how to install Resource Manager
- An overview of the user interface and navigation
- Details of where to find more information about Resource Manager

Introducing Resource Manager

You can use Resource Manager to manage resources on a server, or on a network with multiple servers. Resource Manager enables you to collect, display, and analyze data about system performance, application use, and user activity.

Use Resource Manager to do the following:

- watch what is happening at a particular moment for a system. This is known as real-time monitoring.
- analyze and report using records of system activity.

Resource Manager can track and store information about a wide variety of system and network processes and events. These are known as metrics. During installation, Resource Manager automatically assigns upper and lower limits to define the normal operation of each metric. If the value of a metric falls outside 'normal' limits, Resource Manager can inform you about this in a number of ways.

How can I use Resource Manager?

Monitoring your existing server farm

You can use Resource Manager to monitor and analyze system performance, loading, and user behavior.

You can view information about an entire server farm, analyze individual servers and applications, or monitor specific aspects of performance.

By fine-tuning the monitoring process, you can examine the information that Resource Manager is storing to suit your specific environment.

Identifying, diagnosing, and solving problems

Resource Manager can warn you about any developing problems on your network. If a problem does occur, you can analyze the relevant data to help you decide what action to take.

Gauging and justifying future resource needs

You can produce reports about system usage which will help you to identify requirements for future resources, such as new servers or additional licenses.

Planning and scaling your server farm

By deploying Resource Manager on a pilot system, you can gauge how the system will cope in likely scenarios. This will help you to scale your network, set baselines and spot potential problems before they can affect the final installation. For example, you can evaluate whether a computer can support the activity of a desired number of users.

Quick guide to installing Resource Manager

Use the following instructions to install Resource Manager on a MetaFrame XP server.

For more detailed instructions about installing Resource Manager, refer to “Installing Resource Manager” on page 11.

► To install Resource Manager on a MetaFrame XP server

1. Ensure that you have exited all applications.
2. Insert the Resource Manager CD into your CD-ROM drive.
3. From the splash screen, click **Citrix Resource Manager Setup**.
4. Follow the on-screen instructions to select options and configure your installation.

Displaying Resource Manager and its components

The following procedures are designed to familiarize you with the interface, so that you can quickly get up to speed with the application.

Displaying the Citrix Management Console

The Citrix Management Console is a centralized management utility which enables you to administer your entire server farm.

The console is installed during MetaFrame XP installation, and features of Resource Manager are added when you install Resource Manager.

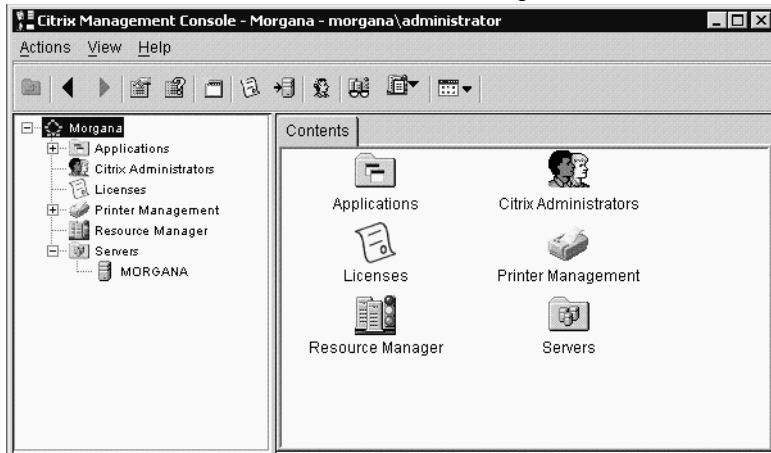
► To display the Citrix Management Console

1. From the **Start** menu, select **Programs > Citrix > Citrix Management Console**. Alternatively, click the Citrix Management Console icon on your desktop.



When the console starts, a dialog box asks you to log in to a MetaFrame server.

2. Enter the server name, user account name and password, and click **OK**.



When you are connected to a farm, the Citrix Management Console displays a window with two main panes:

- The left pane shows a hierarchical list of the components of a Citrix server farm, which is referred to as a tree structure.
- The right pane displays information about the object that is selected in the left pane.

From this window you are able to access Resource Manager.

Displaying the monitored applications in a farm

► To display the applications that are being monitored in a farm

1. From the left pane select the folder labeled **Applications**.

By default, Resource Manager monitors the applications that are published in MetaFrame XP. To monitor applications not published in MetaFrame XP, you will need to add applications using the Resource Manager Application wizard.

Refer to “Checking which applications are being monitored” on page 17.

Displaying the servers in a farm

► To display all the servers in a farm

1. From the left pane select the folder labeled **Servers**, and click the plus sign next to it.

The tree expands to reveal all the servers in your farm. This group of servers are also listed in the right pane under the **Contents** tab.

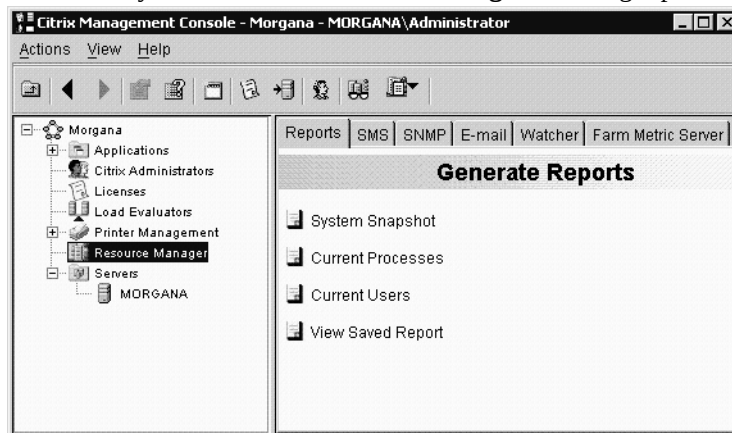
The servers in a farm are managed as a single entity, which share some form of physical connection and a single data store.

Displaying the main Resource Manager screen

► To display the main screen

- In the left pane of the Citrix Management Console, select **Resource Manager**.

Alternatively, double-click **Resource Manager** in the right pane.



This window displays a number of tabs which enable you to perform the following functions in Resource Manager:

- Generate reports about the current status of servers
- Configure automatic alerts
- Monitor servers while doing other tasks

Refer to “What to read next” on page 8 for details about where you can find information about these topics in this Guide.

Displaying Resource Manager for the entire server farm

This view enables you to monitor all the servers in your farm. In this way you can gain an overall picture of the status of the server farm, and spot any problems as they occur.

► To display Resource Manager for a server farm

1. In the left pane of the Citrix Management Console, select the folder labeled **Servers**.
2. Select the **Resource Manager** tab in the right pane.

Refer to “Monitoring the status of a group of servers” on page 22 for further details.

Displaying Resource Manager for a single server

► To display Resource Manager for a single server

1. In the left pane of the Citrix Management Console, ensure that the folder labeled **Servers** is expanded, and select the server that you want to monitor.
2. Select the **Resource Manager** tab in the right pane.

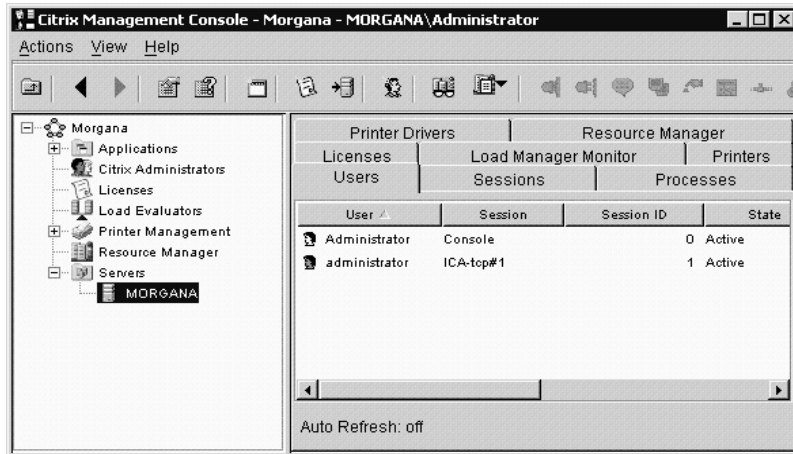
This displays all the metrics that are being monitored for that server. When a problem arises, a colored alarm is displayed to warn you.

Refer to “Monitoring the status of a server” on page 19 for further details.

Displaying the properties for servers

► To display server properties

1. In the left pane of the Citrix Management Console, navigate to the server whose properties you want to display.



2. Select the server, and select **Actions > Properties**.

Alternatively, click the right mouse button, and select **Properties** from the drop-down list.

Use this dialog box to alter the configuration of the server that you are monitoring. Most server configuration options can be accessed here.

What to read next

For further information about Resource Manager in this Guide, refer to the following sections:

Refer to	To find out
Chapter 2: “Installing Resource Manager”	Instructions on installing Resource Manager.
Chapter 3: “Monitoring Servers”	An overview of real-time monitoring.
Chapter 4: “Reporting and Analyzing Information”	How you can generate reports using information about stored data.
Appendix A: “Default Metric Set”	Details about the default metrics that are configured during installation.
Appendix B: “Glossary”	Definitions of the technical terms used in this Guide.

See the Resource Manager Help for detailed information on tasks not covered in this Guide, for example:

- Setting a server to reboot automatically. You can assign times at which Resource Manager reboots individual servers.
- Changing the Farm Metric Server. This is the server that interprets metrics that apply to the entire server farm (for example, application counts).
- Reviewing the history of a Resource Manager server. Resource Manager maintains a log for each server in the server farm, containing the history of metrics being monitored on the server, and any changes to the Resource Manager configuration.

Getting more information

This Administrator's Guide includes a general introduction to installing and configuring your Resource Manager system.

You can find the Administrator's Guide in Adobe PDF format:

- In the /doc directory of your Resource Manager CD-ROM.
- On your MetaFrame XP server once you've installed Resource Manager. From the Start Menu, select **Start > Programs > Citrix > Documentation**.
- On the Citrix Web site at <http://www.citrix.com/support>. Select the **Product Documentation** tab. You can check the Product Documentation area of the Web site at any time for the latest updates to Citrix technical manuals. Any updates to this manual published after the release of this product will be posted there.

You can also view online help for Resource Manager from within the Citrix Management Console. Refer to the online help for:

- Detailed procedures for tasks within the Resource Manager user interface, for example, adding metrics, changing the farm metric server and generating reports.
- Context sensitive help for each setting in a dialog.
- An online summary for the default metrics.

To open the help system, select **Contents and Index** from the Help menu. For help regarding the contents of a dialog box, press F1 or click the Help button in the dialog box.

- You can access the task-based help topics from the left frame of the help window using the Table of Contents, the Index or by searching for a particular word or phrase using the Search tab.

Note Please consult the "readme" file in the root directory of your CD-ROM, for any last-minute updates, installation instructions, and corrections to the documentation.

Finding resources on the Citrix web site

Citrix offers online Technical Support Services at <http://www.citrix.com/> that include the following:

- Downloadable Citrix ICA Clients, available at <http://download.citrix.com/>
- A Frequently Asked Questions page with answers to the most common technical issues
- An FTP server containing the latest service packs and hotfixes for download
- An Online Knowledge Base containing an extensive collection of technical articles, troubleshooting tips, and white papers
- Interactive online support forums
- A product documentation library, available at:
<http://www.citrix.com/services/productdocs.asp>

Providing feedback about this guide

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documentation@citrix.com

Please include the name and version number of the product and the title of the document in your email.

Installing Resource Manager



Overview

This chapter explains in detail how to install Resource Manager. The following topics are included:

- Issues to consider before you start, including software requirements
- Installation instructions, including licensing information

System requirements

This section describes minimum configurations and recommendations for the installation of Resource Manager.

Software requirements

You can install Resource Manager on servers with the following operating systems:

- Windows NT Server 4.0, Terminal Server Edition with Service Pack 5 or later
- Windows 2000 Server Family: Windows 2000 Server, Windows 2000 Advanced Server.

In addition to the Windows operating system requirements, you require MetaFrame XP for Resource Manager installation.

Important If you are installing Resource Manager on Windows NT 4.0 Server, Terminal Server Edition, you will need to install the Microsoft Data Access Components (MDAC) version 2.5, and then upgrade to version 2.6 before you install both MetaFrame XP and Resource Manager. Refer to the MetaFrame XP Administrator's Guide for installation instructions for MetaFrame XP.

Installing Resource Manager

Before you start

Before you install Resource Manager, we recommend that you do the following:

- Ensure that the machines on which you are going to install Resource Manager meet the software requirements.
- Ensure that each server on which Resource Manager is installed can connect to a data store. (The data store is a database that MetaFrame and Resource Manager use to keep track of configuration information about the servers, applications, and configured users in the farm.)

You will have set up a data store during MetaFrame installation, and when you install Resource Manager, it will use this data store.

Installing Resource Manager on MetaFrame XP

Use the following procedure to install Resource Manager on a MetaFrame XP server. You will need to follow this procedure for each server in your farm.

► **To install Resource Manager on MetaFrame XP**

1. Exit all applications.
2. Insert the System Monitoring and Analysis CD-ROM into your CD-ROM drive.
 - If your CD drive supports Autorun, the Resource Manager splash screen is displayed.
 - If the splash screen does not display, click **Run** from the **Start** menu and type **d:\autorun.exe** where *d* is the letter of your CD drive.
3. Click **Citrix Resource Manager Setup**.
4. Follow the on-screen instructions to complete installation. Click **Next** to continue after each screen. If you want to return to a previous screen, click **Back**.

Note At the end of installation you **may** be prompted to reboot the server. If the reboot server dialog is displayed, we recommend that you reboot the server immediately. If this is impractical, the server should be rebooted as soon as possible.

5. Repeat this procedure to install Resource Manager on every server in your farm.

Licensing Resource Manager

A MetaFrame XPe license is required to enable you to use all Resource Manager functionality. Refer to “Licensing MetaFrame XP” in the MetaFrame XP Administrator’s Guide for further details.

After you enter a Citrix license, you can use your software during a grace period when you do not have to activate the license. But you must activate each license to ensure the continued operation of your software. Refer to “Licensing MetaFrame XP” in the MetaFrame XP Administrator’s Guide for details about how to do this.

Uninstalling Resource Manager

If you no longer want to use a server as a Resource Manager server, you will need to uninstall Resource Manager. This is necessary so that the various subsystems can remove data about the server.

► To uninstall Resource Manager from a server

1. Check whether the server from which you are going to remove Resource Manager is being used as the main or back-up Farm Metric Server, and nominate a different Farm Metric Server if necessary.

See the Resource Manager Help for instructions on how to change the Farm Metric server.

2. Use **Add/Remove Programs** from the Control Panel to uninstall Resource Manager from a server.

Note The uninstall process does not remove all Resource Manager files. Use the **Details** option to view those files that are still left. You will need to remove these manually from the server.

Monitoring Servers



Overview

This chapter explains how you can use Resource Manager to monitor server performance and resource usage in real time. The following topics are included:

- How you can use real-time monitoring in your network environment
- Information about status indicators and alarms
- Monitoring a single server
- Monitoring a group of servers
- Configuring automatic alerts

Viewing the items Resource Manager is monitoring

Resource Manager provides you with information about a number of system and network processes and events. There are status displays which store this information in real time to enable you to form an idea of the general state of your system. You can monitor the following:

- the status of the servers in a farm
- the number of instances that specific applications are running in a farm.

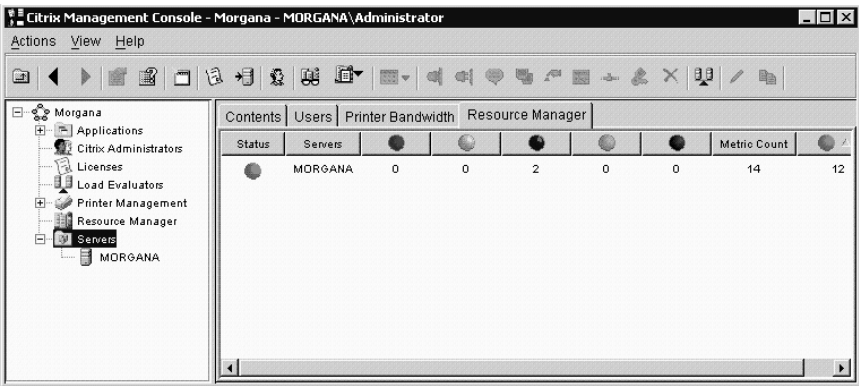
Each item that is being monitored is referred to as a metric.

Checking which servers are being monitored

Use the following procedure to determine which computers in your server farm are being monitored, and to gain an overall view of the real time performance of your system.

- To check which computers are being monitored in your system
1. In the left pane of the Citrix Management Console, select the folder labeled **Servers**.

2. Select the **Resource Manager** tab to display all the status indicators for each server.



The status of servers in your system is displayed, which enables you to gain an idea of the general state of your server farm. All the computers that are being monitored are listed in the Servers column. For each server, the number of metrics that are being monitored are shown in the Metric Count column. And the number of each colored status indicators are shown for each server.

Refer to “Checking the status of the metrics” on page 18 for details about what each colored status indicator means.

Checking which applications are being monitored

You can use Resource Manager to keep a count of how many instances of specific applications are running in the server farm, and notify you if the number of instances of a monitored application reaches a defined limit. This enables you to manage application licenses.

By default, Resource Manager will monitor all MetaFrame XP Published Applications. You can also monitor applications that have not been published in MetaFrame XP, as Resource Manager Applications.

Note All applications that you publish in MetaFrame XP are monitored automatically. You should not add these applications again as Resource Manager applications.

► **To check which applications are being monitored in your server farm**

1. In the left pane of the Citrix Management Console, select the folder labeled **Applications**.
2. Select the **Resource Manager** tab.

A status display indicates those applications that are being monitored. By default, none are displayed.

3. Right-click the Applications folder, and select **New Resource Manager Application**.

A wizard is displayed which enables you to define an application in Resource Manager to monitor. Use the on-screen Help system for details about how to use this wizard.

When you have added applications, you will see that the Metric Count column is always set to 1. This is because Resource Manager only monitors one metric for applications, that is, the number of instances that a specific application is running in the server farm. Details about this enable you to manage your application licenses.

See the Resource Manager Help for more information about:

- How to set up a new Resource Manager application
- Resource Manager applications.

Checking which metrics are being monitored

Although the Metric Count column provides you with information about the number of different metrics that are being monitored for a server, you may want to know what metrics these include.

► **To determine which metrics are being monitored for a server**

1. In the left pane of the Citrix Management Console, ensure that the folder labeled **Servers** is selected, and the **Resource Manager** tab is selected.
2. From the right pane, double-click on the server that you want to monitor.

The status for that server is displayed which lists all the metrics that are being monitored.

Refer to “Monitoring the status of a server” on page 19 for further details.

Checking the status of the metrics

For each server in your system, colored status indicators (visual alarms) show the status of each monitored condition, or metric.

During installation, Resource Manager automatically configures a set of limits for the metrics that apply to each server. If the value of a metric falls outside normal limits, a visual alarm is displayed to warn you. You may be required to alter these limits to suit your specific network environment.

The meaning of each condition is described by the following table:

Status indicator	Metric condition
Green	represents normal operation. That is, the value of the metric falls between limits that have been set.
Yellow	represents a warning condition. This indicates that a problem may be developing that will require further analysis to improve performance, or to prevent the situation from becoming worse.
Red	represents a problem condition. This often means that some action is required to provide better application or server performance. Both yellow and red indicators occur when the average value for a metric over a 15 second period falls outside the normal limits, and remains there for a defined period of time.

Status indicator	Metric condition
Blue	represents a metric that is not yet active, and needs to be configured.
Black	represents a metric that is not currently being monitored because it is set to Sleep. Refer to “Suspending metrics from being monitored” on page 23, for further details.
Gray	represents a metric that is not currently being monitored because it is set to Snooze. Refer to “Suspending metrics from being monitored” on page 23, for further details.

Resource Manager determines the status of each alarm condition by sampling the statistics associated with the monitored condition every 15 seconds, and the colored status indicators change accordingly.

Watching for alarms

There are a number of ways in which Resource Manager enables you to monitor the status of servers in your server farm. You can do this by monitoring the status of individual servers, by monitoring the status of all selected servers, or by displaying a window which enables you to watch for alarms when the status displays are not visible.

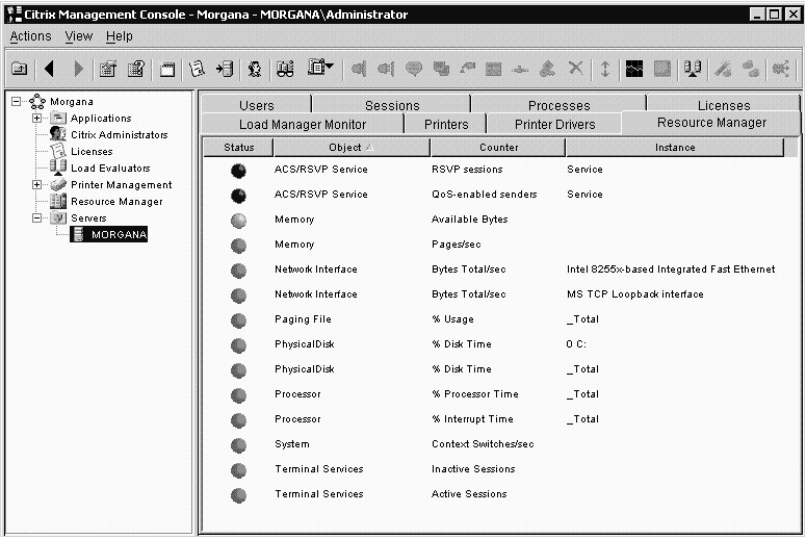
Monitoring the status of a server

Use the following procedure to view the status display for an individual server.

► **To view the status display for a server**

1. In the left pane of the Citrix Management Console, navigate to the list of servers in the farm.
2. Select the name of the server that you want to monitor.

- 3. Select the **Resource Manager** tab to display the current set of metrics that are being monitored for the server.



When a problem occurs, Resource Manager displays an alarm for the relevant metric. Refer to “Checking the status of the metrics” on page 18 for an explanation of what each status indicator represents.

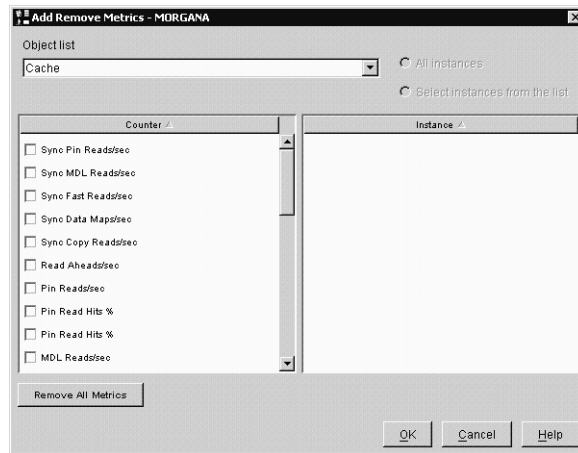
Customizing real-time monitoring

By changing the set of metrics that are being monitored, or altering the alarm configuration for specific metrics on each server, you can tailor real-time monitoring to suit your network environment.

► To change the set of metrics that are being monitored

- 1. Click the right mouse button on any metric in the right pane.

2. Select **Add/Remove Metrics** to display the Add Remove Metrics dialog box.



You will see from this dialog box that a metric is a combination of the following three items:

- An **object** which represents the category that you want to monitor. It is a physical or logical system resource, for example the hard disk of a computer.
 - The **counter** which is the specific aspect of the object that you want to monitor. For example, processor time.
 - The **instance** of an object. For example a computer may have more than one hard disk. In this case, the instance would identify which disk you want to examine.
3. Use the options to determine the metrics that you want to monitor for a server or application.

► **To change the metric properties**

1. Click the right mouse button on any metric in the right pane.
2. Select **Properties** to display the Server Metric Properties dialog box.
3. Configure how alarms should operate for each metric by doing the following:
 - specify the thresholds for each alarm type using the Yellow Limit and Red Limit columns
 - specify the time period beyond which a limit must be exceeded to trigger an alarm using the Yellow Time and Red Time columns.

Monitoring the status of a group of servers

You can monitor a group of servers as an individual unit by placing them into a folder, and viewing the status display for that folder.

► **To monitor a selected group of servers**

1. In the left pane of the Citrix Management Console, select the **Servers** folder.
2. Click the right mouse button, and select **New Folder**.
3. Enter a name for the new folder in the text box.
4. Select the names of servers from the left pane, and drag and drop them into the new folder.
5. Select the new folder, and click the **Resource Manager** tab to view the status display for all servers in the customized unit.

Watching for alarms while doing other tasks

When the status display for all servers in your system is not visible, you can monitor any problems that occur by displaying the Resource Manager Watcher window.

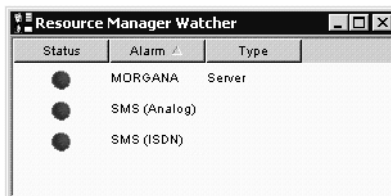
► **To display the Resource Manager Watcher window**

1. In the left pane of the Citrix Management Console, select **Resource Manager**, and select the **Watcher** tab.

Alternatively, select the Resource Manager Watcher Window icon from the toolbar of the Citrix Management Console.



This window lists any problems that are occurring (red or yellow alarms), for example the name of a problematic server.



Note If this window appears blank, this indicates that no problems have been detected in the server farm.

2. Double-click on a server alarm to view the status display for that server.

Suspending metrics from being monitored

You can suspend metrics from being monitored on a Resource Manager server for either a specified period of time, or until you choose to switch back to monitor mode. This may be useful if you want to work on the system without alarms being registered. Similarly, you can suspend applications from being monitored.

► To suspend metrics from being monitored

1. Select the metric that you want to suspend from being monitored from the right pane (use the Shift key to select more than one metric), and click the right mouse button.
2. Select from the following:
 - **Snooze** to suspend metrics from being monitored for a defined period of time.
The status indicators become gray.
 - **Sleep** to suspend metrics from being monitored for an indefinite period of time.
The status indicators become black.
3. To continue monitoring as before, reselect the metric(s) and choose either **Snooze** or **Sleep**, as necessary.
The color of each status indicator changes to indicate the condition of each metric.

Preparing your system for Resource Manager alerts

You can use Resource Manager to send alert messages each time certain metrics change their alarm status. For example, you can specify that you want a particular metric to trigger an alert each time a red alarm occurs.

The alerts can be in one or more of the following forms:

- Short Message Service (SMS) text messages to cell phones
- Simple Network Management Protocol (SNMP) messages
- Email messages

To use Resource Manager to send alerts, you need to set up at least one Resource Manager server to ‘send’ the alert messages. You will need to make sure that these servers have additional hardware or software to handle each type of alert you require: for example, a modem for SMS alerts, and an email system for email alerts.

When you have done this, you can configure settings in Resource Manager, such as who will receive the alert messages, and set up the individual server and application metrics that you want to trigger the alert messages.

Preparing your system for email alerts

To set up your system for email alerts, you first need to choose and configure the servers in the farm that you want to use to actually send the email messages. These servers are called *MAPI Connection Servers*.

Selecting the MAPI Connection Servers

You need to select one or more servers in the farm to be the MAPI Connection Servers: that is, the servers that send the email alert messages. You can configure metrics on any Resource Manager server to trigger email alerts, but it is the MAPI Connection Servers that actually 'send' the alert messages, using your email system. Typically, you might configure two or three MAPI Connection Servers in the server farm: one of which is the main email server and the others to act as backup.

Each MAPI Connection Server must be able to access a mail server (for example, Microsoft Exchange Server). It must have an email client installed (for example, Microsoft Outlook) that conforms to the X-400 protocols.

Creating a mail profile for Resource Manager

On each MAPI Connection Server, you need to configure a mail profile for Resource Manager to use. The profile must have the same name and details on all of your MAPI Connection Servers. It is recommended that you give the profile a name that is easy to recognize (for example, Citrix Resource Manager). The profile is used throughout the server farm.

When you create the mail profile, make sure that you include the mail system that you want to use: for example, Microsoft Exchange Server. You can also specify an address book for the profile.

When you have finished setting up the profile, it is a good idea to test that you can log on to your email system using the profile, and that you can send a message.

Enabling the Resource Manager Mail Service

Email alerts are managed by a service called the Resource Manager Mail Service. This service is installed automatically on all servers on which you install Resource Manager. You need to enable the service on each MAPI Connection Server.

- ▶ **To enable the Resource Manager Mail Service on a MAPI Connection Server**
 1. In the Control Panel, navigate to the Services dialog, double-click the Resource Manager Mail Service, and select **Properties**.
 2. Ensure that the startup type for the service is **Automatic**.
 3. Change the logon for the service to **This account**.
 4. Enter the details of the local user account that you want Resource Manager to use for email alerts. The account name must include the domain. Make sure that you type the account details exactly, or browse to the account so that you can be sure that the details you enter are correct.
 5. Ensure that the Resource Manager Mail Service is started.

Configuring Resource Manager to use email alerts

When you have set up the MAPI connection servers, you can set up Resource Manager to use email alerts for the server farm. For example, you need to set up the people who will receive the alert messages. These settings apply to the entire server farm.

- ▶ **To configure Resource Manager to use email**
 1. In the left pane of Citrix Management Console, highlight **Resource Manager**.
 2. In the right pane, select the **E-mail** tab.
 3. Check that the **MAPI Connection Servers** list displays the names of the servers you have configured to send email alerts for the server farm. If necessary, use the **Add** and **Delete** buttons to edit the list.
 4. Check that the **Selected MAPI Profile** exactly matches the profile that you have set up for Resource Manager on the MAPI Connection Servers. If it does not, use **Edit** to change the profile.
 5. In **Recipient Addresses**, select the users who you want to receive email alert messages for the server farm. The users can be set up in the profile you have defined for Resource Manager on the MAPI Connection Servers.

Tip You may want to organize the people you want to receive email alerts into groups in the address book for the Resource Manager profile. For example, you might create a group of people who normally receive the alerts, and another group who receive alerts during holiday periods.

See the Resource Manager Help for:

- Instructions on how to set up a metric to trigger an alert
- Additional information about each dialog.

Preparing your system for SMS alerts

If you want to use SMS alerts, ensure that at least one Resource Manager server in the server farm has a modem. This may be an analog modem or an ISDN card.

You need to investigate the modem requirements of the service providers for the cell phones to which you want to send alerts. Some service providers require a specific type of modem (usually analog). Where this is the case, at least one server with that type of modem must be in the server farm before you can use SMS alerts for that service provider.

If the people that you want to receive SMS alerts use a variety of different service providers, you need to know the details of the gateway that Resource Manager must use to communicate with each service provider. Each provider is likely to have a different telephone number, and may employ a different protocol to carry the messages. Some service providers offer an analog line, others offer ISDN. You will probably need to configure a range of numbers to call, and a range of protocols to use.

Configuring Resource Manager to use SMS

When you have ensured that all the requirements for SMS alerts are present, you can set up the way in which Resource Manager uses SMS for alerts in the server farm. For example, you need to set up the people who will receive the alert messages. These settings apply to the entire server farm.

You need to select one or more servers in the farm to send the SMS alerts. A server that you have configured to send SMS alerts is called a *TAPI Server*.

You can configure SMS alerts to occur on any Resource Manager server, but it is the TAPI Servers that communicate with the service providers and instruct them to send text messages.

► To configure Resource Manager to use SMS alerts

1. In the left pane of Citrix Management Console, highlight **Resource Manager**.
2. In the right pane, select the **SMS** tab.
3. To configure the servers that you want to communicate with the service providers, in the **TAPI Servers** list, highlight the server you want to configure and click **Edit** to display a configuration dialog.

4. If the server has more than one modem, identify which modem to use, and specify the type of connection (analog or digital).
5. Use the **Enabled** checkbox to enable or disable this server for SMS alerts. By leaving this box unchecked, you can configure the server for SMS alerts, but specify that you do not want to use it at the present time. Similarly, if you need to reconfigure the server, you can just clear the **Enabled** box rather than having to reconfigure SMS messaging.
6. Click **OK** to return to the main **SMS** tab.
7. If required, set up the gateway that is to be used for calls to *each* service provider that you want to use. The **SMS Gateways** panel shows a list of all gateways that are currently configured.
8. When one or more gateways have been configured, you can set up the details of the people who can receive SMS alerts. The **Users** panel shows a list of all the people who are currently configured to receive the alerts.
9. If you want, you can organize the alert recipients into groups. The **Groups** panel shows a list of all existing groups, and the number of members in each.

See the Resource Manager Help for:

- Instructions on how to set up a metric to trigger an alert
- Additional information about each dialog.

Preparing your system for SNMP alerts

To receive SNMP messages, a computer on a network requires an SNMP management tool that enables it to 'listen' for messages. A number of third-party commercial tools are available.

► To configure Resource Manager to use SNMP alerts

1. In the left pane of Citrix Management Console, highlight **Resource Manager**.
2. In the right pane, select the **SNMP** tab.
3. Click **Edit**.
4. Type the *exact name* of the SNMP community that is to receive the alert message.
5. Identify the destination port number that is to receive the SNMP messages. To use the default port (you would nearly always want to do this), enter **0**.
6. Identify the local port number. To use the default port (you would nearly always want to do this), enter **0**.

See the Resource Manager Help for:

- Instructions on how to set up a metric to trigger an alert
- Additional information about each dialog.

Getting more information about monitoring

Look in the Resource Manager online Help for more detailed information about:

- Monitoring applications. You can use Resource Manager to keep a count of how many instances of specific applications are running in the server farm, and notify you if the number of instances of a monitored application reaches a defined limit. This enables you to manage application licenses.
- Displaying a graph that tracks a metric's value in real time.
- Changing the alarm thresholds for a metric.
- Ignoring specific processes on a server.

Reporting and Analyzing Information



Overview

This chapter describes how you can generate and analyze reports using data that is held on each server. Topics in this chapter include:

- Displaying the current status of a server
- Displaying stored data about applications and users
- Viewing reports that you have saved

Creating reports to analyze data

Resource Manager enables you to produce a variety of reports based on the data that has been collected about your server farm.

Reports in Resource Manager present detailed information about your network environment, and include the following:

- the status of your server farm at a particular moment in time
- the statistics about the users in your server farm.

You can use this information to inform others about the network environment, and to establish future resource requirements. You can identify why problems have occurred, and reduce the likelihood of these occurrences in the future.

► To produce a report

1. In the left pane of the Citrix Management Console, select **Resource Manager**.
2. Select the **Reports** tab.
3. Choose from the following types of report, and refer to each section for further information:
 - System Snapshot - refer to “Looking back to a specific time”
 - Current Processes - refer to “Reporting about use of applications”
 - Current Users - refer to “Reporting user activity”

Once you have generated a report, you can save it as HTML or CSV format, which you can then include in a document.

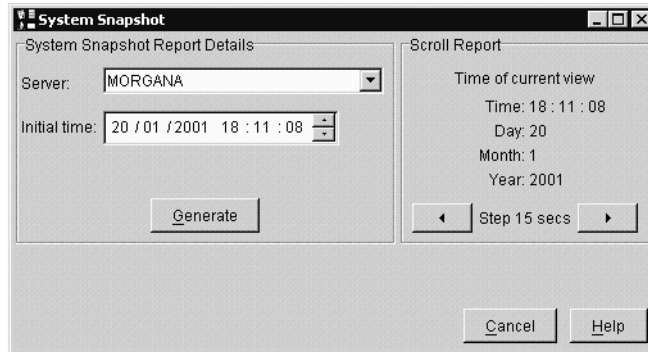
Note Resource Manager uses a number of HTML templates to create reports. These are located on each server in the Citrix Resource Manager folder, and must not be edited so that any inconsistencies in the reports are avoided.

Looking back to a specific time

If there is a problem on a particular server, you can produce a system snapshot which displays information about the status of the server at the exact time when the problem occurred. You can then use this report to try and evaluate why the problem happened.

► To produce a system snapshot

1. Select **System Snapshot** from the Reports tab.



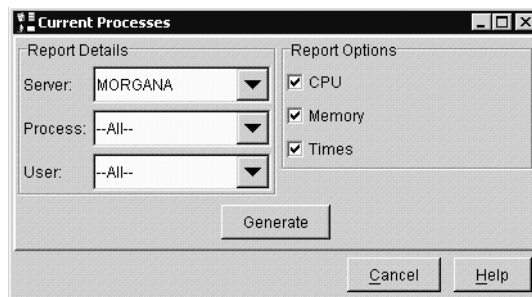
2. Use the options to specify the interval of time for which you want records to be displayed.

Reporting about use of applications

You can produce a report that displays information about the processes that are being monitored in the server farm, and in particular, processes that are running on a specific server.

► To produce a recent process report

1. Select **Current Processes** from the Reports tab.



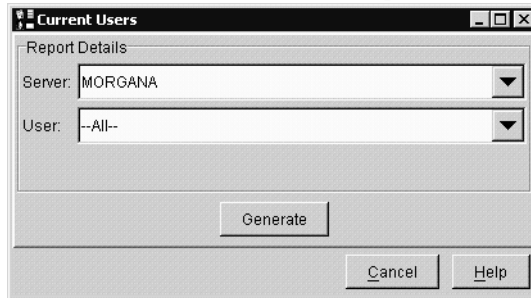
2. Choose which process and user to report on, and use the Report Options check boxes to specify the information that you want to include in the report.

Reporting user activity

You can use Resource Manager to provide information about how users at your site use applications and servers.

► To display a users analysis report

1. Select **Current Users** from the Reports tab



2. Select which user you want to analyze, and for which server.

Viewing saved reports

You can view reports that have been saved as an HTML file, and if necessary, you can convert to CSV.

► To view a saved report

1. Select **View Saved Report** from the Reports tab.
2. Navigate to the location of the report, and click **Open**.

Default Metric Set



Overview

This appendix describes the default set of metrics that are monitored by Resource Manager.

Introduction

During installation, Resource Manager automatically configures a default set of metrics for each server, according to the server type.

There is a default set of metrics for:

- Windows NT 4.0, Terminal Server Edition
- Windows 2000 Server

When you first install, Resource Manager picks a set of default metrics and settings for your server type. These settings should give a good overview of the system, and should mean that you can start monitoring straight away without needing to customize the settings. As you get more used to the normal ranges of your system usage, you may want to fine-tune the settings, or add different metrics.

The main factors of each server that Resource Manager is monitoring are:

- Network cards or interfaces
- Processor
- Disks
- Page files
- Session usage
- Memory

Default set of metrics for Windows 2000 Server

Logical Disk

% Disk Time

Gives an indication as to how busy the disks are. The disk can become a bottleneck for a number of reasons:

- The server has too little physical memory so is 'thrashing'. If 'thrashing' is occurring, the pages/sec will also be high.
- A single user is running an application or process, which makes extensive and rapid use of the disk. You can investigate such a user by running Current Process and Current User reports.
- Many users are performing large amounts of disk activity. The speed of the disks may be the server's bottleneck.

The metric % Disk Time is calculated using a number of factors and values above 100% are possible. If you see values of 100% disk time, the disk is in constant use. Values greater than 100% may indicate that the disk is too slow for the number of requests.

% Free Space

The server is running out of disk space. This can be for a number of reasons:

- A lack of remaining disk space after installing the Operating System and applications.
- A large number of users have logged in (now or in the past) and their configuration data, settings and files are taking up too much space.
- There is a rogue process or user who is consuming a large amount of disk space.

Memory

Available Bytes

Inform the administrator if too much memory is being used. This could be because:

- Too many users are logged in.
- The applications users are running are too memory hungry for the amount of memory available on the server.
- There is some user or process using a large amount of memory. Running a Current Process report may help you track this down.

Being short on memory could result in 'thrashing'. The disk usage and paging metrics may also change to a red alarm state.

Pages/sec

A large amount of paging indicates either:

- The system is low on physical memory and the disk is being used extensively as virtual memory. This can be caused by too many users being logged on, too many processes running or a rogue process 'stealing' virtual memory.
- An active process or processes are making large and frequent memory accesses.

Too much paging will degrade the performance of the server for all users logged on. The Available Bytes, Disk and % Processor Time metrics may also enter warning or danger states when a large amount of paging occurs. Short bursts of heavy paging are normal, but long periods of heavy paging will seriously affect server performance.

Network Interface

Bytes Total/sec

Gives a good indication of how much network activity this server is generating/receiving. If this metric changes to yellow or red, the server is experiencing unusually high network activity and may cause a network saturation. If too many users are remotely logged on for the network card to support, this metric may change to a warning or danger state. In this situation, the bottleneck could be the network or server's network card, which may decrease performance of users' sessions.

Paging File

% Usage

A high page file usage usually indicates that the server's page file size should be extended.

Processor

% Interrupt Time

The processor is spending a large amount of time responding to input and output rather than user processing. A large value for interrupt time usually indicates a hardware problem or a very busy server.

% Processor Time

A high processor time for a long period of time indicates that the processor(s) is the bottleneck of the server, there are too many users logged in, or there is a rogue user or process (use the Current Process report to investigate).

System

Context Switches/sec

A large number of threads and/or processes are competing for processor time.

Terminal Services

Active Sessions

There are a large number of users logged in and running applications. The server may begin running out of memory or processor time and performance for users may deteriorate.

Inactive Sessions

There are a large number of disconnected sessions, which are taking up virtual memory. You should remove some disconnected sessions, or reduce the length of time for which disconnected sessions can persist until they are automatically destroyed.

Default set of metrics for Windows NT 4.0, Terminal Server Edition

Logical Disk

% Disk Time

Gives an indication as to how busy the disks are. The disk can become a bottleneck for a number of reasons:

- The server has too little physical memory so is ‘thrashing’. If ‘thrashing’ is occurring, the pages/sec will also be high.
- A single user is running an application or process, which makes extensive and rapid use of the disk. You can investigate such a user by running Current Process and Current User reports.
- Many users are performing large amounts of disk activity. The speed of the disks may be the server’s bottleneck.

The metric % Disk Time is calculated using a number of factors and values above 100% are possible. If you see values of 100% disk time, the disk is in constant use. Values greater than 100% may indicate that the disk is too slow for the number of requests.

% Free Space

The server is running out of disk space. This can be for a number of reasons:

- A lack of remaining disk space after installing the Operating System and applications.
- A large number of users have logged in (now or in the past) and their configuration data, settings and files are taking up too much space.
- There is a rogue process or user who is consuming a large amount of disk space.

Memory

Available Bytes

Informs the administrator if too much memory is being used. This could be because:

- Too many users are logged in.
- The applications users are running consume too much memory relative to the amount of memory available on the server.
- There is some user or process using a large amount of memory. To help you track this down, you can run a Current Processes report.

Being short on memory could result in ‘thrashing’. The disk usage and paging metrics may also change to a red alarm state.

Pages/sec

A large amount of paging indicates either:

- The system is low on physical memory and the disk is being used extensively as virtual memory. This can be caused by too many users being logged on, too many processes running or a rogue process 'stealing' virtual memory.
- An active process or processes are making large and frequent memory accesses.

Too much paging will degrade the performance of the server for all users logged on. The Available Bytes, Disk and % Total Processor Time metrics may also enter warning states when a large amount of paging occurs. Short bursts of heavy paging are normal, but long periods of heavy paging will seriously affect server performance.

Network Segment**% Network utilization**

Gives a good indication of how much network activity this server is generating/receiving. If this metric changes to yellow or red, the server is experiencing unusually high network activity and may cause a network saturation. If too many users are remotely logged on for the network card to support, this metric may change to a warning state. In this situation, the bottleneck could be the network or server's network card, which may decrease performance of users' sessions.

Paging File**% Usage**

A high page file usage usually indicates that the server's page file size should be extended.

System**Active Sessions**

There are a large number of users logged in and running applications. The server may begin running out of memory or processor time and performance for users may deteriorate.

Context Switches/sec

A large number of threads and/or processes are competing for processor time.

Inactive Sessions

There are a large number of disconnected sessions, which are taking up virtual memory. You should remove some disconnected sessions, or reduce the length of time for which disconnected sessions can persist until they are automatically removed.

% Total Interrupt Time

The processor is spending a large amount of time responding to input and output rather than user processing. A large value for interrupt time usually indicates a hardware problem or a very busy server.

% Total Processor Time

A high processor time for a long period of time indicates either the processor(s) is the bottleneck of the server, there are too many users logged in, or there is a rogue user or process (use a Current Process report to investigate).

Total protocol Bytes/sec

The number of bytes sent through the network to display to remote users. If this is particularly high, a large number of users are receiving frequent screen updates from the server. The users' display performance may deteriorate as more users log on, or when other network activity is performed by the server (for instance, copying a file).

Glossary



alarm A condition that occurs when a metric value is equal to, or outside of, the upper and lower limits for a defined period of time.

alarm threshold The upper and lower limits for a particular metric, beyond which an alarm condition occurs. The values for default metrics are automatically set during installation, but a user can later assign these values.

alert An event that is triggered by an alarm, and which can be one of the following: an email message, an SNMP message, or an SMS message (cell phone alert).

Citrix Management Console Citrix's extensible, platform-independent tool for administering Citrix servers and management products.

data store A data store that centralizes configuration information about published applications, users, printers, and servers. Each Citrix server farm has a single data store.

Independent Management Architecture (IMA) Citrix's server-to-server infrastructure that provides robust, secure, and scalable tools for managing any size server farm. Among other features, IMA enables centralized platform-independent management, an ODBC-compliant data store, and a suite of management products that plug in to the Citrix Management Console.

license number An alphanumeric string displayed by Citrix Management Console when you enter a product serial number. You enter the license number on the Citrix Activation System web page to receive an activation code for the MetaFrame XP server license.

MAPI Connection Server The server that holds information about MAPI connections.

MDAC Microsoft Data Access Components. A collection of Microsoft software components that provide ODBC core functionality and ODBC drivers for many database management systems (DBMS).

MetaFrame Citrix's server-based computing solution that incorporates Citrix's Independent Computing Architecture (ICA) protocol.

metric One of a series of measurable items for a server or application. You can select which metrics you want to monitor for a particular server.

- monitoring** This occurs when Resource Manager is actively looking at the data on servers.
- server farm** A group of servers that are managed as a single unit, and that share some form of physical connection and a single data store.
- shadowing** A feature of Citrix servers that enables an authorized user to remotely join or take control of another user's ICA session for diagnosis.
- SNMP (Simple Network Management Protocol)** A type of automatic alert that you can configure when an alarm condition occurs.
- status display** A set of status indicators, one for each metric that is being tracked.
- status indicator** A colored signal in the status display that shows the status of each metric. When a status indicator in the display changes color, an alarm condition occurs.
- zone** A logical grouping of Resource Manager servers.

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