Remote Deployment Manager 4.1 Operations Guide

Note:

Before using this information and the product it supports, read the general information in Appendix E, “Notices,” on page 263.

Contents

About this guide

This guide explains the capabilities of IBM® Remote Deployment Manager (RDM) 4.1. This product gives administrators centralized control over many servers, workstations, desktop computers, point-of-sale systems, and mobile computers that are connected to the local area network (LAN) or wide area network (WAN). Using the RDM tasks in IBM Director Console, you can deploy an operating system (including applications), update BIOS code or other system firmware, back up or restore the primary partition, and perform other maintenance tasks on your computers without having to visit each computer. This can significantly lower your cost of ownership.

Although one of the features of RDM is to distribute software to systems across a LAN, the terms and conditions of the IBM International Program License Agreement for RDM do not grant any license to install, copy, or use any application software or operating system software not provided with RDM. This includes, but is not limited to, Windows® 2000 Professional, Windows 2000 Server and Advanced Server, Windows XP Professional, Windows Server 2003, DOS, and Linux®. Always ensure that you have obtained suitable licenses for any software you intend to use with RDM.

This guide is organized as follows:

Chapter 1, "**Overview**," contains an introductory overview of the purpose and features of RDM. The various concepts relevant to RDM are also discussed. It is important to understand the information discussed in this chapter to take full advantage of RDM.

Chapter 2, "**The RDM interface**," provides a graphical view of the main windows of the RDM console.

Chapter 3, "**RDM tasks**," describes the main functions and operations of RDM.

Chapter 4, "**Tools**," describes the Power Restore tool used by RDM.

Chapter 5, "**Scenarios**," describes how to perform a variety of common tasks.

Chapter 6, "**Customizing RDM**," describes how to modify parts of RDM to address your unique requirements.

Chapter 7, "**Utilities**," contains instructions on how to use the utilities supplied with RDM.

Chapter 8, "**Troubleshooting**," contains a compilation of answers and workarounds to known problems with RDM.

Appendix A, "**Command list commands**," lists the syntax allowed in an RDM command list.

Appendix B, "**Client environment overrides**," describes customizing system environments.

Appendix C, "**RDM 4.1 data**," describes where files are stored within the RDM repository directory structure.

Appendix D, "**Linux directories**," lists the major Linux directories that should be avoided when deploying Linux to clients.

Appendix E, "**Notices**," provides legal information (trademarks and edition notices).

A glossary and index are included at the end of the guide.

Who should read this guide

This guide is intended to help network administrators understand the concepts and procedures of RDM. To effectively use this guide, you should already have an extensive knowledge of your Network environment as well as the applicable operating system: Windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server, Windows XP Professional, Windows Server 2003 Standard Edition, Windows Server 2003 Enterprise Edition, Windows Server 2003 Web Edition, or Linux.

RDM is a networked system administrator tool; however, within that group there are several distinct types of user:

- **Corporate Deployment Developers**. This group consists of professionals who develop system images and delivery mechanisms for large organizations. They typically explore RDM, see what it does, and then create their own highly customized system images to be delivered by technicians using RDM tasks. They likely modify the batch files and data files generated by RDM.
- **Group Network Administrators**. These users have the knowledge and authority to deploy systems within their organization, but it is not their primary role. They typically use all the facilities of RDM but are not involved with in-depth details of the product. RDM provides all they need without requiring that they write code.
- **Deployment Technicians**. This group delivers the services put together by the corporate developers. They use a limited subset of RDM to deliver system images, and to update and recover problem systems. They are familiar with things such as IP-address assignments and workstation-naming policies, but they are prompted by the system for any such information they have to provide.

Changes since the previous version

RDM version 4.1 is a new implementation of the RDM product, using a new architecture while retaining the core function of managing the delivery of deployment and low-level services for IBM servers, workstations, desktop computers, point-of-sale systems, and mobile computers (Intel-architecture systems).

New functions in RDM 4.1 include:

- Integration with IBM Director
- New user interface with the same look and feel as the IBM Director console
- Supports up to 5000 systems on a single IBM Director/RDM server and console
- Ability to perform hardware configuration separately from operating-system deployment
- True WAN access across IP
- Architecture for adding the following new types of service:
  - Custom tasks that you can use to create your own deployment scenarios
  - System Firmware Update task that supports integrated system management processor (ISMP) firmware updates
  - RAID setup task that supports both ServeRAID® and LSI RAID controllers
  - Script tasks that you can use to run several tasks in a single operation
- Customer can modify task logic at the top level (that is, how the server controls the task logic), as well as at the batch-file and data-file level

- Command-line interface to run RDM tasks
- Independent scheduling of multiple tasks
- Uses TCP/IP for all communication
- IP multicast support for deploying operating systems to large numbers of systems simultaneously
- Preboot Execution Environment (PXE)-related enhancements:
  - DOS-image (or Linux-image) support
  - Ability to select a PXE boot image on a per-system basis
  - Multiple copies of RDM 4.1 PXE Services can be managed by the RDM 4.1 server (installed on multiple systems)
- Ability to run the RDM server on 32-bit Windows Server 2003 Standard Edition, Enterprise Edition, or Web Edition
- Enhanced device-driver deployment:
  - Unattended installation of all device drivers so that the entire deployment has the latest drivers (or the specific driver versions you want)
  - User interface that you can use to add new device drivers (using an automated function)
  - Deploy hot-swap PCI driver
- Support for deploying new operating systems:
  - Built-in native installation for 32-bit Linux (Red Hat versions 7.3 and 8.0)
  - Built-in native installation for 32-bit Windows Server 2003 Standard Edition, Enterprise Edition, or Web Edition
  - New Windows 2000, XP, or 2003 service packs
- Support for new hardware:
  - Processor blades
  - Partitioned servers
  - New network, SCSI, RAID, and service processor adapters
- Replicate files from the Master Repository to other repositories (using an automated function)
- One-step installation of all RDM 4.1 components (that is, after the IBM Director prerequisite is installed) on a system
  - Unattended (silent) installation of all RDM 4.1 components
  - Support for new IBM systems and new IBM network and other adapters. See the RDM *Compatibility and Configuration Guide.*
  - RDM 4.1 is a complete replacement for RDM 3.x and has dropped some functions that are considered obsolete. Items that were in the previous version that are not included in RDM 4.1 are:
- Use of NetBIOS protocol (removed the need for systems to login)
- LSA1 protocol support
- DDE interface to Wake on LAN® tool

- Built-in Windows 95 and Windows 95 OSR2 deployment
- Built-in Windows 98 and Windows 98 SE deployment
- Built-in Windows NT deployment

Further reference

In addition to this guide, there are various other sources of information that you can consult for RDM.

Guides

The following product documentation is available for RDM:

- *Remote Deployment Manager 4.1 Getting Started* – Step-by-step examples of using several tasks
- *Remote Deployment Manager 4.1 Installation Guide* – Describes the complete installation process of RDM
- *Remote Deployment Manager 4.1 Compatibility and Configuration Guide* – Lists RDM-supported hardware and software

Online help

In general, every window has online help available (except for some message windows or other windows where no help is applicable), either using a **Help** menu or a **Help** button.

Links

The following links are available for further information:

- The compatibility and configuration guides list compatibility of RDM with system hardware, network adapters, and operating systems. For details, go to the RDM home page at:

  http://www.ibm.com/servers/eserver/xseries/systems_management/sys_migration/rdm.html
- You can subscribe to the RDM Users Forum to discuss problems and solutions with fellow users. Go to http://www7.pc.ibm.com/~UMS/.
- Support is available for supported systems (IBM and non-IBM) through e-mail or fee-based telephone support. Telephone support is not available in all countries. For more information about the fee-based telephone support, go to http://www.ibm.com/support or http://service.software.ibm.com/supportline.html. For more information about e-mail support, refer to the RDM home page.

Important: Before using RDM 4.1, check the compatibility test results and browse the rest of the RDM Web site for additional information and tips concerning the installation and use of RDM.

Chapter 1. Overview

RDM provides you with tools to simplify the configuration of your computers and the deployment of your choice of Windows or Linux operating systems and applications. When computers are added to the RDM database, you can remotely install, maintain, and update software on these systems. For example, with RDM you can perform the following tasks:

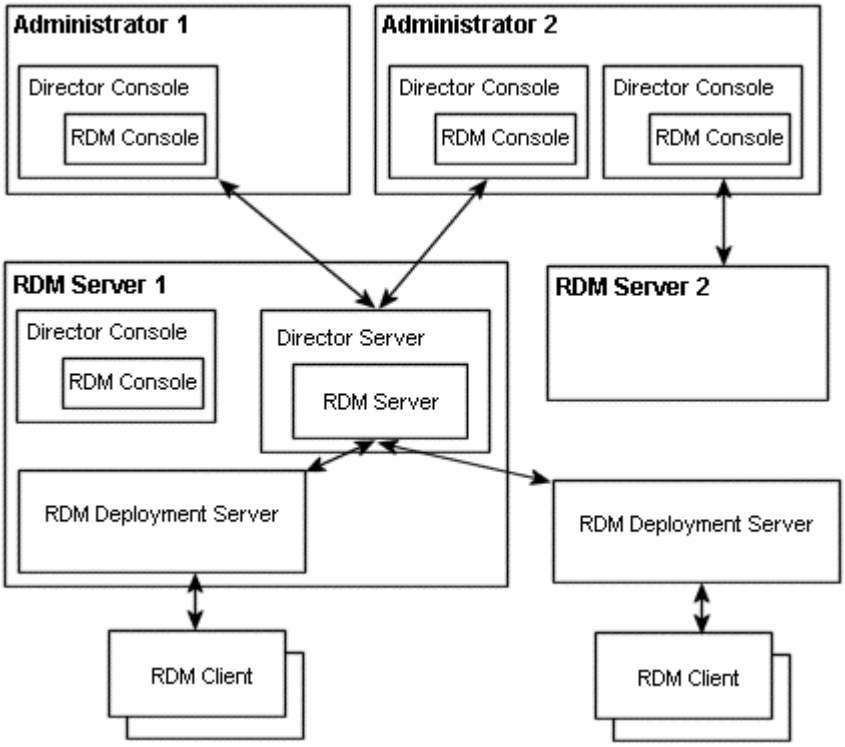
- Remotely identify computers and gather important vital product data such as serial number, machine type model, system memory, hard disk drive capacity, and BIOS code level
- Remotely perform automated installations of Windows and Linux, as well as applications
- Turn on computer systems by sending a Magic Packet to Wake on LAN®-enabled systems, or for some systems, use the service processor to power them on
- Update or flash system BIOS code or other system firmware, or modify system configuration settings
- Completely erase system hard disk drives, in preparation for disposing or reassigning the computer
- Back up to, or restore the boot partition from, a hidden area on the hard disk drive

RDM is a large product with a rich set of functions. A good way to become familiar with RDM is to read this overview chapter, and then to try the scenarios described in *Remote Deployment Manager 4.1 Getting Started.* At that point, read the rest of this *Operations Guide* to learn more about RDM capabilities.

RDM components

Remote Deployment Manager is divided into several components. The functions of each of these major components are described next. For more information on the hardware requirements and installation of these components, see the *Remote Deployment Manager 4.1 Installation Guide*.

The following diagram illustrates the main elements of RDM and its installable components.



Console

The RDM Console is an IBM Director Console on which the RDM Console functions are installed. RDM tasks appear as peers of other IBM Director subtasks, and RDM systems appear in a similar manner as IBM Director managed systems. A console must be installed on the same system as the server; another console can be optionally installed on a separate system.

The console is an interface to RDM. You start most RDM functions from the console using the RDM tasks, templates, or tools in the Tasks pane of IBM Director Console, either by right-clicking the applicable RDM item, or by dragging systems onto a task.

Server

The RDM Server is an IBM Director server on which RDM components are installed. RDM delivers the required program and data files to a system using its local deployment server, dynamically configuring the boot server so that the system starts the correct system environment, and monitoring status communicated from the system and Dynamic Host Configuration Protocol (DHCP) Proxy.

Access to the server functions from the console is through the IBM Director Console-to-Server interface.

The RDM Server is a selectable component during the RDM installation. If you select to install the server, the RDM Console and RDM Deployment Server (also known as D-Server) components are also required and automatically installed, as well.

Director database

IBM Director uses its SQL database to contain all its system inventory data. RDM uses the IBM Director database for its RDM-unique inventory data.

Director Persistent Storage

IBM Director uses its *Persistent Storage* to contain all its data that is not system inventory data. Although RDM does not access this data directly, the IBM Director internal software accesses this data whenever an RDM object is created.

RDM database

RDM uses its own SQL database to store most of the data that defines its tasks and jobs. This is a Microsoft Jet (the database engine that is used by default by Microsoft Access) database, located at \RDM\Local\RDM.mdb.

Tasks

Tasks are the functions that a user needs. A task is a predefined and configured unit of work that can be applied to a system or a group (of systems). You create a task using the applicable task template in the RDM main console. RDM is also installed with a few built-in tasks, for example, several data disposal tasks and a scan task.

RDM tasks and RDM task templates are displayed in the IBM Director Console Tasks panel (the right panel), along with all the IBM Director subtasks.

A task includes the following key components:

- command list
- programs
- images

Templates

A task template is a prototype of a specific kind of RDM 4.1 task. Each task template has its own characteristics and attributes that apply to any subtasks created from the template. In other words, any new task is initialized with the properties of its template. RDM 4.1 comes with a set of task templates that is displayed in the Tasks pane of IBM Director Console. A basic RDM operation is to take a raw task template and create a task that is ready to do work. For example, you might use the System Firmware Flash template to create a task with specific system firmware levels for specific machine types, or use the Windows Native Installation template to create a task with a specific operating system and installation parameters. Remember, the function of a task template is not to perform tasks; it is to create tasks.

You can also customize a template. Each template contains default values for some task parameters. You can change the default values or even add new parameters by using the template property-sheet.

Each task template provides a property sheet interface which can be used to set default values for template parameters. Most tasks also provide a property sheet interface to create new tasks derived from that template. Some complex task templates provide a wizard-style user interface to create a new task.

Deployment Server

The RDM Deployment Server, or D-Server, is a file server comprised of a collection of subcomponents that are always installed as a unit. There can be multiple D-Servers to service different LANs efficiently. The D-Server sets options relating to the entire RDM 4.1 program, as opposed to tasks. In the **Tasks** menu, when you select **D-Server Options** under **Remote Deployment Manager**, the Deployment Server Management Options window opens.

PXE Services

The *IBM RDM PXE Service* enables the Preboot Execution Environment (PXE) 2.0 or 2.1 protocol. It also supports the older PXE 0.99 protocol (which is often referred to as "PXE 1.0"). PXE is an industry-standard client/server interface that you can use on network computers that are not yet installed with an operating system to be configured and started remotely. PXE is based on Dynamic Host Configuration Protocol (DHCP).

The PXE service contains 2 internal components: Proxy DHCP service and boot service. The Proxy DHCP service directs the system to the appropriate boot server. Using the PXE protocol, systems can request configuration parameter values and startable images from the server. The boot service provides the name of the network bootstrap program to the system.

The PXE process consists of the system initiating the protocol by broadcasting a DHCPDISCOVER message containing an extension that identifies the request as coming from a system that uses PXE. When the PXE service receives this message, it sends the system a list of boot servers that contain the network bootstrap programs that are available. The system then contacts a boot server and receives the name of a network bootstrap program and a location of a file server from which this program can be downloaded. The system downloads the bootstrap program using Trivial File Transfer Protocol (TFTP) and executes it. Within RDM, the network bootstrap program is used to install operating systems and to do additional maintenance tasks.

The PXE service is a subcomponent in the RDM Deployment Server component. It is automatically installed whenever the RDM Deployment Server is installed.

A DHCP service is not supplied with RDM, as Windows NT 4.0, Windows 2000, Windows 2003, and all UNIX® and Linux operating systems provide a suitable DHCP service.

MTFTP Service

The *IBM RDM MTFTP Service* is a Multicast Trivial File Transfer Protocol (MTFTP) server that downloads files to systems using either TFTP or MTFTP. Operating-system native install images are provided using MTFTP; the DOS or Linux images, bootstrap images, and other small files are provided using TFTP. You can use the MTFTP service for downloads of up to 2 GB (a DOS limitation).

The MTFTP Service is a subcomponent of the RDM Deployment Server component. It is automatically installed whenever the RDM Deployment Server is installed.

D-Server Service

The *IBM RDM DServer Service* handles the communications between systems and the RDM server. It uses HTTP to communicate with the RDM Server.

Repository

The RDM Repository contains the files that RDM uses to run its tasks. It contains the following elements:

- PXE bootstrap programs
- DOS or Linux system environments that are booted remotely
- Other file packages (for example, Windows installation images, Linux installation images, and system firmware diskette images) used during RDM processing

The RDM D-Server that is installed on the RDM Server contains the *Master Repository*, which contains the definitive copy of all the files used in RDM. The files might be large – for example, entire installation images for systems – so communications bandwidth should be taken into account.

Other RDM D-Servers contain a *Distributed Repository* that is a subset of the Master Repository. Each Distributed Repository will contain only the files that are needed to deploy systems on the subnets that are supported by that D-Server.

Replication

Replication from the Master Repository to its various Distributed Repositories is accomplished in the following ways:

- Initiated using the Image Management (IM) tool. RDM copies files to the remote Deployment Servers using HTTP protocol.
- Automatically, the first time an image is needed by a task. RDM copies files to the Remote Deployment Servers using HTTP protocol.
- Manually (not using RDM functions). You populate Remote D-Servers with the applicable files prior to their first use by a task.

You control which of these are applicable by a set of global RDM settings.

Systems

The RDM systems connect to the network using the PXE protocol. There are several types of programs or agents that can run on the systems.

Bootstrap

The bootstrap loader contacts the RDM server and receives instructions to do one of the following:

- Boot the local hard disk drive
- Install and boot an RDM system environment (often called a preboot operating system, such as a startable DOS or Linux image file)

System Environment

An RDM system environment is a single file that the bootstrap installs onto the RDM virtual diskette drive A. The system then boots this environment, which is a minimal DOS or Linux operating system containing the following elements:

- A communications stack
- An RDM Agent program

Note: When installing a DOS environment, the RDM bootstrap will return an error if there is less than 16 MB of system memory. The bootstrap by itself requires 2.88 MB of RAM to save the DOS image before transferring control to it.

RDM agent

The RDM Agent program controls the processing on the system. It has the following functions:

- In a loop:
  - Request the next command from the RDM Server
  - Run that command on the system
  - Send the results of that command to the RDM Server
- Power off the system

IBM Director Agent

The IBM Director Agent might be present on the system after its production operating system is installed and running. If present, RDM can use its interface to shut down a system or to restart a system that is up and running to initiate service boots. If it is not installed, you must find another way to shut down and restart systems.

Note: Director Agent does not support silent installation on Windows XP or Windows 2003.

Specifically, the RDM server starts the processing by waking up the systems (so that these connect to the network). If RDM cannot wake a system, you must power it on (again, so that it connects to the network). There are several reasons why the RDM server might not have been able to wake the computer:

- The hardware does not support the Wake on LAN feature.
- The computer is already awake (that is, started and running an operating system).
- The Wake on LAN feature is supported but not properly configured in the system BIOS code settings.

In general, there are a number of ways that a system can be powered on:

- If the system is powered off:
  - You can power the system on manually so it connects to the network when a system has been dragged to a task or you can use the Wakeup Tool from the menu **Tasks → Remote Deployment Manager → Wakeup Tool**.
  - The RDM server can use the Wake on LAN feature to power the system on so it connects to the network.
  - For some systems, the RDM server can use the service processor to turn on the system so it boots to the network,
- If the system is up and running:
  - You can shut down the system manually, and then power the system on manually so it connects to the network.
  - You can shut down the system manually, and then RDM can use the Wake on LAN feature to power the system on so it connects to the network.
  - You can shut down the system with IBM Director Agent, and then power the system on manually so it connects to the network.
  - You can shut down the system with IBM Director Agent, and then RDM can use the Wake on LAN feature to power the system on so it connects to the network.

Running RDM tasks

There are several ways to start an RDM task.

Console

You can start RDM tasks in IBM Director with one of the following actions:

- Drag a task onto a managed system (or a managed group, in some cases)
- Drag a managed system (or a managed group, in some cases) onto a task
- Right-click a managed system (or managed group, in some cases)

Throughout this guide, only dragging a task onto a managed system or group is explained as the method of starting tasks, although you can use any of the methods listed previously.

Event Action Plan

Use the IBM Director Event Action Plan wizard to automate setting up system notifications. This wizard runs automatically when you open IBM Director.

If you choose not to use the Event Action Plan wizard on your first use of IBM Director, you will not be able to run the wizard again. You must set up event action plans manually.

To set up event action plans using the wizard, use the following procedure:

1. The first time you start IBM Director, the Event Action Plan wizard starts. Click **Next**.
2. Select the check boxes for events of which you want to be notified and click **Next**.
3. Enter information about how you want to be notified about your events and click **Next**.
4. Select the event action plan you want to apply and click **Next**.
5. Select **Discover all systems and devices** to perform a discovery of all systems and services you want to manage with IBM Director and click **Next**.
6. Verify that the information on the final wizard window is correct. If information is not correct, click **Back** and change the information in the previous windows. If information is correct, click **Finish**. IBM Director Console opens, and the initial discovery process starts.

Refer to the *IBM Director 4.1 Systems Management Guide* for more information on the Event Action Plan wizard.

Command line interface

Any IBM Director task can be started from a command line (usually as part of a batch file you run). RDM noninteractive tasks can be run using the IBM Director command line interface (that is, the *Run system* command). Refer to the *IBM Director 4.1 Systems Management Guide* for more information regarding the command line interface.

Basic RDM operations

This section describes in very broad terms the system-focused operations you are likely to run with RDM after you have installed the software and have made the changes and additions necessary to meet the demands of your organization. Chapter 3, “RDM Tasks,” describes in detail how to run these basic operations and how to make the necessary changes and additions to RDM.

Discover new systems

RDM has a Scan task that automatically runs on all new systems when they connect to the network using PXE. When it finds a new system, RDM interrogates the system for hardware information, such as the serial number and network address. RDM then assigns a default name to the system, based on a <machine type><model>-<serial number> syntax (for example, 867133Z-23G0090), and creates an entry in the System/Task Configuration window for the new system.

You can enable or disable the automatic scan process.

Creating tasks

The basic user operation is to take a task template and use it to create a task that is ready to do work. Typically, you right-click the task template in the IBM Director Tasks pane and click **Create new task** to display the wizard or property-sheet interface; then, follow the instructions in the interface to create a new task. For example, you might use the System Firmware Flash template to create a task containing specific System Firmware levels for specific machine types, or you might use the Windows Native Install template to create a task with specific Windows operating system and installation parameters.

Running tasks on systems

A basic user operation involves specifying one task, and one or more systems to run that task. This can be accomplished the following ways:

- Drag systems onto a task and click **Run systems**.
- Drag a task onto a system or a group and select **Run systems**.
- Trigger an event action plan for a system.
- Trigger an IBM Director Scheduler event.
- Trigger a task from the IBM Director command line.

Concepts

The following overview information will help you understand the various elements used by RDM.

The lifetime of a task

In the course of using RDM, a task flows though various stages during its lifetime. As a way to understand tasks and how they work in RDM, it is helpful to know the possible stages in the life of a task:

- **Install a template** – Download one Java™ .jar file (usually done automatically as a part of installing RDM itself) to the RDM server and another to the console. The template, as part of its initialization, can create new entries in the database or Master Repository that it needs for later use. After installation and initialization, a template icon appears in the right pane of the RDM console and the template is available for use.
- **Create an image** – Create the files (for example, create a clone image from a donor computer, or pack a Microsoft CD into an image file) that the task will ultimately deploy. The Image Manager (IM) builds and stores these images, either separately as a utility program, or when started as part of creating a task from a template.
- **Replicate an image to the Deployment Server** – Replicate either manually (physically carrying a CD to a Deployment Server), preemptively (pressing a button in IM), or reactively (the Deployment Server gets the file from the Master Repository when the system finally requests it). Files loaded to a system come from the designated Deployment Server. In a case where the designated Deployment Server is not on the same computer as the RDM server, the files are replicated to the designated Deployment Server to be sent on to the system.
- **Create a task** – Create a task by invoking the task creation wizard (part of the task template). The wizard gathers whatever information is needed to create a usable task, including the identification of the particular image deployed by the task, and

then creates it. (Note that not all tasks have images, however.) Afterwards, a task icon appears in the right pane of the console (indented under the applicable template), and the task itself is ready for use. Data representing the new task is saved, in the RDM database tables created during RDM installation and template initialization. Use task property sheets to modify the values of the default task templates or the individual tasks.

- **Perform System/Task Configuration (STC)** – Customize system parameters through the STC window. The STC window first performs system qualification to eliminate inappropriate systems (based on hardware and software). Where possible, an attempt is made to provide valid values for all parameters, making it safe (though not always applicable) to click **OK** to continue. While the STC screen is shown, new systems can be removed from the task (you can also choose whether to remove the configuration from the database), and individual system parameter values can be modified. When **OK** is pressed, STC validates that the system parameters are suitable for the particular task (that is, it will require you to fill in values for all *required* parameters, and check that the parameters are reasonable). After validation, job data is created in the RDM database, and the STC window closes. You open the STC window with a drag-and-drop action – by dragging either selected systems from the center pane, or one group from the left pane, onto the task icon; or by dragging a task icon onto selected systems in the center pane or a group in the left pane.
- **Start the task** – Apply the task to some number of systems. This can be done in one or more of the following ways:
  - Drag and drop – by dragging either selected systems from the center pane, or one group from the left pane, onto the task icon; or by dragging a task icon onto selected systems in the center pane or a group in the left pane. IBM Director first asks whether to run the job immediately, or schedule it for later.
  - IBM Director Scheduler – by selecting the Scheduler icon on the IBM Director toolbar, clicking the **Jobs** tab, selecting **New job** from the **File** menu or context menu, and then choosing a task and some systems from the applicable property sheet pages. A further window (part of IBM Director) opens to collect the schedule information, if you choose not to run the task immediately.
  - Event Action Plan – When an event triggers an action plan, that plan could be to start a configured RDM task.
  - IBM Director Command Line – The IBM Director command line interface can start any IBM Director subtask (including an RDM task).
- **Wait for the scheduled execution time** – No activity takes place during this time, and the Console need not be running. You can check the IBM Director Scheduler to either cancel or reschedule the job. If you change any task or system parameters, these changes take effect when the job is run.
- **Run the job at the appointed time** – Each system task runs independently, not necessarily concurrently with other system tasks. Execution is a function of the server-side components only, and the console need not be running.
- **Check the log** – at any time after the task begins executing. This is purely an IBM Director operation because RDM makes log entries just like any other part of IBM Director. Errors or other indications are logged, and can be viewed either in near real time or at any time afterward.
- **Delete the task** – if required. Delete tasks only when they have no pending or running jobs. If the deletion of a task leaves any of its image files unreferenced, RDM will ask if you want the image files deleted with the task, or left behind for future use.

How to use RDM tasks

This section describes what you can do with an RDM task.

View or edit a task

In general, you can view and modify a task by using the task property sheet. When you click **OK**, all the changes made to the data in various property sheet tabs are updated to the database. If you click **Cancel** (or the Close (X) icon), RDM ignores all the changes and no database updates occur.

You can modify a task at any time, provided that it is not already open by another console and provided that it has no pending or running jobs. A task can always be viewed. Task data is always referenced in place (that is, there is only one copy of it).

The first console that opens a task causes that task to be locked. Other users will be unable to make changes but will be able to view the task properties.

Copy a task

You can copy an RDM task to create another task. A task property sheet will open in which you are required to at least change the task name to another unique name.

To copy a task, right-click a task and click **Copy task**.

Delete a task

A task can be deleted when:

- The task is not locked by another console
- The task is not part of a script task
- The task is not running
- The task is not scheduled

If you must delete the task and the task is referred to by another task as part of a script, you will need to first remove it from the script task, or remove the script task itself.

When a task is deleted, any images that are used only for that task are also deleted.

Apply a task to systems

Applying a task can be done in one or more of the following ways:

- Drag and drop – by dragging either selected systems from the center pane, or one group from the left pane, onto the task icon; or by dragging a task icon onto selected systems in the center pane or a group in the left pane.
- IBM Director Scheduler – by clicking the **Scheduler** icon on the IBM Director toolbar, clicking the **Jobs** tab, clicking **New job** in the **File** menu or context menu, and then choosing a task and some systems from the applicable property sheet pages. A further window (part of IBM Director) opens to collect the schedule information, if you choose not to run the task immediately.
- Event Action Plan – When an event triggers an action plan, that plan could be to start a configured RDM task.
- IBM Director Command Line – The IBM Director command line interface can start any IBM Director subtask (including an RDM task).

Set the Default Scan task

Use the RDM property sheet (**Tasks → Remote Deployment Manager → RDM Options**) to define a single task to be the default Scan task for any newly discovered systems. When an unknown system requests work from the RDM server, it will be this

task that runs. RDM comes with the built-in task Basic Scan enabled as the default Scan task. Typically, Scan is the first task to be performed, gathering the data needed for RDM to perform other tasks on the system.

Whatever task is set as the default Scan task should have the **Run without STC** option set, so the task can run without user intervention.

Images

Most RDM tasks use various files during the task processing. The generic term *image* is used to refer to these files (or sets of files). An image usually is the software or data that the task downloads to and ultimately installs on a system. Images vary in size and in the type of software or data they provide to the system. The purpose and content of each image depends on the function that its task performs.

Images are stored in the \rdm\repository\images directories on the various RDM Deployment Servers.

- *Image Management* is one of the major RDM management functions. It contains a user interface that you can use to create, modify, or delete images.
- *File Replication* is a related RDM function. It distributes images to remote RDM Deployment Servers.

You can create images as a distinct RDM operation, or you can create images as part of the task-creation procedure. Ultimately, you select which images a task will use during task creation.

Windows Native Install images

The Windows Native Install task uses the Microsoft installation program to deploy the operating system to other systems. This task can use several types of images. These include:

- Operating System – Files from a Microsoft Windows CD. This can also be a copy of the CD on which you have installed a Microsoft service pack (this technique is often called slip streaming the service pack).
- Service Pack – Files from a Microsoft Windows Service Pack CD (or from a service pack that you downloaded from a Microsoft Web site).
- Desktop wallpaper file – Bitmap (.bmp) files used as a background pattern or image for the user interface.
- Software Delivery Assistant - Image and supporting batch files created by this stand-alone application are used to install applications by bundling the setup.exe and installation files from an application installation CD-ROM.
- System Migration Assistant – Image files created by this stand-alone product make up your personal settings, colors, and Windows files. When used in conjunction with RDM, your can upgrade your systems to a new installation of the latest version of Windows without losing your previous settings.
- Application - Windows-supported applications.

Windows Clone Install images

The Windows Clone Install task uses an exact copy of a boot partition from a donor computer to deploy other systems. The image consists of:

- An exact bit-by-bit copy of a donor computer

- Batch files to control the RDM processing

The clone installation image is stored in a directory on your server referred to as the distribution share point. Multiple images can reside on a server, and the same image can be downloaded to multiple systems.

System Firmware Flash images

The System Firmware Flash task deploys firmware for devices that are built into the system board. These images include:

- System BIOS – Files from a BIOS update diskette.
- Integrated system management processor (ISMP) – Files from an xSeries ISMP firmware update diskette. Note that this is *not* a firmware update diskette for an adapter, such as the IBM Remote Supervisor Adapter.
- Embedded Controller – Files from a ThinkPad® Embedded Controller firmware update diskette.

Linux Native Install images

Red Hat Linux is shipped on multiple CDs. For an operating system installation, only use CDs 1, 2 and 3 in your image. If you include the other CDs the image size exceeds the recommended partition size on the target system, and causes the installation task to fail.

CMOS Update images

The CMOS Update task uses an exact copy of BIOS settings from a donor computer to deploy other systems. You create the image file using a program that is included on the BIOS update diskette (for example, SRCMOSnn.EXE or CMOSUTIL.EXE).

RAID Clone Configuration images

Use the RAID Clone Configuration task to clone a RAID configuration onto homogeneous systems (that is, systems with the exact same number and size hard disk drives attached to the exact same channels on the exact same type of RAID adapter).

Clone files for RDM can be one of two basic types with each type subdivided by the controller type it supports:

- ServeRAID Command File – A DOS batch file comprised of appropriate ipssendl commands, comments, and error-handling to configure a ServeRAID controller. The ipssendl command is a light version of the ServeRAID ipssend command-line configuration utility. As such, it supports a subset of the ipssend command set.
- ServeRAID Configuration Backup File – A file <cfgfile> created by booting the ServeRAID Utility diskette on a donor system and executing the following command:

  ```
  ipssend backup <controller#> <cfgfile>
  ```

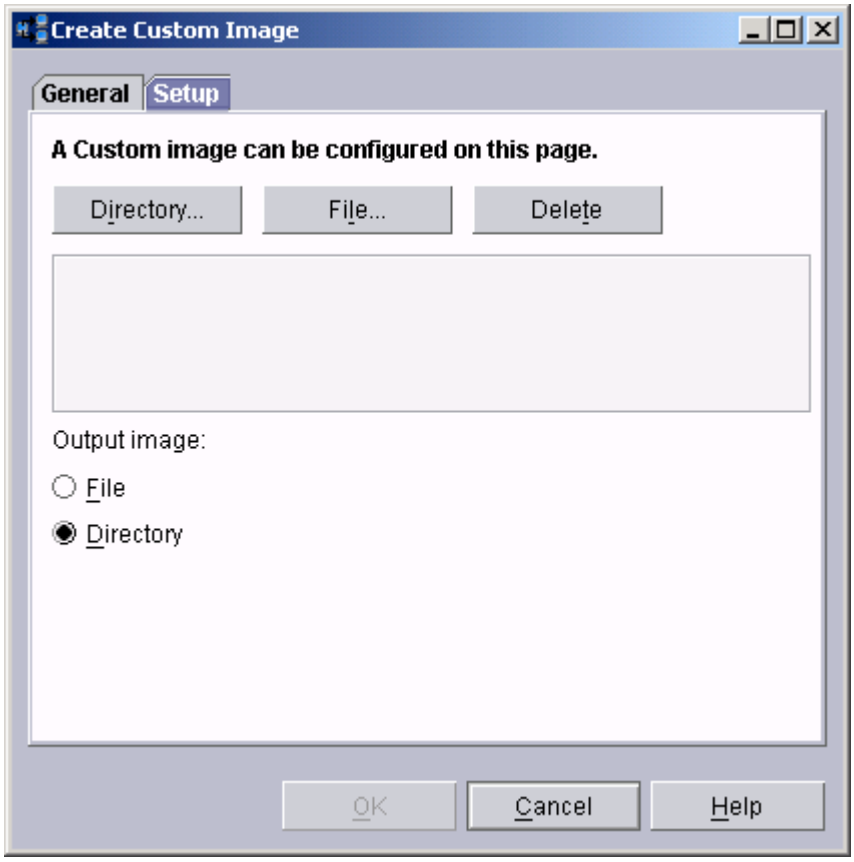
  The data format in <cfgfile> is a ServeRAID proprietary binary format.
- LSI53C1020/1030 Command File – A DOS batch file comprised of appropriate cfg1030 commands, comments, and error-handling to configure an LSI153C1020/1030 controller. cfg1030 is the LSI command-line configuration utility.
- LSI53C1020/1030 Configuration Backup File – A file <cfgfile> created by booting a DOS boot diskette containing the cfg1030 utility on a donor system and executing the following command:

  ```
  cfg1030 backup <controller#> <cfgfile>
  ```

  The data format in <cfgfile> is an LSI proprietary binary format. The cfg1030 program can be copied onto a startable DOS diskette from the directory local\env\71s in the RDM installation path.

Custom images

From within a specific task, you can create only those types of images (using the task property sheets) that are understood by that task. To create any kind of custom image, use the Image Management (IM) tool directly. From IBM Director Console, click **Tasks** → **Remote Deployment Manager** → **Image Management**. Click **Create** and select the **Custom** option; then, click **OK**. On the Setup page, specify from which directories and files to make an image.



Batch files

RDM uses batch files for the following tasks:

- Hard disk preparation (usually to start the FDISK operation)
- Software installation (usually using FORMAT, COPY, and XCOPY commands)
- Software personalization (to search for and replace character strings using variables)
- Software maintenance (to replace one or more files)

Note: You are responsible for correct syntax within any custom batch file you create.

How RDM Works

This section describes the inner-workings of RDM.

Internal Logic

RDM basic internal logic (except for the Linux Native Install task), in high-level terms, is the following:

1. The RDM server sends a Magic Packet to the system to power it on. This capability is called Wake on LAN, and is provided by the system network adapter.
2. The system powers on and boots to the network (in the alternate startup sequence, the network is before the hard disk drive) using the PXE utility program.
3. The system receives an IP address from the DHCP Service and the path and file name of the RDM Bootstrap Loader program from the RDM PXE Service.
4. The system downloads (with TFTP protocol, using the TFTP client that is part of the network adapter firmware) the RDM Bootstrap Loader program.
5. The system runs the RDM Bootstrap Loader program.
6. The RDM Bootstrap Loader program communicates with the RDM Server to get the path and file name of a DOS System Environment (a single file that contains a DOS operating system). This only happens if the RDM Server has work for the system. If there is no work, the RDM server tells the system to boot its hard disk drive.
7. The system downloads (with TFTP protocol, using the TFTP client that is part of the network adapter firmware) that DOS image onto a virtual diskette drive A (the real system diskette drive is disabled).
8. The system boots DOS from the virtual diskette drive A. The AUTOEXEC.BAT file in the DOS image automatically starts the RDM RDAGENT.EXE program.
9. RDAGENT.EXE runs the following in a loop (the loop ends when it gets to the end of the command list):
    a. RDAGENT.EXE communicates with the RDM Server to get the next command (from the task command list).
    b. RDAGENT.EXE runs that command on the system.

The Linux Native Install task logic is similar; however, it uses a second bootstrap program, and it installs and boots its Linux System Environment in a different manner. That is, steps 6, 7, and 8 are, internally, implemented somewhat differently.

DOS System Environment

Different kinds of RDM tasks might require different DOS System Environments, and several DOS System Environments are created when you install RDM. If you have RDM tasks that require a different DOS configuration than those provided in RDM, you can modify those images or even create your own new images.

All of the shipped DOS System Environments are built by the RDM installation program that runs the \rdm\local\env\dos\mkimages.bat program to do this.

The DOS System Environments are built from the files contained in the \rdm\local\env\dos directory using the BPDISK.EXE utility. The file \rdm\local\env\dos\baseimg is the base DOS 7.1 image file. The other files in that

directory structure are the DOS and RDM programs that are added to the base image file to build the DOS System Environments.

To modify a DOS image on the Master Repository, complete the following steps:

1. Copy any new files that are needed into an appropriate subdirectory under \rdm\local\env\dos.
2. Modify existing files (for example, config.sys and autoexec.bat) as necessary.
3. Modify \rdm\local\env\dos\mkimages.bat as necessary, so that it builds the image file with the changes. It uses the BPDISK.EXE utility (described in Chapter 8) to create the single image file that a system will ultimately download.
4. Run \rdm\local\env\dos\mkimages.bat.

Linux System Environment

There is no capability to modify the RDM built-in Linux System Environment.

Configuration Data

In order to run a task on a system, there is data (for example, parameter values) that defines that work. You must provide that data.

The data can come from several places:

- **Task Template.** Default parameters used for all tasks created with this template.
- **Task.** Parameter values created in the specific task.
- **System.** Parameter values from information collected about the system by an RDM Scan task.
- **User.** Parameter values supplied by the user in the System/Task Configuration function.

In order to create the data, you must create the task, create the system (using an RDM Scan task), and then configure the system for that task (with the RDM System/Task Configuration program). When you create the System/Task data, RDM stores the data in its database. That data is persistent. It remains in the database forever, unless you explicitly unconfigure the System/Task. This is an important RDM concept. It enables you to rerun a task on a system, without having to enter the data values a second time.

It is also important to understand some side effects of this persistence. Although there are a few exceptions to this, in general, when you edit a task and change the value of a task parameter, that change is not propagated into the System/Task data.

For example, suppose you configure a system for a Windows Native Install task that provides a default workgroup name WG1, and you do not change that default value during System/Task Configuration. Later, you edit the task and change the default workgroup name to WG2. If you then redeploy that task to that system, it will use WG1 as the workgroup name.

An exception to this model is if you configure and deploy a system for the built-in "Deploy latest system firmware" task, and it deploys System BIOS level PJJT13A onto that system. If you later create an image for a newer BIOS, say PJJT14A, rerunning the task on that system will deploy the newer BIOS, PJJT14A.

Chapter 2. The RDM interface

This chapter gives you an overview of the RDM Console. If you are new to RDM, it will be easiest if you use the RDM console to follow along with the instructions. You can also use this chapter as a reference to find where the various parameters are stored and can be configured.

In RDM, the IBM Director *Group* object takes on the role of the container, and the RDM *Task* object takes its role as a service, and the action of applying a task to a group takes on its role as an organizer. This allows flexibility in applying a task to a system, or group of systems, by dragging or other selection methods. A system might be viewed as unscheduled, scheduled, or in progress (among several other categories) for sorting and viewing systems. New systems are displayed in the applicable pane as they are discovered.

Console window

The RDM console is an IBM Director Console window that also contains RDM features. Most RDM functions can be accessed through the RDM tasks in the right pane of IBM Director Console, either by right-clicking the applicable item, or by dragging systems onto a task.

RDM installation does not add groups to the Groups pane (the left pane of the Console window); however, during operation, you can create Groups manually with IBM Director.

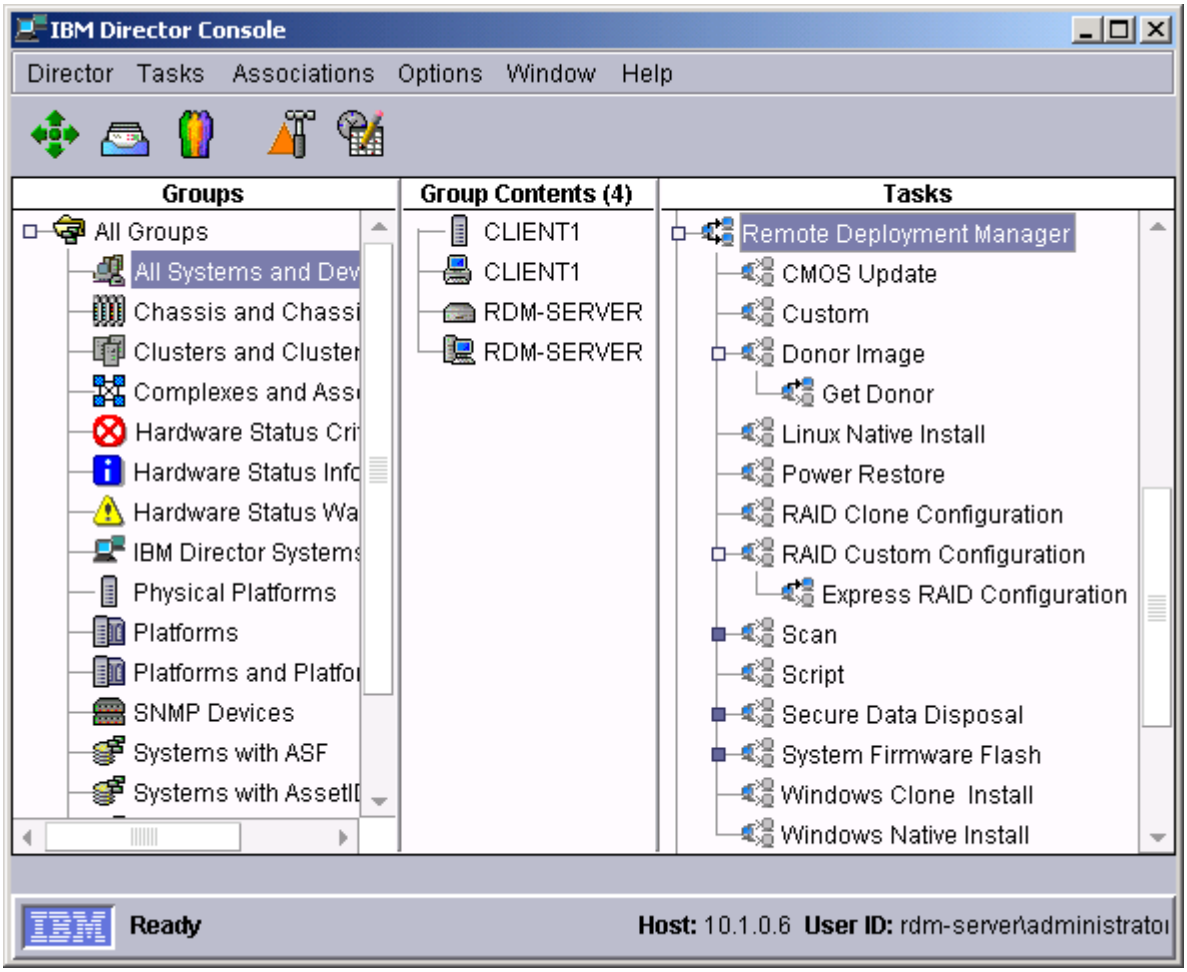
The Group Contents pane, the middle pane in IBM Director Console, contains a list of the systems that are members of the group that is selected in the Group pane.

In the Tasks pane (right pane of the Console window), you can initiate almost all of the RDM functions that operate on systems. Under the Remote Deployment Manager heading, there is a series of subheadings underneath. Content changes as you define tasks but the general presentation is a tree view that contains the following hierarchy:

– Remote Deployment Manager (the main heading)

    – RDM templates

        – RDM tasks (built-in or ones you create)



Icons

The following RDM icons are displayed in the console:

Icon	Definition
	RDM
	Template
	Task
	Connect
	Waiting
	Error

Task Creation

You create RDM tasks by using the corresponding task templates. They provide either a property-sheet or wizard interface for task creation.

Templates

You can think of a template as a prototype of a specific kind of RDM task. Each template has its own characteristics and attributes that apply to any tasks created from that template. In other words, any new task is initialized with the properties and default parameter values of its template. RDM comes with a set of templates that appear in the Tasks pane of IBM Director Console. A basic RDM user operation is to take a template and use it to create a task that is ready to do work. For example, you can create a System Firmware Flash task customized with specific System Firmware levels for specific machine types, or a Windows Native Install task to deploy a specific Windows version with specific default parameters values.

Property sheets

Property sheets have several uses:

- Change the default values of parameters in a template.
- Modify a task.
- Create a new task. Some templates use a property sheet for task creation; others use a wizard.
- View the collected information representing a task or template.

The values of a template property sheet are applied to any task created from that specific template. If you change the template, the changes will be reflected in any new task you create from that template. When a task is created, you can edit its properties without affecting its template. The task property sheet provides you easy access to the information by clicking on tabs to access different pages of settings.

Within property sheets, hot keys (that is, shortcut keys) are supported where an underlined letter in a field label or command is displayed. Press ALT+*underlined letter* to move to that field, select a check box, or to execute that command.

To navigate to other tabs (Setup and Advanced) of a task window using just keystrokes, complete these steps:

1. Open a task window. (The focus is on the OK button to start.)
2. Press the **Ctrl+Tab** key combination three times to cycle the focus through the Cancel and Help keys. (The focus is now on the tabs.)
3. Press the arrow keys to move between tabs.
4. Press the **Tab** key once when, for example, you select the Advanced tab. (Now the focus is on the Categories on the Advanced page.)
5. Press the arrow keys to move between the different list items.

Task creation wizards

Task wizards provide you with a relatively foolproof method of creating a task by guiding you through questions, one window at a time, in a predefined order. Before moving on to

the next window, the data entered is always validated, ensuring that a usable task is created as the end product.

Right-click a task template in the IBM Director Tasks pane to create a new task. Open a task creation wizard by using the **Create new task** option.

Typically, wizards are used for complex tasks only, such as RAID custom configuration or Windows native installations, where the amount of information you request is too large to fit in a single window. Default values in the task templates and the individual tasks themselves can be modified by editing the task template.

Options

You can control how RDM works by setting the values of some global parameters. The IBM Director Console provides some dialogs to set these values.

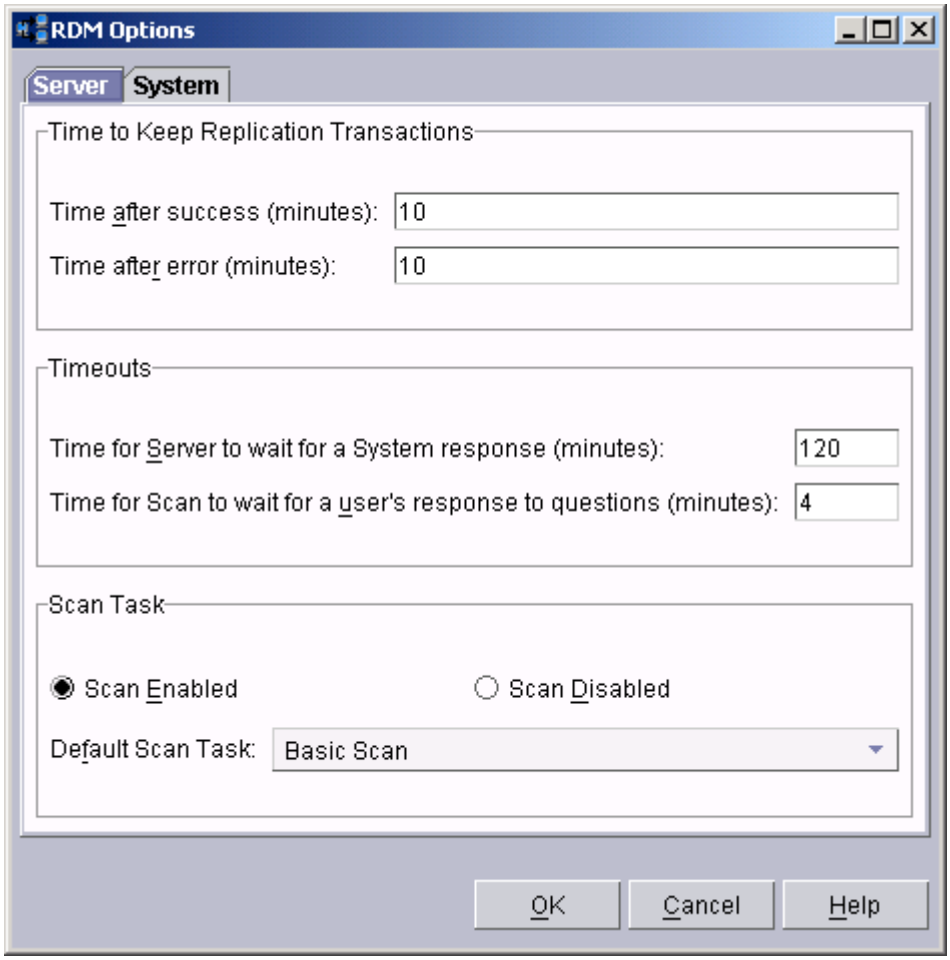
RDM options

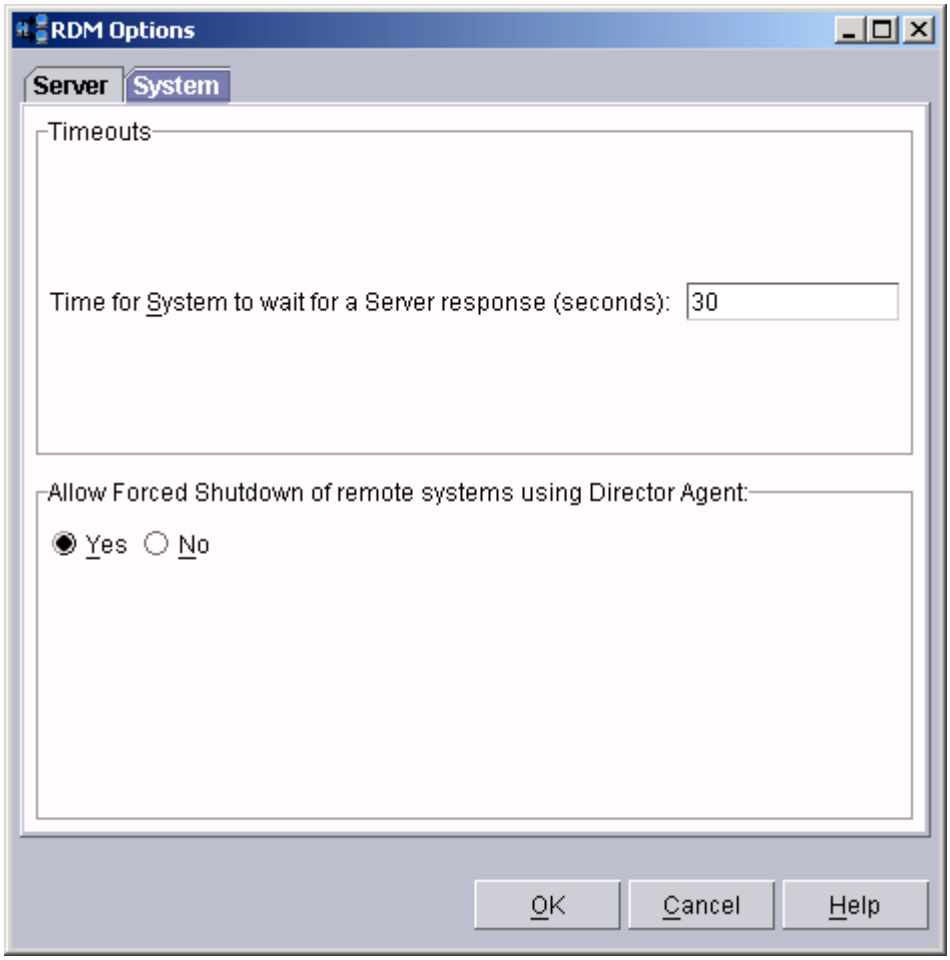
Access the RDM Options window in IBM Director Console by clicking:

Tasks → Remote Deployment Manager → RDM Options

On the Server page, set time intervals for replication transactions and timeouts, and enable or disabled the default scan task. On the System page, set the server response time and forced shutdown option.

Note: A system might take longer than the default timeout value and still successfully complete a task. This only indicates that the system took longer than expected to complete the last instruction from the RDM Server. There will still be an error logged indicating the timeout failure. For future successes, modify the command list of the task to include a longer timeout than the default server value. Refer to Appendix A for the TIMEOUT command.





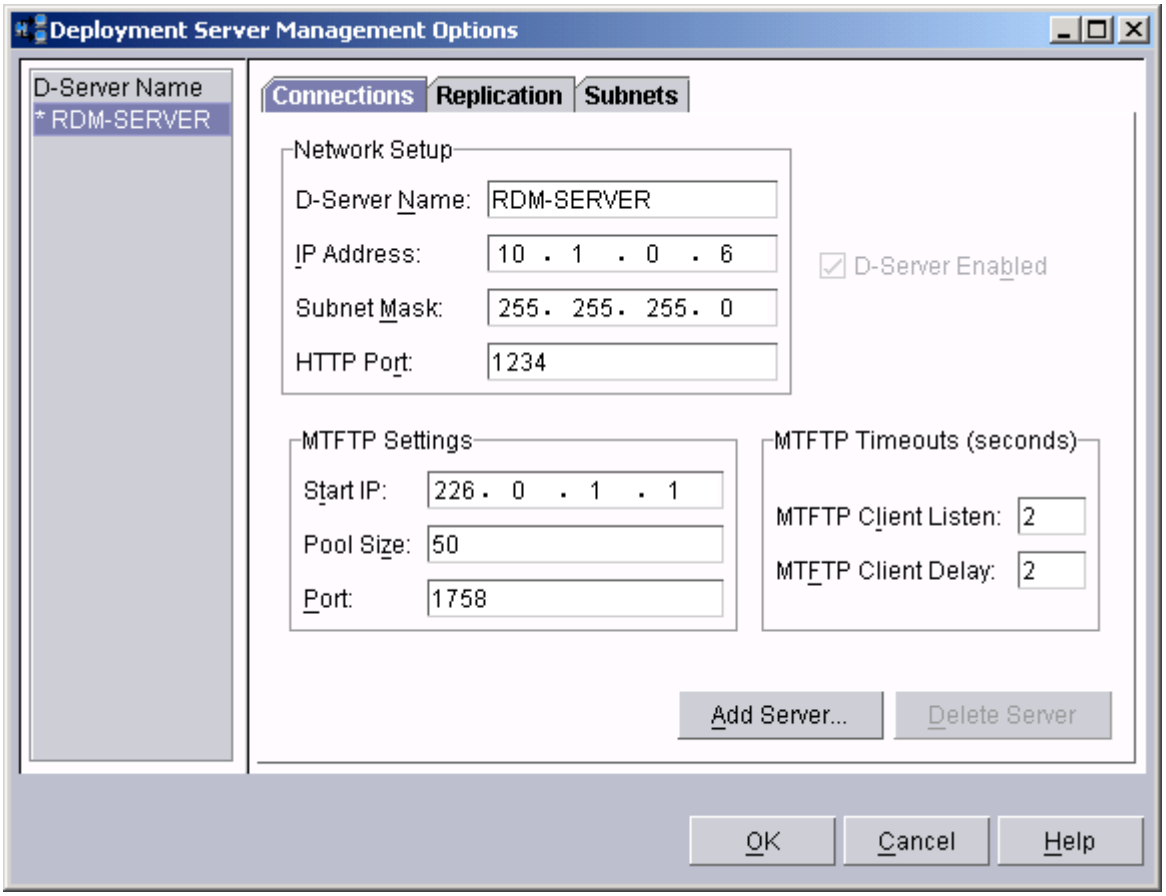
Deployment Server options

Deployment Server, or *D-Server*, management is accomplished through options in the **Tasks** menu. The D-Server Management window sets options relating to the entire RDM program, as opposed to tasks. In the **Tasks** menu, when you select **D-Server Options** under **Remote Deployment Manager,** the Deployment Server Management window opens (**Tasks → Remote Deployment Manager → D-Server Options**). The settings are presented as tabs in property sheet-style.

Note: When D-Server options are modified, the MTFTP Service and the D-Server Service are shut down and restarted without regard for whether there are any jobs in progress. If this happens while a system is in the middle of an MTFTP operation, the MTFTP operation will fail with an illegal TFTP operation error because the reset server knows nothing about the previous session that was started before it was reset.

You *must* select the **OK** button on this window to save any changes you make. If you select the **Cancel** button (or the **X** icon in the upper-right corner), any changes you made on the pages of this window or on any dialogs that were involved in the changes will be lost.

Click the **Connections** tab to display the D-Server properties.



Network Setup

D-Server Name – This is the hostname of this server. Multiple D-Servers can be listed in this left column. Properties displayed reflect the selected D-Server.

IP Address – The IP address of this D-Server.

Subnet Mask – The subnet mask of this D-Server.

HTTP Port – The port number that this D-Server uses to communicate (using HTTP format) with the RDM server. The default is 1234. The maximum HTTP port is 65535 for all D-Servers. The minimum HTTP port is 80 for Remote D-Servers and 1024 for Master D-Servers.

MTFTP Settings

Start IP – This is the first class-D (multicast) IP address in a range of addresses that is assigned to this D-Server. The default value, 226.0.0.1, is the smallest class-D address that RDM allows. The largest address is 239.255.255.1. Ensure that no D-Server range of addresses overlaps with another D-Server range (or with addresses used by another application).

Pool Size – This is the number of contiguous class-D addresses reserved by RDM for use by this D-Server. The minimum size is 10. The maximum size is 255. The default size is 50. Ensure that no D-Server range of addresses overlaps with another D-Server range (or with addresses used by another application).

Port – This is the port number used by the IBM RDM MTFTP Service that is installed on this D-Server. The maximum value is 65535. The minimum value is 70. The default is 1758.

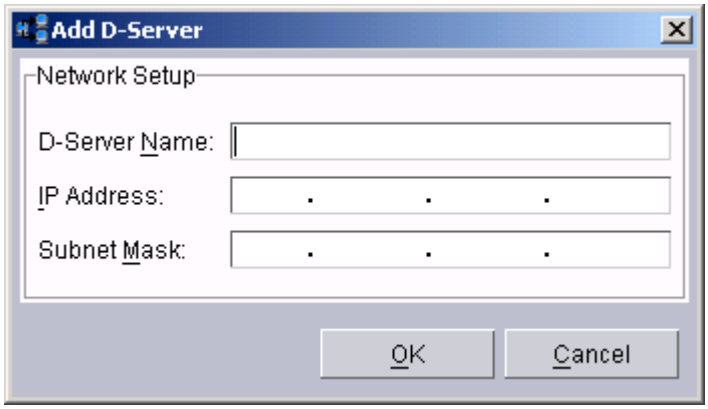
MTFTP Timeouts

MTFTP Client Listen – Specifies how long the system listens before it attempts to become the master. The default value is 2 seconds.

MTFTP Client Delay – Specifies how long the system waits to receive an ACK message before retrying. Default value is 2 seconds.

In addition to **OK**, there are the following two buttons for special purposes:

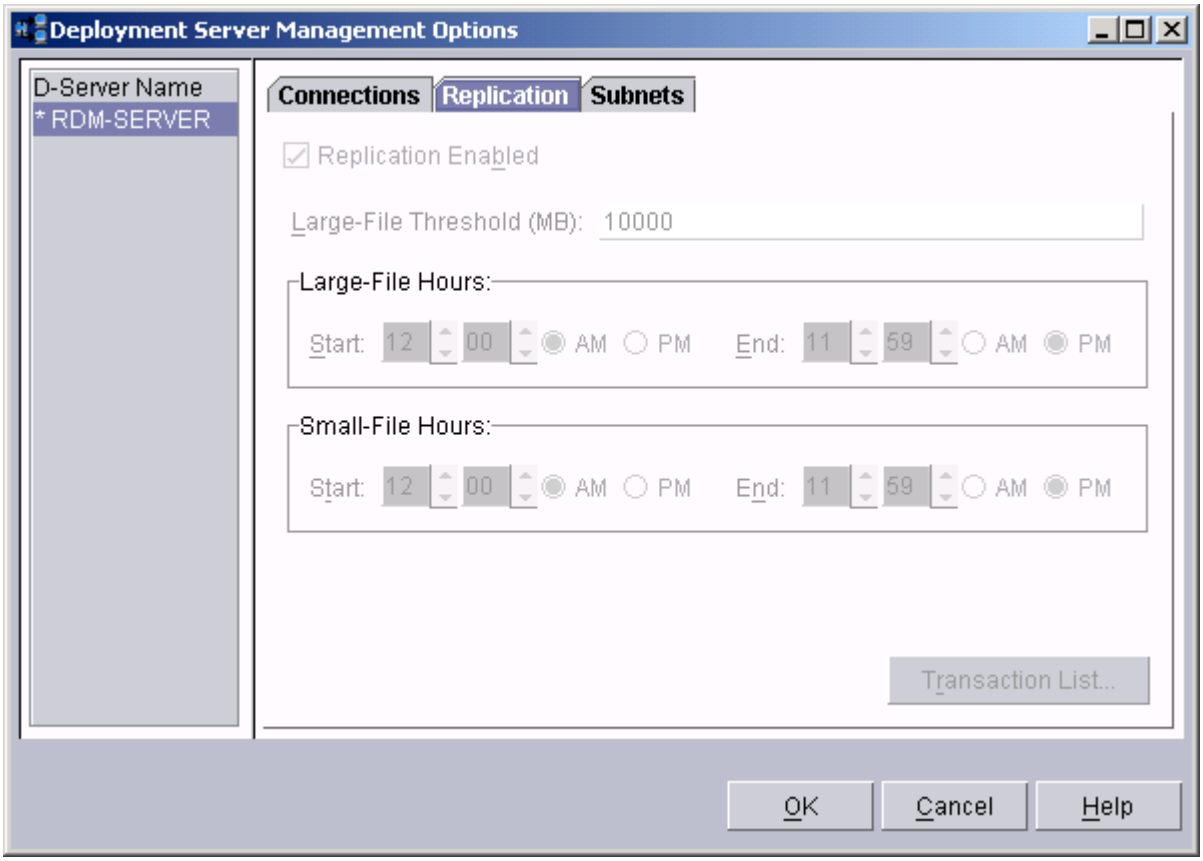
Add Server – Creates a new entry in the list, allowing another D-Server to be added and managed by this RDM Server. RDM must have already been installed onto the target D-Server. You can then change its other settings on the Connections page, if desired.



Delete Server – This removes the selected D-Server from management by the RDM Server, but does not uninstall any code on the D-Server.

Note: If you uninstall a D-Server, it might remain listed in the Deployment Server Management Options window. You must manually delete the D-Server listing after it is uninstalled.

The Replication page defines rules for each D-Server with regard to how data is replicated from the Master Repository to the repository on the selected D-Server. Each D-Server can use different rules, based on bandwidth and usage characteristics.



Note: There are no replication settings for the Master D-Server. The Master D-Server cannot be disabled so those options are disabled on the Replication page when the Master D-Server is selected.

The following fields are located on the Replication page:

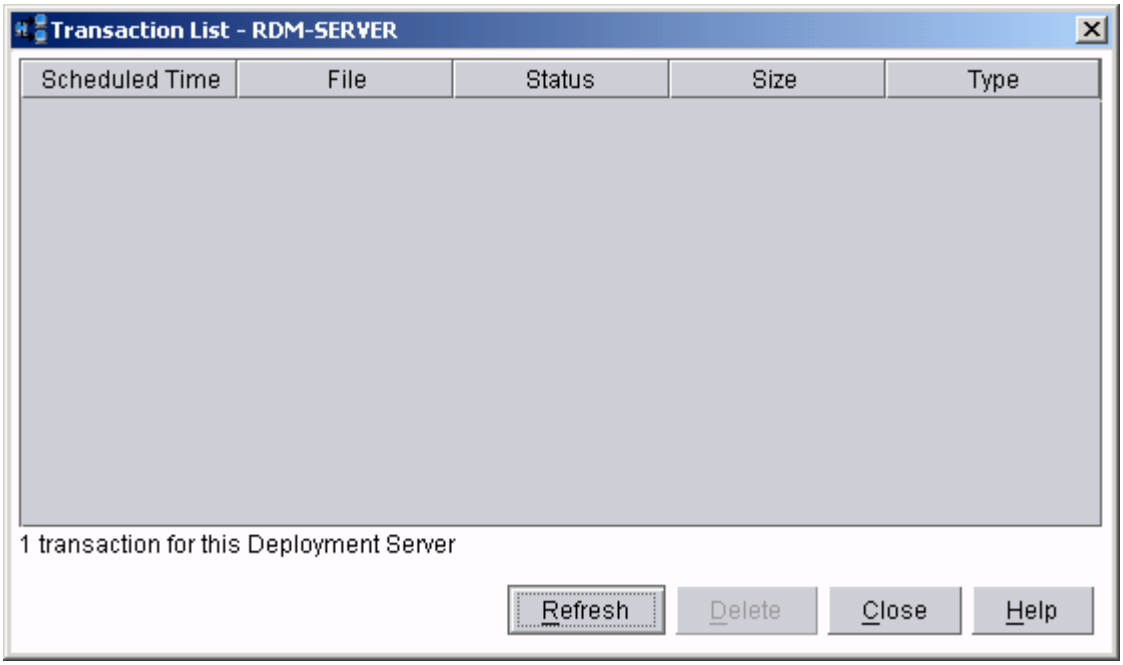
Replication Enabled – Select this check box if you want to allow this D-Server to get files directly from the RDM Server. This box would normally not be selected in cases where the connection between the D-Server and RDM Server was very slow or unreliable. The implication is that you will manually get the necessary files to the D-Server (for example, by creating a CD that contains the files and mailing it to the D-Server site, where someone would manually copy the files to the D-Server). Checking the Replication Disabled box does not impact the RDM Server ability to delete files from the D-Server. That facility is needed to ensure consistency.

Large-File Threshold – This is the file size at which RDM will consider the file to be "large"; any files smaller will be considered "small".

Large-File Hours – These are the hours within which a large file might be replicated over the network. Often these will be constrained to nighttime to avoid excessive network traffic at peak times.

Small-File Hours – These are the hours within which small files might be replicated over the network.

Transaction List – This button opens the Transaction List window showing the outstanding replication transactions (these include file deletion commands) waiting to be executed by the selected D-Server. Transactions that are complete or in error are removed from the list, based on the times specified on the Server page of RDM Options (**Tasks → Remote Deployment Manager → RDM Options**).



Transaction **Status** is one of the following states:

Pending – The transaction is scheduled to run later.

In process – The transaction is running now. You cannot delete a transaction in this state.

Error – The transaction had an error.

Complete – The transaction completed successfully.

Transaction **Type** is one of the following types:

User initiated – The replication was manually forced during image creation by IM.

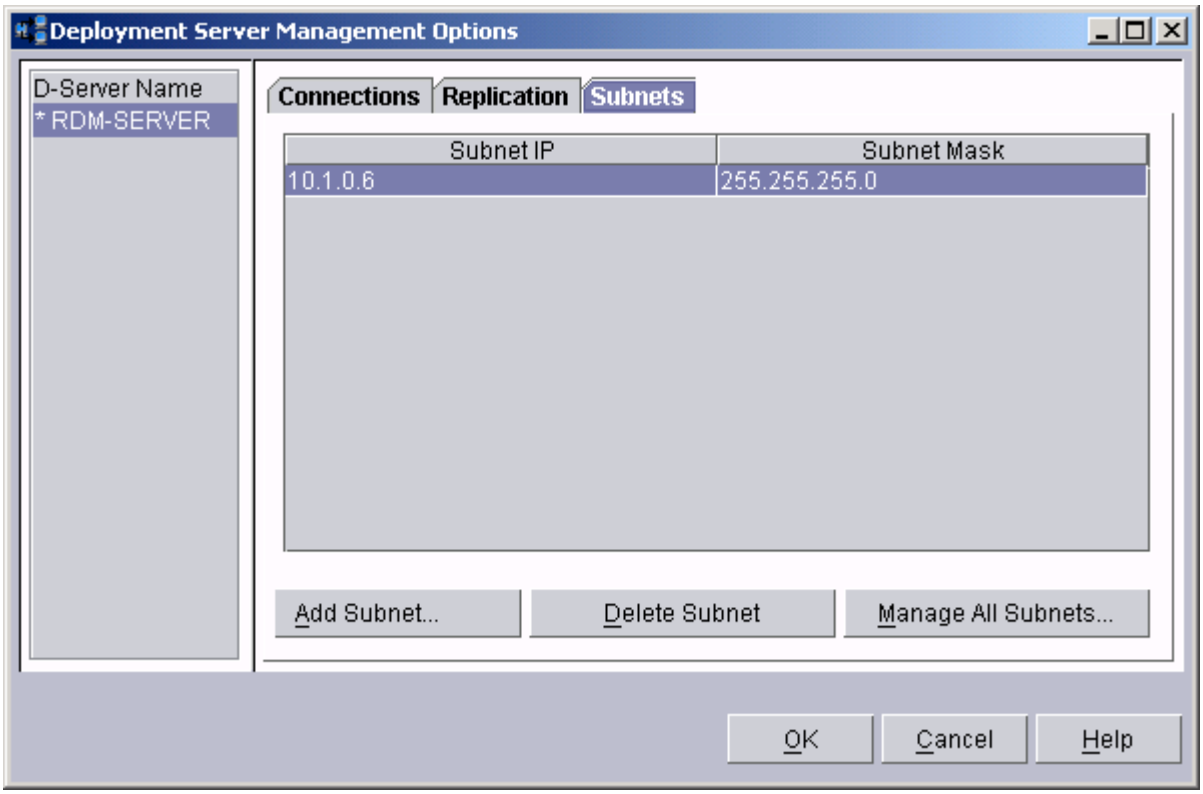
Automatic update – The replication was initiated by a system running a task that needs the image.

To delete a transaction, select the transaction in the list, and then click **Delete**.

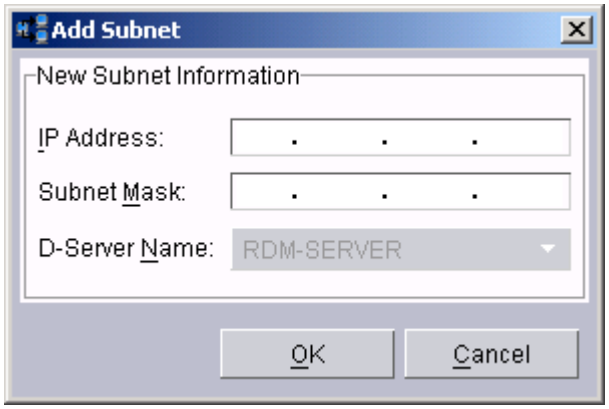
To refresh the list, click **Refresh**.

The Subnets page defines the subnets that are served by each D-Server.

Note: Remote D-Servers cannot be on the same subnet as the Master D-Server.

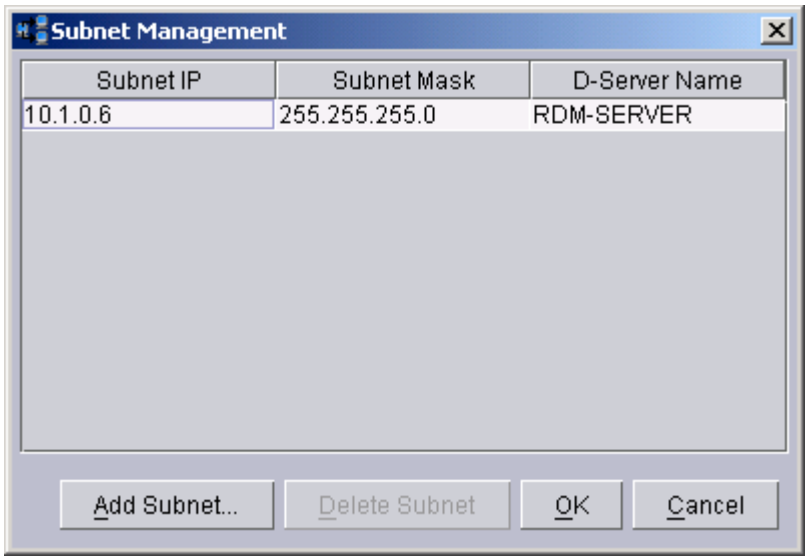


Add Subnet – This button adds the specified subnet.



Delete Subnet – Deletes the selected subnet.

Manage All Subnets – This button displays all the subnets for all D-Servers in the RDM database. You can add and delete subnets from this list with **Add** and **Delete**. You can reassign subnets to a different D-Server by selecting the D-Server Name and then selecting another D-Server from the resulting drop-down list.



Click **OK** to apply the changes. Click **Cancel** to exit with no changes.

Start/stop the RDM D-Server service from the command line:

- To start, type the following at the command prompt window:

  ```
  net start dserver
  ```

- To stop, type the following the at the command prompt window:

  ```
  net stop dserver
  ```

Image Management

Image Management (IM) is the RDM tool that collects, builds, defines, propagates, and deletes the image files you use to implement various RDM tasks. Most tasks of RDM have references to image files that are copied and used by the tasks. All of these image files are collected inside the RDM Server Deployment Server. You use IM to import or build those images (into the applicable file format) from their own source files.

When the RDM Server is installed, one of the components that is always installed with it is a Deployment Server. Part of any Deployment Server is a repository of files. The one installed within the RDM Server is referred to as the Master Repository. IM serves as the manager of the RDM Master Repository. All activities involving the exploring, browsing, building, and deleting are handled by IM.

Note: Do not manipulate (delete, add, or rename) any images files or directories from the command line prompt or by using Windows Explorer-type of programs. Instead, use IM.

IM builds images by copying files and directories from your specified source. IM stores those files and directories into one image file (for some types of image, this might be a zipped file), transports it to the RDM server, and adds it into the Master Repository directory. Those image files inside the Master Repository directory are assigned unique filenames by IM and are not intended to be meaningful when browsed in the file system.

Create an image

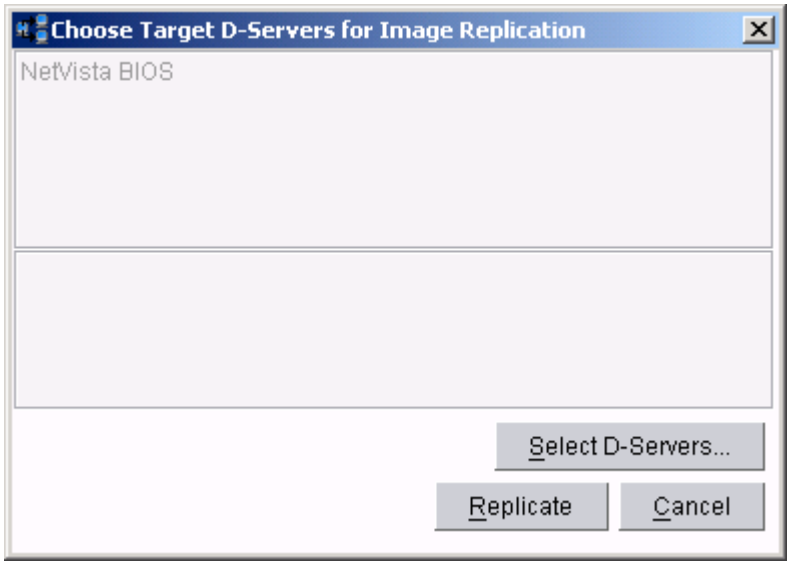
Common input sources for images include:

- Local drives (diskette drive, hard disk drive, CD-ROM drive, mapped network drives). These are drives on the IBM Director console.
- Server drives. These are drives on the IBM Director server.

Note: Image Management does not validate Windows operating-system languages. The file copy process starts regardless of what language CD has been inserted. For example, if you select to create a Windows XP Professional French image but use the Spanish version of the Windows CD, no error is given.

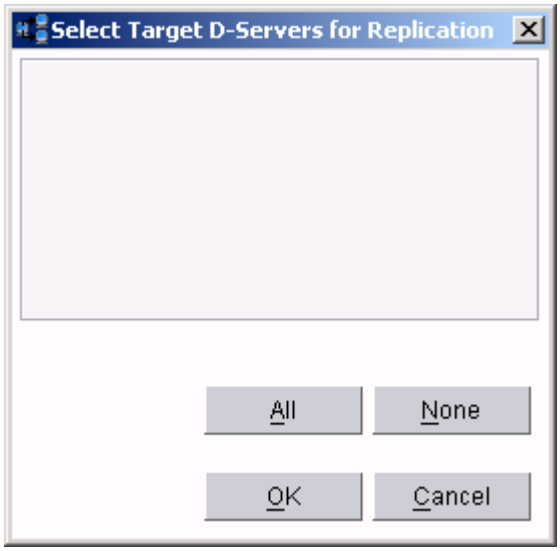
Replicate an image

When you click **Replicate**, a window opens allowing you to select which of the known Deployment Servers are to be loaded with the image.



Note: You must take care to avoid situations where the wrong data is loaded to a Deployment Server – this could potentially compromise security in multi-corporate installations.

After you select the Deployment Servers you want, a queue of replication transactions is created, one entry for each Deployment Server. Each entry in the queue causes the file to be transmitted to its respective Deployment Server.



Delete an image

You cannot edit the content of an image file in RDM. If you need to modify an image, you must delete the old image and then add the new image. You can delete an image, provided that there are no references to it from any existing tasks or jobs, whether the job states are running or queuing.

In other words, IM provides a means of compressing files, but decompression is only done at the system; IM does not provide a way to expand the components of an image back to their original form.

When an image is deleted, it is also deleted from each remote Deployment Server.

Edit or view image properties

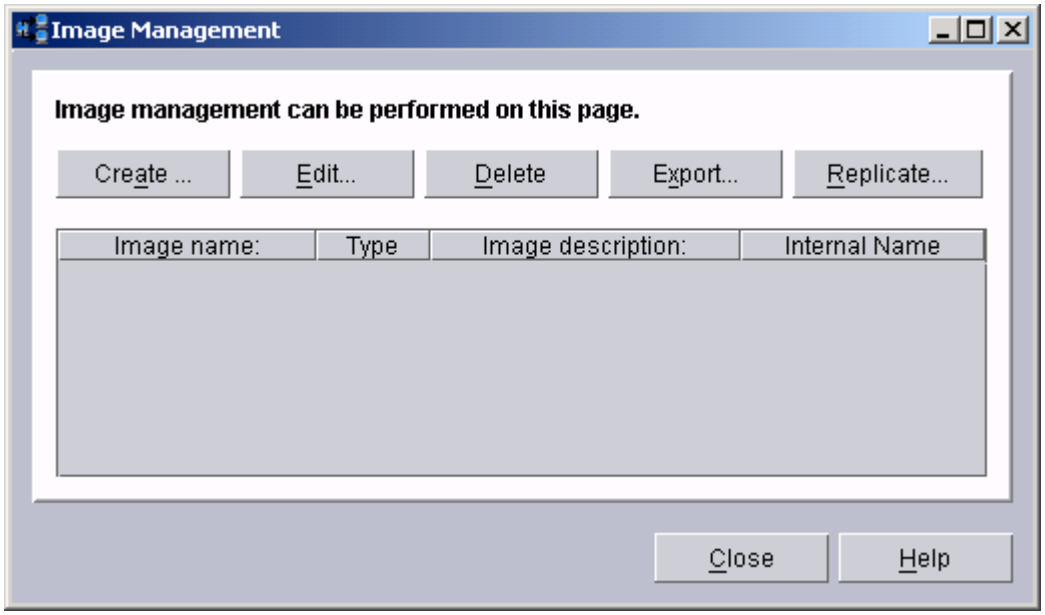
The Image Properties function is only available when you select a single image, and then click **Edit**. An images properties window might also be called from within a task template or task. The property sheet deals with the primary attributes of the file.

Export an image

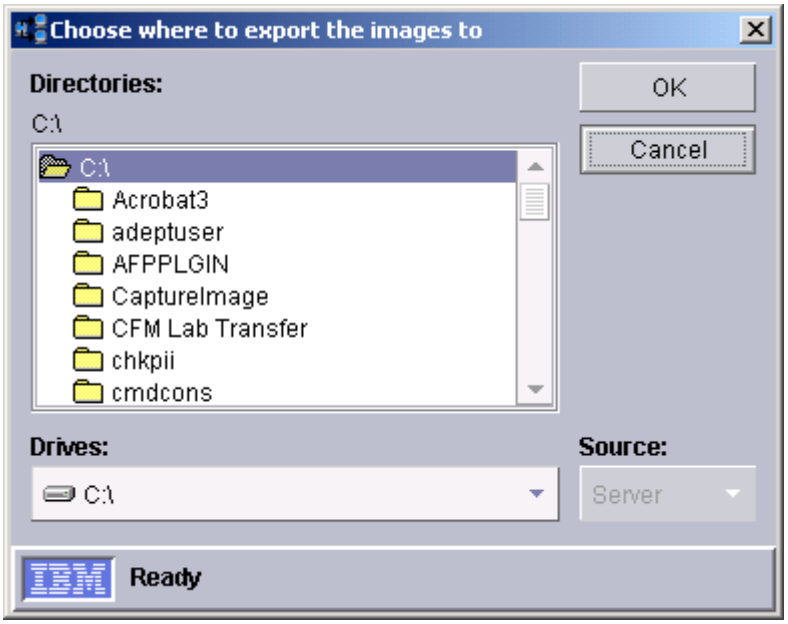
The export function, used for manual replication, copies all the files of an image into a subdirectory that has the same structure as the Master Repository. You can then create a CD that contains the exported files. At a remote Deployment Server, you would copy the files from the CD to the local repository.

Complete the following steps to export an image from any RDM console:

1. On the RDM server, create a new directory (or use an existing empty directory).
2. On the RDM Console, open the main IM window (**Tasks → Remote Deployment Manager → Image Management**).



3. Select one or more images from the list.
4. Click **Export**. This causes a file window to open.



5. Select the target directory (which is always on the RDM server, regardless of where the RDM console is) created previously. This causes RDM to copy the selected images to the target directory.
6. Create a CD that contains the exported files.
7. At a Remote D-Server, copy the files from the CD to the local repository.

Invoke the Image Manager

IM is accessible from multiple points within the RDM Console and can be run in the following ways:

- As a tool
- From a task creation wizard or property sheet
- From a template property sheet

You typically run the Image Manager as a tool whenever you receive new image data that you will eventually use in a new task, or that could be used by an existing task. For example:

- You acquire a System BIOS diskette image from the IBM Web site. You would create a new System Firmware Flash image so that it would be included in the Deploy Latest System Firmware task.
- You would create a Windows Server 2003 Enterprise Edition image upon receiving the site-licensed CD from Microsoft, knowing that some Windows Native Install tasks will soon be created which will need that image.

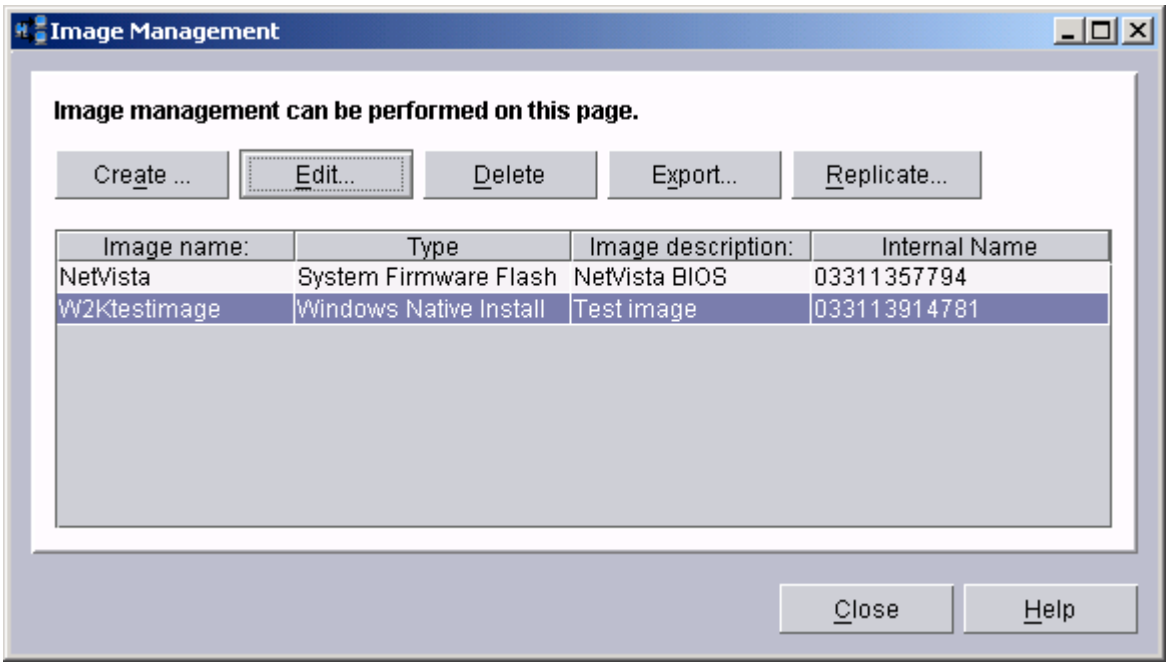
In these cases, start IM from the IBM Director main menu:

Tasks → Remote Deployment Manager → Image Management.

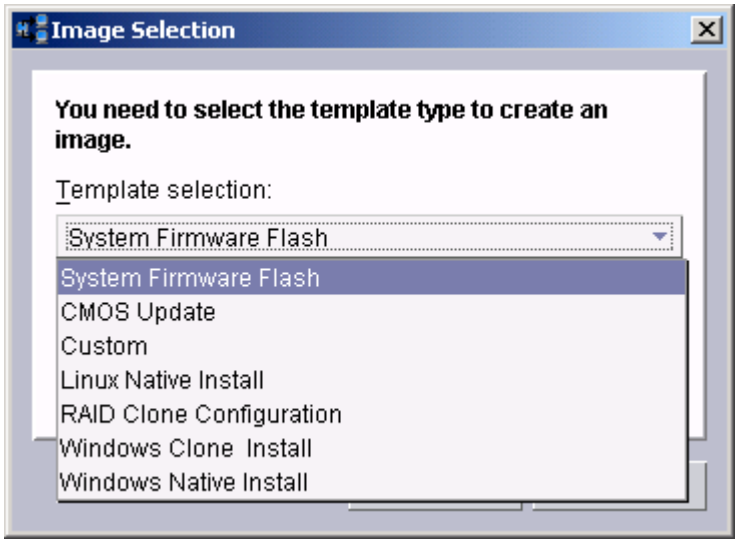
You can, instead, wait until you create a new task to invoke IM. The task wizard or property sheet (or even the template property sheet) provides a way to display IM.

Use the top-level of IM to view the images in the Master Repository. IM exports images to other directories, replicates images to other D-Servers, deletes existing images, creates

new images, and allows you to edit image properties. The Type and Internal Name of images are predefined and cannot be altered. However, you are free to enter whatever Name and Description are appropriate.



Click **Create** to open the Selection window in which you specify the type of image to create:

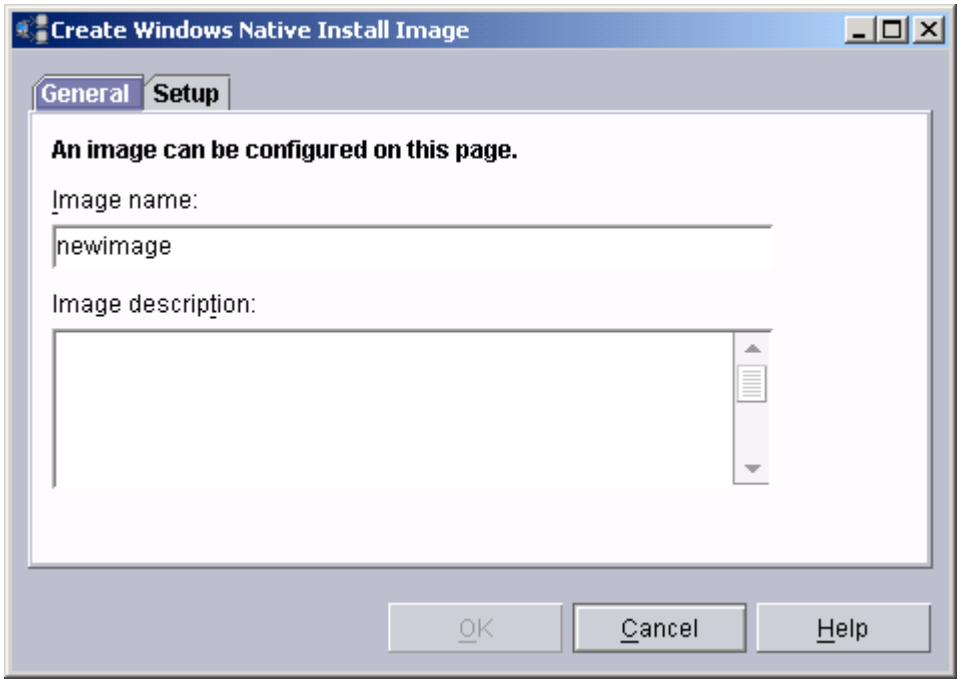


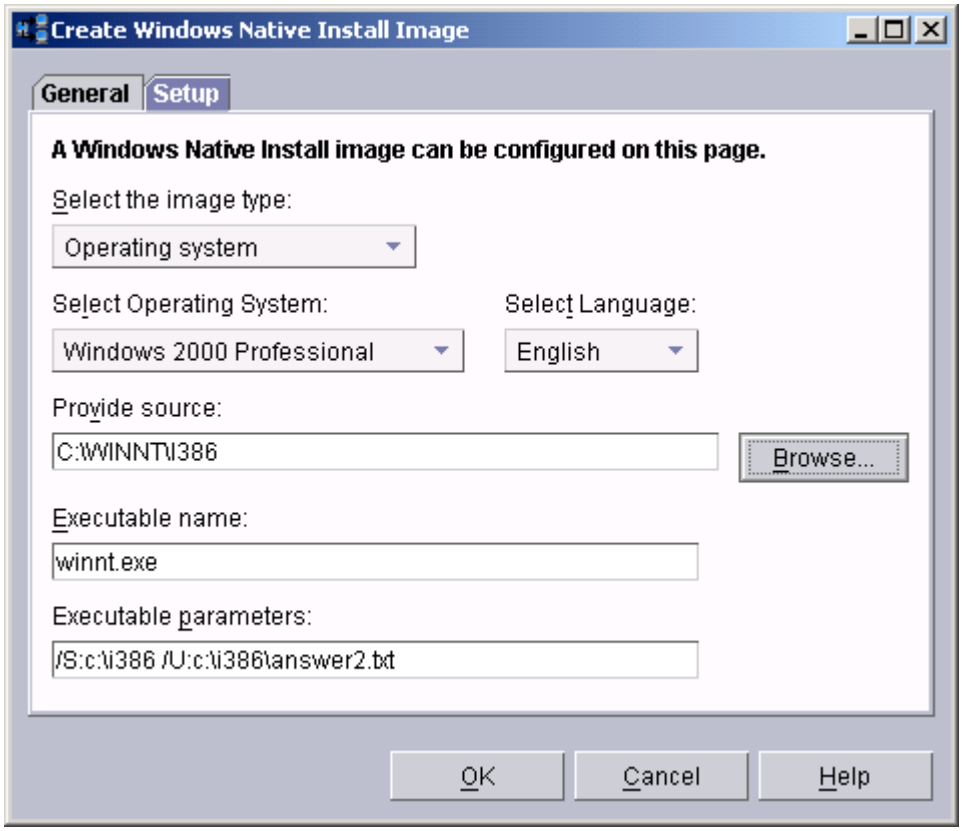
Select the appropriate image type from the drop-down list, and then select **OK** to begin the image creation process.

Image property sheet

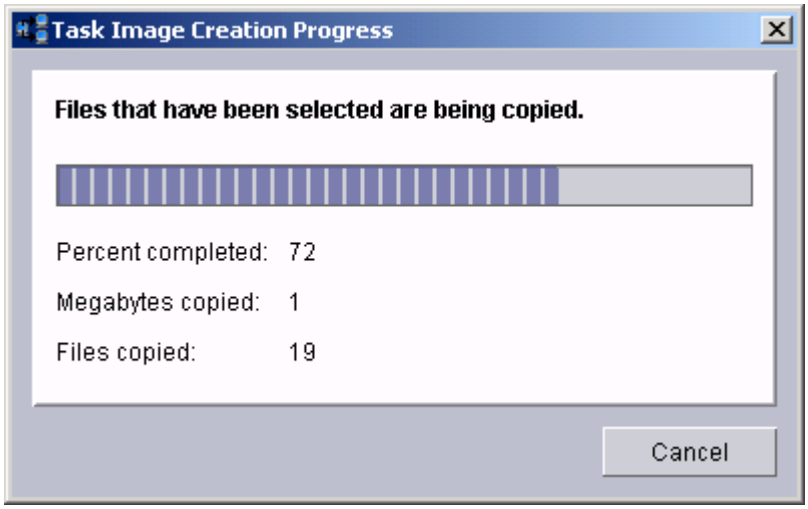
The image property sheet is the user interface that actually imports the image into the Master Repository. They are highly task-dependent. See the sections on individual tasks for examples of image property sheets. A sample property sheet for a Windows Native Install image is shown next. On the General page, type a name and (optional)

description of the image. On the Setup page, specify the source files from which the image will be created.

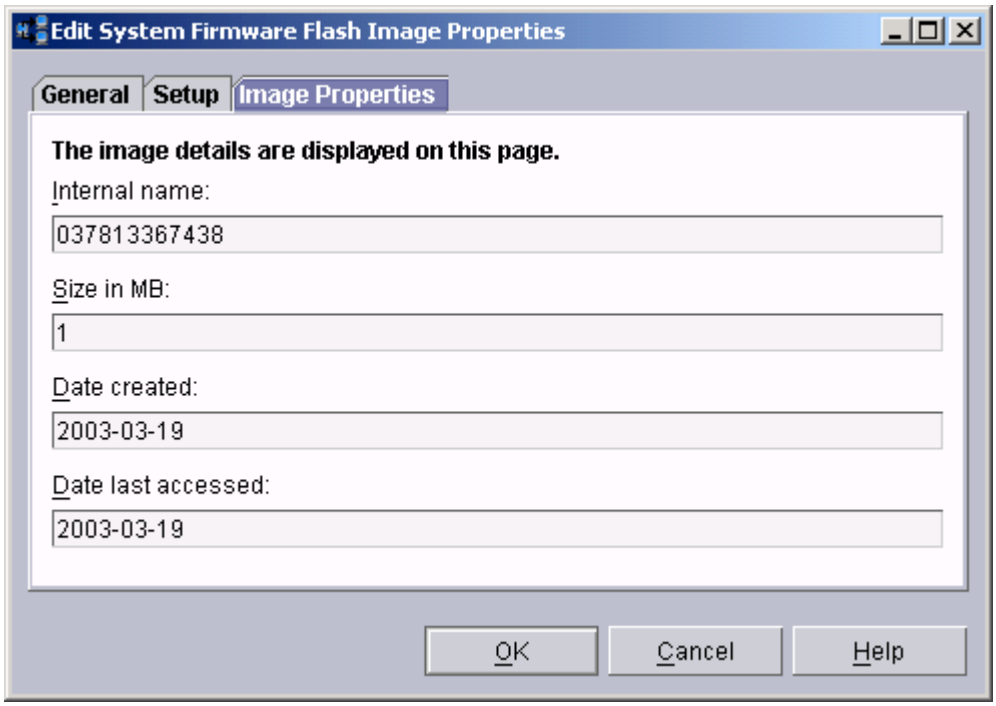




As an image is being created, the following Creation Progress window is opened.



From within IM (**Tasks → Remote Deployment Manager → Image Management**), selecting an image and clicking **Edit**, an additional Image Properties page (not visible when accessing image property sheets through an individual task) is available that lists read-only attributes such as internal name and size.



System/Task Configuration

The purpose of the System/Task Configuration (STC) window is to prompt RDM for system-specific information that is needed to execute a task. The STC window associates some number of systems with a task and defines all the parameters needed to execute that task on each of the systems. Exiting the STC window opens an IBM Director message box (if you have the check box on the STC screen "Execute this task…" selected) asking whether to schedule the task or to execute it now.

Right-click a system, and then click **Remove System** from the context menu to delete systems already displayed, but not to remove its data from the database. This deploys a task on a subset of the systems that are configured for that task, without losing the system/task configuration data for the systems not being deployed.

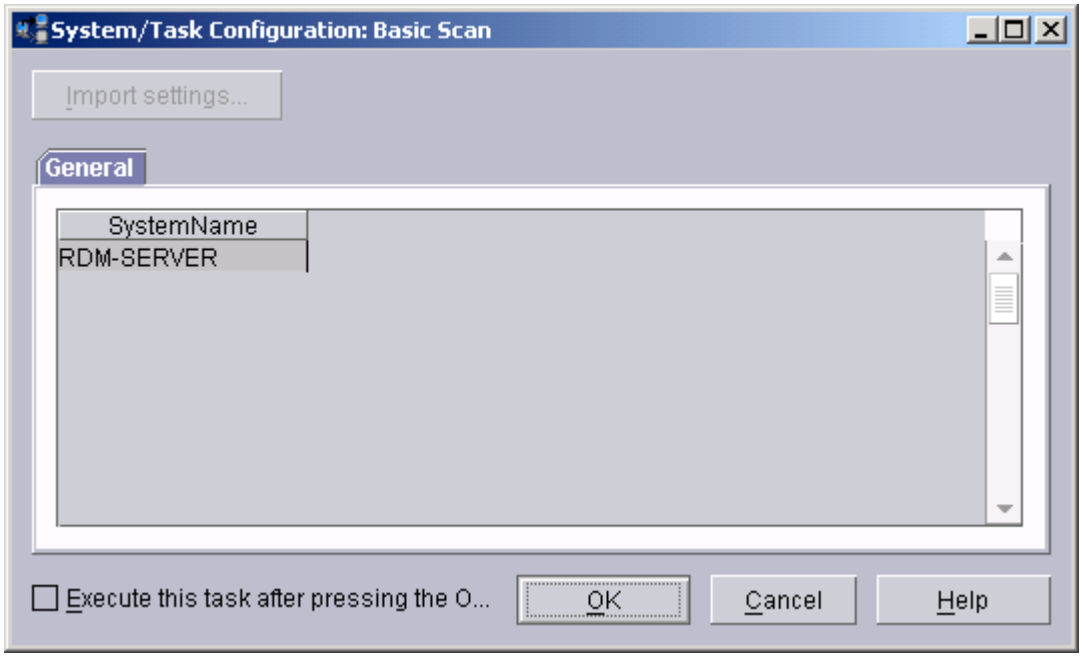
Right-click a system, and then click **Unconfigure System** from the context menu to delete the STC data from the database.

The following steps outline what the STC does, whenever its window is displayed:

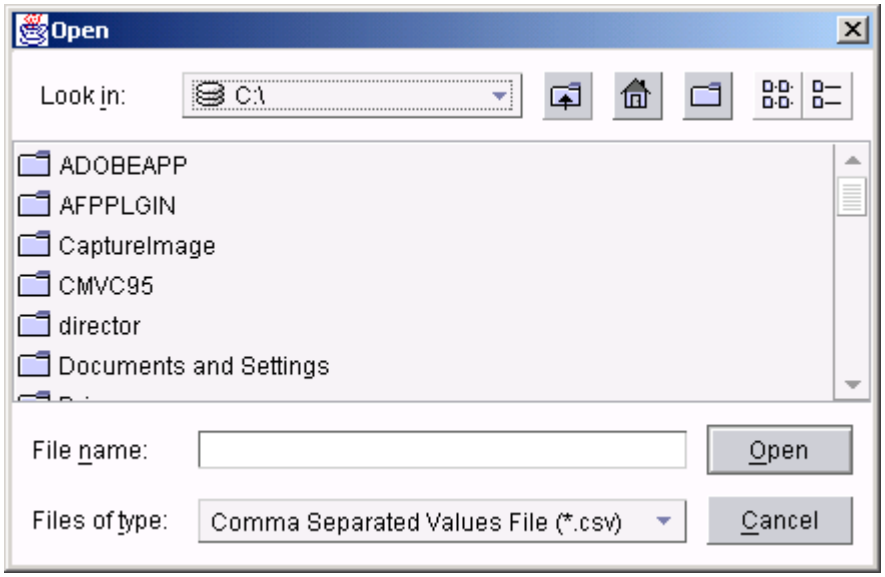
1. Qualification (verifies that the system is suitable for running the task)
2. Parameter generation (from task defaults)
3. Parameter editing by you in the STC window
4. Parameter validation
5. Save the new STC data (keyed by the system/task pair)

An STC window can be started in the following ways:

1. **Drag selected systems onto a task.** A context menu displays, and you click **Configure Systems**. The STC window opens, with the dragged systems shown in the STC grid.
2. **Drag a task onto a system (or one of a set of selected systems).** A context menu displays, and you click **Configure Systems**. The STC window opens, with the systems shown in the STC grid.
3. **Drag a group onto a task (from the left pane of the IBM Director Console).** A context menu displays, and you click **Configure Systems**. The STC window opens, with the systems that are members of the group shown in the STC grid.
4. **Drag a task onto a group.** A context menu displays, and you click Configure Systems. The STC window opens, with the systems that are members of the group shown in the STC grid.
5. **Right-click a task.** A context menu displays, and you click **Configure Systems**. The STC window opens with all previously configured systems filled in.

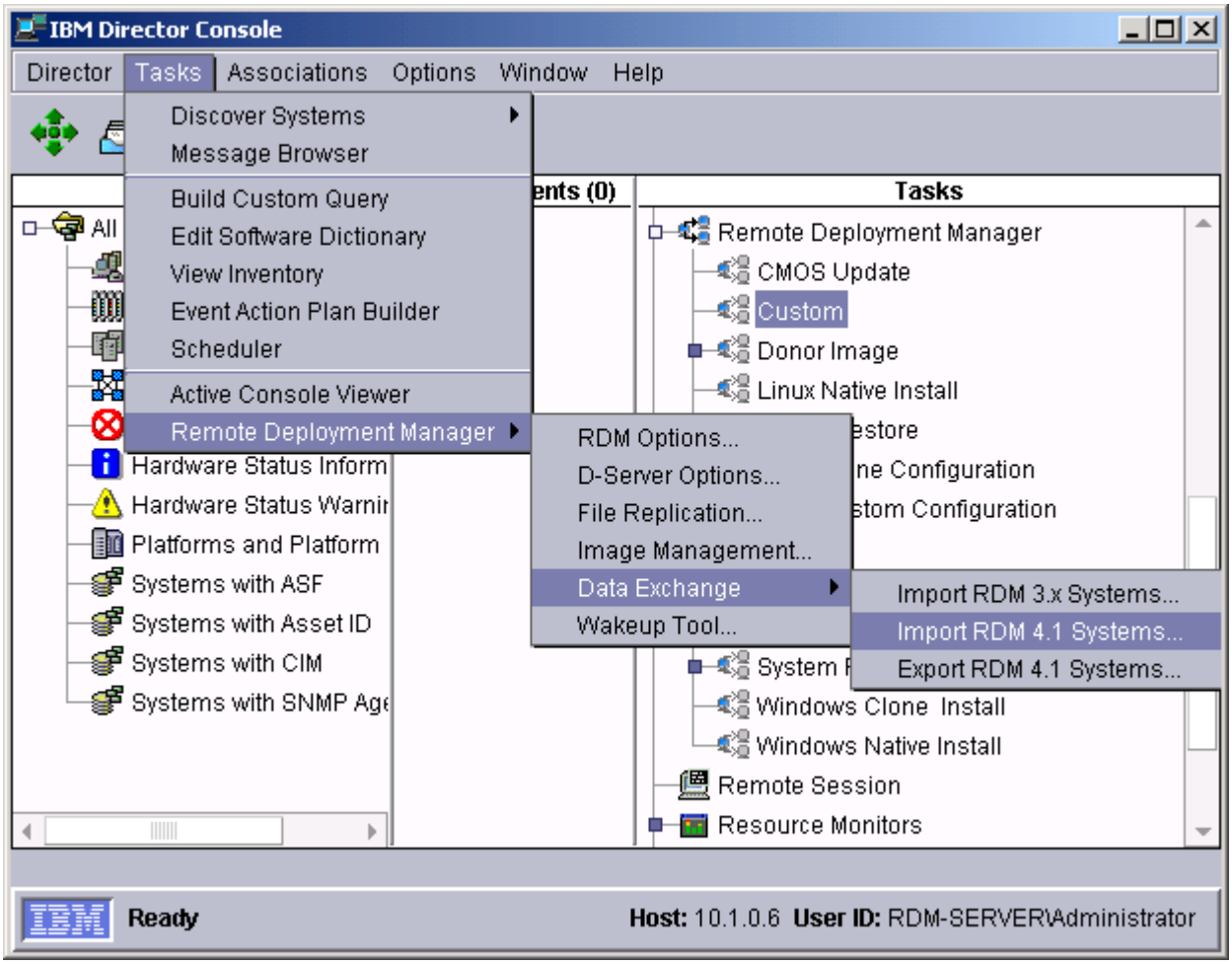


The **Import settings** button imports parameter values for the systems displayed in the STC. The imported file must be a comma-delimited text file. Columns must be named (in the first comma-delimited row) to match existing columns in STC – fields not matching existing columns are discarded. The default extension for the imported file is .csv.



Data import/export

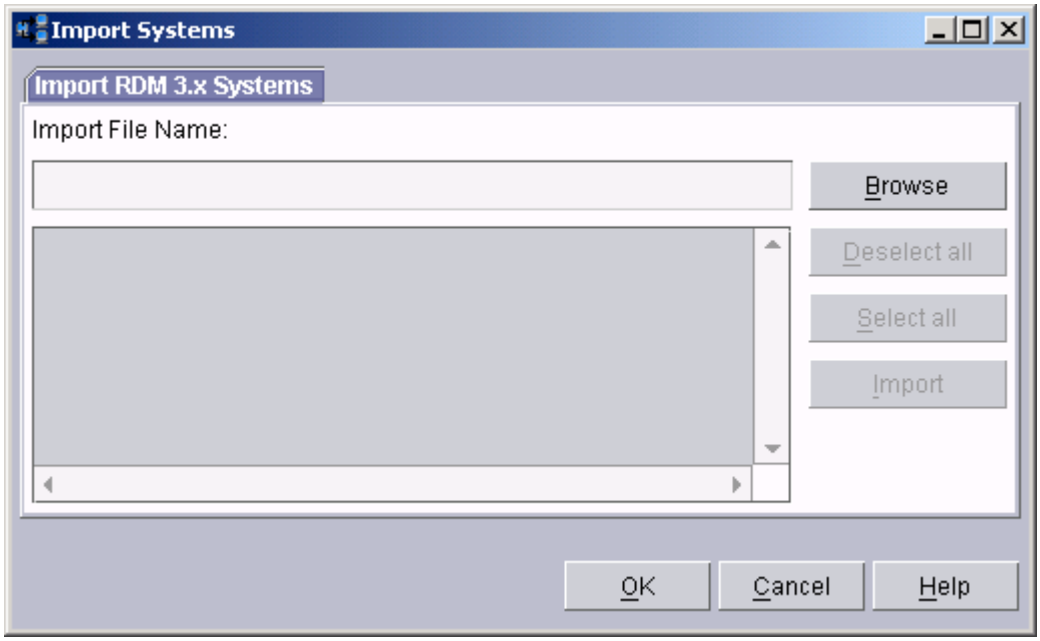
Data importing and exporting is a means of getting data from foreign programs, including LANClient Control Manager™ (LCCM) 2.x or RDM 3.x, into RDM. Data imported or exported is system data.



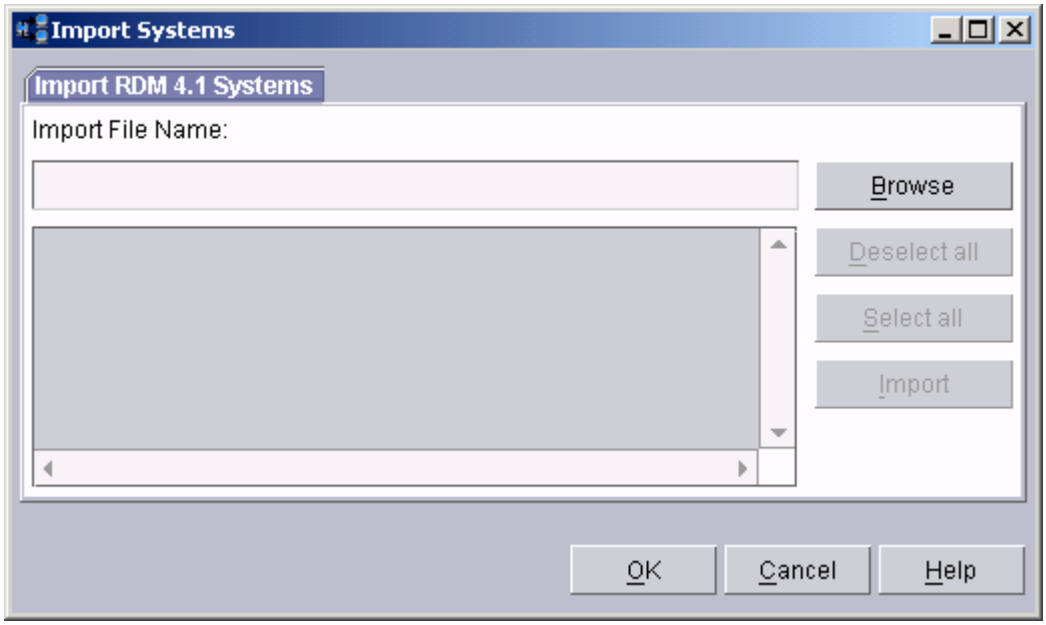
It should be emphasized that importing “data” in this sense is different from importing “images,” which happens in the Image Manager. In the image case, you are dealing with getting the files necessary to perform a certain task; this is an ongoing operation. Importing data refers to a more global operation, possibly affecting multiple tasks. It is usually a one-time, or infrequently performed operation, and is primarily used when the system is first installed, as a way to use data that already exists.

Import RDM 3.x Systems. Imports old RDM 3.1 client information into an RDM 4.1 installation in a 2-step process:

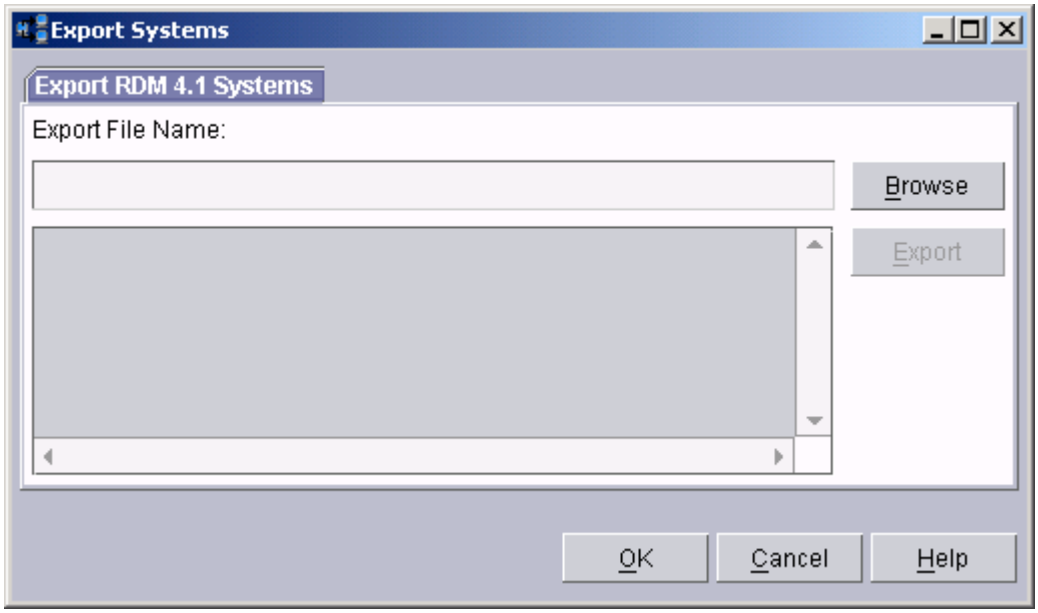
1. From RDM 3.1, *export* client data to a file.
2. From RDM 4.1, import that same client data file.



Import RDM 4.1 Systems. Always a local file.

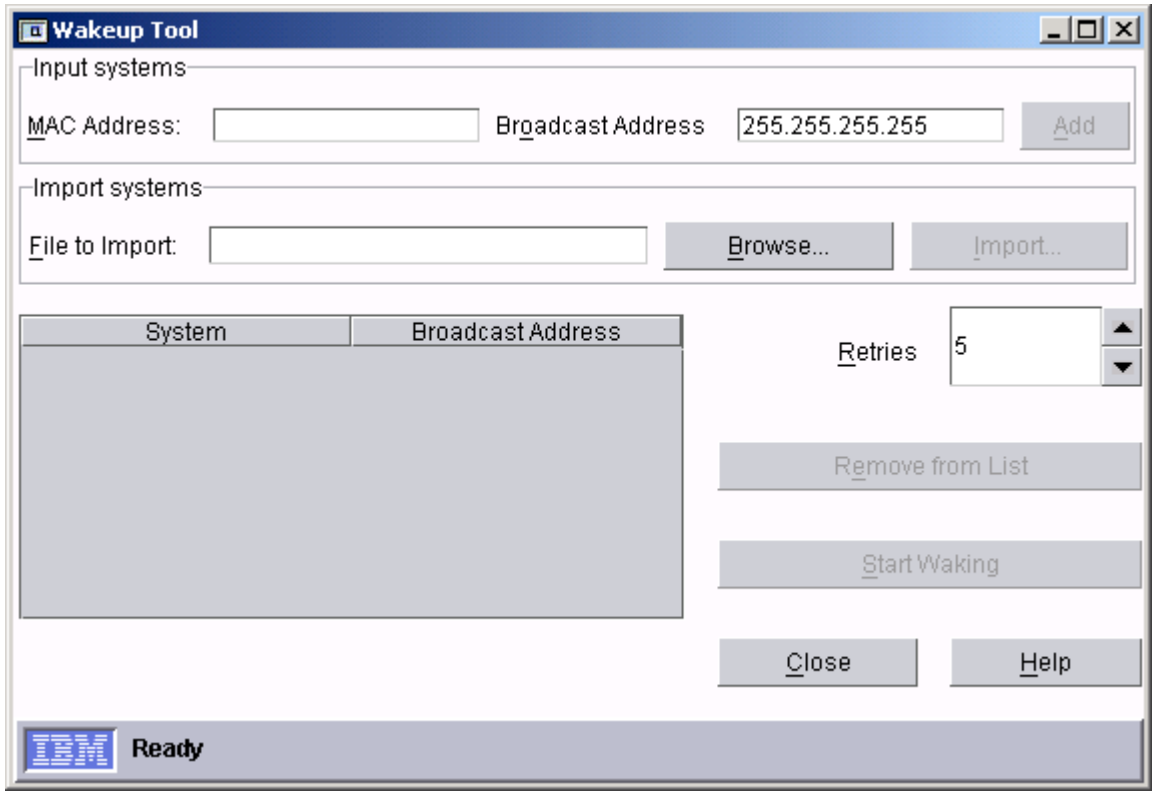


Export RDM 4.1 Systems. For exporting an RDM 4.1 client. Browse to the file or directory and give it a name with a .txt file extension. Export this file to the location you specify.



Wakeup tool

The wakeup tool is a tool for waking up arbitrary systems. It collects a list of MAC addresses (and subnets) for systems that you want to scan, and issues wakeup packets for each of them at intervals.



To wake systems, you must get their MAC addresses and broadcast addresses into the list box before you click **Start Waking**. There are several ways to fill the list box:

- Type data in both *Input systems* fields (MAC Address, Broadcast Address) and click **Add**.
- Type a file name in the applicable *Import systems* field (File to import), and click **Import**.
- Use **Browse** to navigate to a file, and click **Import**.
- Start the Wakeup Tool using IBM Director Console by clicking **Tasks→Remote Deployment Manager→Wakeup Tool**.
- Select one or more systems in the IBM Director Console, right-click one of the selected systems, and select **Wakeup Tool**.

You can select one or more systems in the list box and click **Remove from List** to delete the selected systems from the list box.

Note that when the information provided in the window is retrieved through an import file this information is not entered into the system database. This information is merely passed to the Wake System tool as its input to start waking up those systems. Wake system is not a task that can be scheduled; it simply runs when you click the **Start Waking** button. There is no job or history information kept for this task.

Troubleshooting

There are many variations possible across different systems. Most IBM systems work well, although some older systems have their quirks. Here is some general setup information in case the Wakeup Tool does not wake your systems:

- Ensure that your system hardware supports the Wake on LAN feature. For example, older servers do not (although most xSeries servers do).
- Ensure that you have an up-to-date BIOS level on the system.
- Ensure that the Wake on LAN feature is enabled in the BIOS code setup (press F1 during POST to change the settings).
- Ensure that one of the following is true:
  - The system is on the same physical subnet as the server (in this case, you can use the default broadcast address 255.255.255.255).
  - You specify the subnet broadcast address of the system (so that the broadcast can be routed to the correct subnet).
- Ensure that the Wake on LAN feature is enabled for your NIC in the NIC boot agent.

  On some Intel network adapters, the boot agent can be accessed by pressing **Ctrl+S** during system startup when the prompt `Initializing Intel Boot Agent Version x.x` appears on the screen. Make sure the Legacy OS Wakeup Support option is enabled. For other adapters, go to the Web site of the manufacturer and search on *Boot Agent*. Download the appropriate file for activating the Wake on LAN feature. For example, search for *Boot Agent* on the Intel Web site for the PRO/1000 XT adapter, and download the file Proboot.exe. This file produces the ibautil.exe utility described in the *Compatibility Guide* for this adapter. The utility explains how to enable the Wake on LAN feature.

- Double-check that the MAC specified is the MAC shown in the BIOS code setup windows. If you have a server with multiple network adapters, you should see multiple entries in the Wakeup Tool (a MAC address for each adapter).

Chapter 3. RDM tasks

This chapter describes the RDM templates and how to create new tasks from these templates.

CMOS Update

Use the CMOS Update task to update the CMOS configuration settings in the target systems.

To use this task, you must do the following:

1. Add an LCCMOS.BAT file to a BIOS update diskette (required for some, but not all, systems).
2. Import a BIOS update diskette into an RDM System Firmware Flash image.
3. Create a file that contains the desired CMOS settings.
4. Import that file into an RDM CMOS Update image.
5. Create an RDM task that uses that image.
6. Deploy systems with the task.

This task can use multiple CMOS images and will select the correct CMOS image for each system at run time. Each CMOS image is created from a donor system, using a program contained on its BIOS flash diskette. The CMOS image is, therefore, tied to a specific BIOS product code and BIOS code level. As a prerequisite for creating a CMOS Update task, you need to have a BIOS image for every product code to which the task applies (step 2, above). Note that some BIOS product codes apply to more than one machine type.

LCCMOS.BAT file

When RDM does a remote update of the CMOS settings, it will execute `LCCMOS.BAT`, `CMOSUTIL.EXE`, or `SRCMOSxx.EXE`, depending on which file is in the BIOS image. `LCCMOS.BAT` will always be executed, if it is present; otherwise, the EXE file will be executed. The command that RDM runs is similar to one of the following:

```
CALL LCCMOS.BAT %CMOSFILE%

CALL CMOSUTIL.EXE %CMOSFILE% /UPDATE /NOREBOOT /QUIET

CALL SRCMOSNV.EXE %CMOSFILE% /UPDATE /NOREBOOT /QUIET
```

If you thoroughly understand the CMOS process, you might modify (or create, if none exists on the BIOS flash diskette that will be imported into RDM) `LCCMOS.BAT` to customize this process. For additional details on what functions are available, consult the readme file on the BIOS flash diskette.

Note that the `CMOSUTIL.EXE` programs for different Netfinity, xSeries, or BladeCenter servers might require different command-line syntax. For example, to update CMOS with RDM on an xSeries 330 server, you must create an `LCCMOS.BAT` file (because the required syntax is different from what RDM uses by default). If you do not create this file, RDM will by default run a command like the following:

```
CALL cmosutil.exe  %CMOSFILE% /UPDATE /NOREBOOT /QUIET
```

That will fail, because it uses the wrong syntax for `CMOSUTIL.EXE`. To make CMOS updating with RDM work, create an `LCCMOS.BAT` file like this one:

```
REM LCCMOS.BAT file created by the customer for xSeries 330
REM to override the default syntax for CMOSUTIL.EXE.
cmosutil.exe /R %1
```

RDM will, by default, run a command like the following, which will work properly:

```
CALL LCCMOS.BAT %CMOSFILE%
```

Note: Any system whose cmosutil program uses -s and -r to save and restore, versus /s and /r, requires an LCCMOS.BAT file. Make a note of what syntax that particular system uses when you create the .cms file initially. What should go into the batch file is either one of the following commands:

```
cmosutil.exe -r filename.cms
cmosutil.exe -r %1
```

Create the BIOS image

Import the BIOS diskette (that contains an LCCMOS.BAT file, if needed) into RDM in the normal way.

Capture the CMOS settings in a file

Updating the CMOS settings for a system is a two-step process. First, you must create the CMOS settings update image, and then you apply the image to update the settings for specific systems.

To capture the CMOS settings, you must use the CMOSUTIL.EXE or SRCMOSxx.EXE (where *xx* will be two characters identifying the system board type) program. You will find the appropriate program on the BIOS flash diskette.

You create the CMOS-settings file on a donor computer that has the correct BIOS code level installed. Specifically, you execute the following steps on the donor computer:

1. Start the computer and access the Configuration/Setup Utility program. On many IBM computers, you can access this program by pressing **F1** while the computer is starting up.
2. Change and save the new settings as required. In particular, put "diskette" ahead of "network" in your alternate boot sequence.
3. Exit from the Configuration/Setup Utility program (saving your changes) and power off the computer.
4. Insert a DOS boot diskette that contains the appropriate CMOSUTIL.EXE or SRCMOSxx.EXE program into the donor computer diskette drive.
5. Restart the donor computer using the Wake on LAN feature. You can use the RDM wake tool to do this.

   Use the CMOSUTIL.EXE or SRCMOSxx.EXE program to save the current settings of the donor computer to a file that you will name with the .cms file extension. Enter:

   ```
   CMOSUTIL \path\file_name.CMS /capture
   ```

   or

   ```
   CMOSUTIL – s \path\file_name.CMS
   ```

   or

   ```
   SRCMOSxx \path\file_name.CMS /capture
   ```

where `xx` is the two-character system board identifier, and `path` is any accessible directory name of your choice.

Note: For the CMOSUTIL utility, check the BIOS diskette for documentation on the exact syntax for capturing CMOS settings. This information should either be in the file readme.txt or cmosutil.txt.

Give the file a unique name that you can identify later. For example, the file no35disk.cms could be the name of a file that has settings that restrict system access to diskette drives.

Use this .CMS file with the CMOS Update task or with the Image Manager (IM) to create the CMOS image.

6. If you want to create another CMOS image that uses different settings, return to step 1 and repeat the procedure, saving the results to a different file name.

Deploy the CMOS settings image

To apply the newly created CMOS settings image to selected systems, create a CMOS Update task. When creating the CMOS Update task, you can select which CMOS image to use or create a new CMOS image to use; then, by dragging systems with the correct BIOS code levels to this task, the CMOS is updated.

Note: You need to know the corresponding BIOS level when creating a CMOS Update task for the task to operate properly.

CMOS updates will not be made until the scheduled update time is reached and the system is powered off and restarted. If the CMOS settings update fails, an error code appears in the Progress and Errors window. The meanings of the error codes vary depending on the BIOS code level. To decipher the error codes:

1. Insert the applicable BIOS flash diskette into the diskette drive.
2. At a command prompt, type:

   ```
   A:\CMOSUTIL /?
   ```

   or

   ```
   A:\SRCMOSxx /?
   ```

   where `xx` is a two-letter model-specific designation.

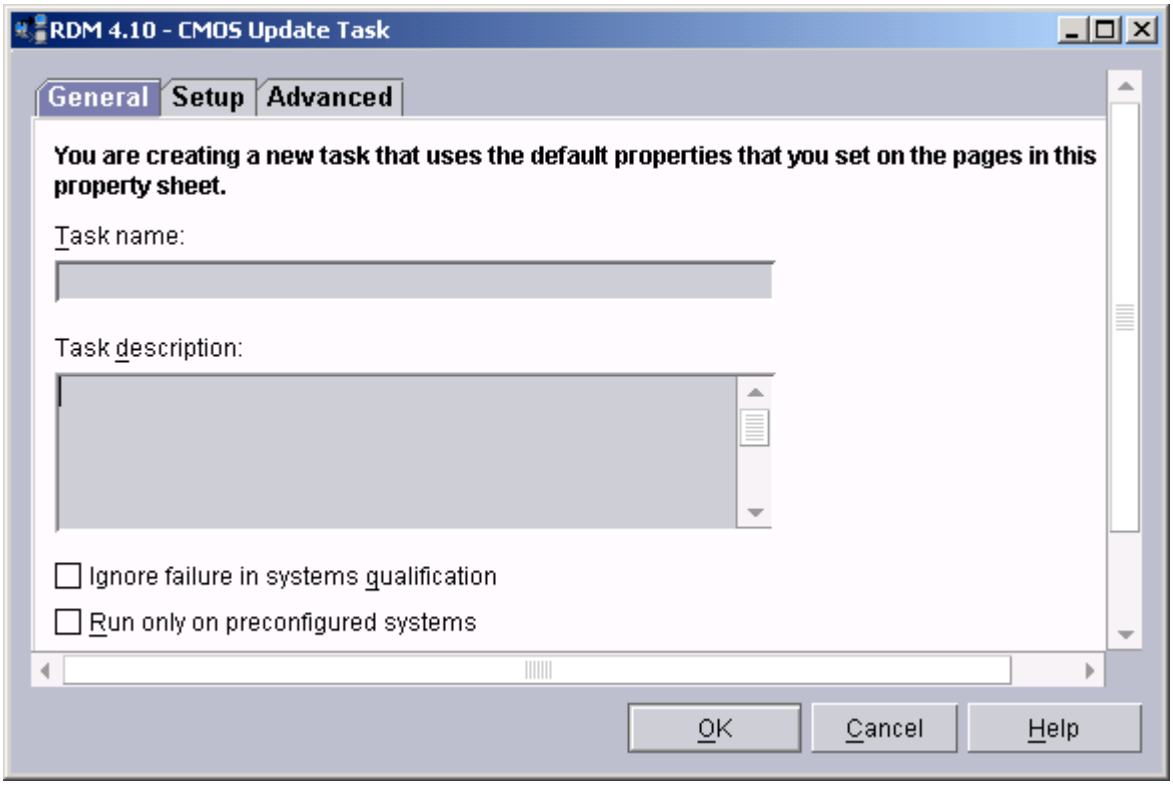
A list is displayed containing the error codes and their meanings.

Right-click the RDM **CMOS Update** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows; however, the first option results in creating a new task while the second makes changes to the task template properties. Any changes you make to the template properties will be reflected in new tasks created from that template.

Create a CMOS Update task – detailed instructions

Complete the following steps to create a CMOS Update task:

1. Right-click the **CMOS Update** template, and then click **Create new task**.

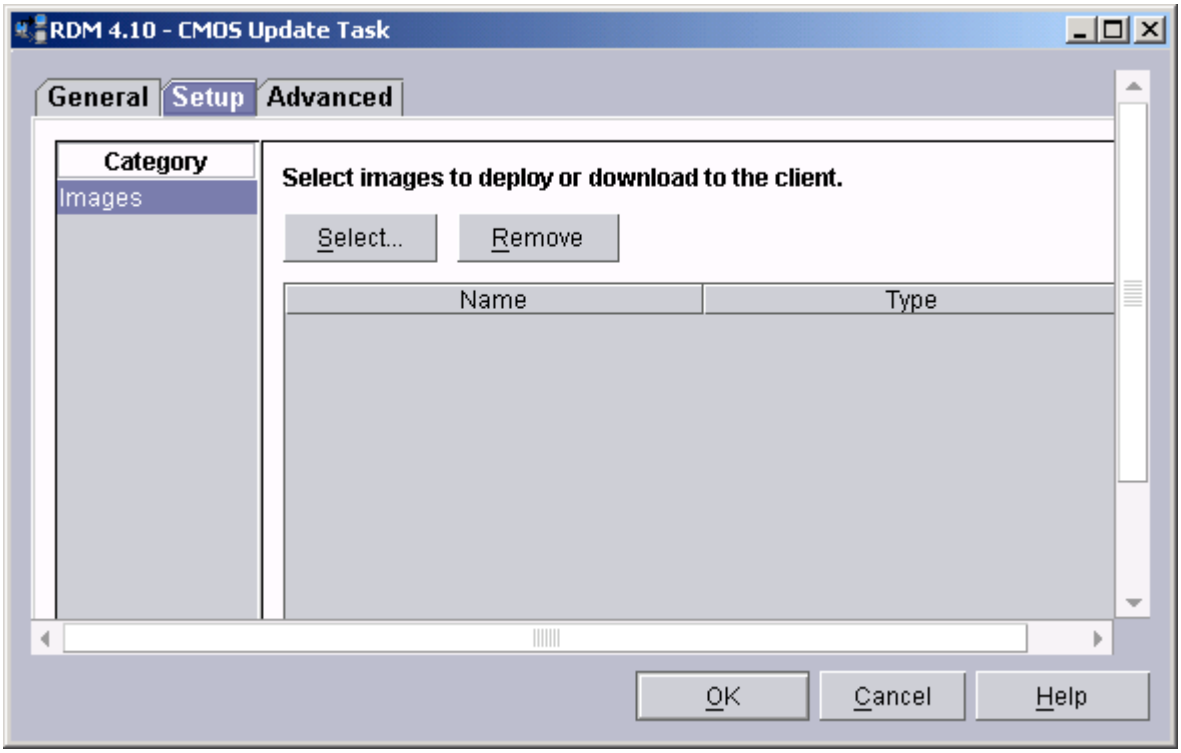


2. Type a task name and, optionally, a description.
3. Select the applicable check boxes:

   Ignore failure in systems qualification. If the flag is checked, systems associated with this task will not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.

4. Click the **Setup** tab.



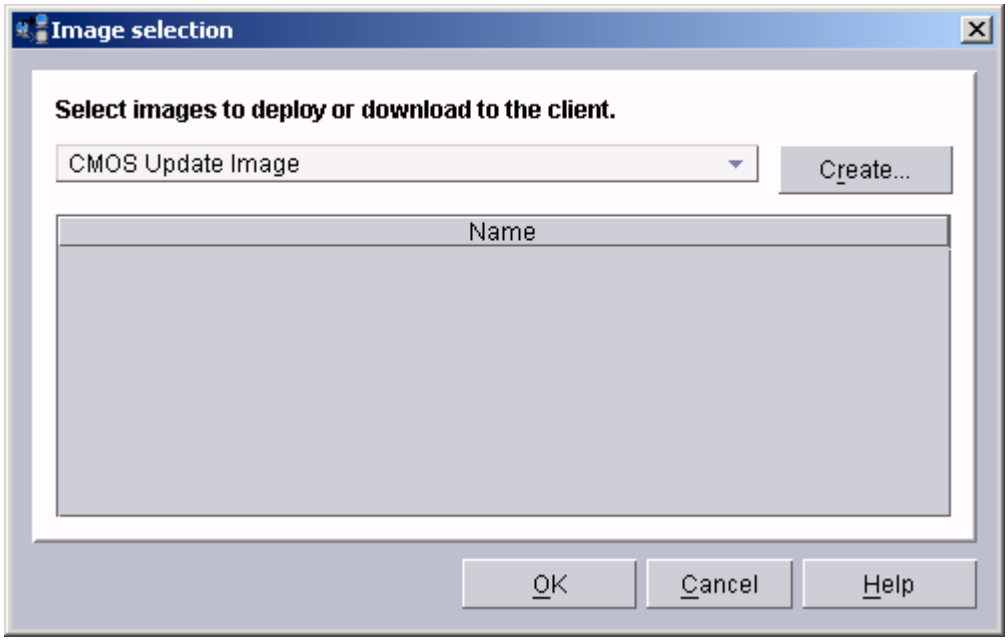
Select an image from the list box, or click **Select** to add an image to the RDM repository and to the list in this window. If you are going to create a new CMOS Update image, a corresponding System Firmware Flash image must already exist.

To remove an image from the list, select the image (within the list), and then click **Remove** (this does not remove the image from the RDM repository).

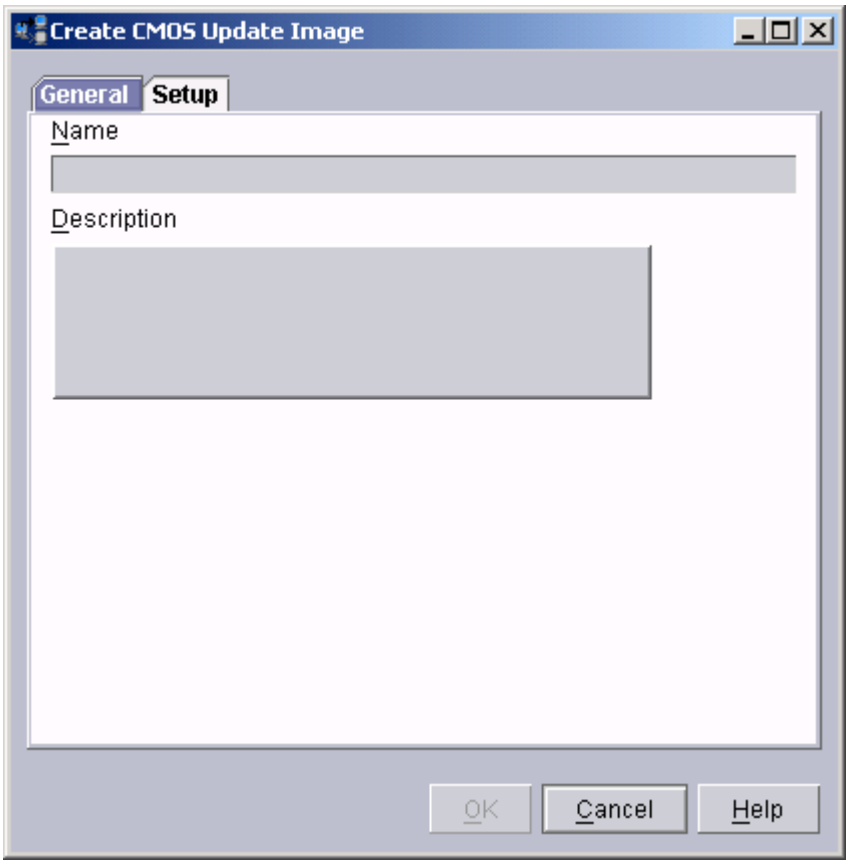
Create a new image

Complete the following steps to create a new image:

a. From the Setup page of the CMOS Update template, click **Select**. This opens the Image Selection window.



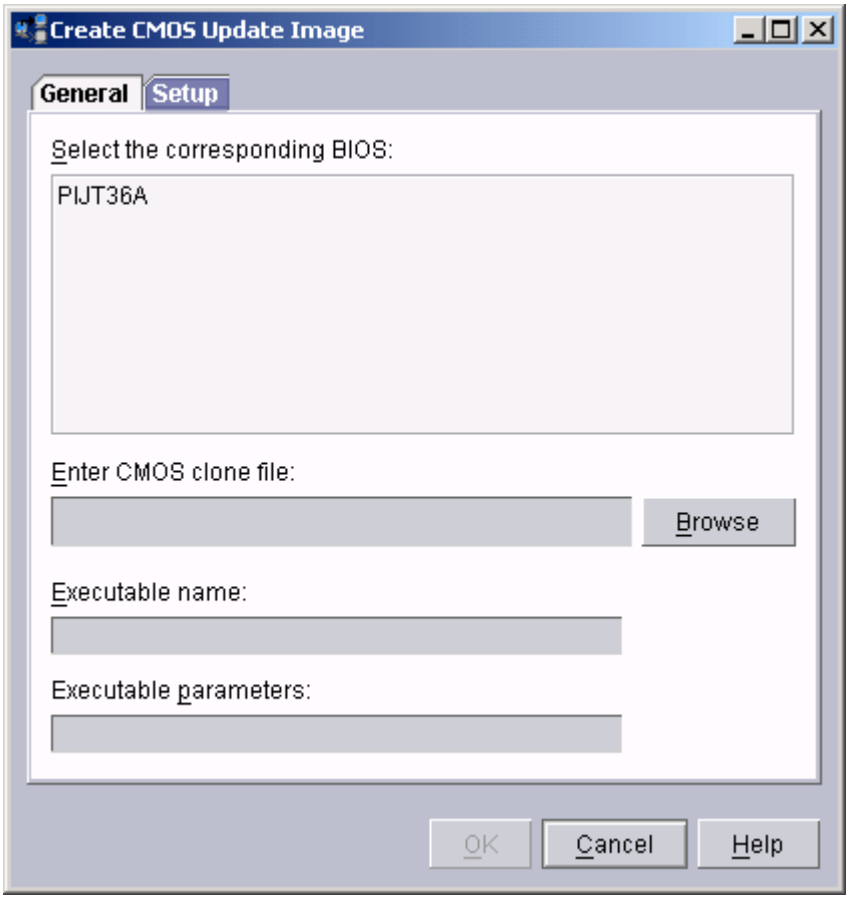
b. Click **Create**.



c. On the General page, type a name and optional description for the new image to be created.

d. Click the **Setup** tab, select the corresponding BIOS code (the System Firmware Flash image) and specify or browse to the source of CMOS clone

file to be imported. The Executable name and Executable parameters will be filled in automatically.



If you click **Browse**, the file you are looking for is called out in the title of the browse box.

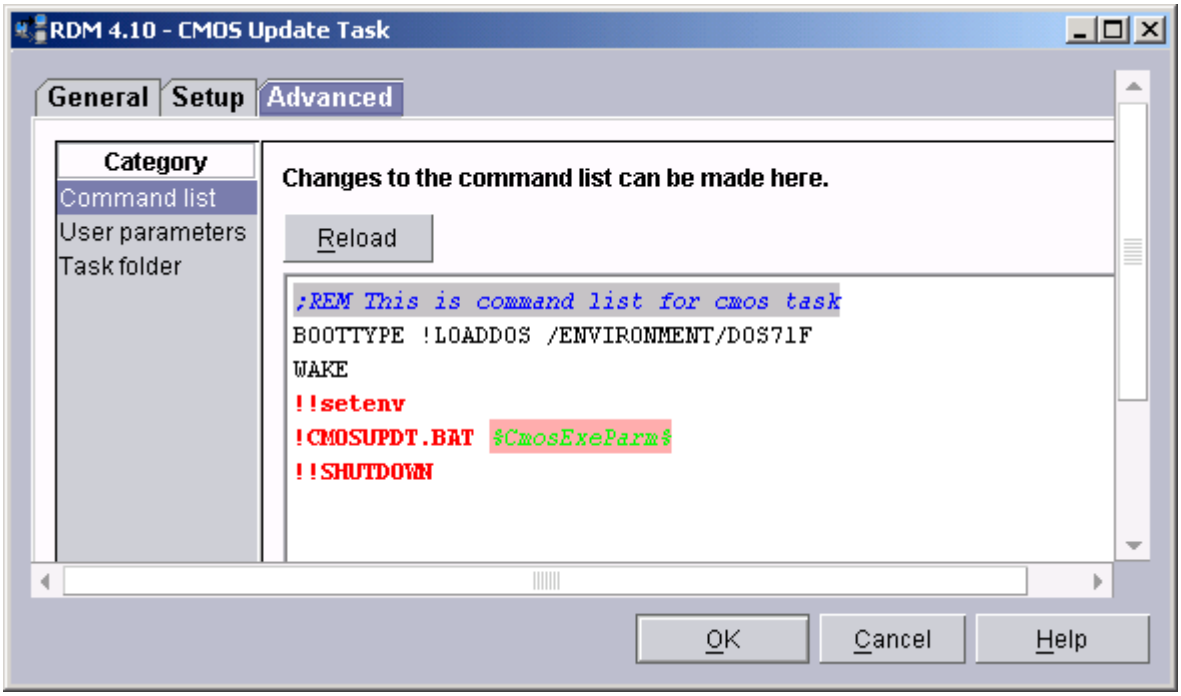
e. Click **OK**.

5. Click the **Advanced** tab, only if you want to modify the task logic. Otherwise (this is the normal procedure) select **OK** to finish creating the task.

6. Enter your values for each of the following categories:

   Command List

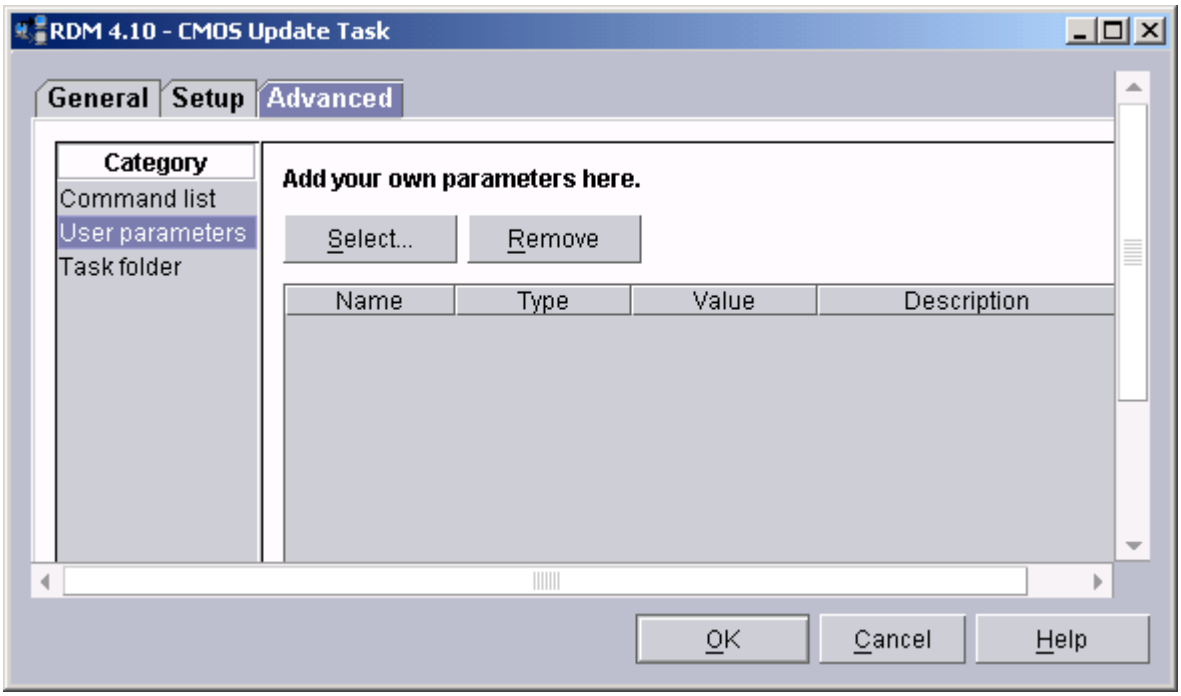
   The command list is a list of RDM and DOS commands that perform the CMOS Update task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.



Refer to Appendix A for information on commands and syntax within a command list.

User parameters

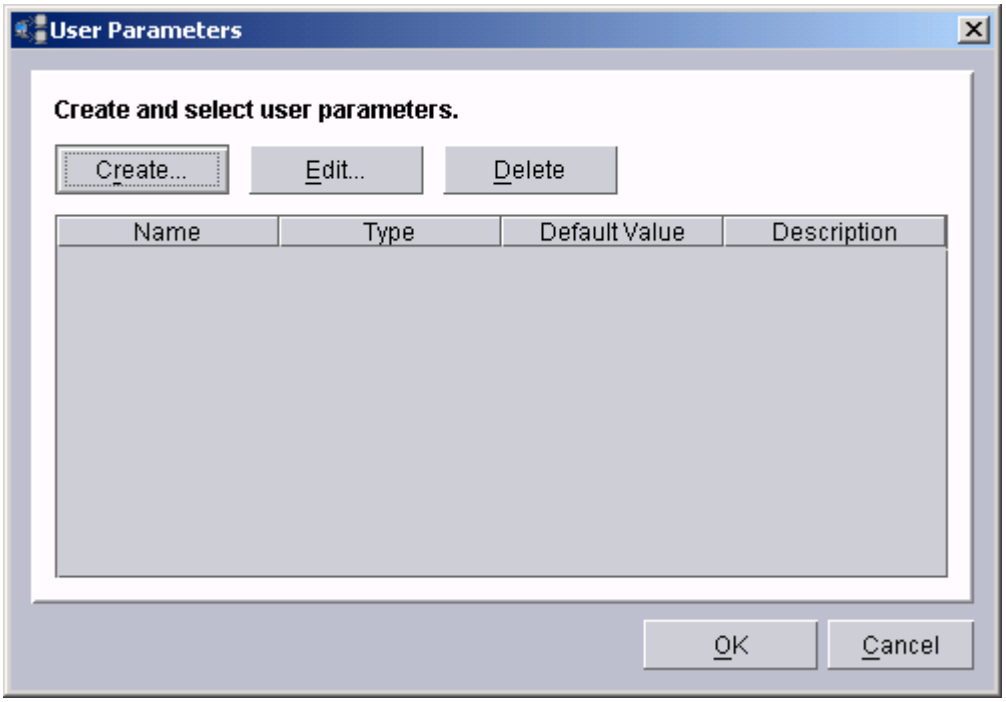
A list box displays the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box and, as a result, the task. CMOS Update tasks, by default, do not use any user-defined parameters.



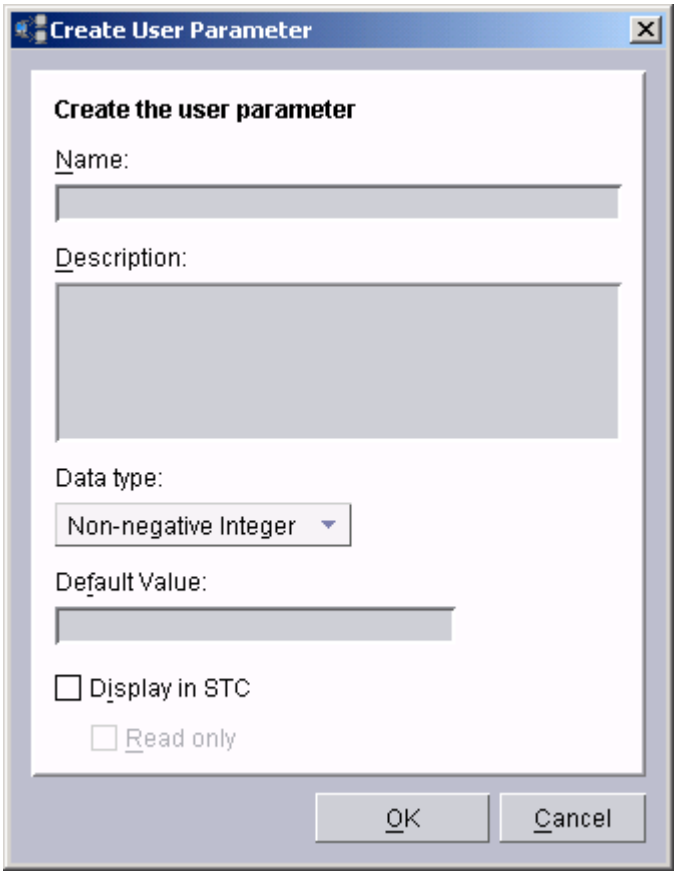
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

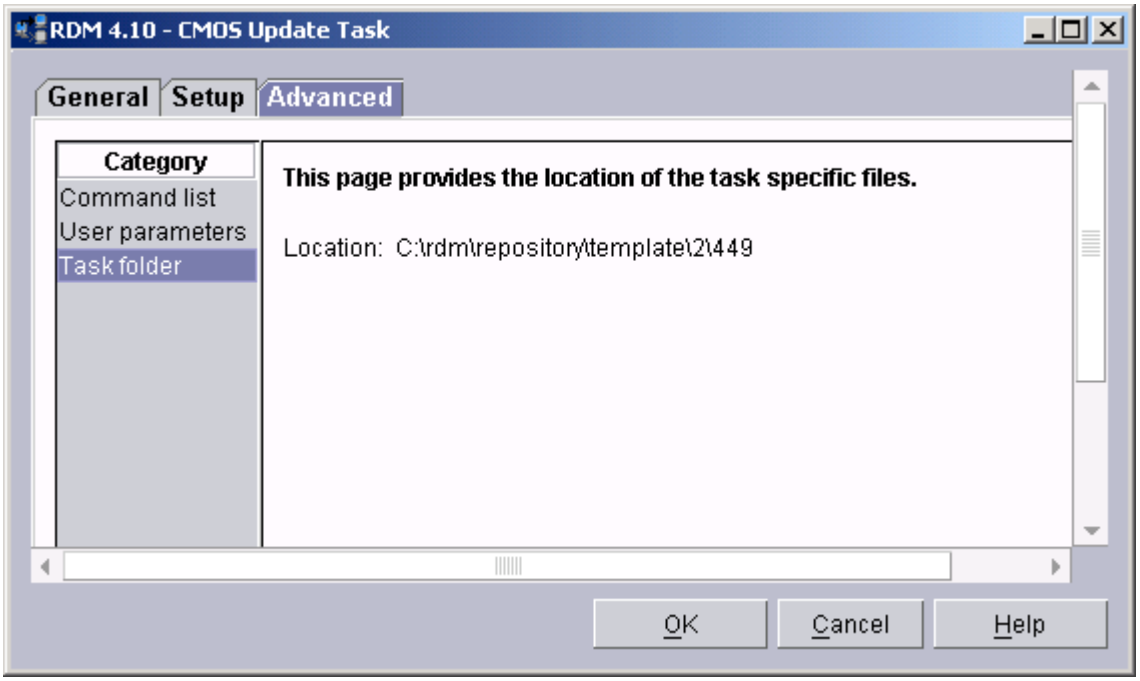


c. Enter a parameter name, description, data type, default value, whether or not it should display in the System/Task Configuration (STC) table, and whether or not it should be read-only in the STC.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



7. Click **OK** to create the task.

   The task will appear with the **CMOS Update** template in the IBM Director Tasks pane. Right-click the new task to edit or delete the task.

Custom

The Custom task template is a general-purpose template that you use to specify your own processes to run on the system. The task consists of the following:

- A CommandList file containing the commands that are to be executed as part of the task.
- Optionally, one or more image files containing all the supporting files that are required by the commands.

Custom tasks can use any image by using a call to MTFTP in the command list (or in a batch file that is called by the command list). Each image must be created and saved to the Master Repository using the Image Manager (IM). RDM simply delivers the files to a point accessible to the system, and executes the commands that are specified in the command list, in the order in which they appear.

Right-click the RDM **Custom** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows; however, the first option results in creating a new task, while the second makes changes to the template properties. Any changes you make to the template properties will be reflected in new tasks created from that template.

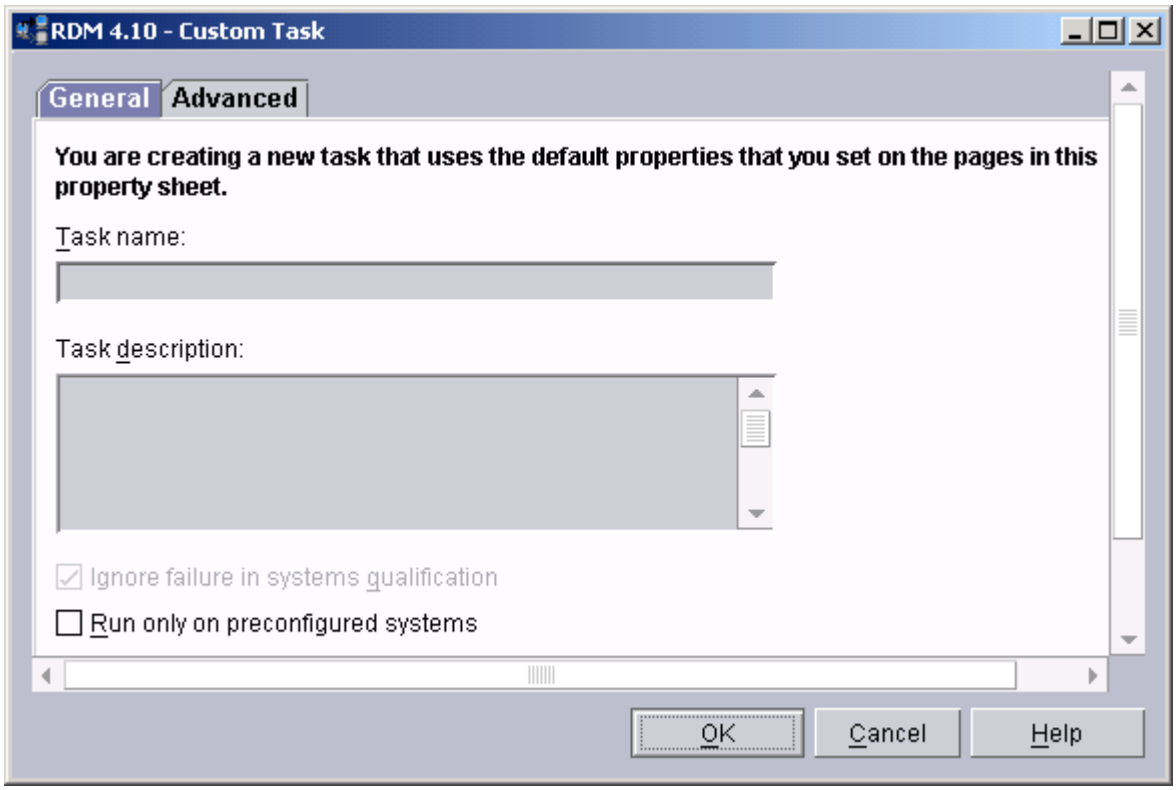
Create a Custom task

Complete the following steps to create a Custom task:

1. Right-click the **Custom** template, and then click **Create new task**.

2. On the General page, enter a task name, description (optional), and select any applicable check box (optional).

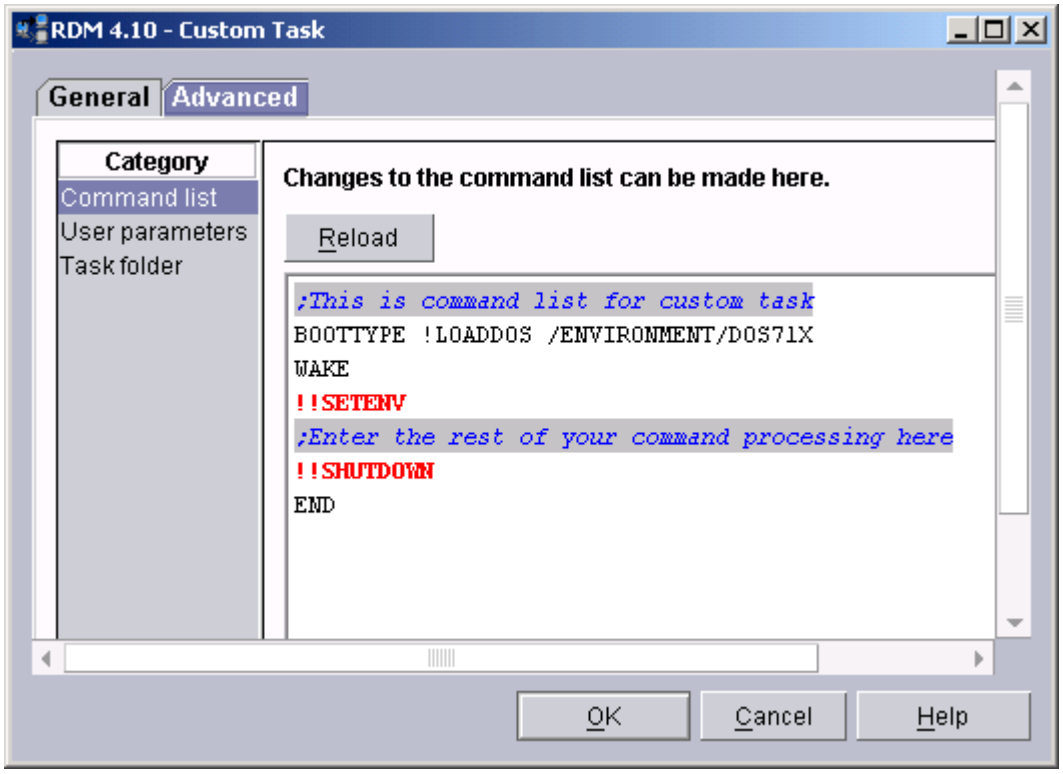
   The **Run only on preconfigured systems** check box affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run systems**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.



3. Click the Advanced tab.
4. Enter your values for each of the following categories:

   Command list

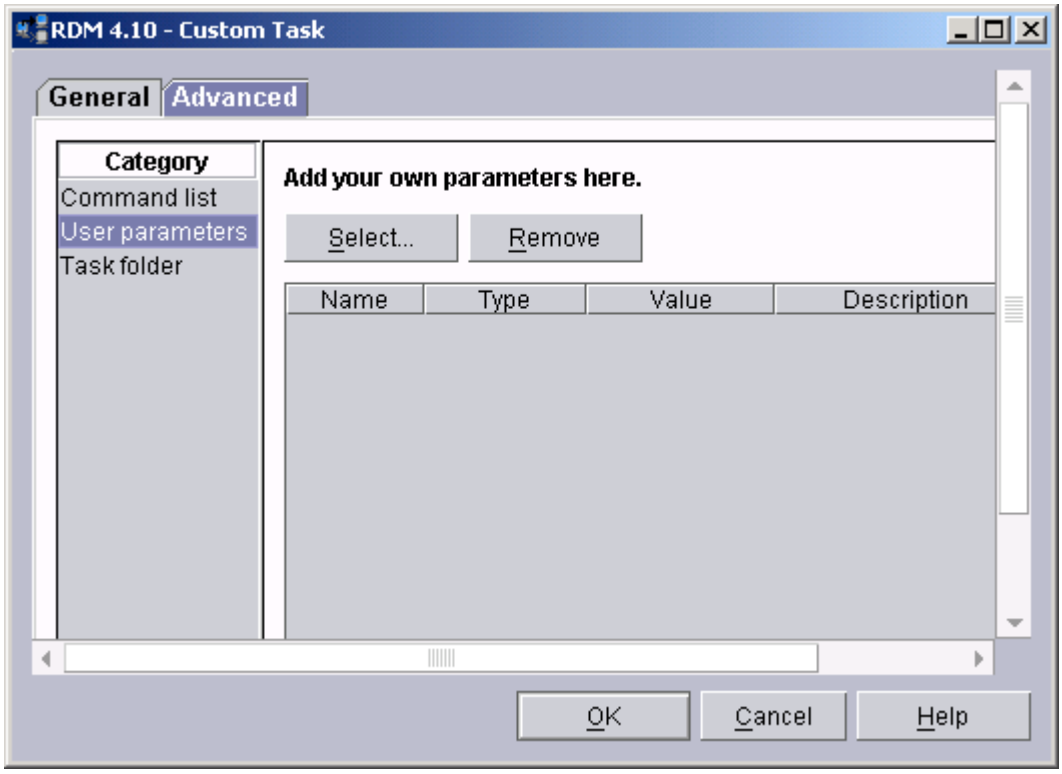
   The command list is a list of RDM and DOS commands that perform the Custom task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.



Refer to Appendix A for information on commands and syntax within a command list.

User parameters

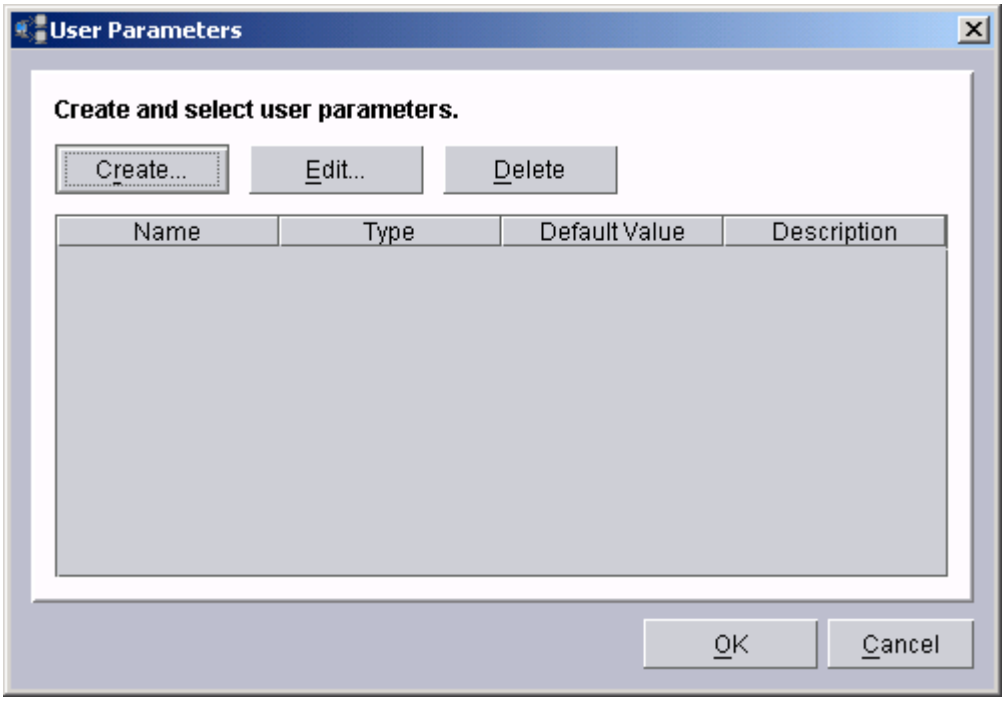
A list box displays the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. Custom tasks, by default, do not use any user-defined parameters.



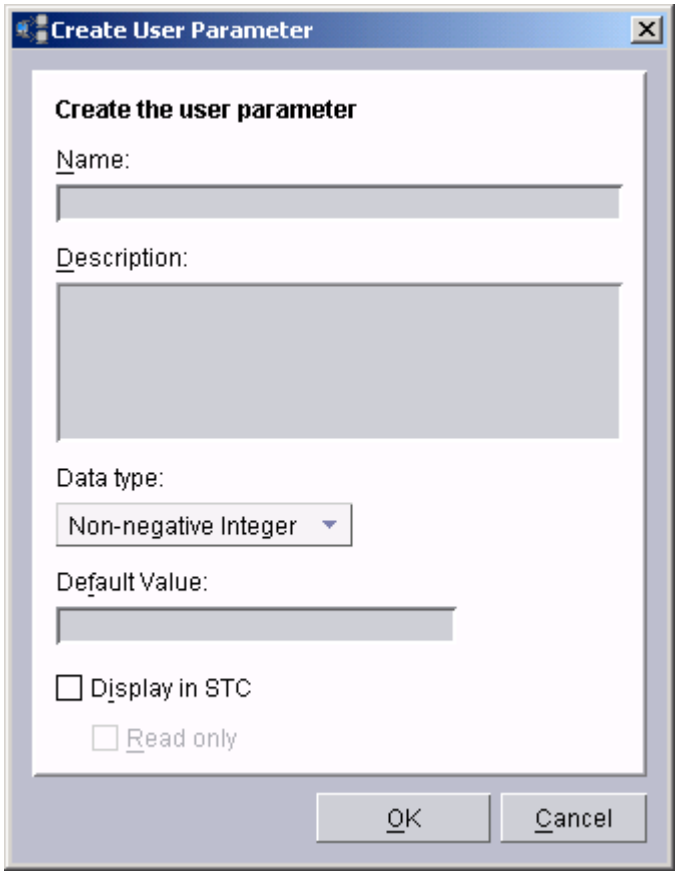
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

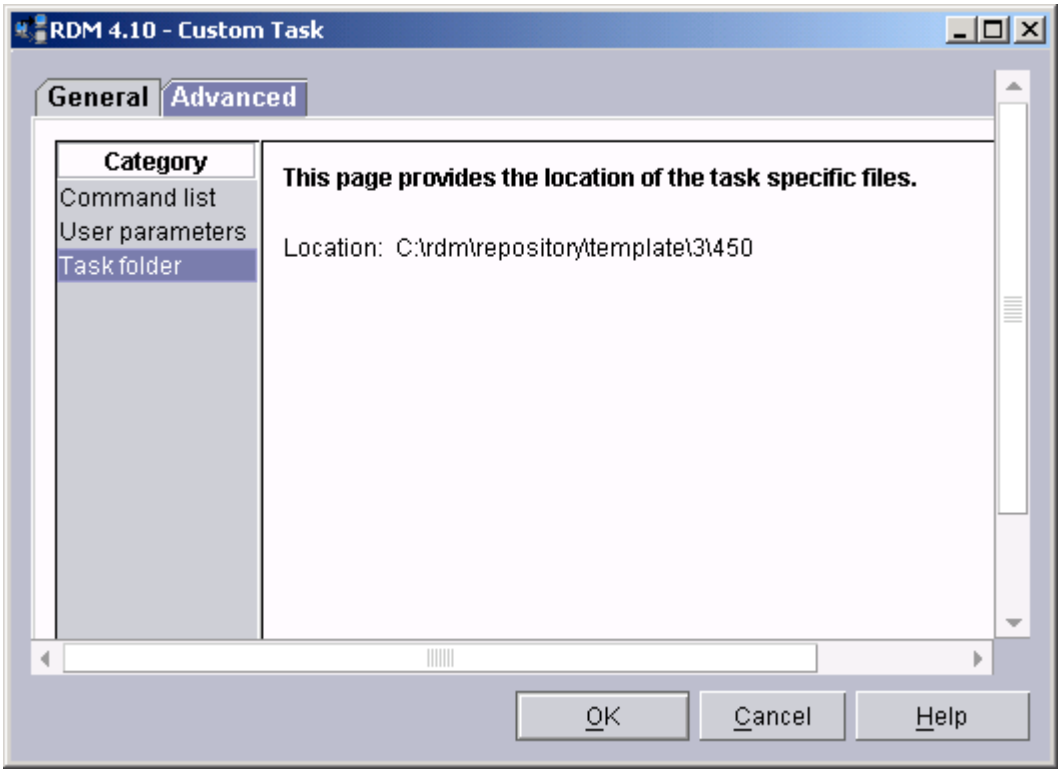


c. Type a parameter name, description, type, and value.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



5. Click **OK** to create the new task.

The task will appear under the Custom template in the IBM Director Tasks pane. Right-click the new task to edit or delete the task.

Example: Using a Custom task to flash RSA firmware

The following example creates a Custom flash task for an IBM Remote Supervisor Adapter (RSA):

1. Obtain the appropriate flash diskette images from the IBM web site. Note that RSA flash diskettes are usually system-dependent (that is, the same adapter model may need a different set of flash diskettes for each system model).
2. Create the flash diskettes.
3. Copy all the files (except DOS files like IBMBIO.COM, IBMDOS.COM, CONFIG.SYS and perhaps documentation files like README.TXT) from the flash diskettes to a folder named C:\RSAFLASH .
4. Create a C:\RSAFLASH\RSA1.BAT file containing these statements:

```
%RAMDSK%
FLASH2.EXE /u /c /m /b /d
```

5. Run your favorite zip program to zip up the C:\RSAFLASH directory into a RSA1.ZIP file. Do not allow it to keep the path name.
6. Create a Custom task for the RSA firmware flash with the following script:

```
; This is a command list for custom task

; Flashes RSA firmware for model 8671 server.
BOOTTYPE !LOADDOS /ENVIRONMENT/DOS71F
WAKE
!!SETENV
```

```
!%%RAMDSK%%
!mtftp get %%SERVER_IP%% template\%%TASKTEMPLATEID%%\RSA1.ZIP RSA1.ZIP
!mtftprc.bat
!mtftp get %%SERVER_IP%% environment\dos\unzip.exe unzip.exe
!mtftprc.bat
!UNZIP RSA1.ZIP
!rsa1.bat
!!SHUTDOWN
END
```

Note: You might need to change the DOS71 directory from the default "X" to "F" to get the flash operation to take place.

7. Edit the new task, select the **Advanced** page, select **Task folder**, and note the directory name (for example, <RDMInstallPath>\repository\template\3\501). Click **OK**.
8. Copy RSA1.ZIP to the custom task's template folder (for example, <RDMInstallPath>\repository\template\3).

   Note: In this example, the zip file was created outside of RDM and put it in the template directory. This could have been done differently, such as in the custom-task scenario for updating network adapter firmware in Chapter 5. To store the file in the task directory, you would reference it as `template\%%TASKTEMPLATEID%%\%%TASKTOID%%\RSA1.ZIP` in the command list.

Donor Image

The Donor Image task runs PowerQuest® code (PQIDplyZ.exe) on a donor system that has been prepared with the sysprep utility, creates a clone image from the donor system, and stores it in the RDM Master Repository. The image can then be deployed to target systems through the Windows Clone Install task. The target systems do not have to exactly match the donor in terms of hardware configuration, however the same HAL (Hardware Extraction Layer) must be present on both.

The PowerQuest software provides support for Ethernet only. Token Ring is not supported for this task.

A typical scenario for using the PQIDplyZ.exe and sysprep programs would involve these steps:

1. Prepare a donor computer to be the basis of the clone by running the sysprep.exe program to remove the unique system information, such as its Security Identifier (SID) and to prepare the hard disk drive for customization using mini-setup on the next reboot.

   Complete the following steps to prepare the donor system:

   a. Ensure the donor system is set as part of a workgroup, not as part of a domain.

   b. Ensure the built-in Administrator password is blank.

   c. If you are including applications as part of the image:

      i. Log on to the donor system as a user account that has administrative privileges. Do not use the built-in Administrator account.

      ii. Install and configure the applications as necessary.

Note: If you are planning to deploy systems with Power Restore partitions, it is recommended that you setup your donor computer with a Power Restore partition. This action ensures the donor partition will not be too large to prevent the creation of a Power Restore partition on the systems.

      iii. Log on to the donor system as Administrator.

      iv. Copy the user profile you used to install the applications to the Default Users folder.

   d. There are two utilities available from Microsoft: sysprep.exe and setupcl.exe. They are available on the Windows 2000 and Windows XP operating system CDs (in the support\deployment\deploy.cab directory) or updated versions can be downloaded from www.microsoft.com.

      Create a directory for the Microsoft utilities, for example, c:\winnt\support\deployment

   e. Copy the sysprep.exe and setupcl.exe programs to the new directory on the donor.

   f. Close all windows on the donor system.

   g. Open a Command window on the donor system. For example, **Start → Run → cmd**.

   h. Run sysprep, for example:

      ```
      c:\winnt\support\deployment\sysprep
      ```

   The sysprep utility prepares the donor for imaging. System settings are removed so there are not conflicts when the image is deployed.

   Click **OK** for sysprep to complete. The donor computer should shut down.

   For Microsoft Windows XP Professional, run sysprep from either a command prompt or from Windows Explorer. Click **OK** for sysprep to continue. A new window opens. Select the MiniSetup check box and make sure Shutdown is shown in the drop down box; then, click **OK** for sysprep to complete. The donor computer should shut down.

After running sysprep on most mobile computers, the computer will not shut down automatically. The system can be shut down manually without any errors when the blue screen with the mouse pointer appears after a few minutes.

RDM uses sysprep.exe to personalize the system with data from the sysprep.inf file. Sysprep.inf options can be modified and stored directly on the target system hard disk drive after downloading the image.

The MiniSetup option that is used with sysprep for Windows XP Professional has limitations on its definition of new users. As a result of this, a system deployed with a PowerQuest clone installation of Windows XP Professional which uses the new-style login screen will not show the RDM-assigned user. Instead, users will have to press the Ctrl+Alt+Del key combination twice in rapid succession to bring up the "classic" login screen, which will display the RDM-assigned user.

2. Create a clone image by running the RDM built-in Get Donor task that runs the PQIDplyZ.exe program to create the image of the donor computer and store it in the Master Repository. If the donor system does not appear in the Group Contents pane, run the Scan task. The output of the PQIDplyZ.exe program is a PowerQuest image file (with a .pqi file extension) on the D-Server that is a binary snapshot of a system hard disk drive.

Note: Creating too many large clone files can cause the RDM server to run out of disk space. RDM does not monitor server hard disk space for the Get Donor task; you must make sure there is enough disk space to perform the task. Clone image size is dependent on the data being cloned, so there is no way to predict how large a cloned image will be.

Complete the following steps to create a clone image:

a. Expand **Remote Deployment Manager** in the **Tasks** pane so that **Donor Image** is visible.

b. In the **Group Contents** pane, right-click the donor system and drag it to the **Donor Image** task.

c. Click **Configure Systems**. RDM sends a wake up to the donor system. A command window opens on the donor to display progress. A progress window is also opened on the RDM console to monitor the creation of the image file. The file is of type .pqi (power quest image). The resulting image can be several gigabytes in size.

d. When configuration is complete, right-click the **Get Donor** task and click **Run**. This step adds the donor image to the Master Repository so it is accessible to other tasks. The following fields can be edited:

DonorOSType is the operating system used for the image. This is a drop-down list.

DonorExternalName is a descriptive name for the image.

DonorDescription is a description of the image.

Click **Save** when complete. The image is added to the repository.

Note: When running the **Get Donor** task on a client attached to a Remote D-Server, the client may be suspended for a time contacting the server after capture.bat is completed. During this time, the Remote D-Server is replicating the donor image to the Master D-Server. If you cancel the **Get Donor** task while the task is running, you may have a problem running the task again until the canceled task finishes copying the donor file to the Master D-Server.

When replication is complete, the client will shut down and the task will complete.

---

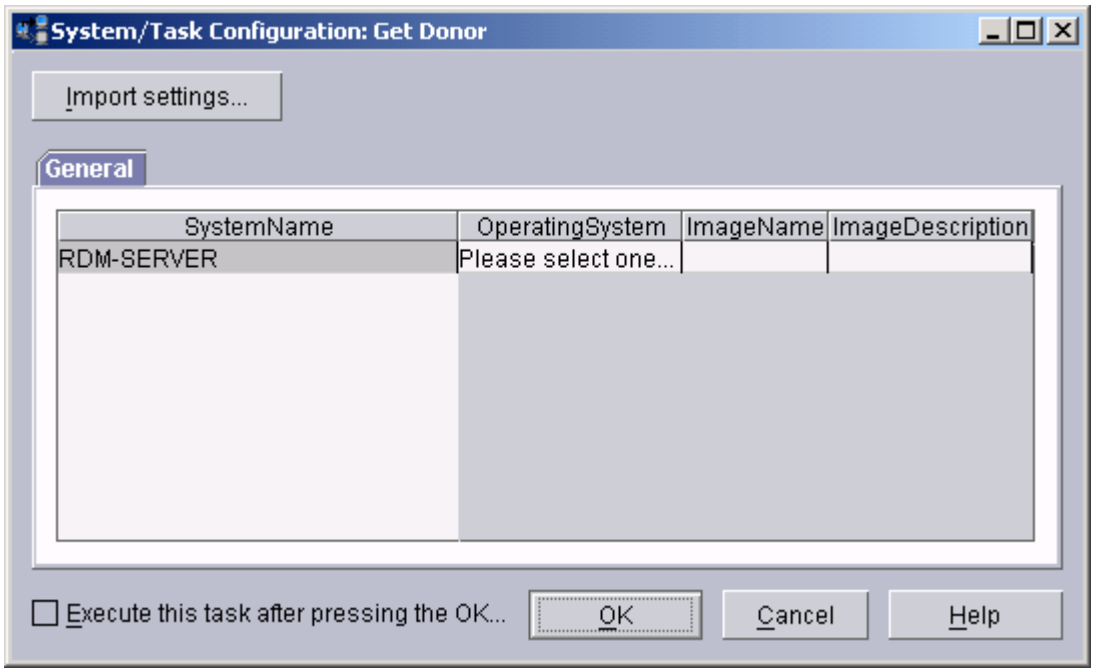
3. Create a Windows Clone Install task using the PowerQuest donor (.pqi) file as input.

4. Deploy the cloned image to other systems by dragging system-to-task or task-to-system within IBM Director Console. Clone N (a large number) identical-hardware systems using the Windows Clone Install task (which uses PQIDplyZ.exe). These are assumed to be identical systems. Update the sysprep.inf file with personalization on the N systems using RDM remote DOS boot, using the Pqaccess.exe program. Reboot the N systems to their hard disk drive. The sysprep program will personalize the system with data from sysprep.inf.

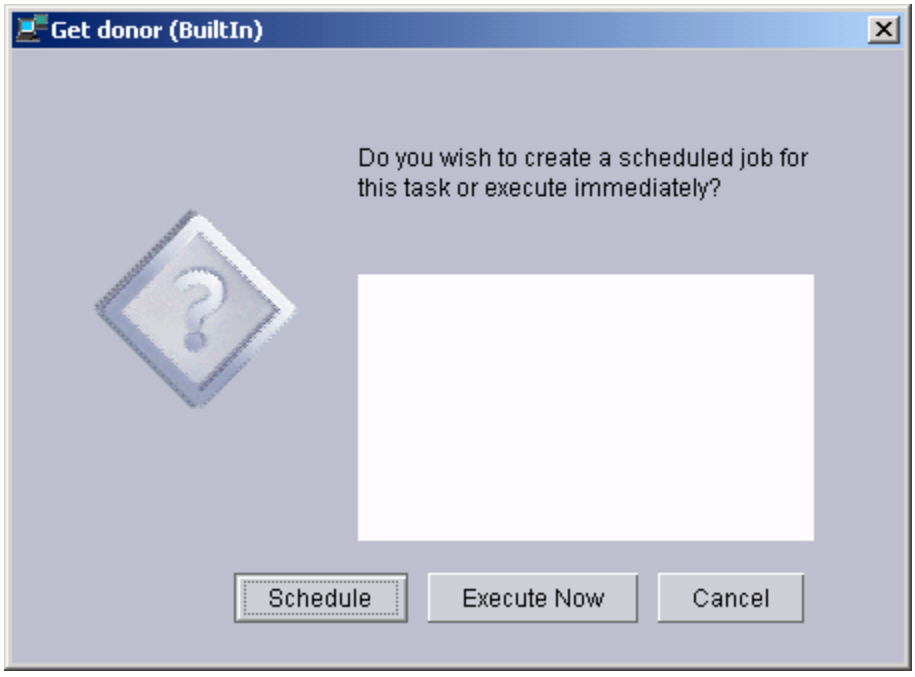
Schedule a Get Donor task

Complete the following steps to schedule a Get Donor task:

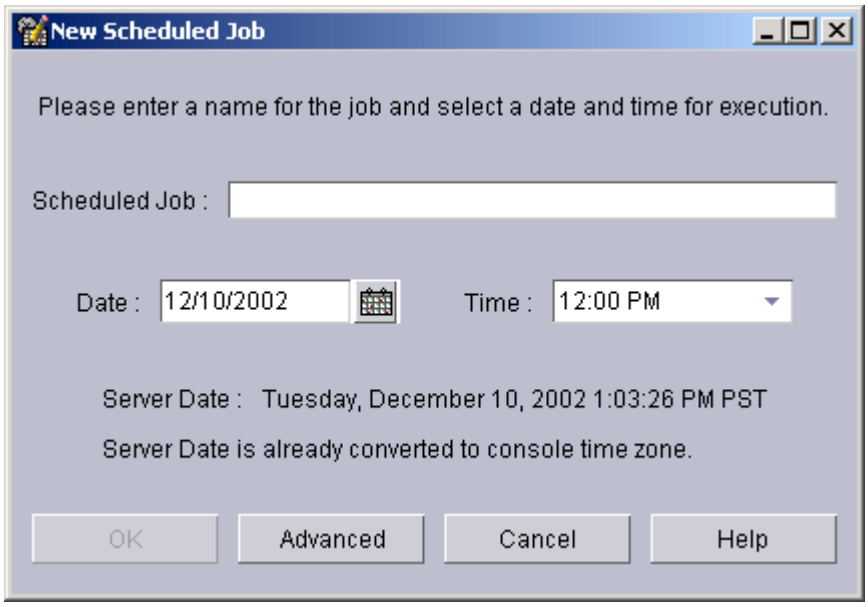
1. Right-click the **Donor Image → Get Donor** task in the IBM Director Tasks pane, and then click **Configure systems** to open the System/Task Configuration window.



2. Select an operating system, type an image name, and mark the “Execute this task” check box, then click **OK**.



3. Click **Schedule**.



4. Type the job name, date, and time for job execution and click **OK**.

Upgrading to Deploy Center version 5.5 with RDM 4.1

To upgrade to the full version of Deploy Center, complete the following steps:

1. Extract the following files from your Deploy Center version 5.5 Install CD:

   PQImgCtr.exe

   PQdplctr.rtc

Note: Files may be located in a cab file.

You can also get these files by created a PQImgCtr DOS boot disk from the PowerQuest BootDisk builder.

2. Copy the files PQImgCtr.exe and PQdplctr.rtc into the directory '%rdmpath%\local\env\71c' .
3. Run the mkimages.bat files in the '%rdmpath%\local\env' directory.

You will now be using the full version of Deploy Center whenever you run the Get Donor or Windows Clone Install tasks.

You can now take advantage of the full version of Deploy Center functionality by modifying "capture.bat" and/or "pqstore.scr" located in the '%rdmpath%\local\env\71c\capture' directory.

Linux Native Install

The Linux Native Install task provides you several different methods of gathering operating system and application installation information in advance. After these system systems have been assigned their individualized information, the operating system and applications installation and configuration to these systems will take place without any further user attendance.

Right-click the RDM **Linux Native Install** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows, however, the first option results in creating a new task while the second makes changes to the task template properties. Any changes you make to the template properties will be reflected in any new tasks created from that template.

In creating a new unattended Linux installation task using the wizard, you are guided through a series of panels in a predefined order, filling in answers or changing the default answers on all the questions asked. Use the property sheets to make changes to the Linux Native Install template and to create installation images (but not a new task).

Note: LNI task configuration uses the client system name to be the client computer name, if the client computer name does not exist.

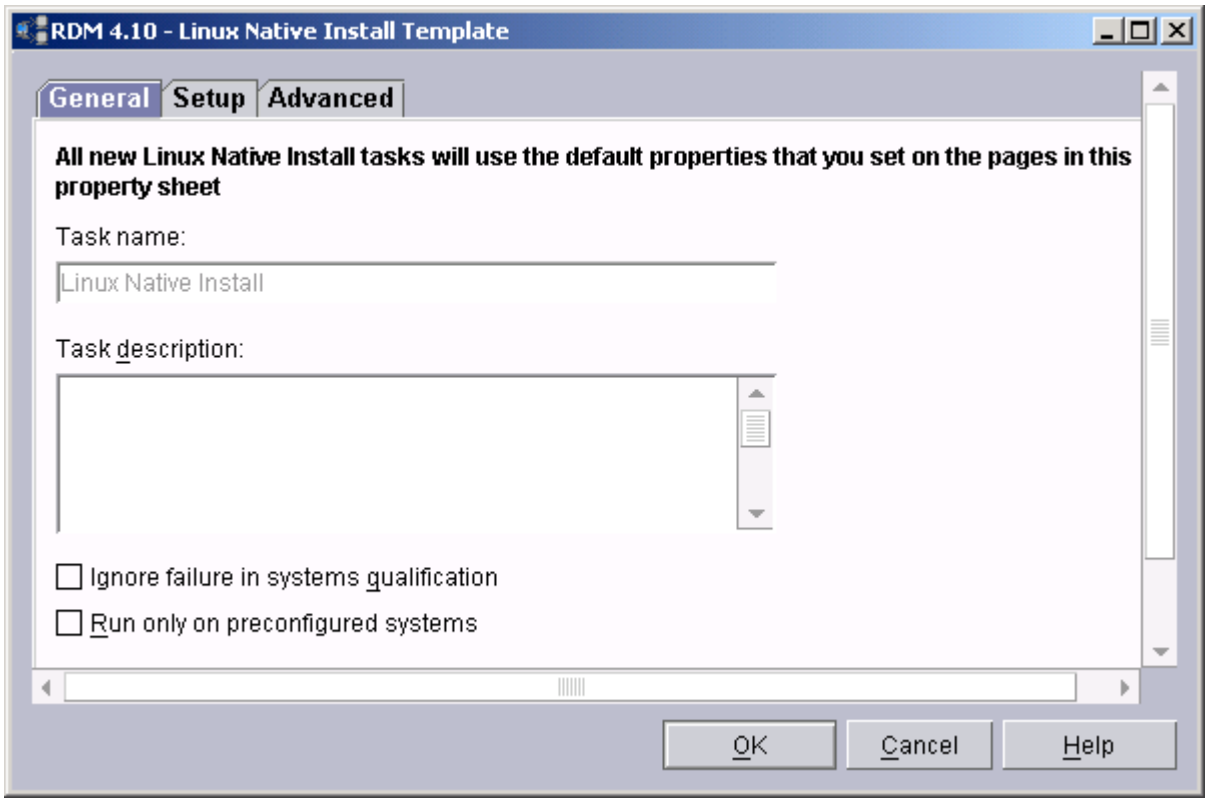
If the assigned computer name is invalid, the computer name is changed using the following rules:

- Remove spaces and invalid characters from computer name. Valid characters are alphanumeric and a dash (-). For example, *pearl rfrsh* would be changed to *pearlrfrsh*.
- If the computer name is too long (greater than 64 characters), truncate from the end to make it shorter or equal to 64 characters long
- If the computer name is duplicated, add -1, -2, and so on, to the end of the duplicate computer name.

Edit the template property sheet

Complete the following steps to edit the template:

1. Right-click the **Linux Native Install** template, and then click **Edit template** to open the Linux Native Install template, or *property sheet*. The property sheet contains 3 tabs: General, Setup, and Advanced.



2. Type a description (optional). The task name is not available because you cannot change the name of the template.

3. Select the applicable check boxes:

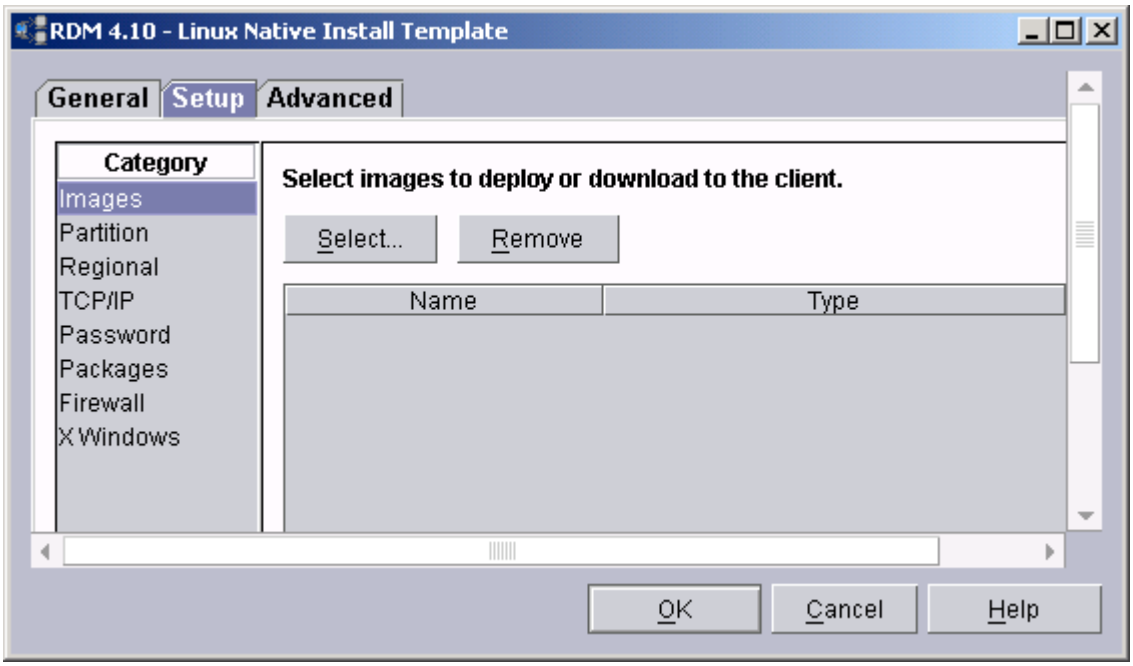
   Ignore failure in systems qualification. If the flag is checked, systems associated with this task will not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.

4. Click the **Setup** tab. The Setup page contains a list of categories in the left pane from which you choose and set their properties in the right pane.

5. Type your values for each of the following categories:

Images Category



The list box contains all installation images previously selected for this template.

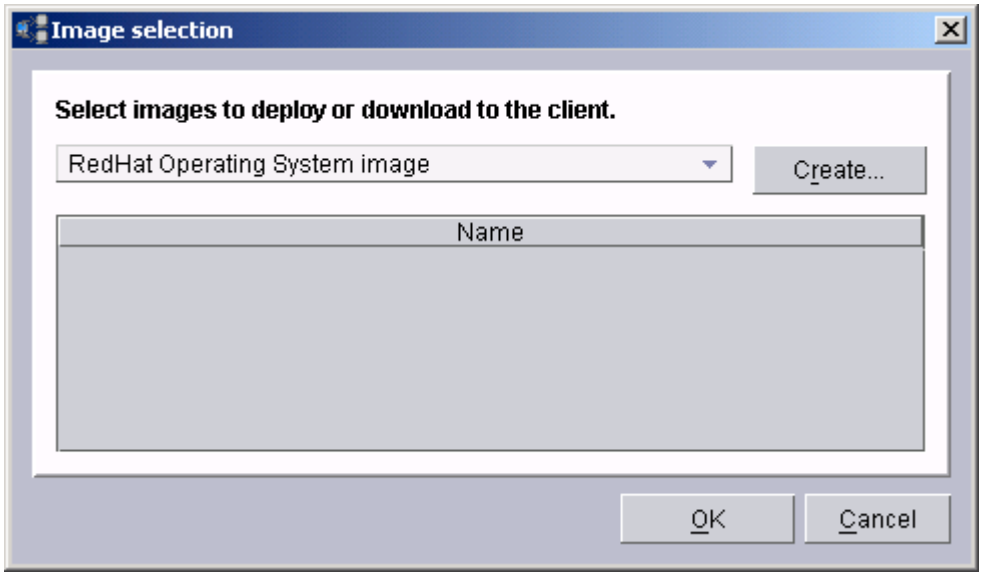
Select an image from the list box, or click **Select** to add an image (from the RDM repository) to the list in this window.

To remove an image from the list, select the image (within the list), and then click **Remove**.

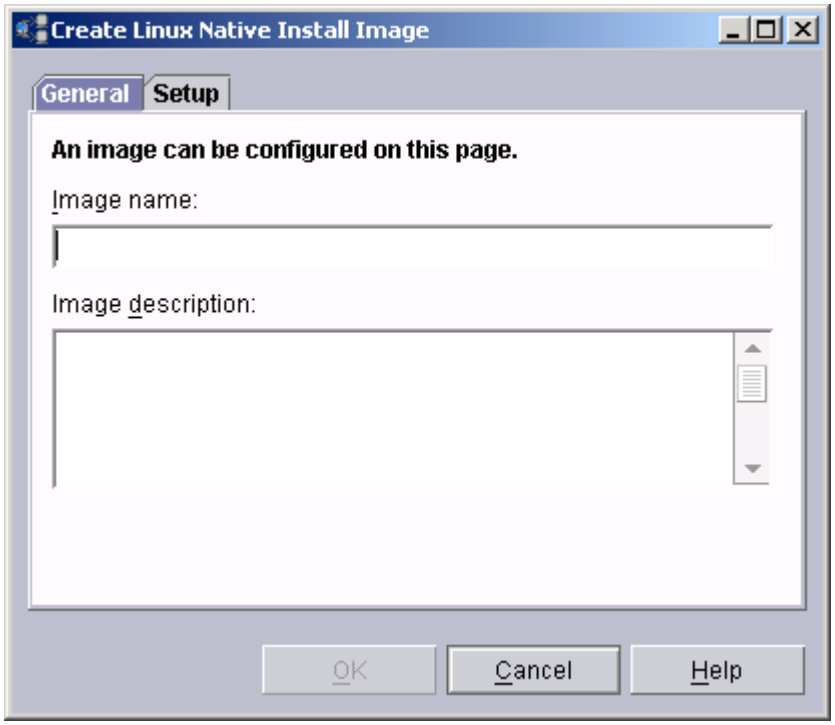
Create a new image

Complete the following steps to create a new image:

a. From the Setup page of the Linux Native Install template, click **Select**. This opens the Image Selection window that lists all Linux Native Install images built by IM and collected in the Master Repository.

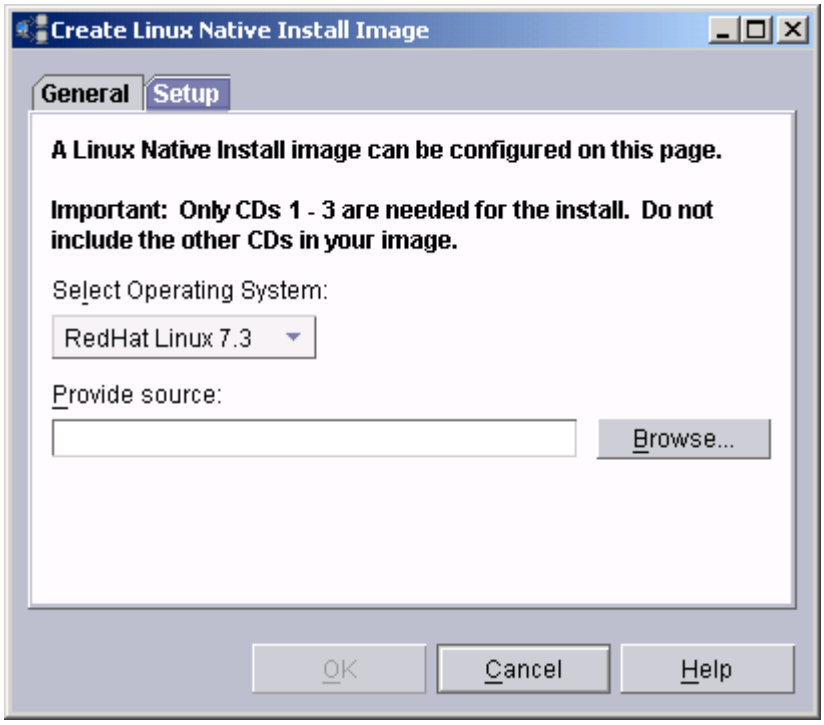


b. Click **Create**.



c. On the General page, type a name and description for the new image to be created.

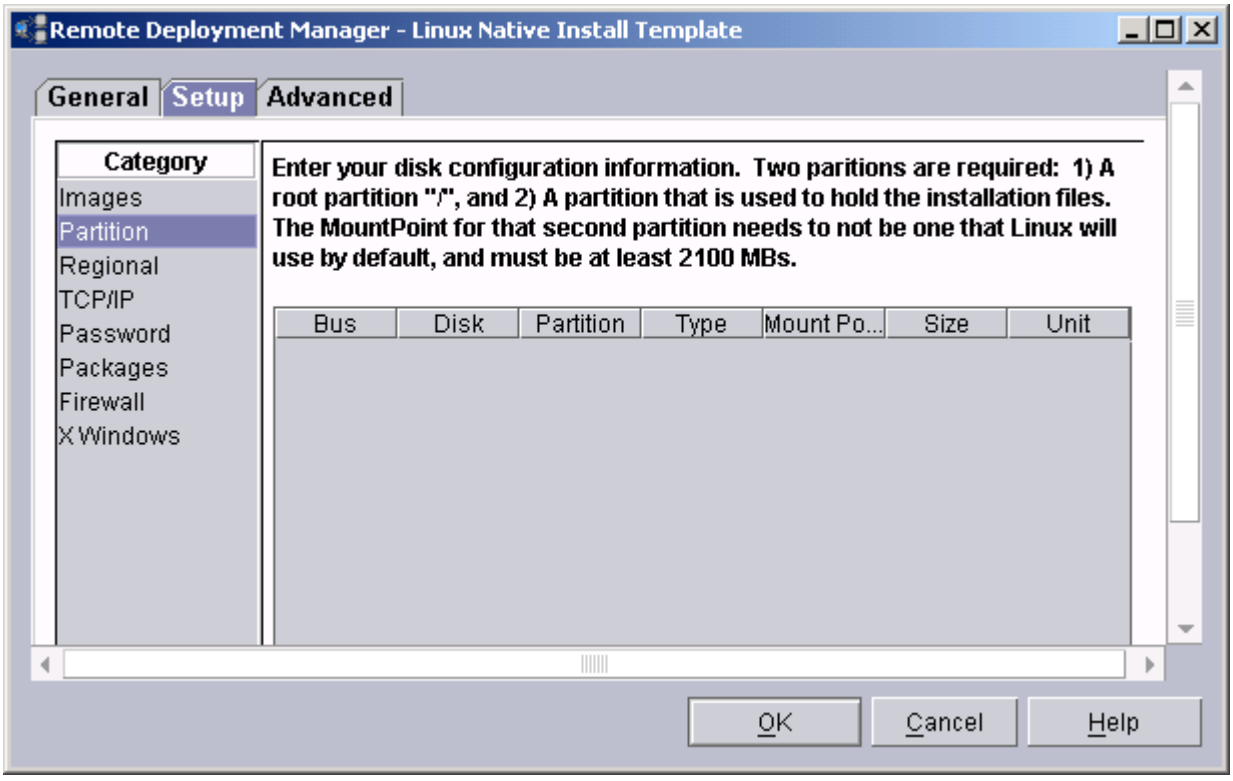
d. Click the **Setup** tab and select the operating system image. Specify, or browse to, the source of the operating system to be imported.



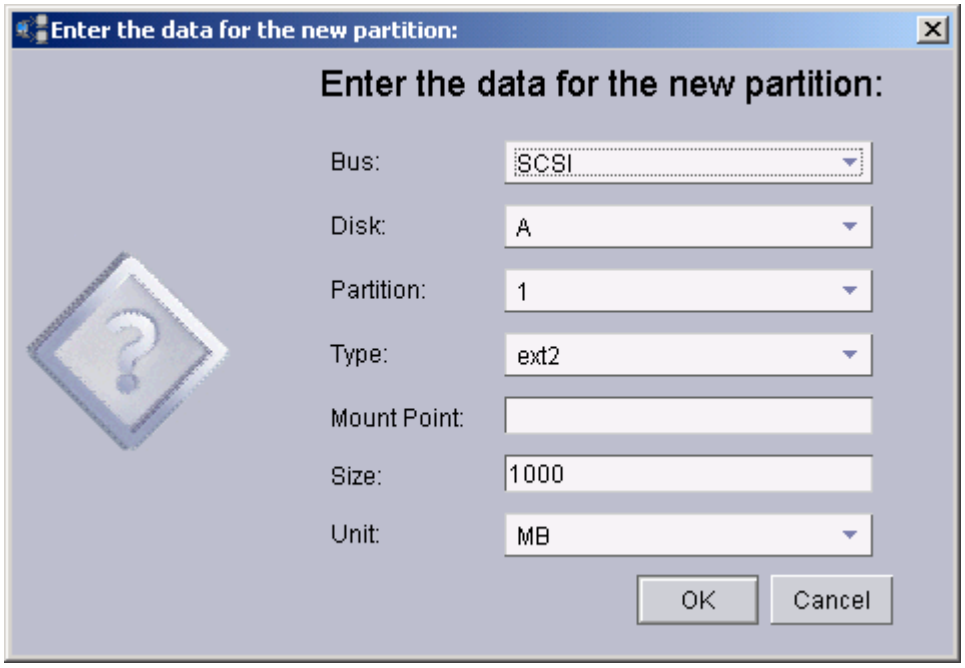
If you click **Browse**, the file you are looking for is called out in the title of the browse box.

e. Click **OK**.

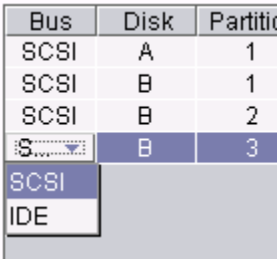
Partition Category



Click **Add** to enter data for a new partition.



To change any values of the listed partitions, either click the individual cells to select from drop-down menus of the available values or, in the case of the Mount Point and Size columns, edit the values directly within the cell.



Enter the data for the partition and then click **OK**.

Bus column
This column lists if the hard disk drive is connected to a SCSI or IDE bus. Each entry has a drop down with the two choices.

Disk column
This column lists the disk letter for each hard disk drive. The values are always upper case A through Z. It can go further starting with AA and going through DX for a total of 128 possible values. Each entry has a drop down list with those values.

Partition column
This column lists the partition number within each hard disk drive. Partitions 1 through 4 are primary partitions. Partitions 5 through 16 are within an extended partition.

A partition 1 is required on each hard disk. If you have logical partitions (5 - 16), they must start at 5 and be contiguous.

Type column
This column lists the type of the partition. Only ext2, ext3, swap, and extended are supported. Each entry has a drop down list with those values.

Mount Point column
This column is an entry field for a valid Linux pathname. When you click **Next**, there must be a partition whose mount point is "/". There are rules about which disk the "/" mount point, or the "/boot" mount point (if you define one) must go. It must be one of the first two SCSI Disks or one of the first two IDE Disks. There also needs to be a partition defined that is both big enough (approximately 2 GB) to hold the installation files that are downloaded and whose mount point is not a normal Linux directory.

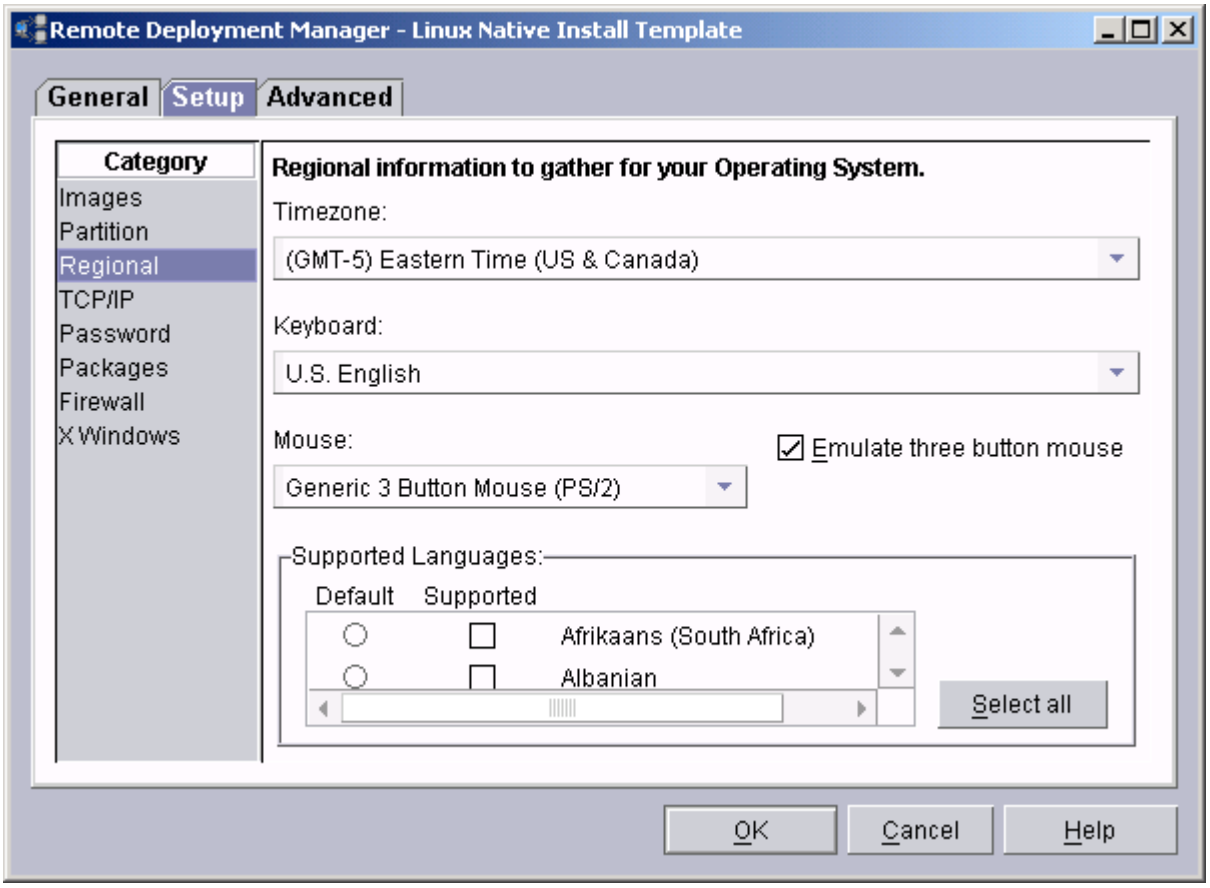
Appendix C lists mount points that are normal Linux directories. The mount point you specify for the installation cannot be one of these.

Size column
This column is an entry field for valid numbers that are associated with the Unit column. Type in any number which is validated when you click **Next**.

Unit column
This column has one of two values: MB for megabyte, or % rem for the percent remaining after the MB values are allocated. For example, suppose you want one partition to have 400 MB, and then two other partitions that split up the remaining room on the drive evenly. You would specify one entry as 400 MB, and then the following two entries as 50%rem. Order does not matter for these. You can intermix % rem and MB values. MB values are added up before the % rem values are calculated.

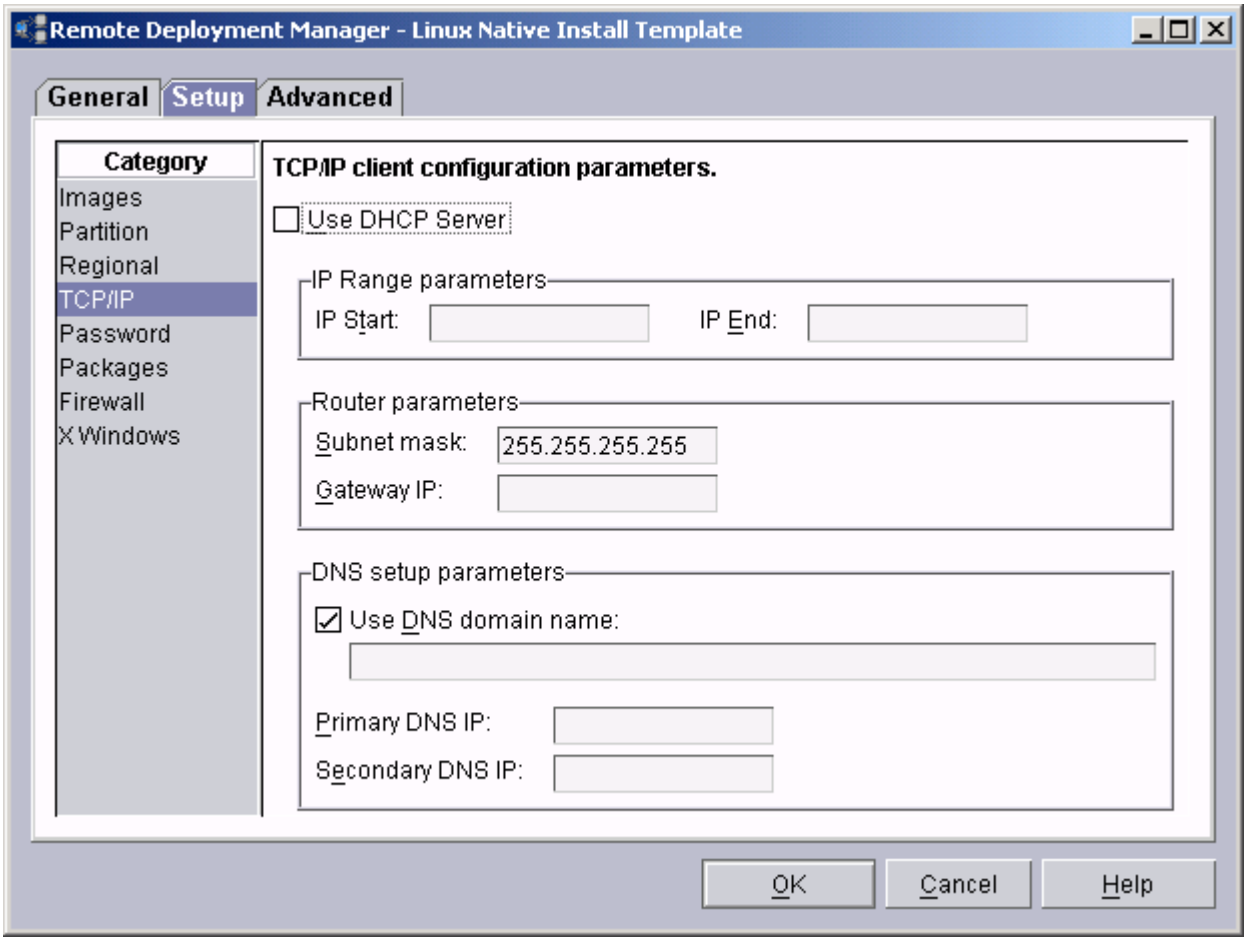
The percentages in the primary partitions (1–4) cannot exceed 100%; however, the percentages for the logical partitions (5–16) within the extended partition can also add up to 100%. They are considered 100% of the extended partition. For example, if primary partition 3 is an extended partition and is 50 GB, then the logical partitions (5–16) can add up to 100% of the 50 GB. This makes it possible to have the primary partitions (1– 4) add up to 100%, and have logical partitions (5–16) also add up to 100%.

Regional Category



The Regional Parameter Setup page is for you to select values for time zone, keyboard, mouse, and supported languages. You can select all the languages if you want. There must be one selected as the default. Support will be installed for Linux for each language selected. The default language will be the default for Linux.

TCP/IP Category



TCP/IP configuration

Use this window to set up the TCP/IP protocol settings to be used on the target system. Access this window from the Setup tab or in the wizard. You can specify TCP/IP settings to be assigned through DHCP or to be configured manually.

Manual configuration

You have two choices for implementing manual configuration:

1. You can leave the IP address range blank. You then manually assign an IP address to each system during System Task Configuration (STC). This option is the best choice if either of the following conditions apply:
   - You have multiple subnets. RDM does not check for unique IP addresses on multiple subnets.
   - You use multiple installation tasks of a single type, or multiple types of installation tasks (such as, Windows Clone, Windows Native and Linux Native). RDM validates unique IP addresses within a single task, not across multiple tasks. If there is any overlap of address ranges within tasks, duplicate IP addresses are possible.
2. You can specify an IP address range. RDM then assigns an IP address to each system during system qualification. This option can be used for deploying tasks on a

single subnet. An example is a classroom lab where you redeploy the same image on all systems before every class. You could set up a classroom installation task with the reserved range of addresses for the classroom.

Field descriptions

Select either **Use DHCP** or **Configure manually**.

Note: If Use DHCP is selected, no other values are needed. A DHCP server must be present on the network. If Configure manually is selected, the other fields are enabled, and their set up notebook is available in the Category list and through the wizard.

For manual configuration, the following fields are enabled:

Starting IP address

Type the starting IP address for the range of available addresses to be assigned to target systems. RDM uses the IP address range to select a unique IP address for each target system when the system is qualified. The range of values can be obtained from your network administrator. You can leave this field blank. If you specify a Starting IP address, you must also specify an Ending IP address.

Note: If you specify a range of IP addresses, you must make sure there is no overlap of the range with any other installation task. RDM validates unique IP addresses within the individual task, not across multiple tasks.

Ending IP address

Type the ending IP address for the range of available addresses to be assigned to target systems. This parameter is required if you specify a Starting IP address.

Subnet mask
The default value is 255.255.255.255.

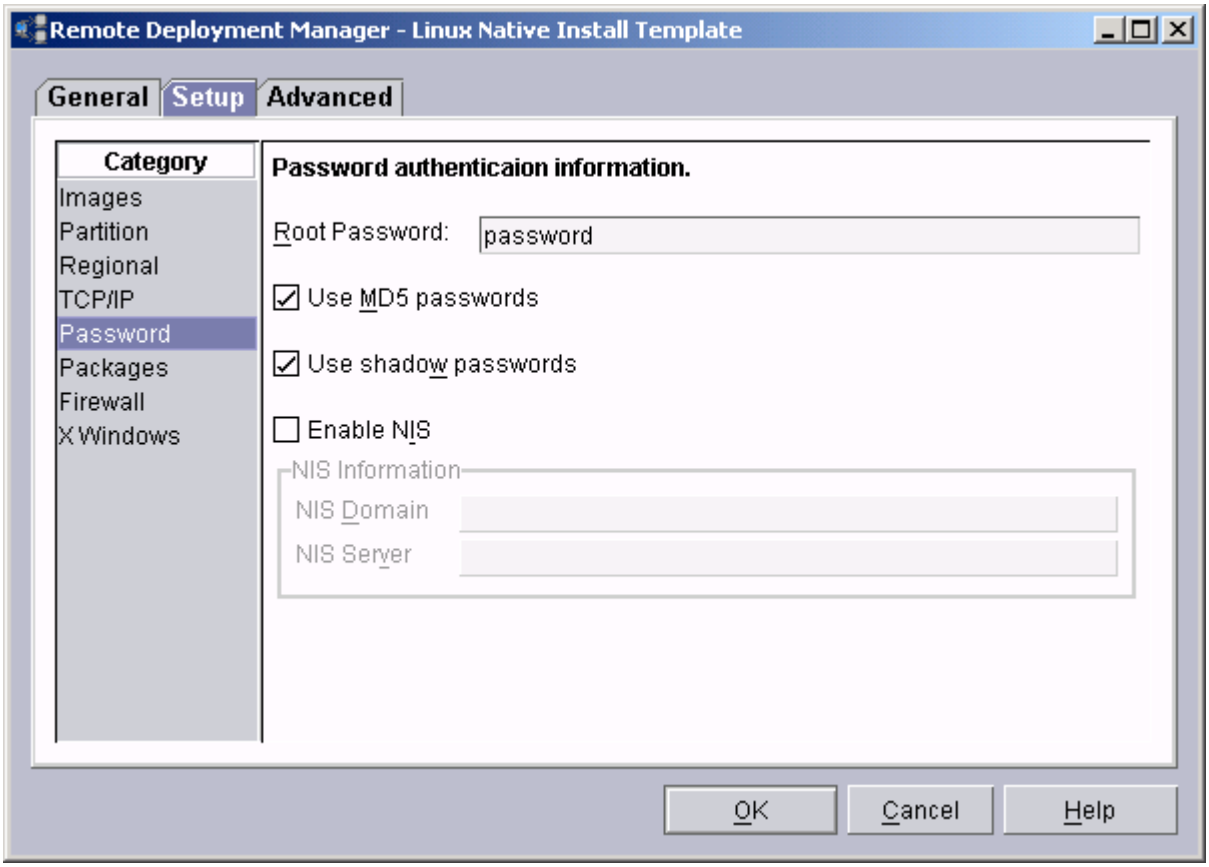
Gateway IP
The default value is blank. It is an optional system parameter whose value is not required.

DNS domain name
The default value is blank. When the task is customized to configure the DNS settings, the DNS domain name and the primary DNS Server IP address become required system parameters that the user must provide values to. The secondary DNS Server IP address is optional. Those values can be entered in the task phase or in the System/Task Configuration phase.

Primary DNS IP
The default value is blank. It is a required system parameter only if you select the **Use DNS domain name** check box. You type the value in the task phase or in the System/Task Configuration phase.

Secondary DNS IP
The default value is blank. It is an optional system parameter whose value is not required.

Password Category



From this window, you select the way you would like to manage security.

Root password
Type the password for the root account.

Use MD5 passwords
Use passwords up to 256 characters (standard is eight or less).

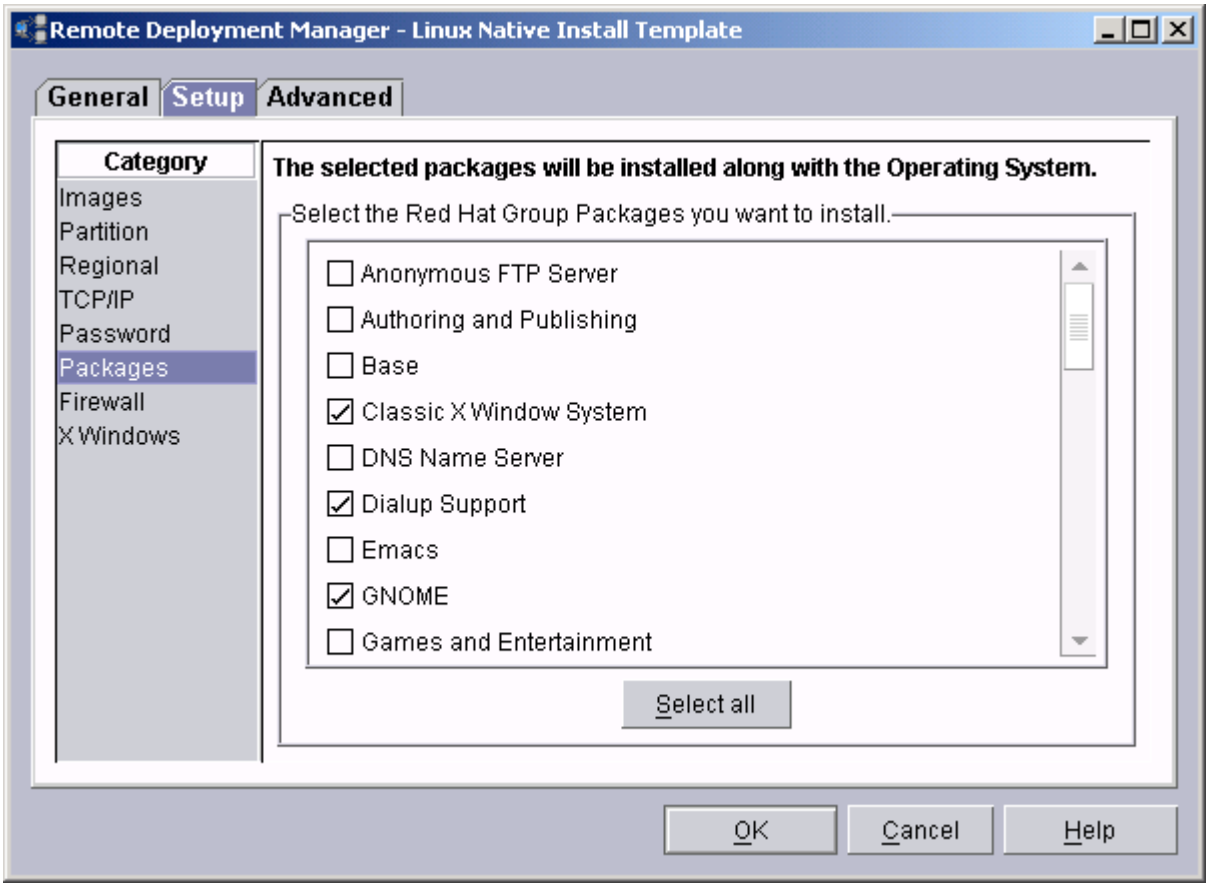
Use shadow passwords
Red Hat provides improved security. Encrypted passwords are placed in a file that requires a higher level of access permission.

Enable NIS
Allows groups of systems in the same Network Information Service (NIS) domain, with a common password and group file. Type values for both of the following options:

NIS Domain
Specifies to which domain or group of computers your system belongs.

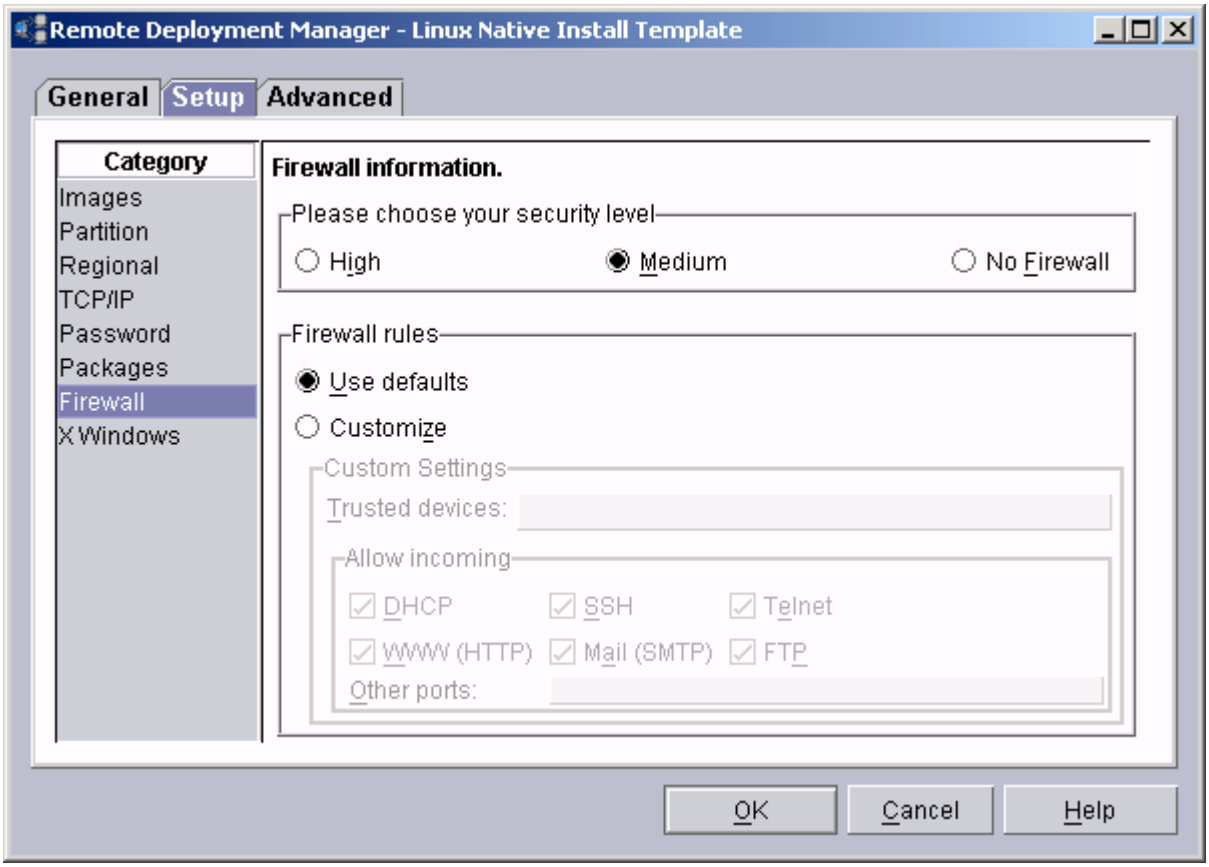
NIS Server
Forces your computer to use a specific NIS server, rather than broadcasting a message to the Local Area Network asking for any available server to host your system.

Packages Category



Select the Red Hat packages you want to install.

Firewall Category



Security Levels -

High
If you choose High, your system will not accept connections (other than the default settings) that are not explicitly defined by you. By default, use only the following connections:

- DNS replies
- DHCP — so any network interfaces that use DHCP can be properly configured

If you choose High, your firewall will not allow the following:

- Active mode FTP (passive mode FTP, used by default in most clients, should still work)
- IRC DCC file transfers
- RealAudio™
- Remote X Window system clients

If you are connecting your system to the Internet, but do not plan to run a server, this is the safest choice. If additional services are needed, you can choose **Customize** to use specific services through the firewall.

Medium
If you choose Medium, your firewall will not allow remote systems to have access to certain resources on your system. By default, access to the following resources are not allowed:

- Ports lower than 1023 — the standard reserved ports, used by most system services, such as FTP, SSH, telnet, and HTTP
- The NFS server port (2049)
- The local X Window system display for remote X clients
- The X Font server port (by default, xfs does not listen on the network, it is disabled in the font server)
- If you want to use resources such as RealAudio, while still blocking access to normal system services, choose Medium. Select Customize to allow specific services through the firewall.

No Firewall
No firewall provides complete access to your system and does no security checking. Security checking is the disabling of access to certain services. This should only be selected if you are running on a trusted network (not the Internet) or plan to do more firewall configuration later.

Choose **Customize** to add trusted devices or to use additional incoming services:

Trusted Devices
Selecting any of the **Trusted Devices** allows access to your system for all traffic from that device; it is excluded from the firewall rules. For example, if you are running a local network, but are connected to the Internet through a PPP dialup, you can check **eth0** and any traffic coming from your local network will be allowed. Selecting **eth0** as trusted means all traffic over the Ethernet is allowed, but the ppp0 interface is still firewalled. If you want to restrict traffic on an interface, leave it unchecked.

It is not recommended that you make any device that is connected to public networks, such as the Internet, a *Trusted Device*.

Allow Incoming
Enable these options to use specified services to pass through the firewall. Note, during a workstation installation, the majority of these services are *not* installed on the system.

DHCP
If you allow incoming DHCP queries and replies, you allow any network interface that uses DHCP to determine its IP address. DHCP is normally enabled. If DHCP is not enabled, your computer can no longer get an IP address.

SSH
*S*ecure *SH*ell (SSH) is a suite of tools for logging into and executing commands on a remote system. Use this option if you plan to use SSH tools to access your system through a firewall. Install the `openssh-server` package to access your system remotely, using SSH tools.

Telnet
Telnet is a protocol for logging into remote systems. Telnet communications are unencrypted, and provide no security from network snooping. Allowing incoming

Telnet access is not recommended. If you do want to allow inbound Telnet access, you will need to install the `telnet-server` package.

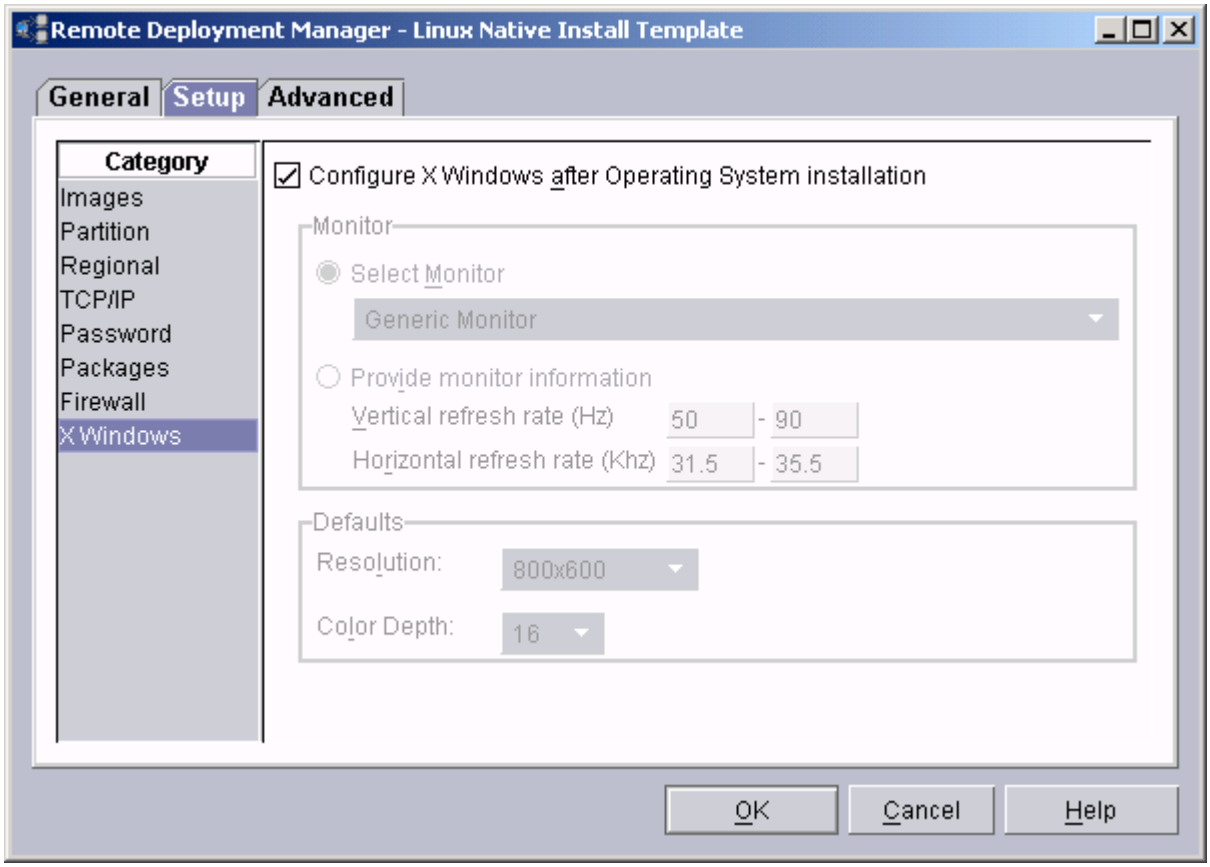
WWW (HTTP)
The HTTP protocol is used by Apache (and by other Web servers) to serve Web pages. Use this option if you plan on making your Web server publicly available. This option is not required for viewing pages locally or for developing Web pages. Install the Apache package if you want to serve Web pages.

Mail (SMTP)
Use this option for incoming mail delivery through your firewall so that remote hosts can connect directly to your system to deliver mail. You do not need to use this if you collect your mail from your ISP server using POP3 or IMAP, or if you use a tool such as fetchmail. An improperly configured SMTP server can allow remote systems to use your server to send spam.

FTP
The FTP protocol is used to transfer files between systems on a network. Use this option if you plan on making your FTP server publicly available. Install the `wu-ftpd` (and possibly the `anonftp`) package for this option.

Other ports
You can access ports that are not listed here by listing them in the Other ports field. Use the following format: `port:protocol`. For example, if you want to allow IMAP access through your firewall, you can specify `imap:tcp`. You can also explicitly specify numeric ports; to allow UDP packets on port 1234 through the firewall, type `1234:udp`. To specify multiple ports, separate them with commas.

X Windows Category



If the **Configure X Windows after Operating System installation** check box is not selected, fill in the specific set of information pertaining to your monitor for the video. Select either a specific model of monitor or, if not listed, type the vertical and horizontal refresh rates.

If you allow the default monitor (Generic Monitor) to remain, and do not select the actual monitor that you will be using, Linux will ignore any resolutions higher than 800x600. If you pick your actual monitor (and it allows higher resolutions), the resolution you specify is used.

Valid values for **Resolution** are:

640x480
800x600
1024x768
1152x864
1280x1024
1400x1050
1600x1200

Valid values for **Color Depth** are: 8, 16, 24, and 32

Configuring X Windows for systems with the Remote Supervisor Adapter II

RDM 4.1 cannot configure X Windows support for machines with the Remote Supervisor Adapter II. For X Windows support, you must configure it after the installation is complete. Be sure to select the "X Window System" and "Classic X Window System" packages for Red Hat 7.3 and the "X Window System" package for Red Hat 8.0. Once you have the system installed, complete the following steps for either Red Hat 7.3 or Red Hat 8.0:

For Red Hat 7.3

1. From a shell prompt, run the following command:

   ```
   Xconfigurator --expert
   ```

2. When the screen that allows you to select your video adapter driver is displayed, select the following driver:

   ```
   VESA driver (generic)
   ```

3. For the resolution use:

   ```
   1024x768
   ```

4. For color depth use:

   ```
   16
   ```

5. When you get to the "Starting X" window where it asks "XConfigurator will now start X to test your configuration", select **OK**. For the GUI prompt asking if you want to have X Windows start on reboots, select **Yes**.

6. Click **OK** on the informational message pop-up that follows.

7. You should now be back at a shell prompt. To go to X Windows, type the following command:

   ```
   init 5
   ```

   You should now have a graphical login screen.

For Red Hat 8.0

1. From a shell prompt, run the following command:

   ```
   redhat-config-xfree86 --set-driver='vesa' --forceui
   ```

   This displays a panel where you can select Resolution and Color Depth. Pick **1024x768** for Resolution, and **Thousands of colors (16 bit)** for Color Depth. On the Advanced tab, you can select your Monitor Type and Video Card. The Video Card value is already set to what is needed so do not change it, but you should select your Monitor Type. Click **OK** when finished.

2. Back at a shell prompt, type the following command:

   ```
   Xtest
   ```

   At the "Can you see this message?" prompt, click **Yes**. At the "Would you like to have your computer start up in graphical mode when your system starts up?" prompt, click **Yes**.

3. You should now be back at a shell prompt. To go to X Windows, type the following command:

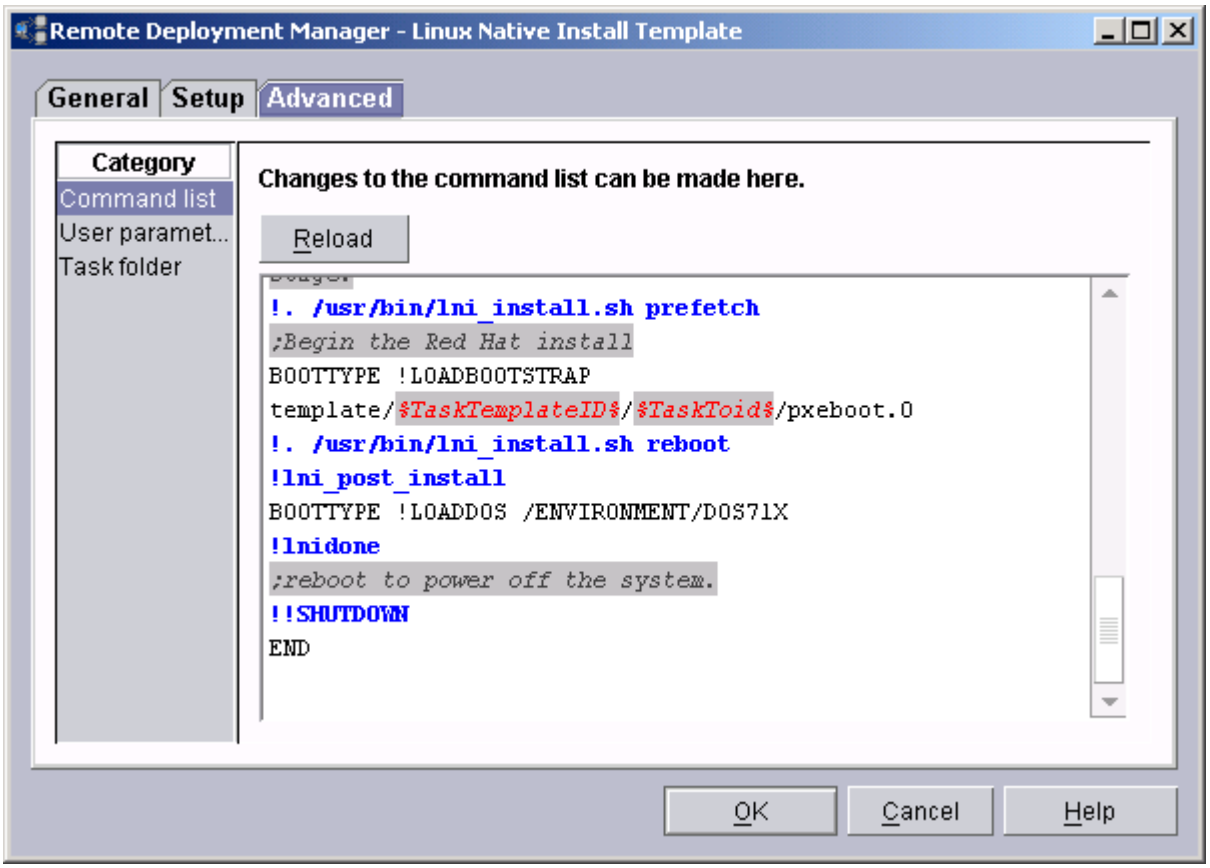
```
init 5
```

You should now have a graphical login screen.

6. Click the **Advanced** tab.
7. Type your values for each of the following categories:

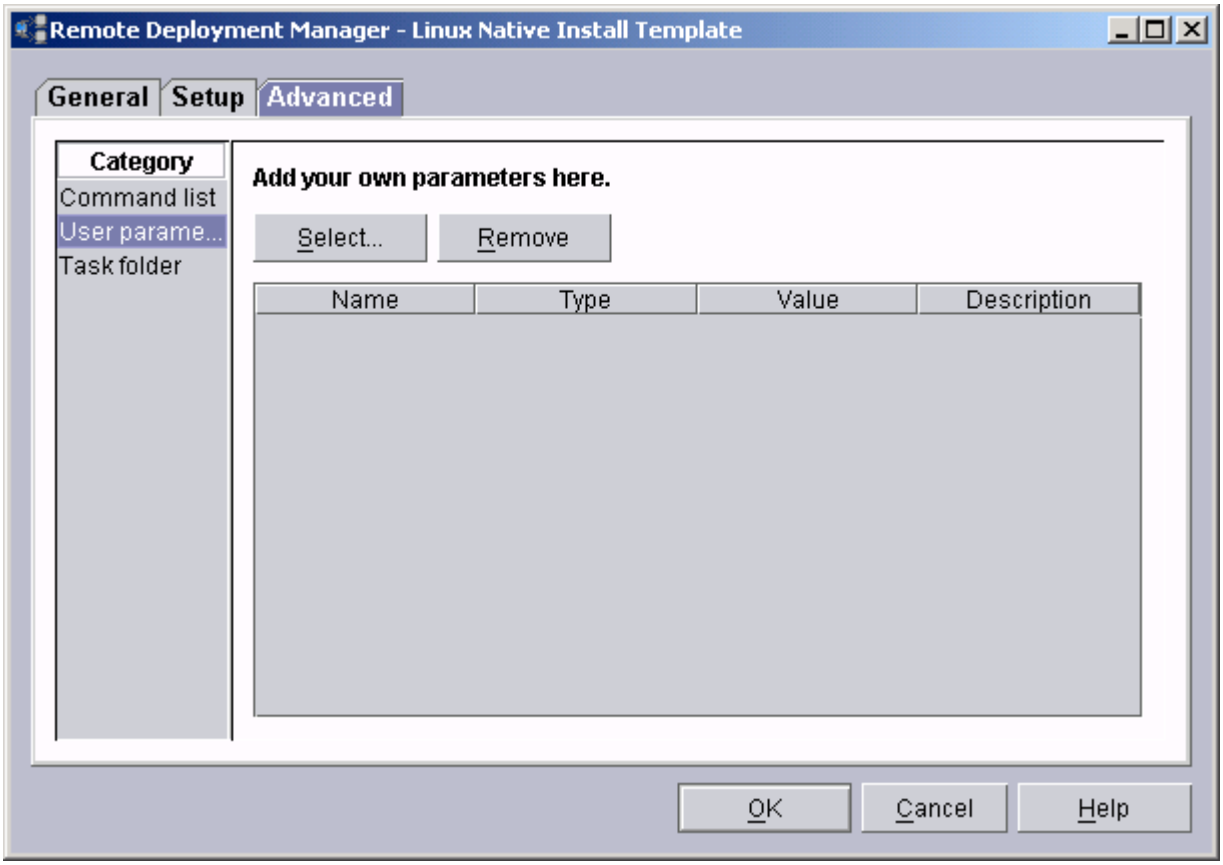
   Command list

   The command list is a list of RDM, DOS, and Linux commands that perform the Linux Native Install task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state. Refer to Appendix A for information on commands and syntax within a command list.



User parameters

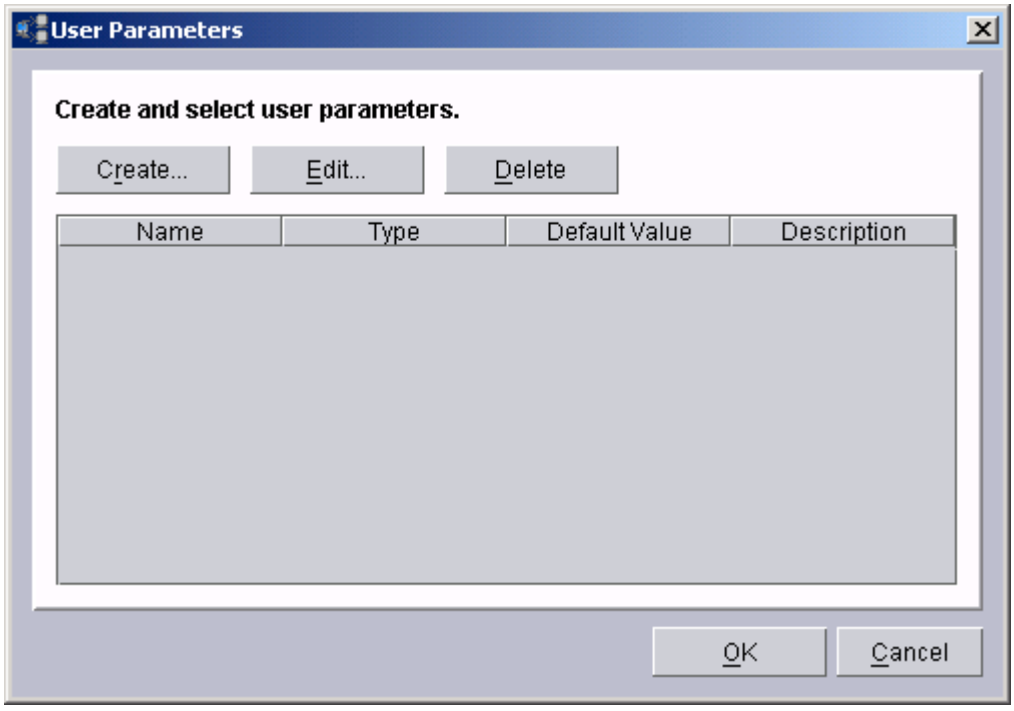
Opens a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** will delete the selected parameters from the list box, and as a result, the task. Linux Native Install tasks, by default, do not use any user-defined parameters.



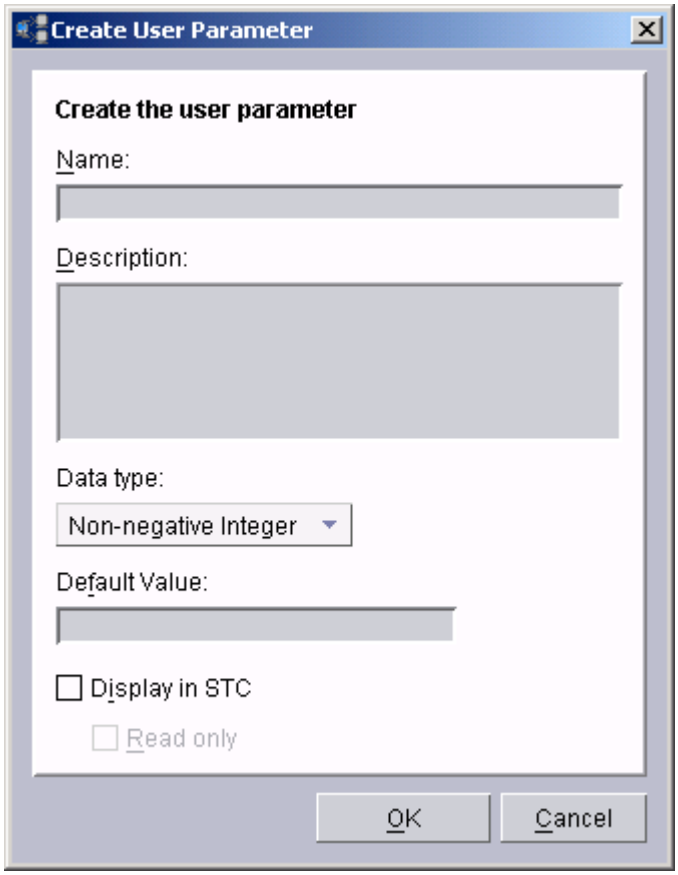
To create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

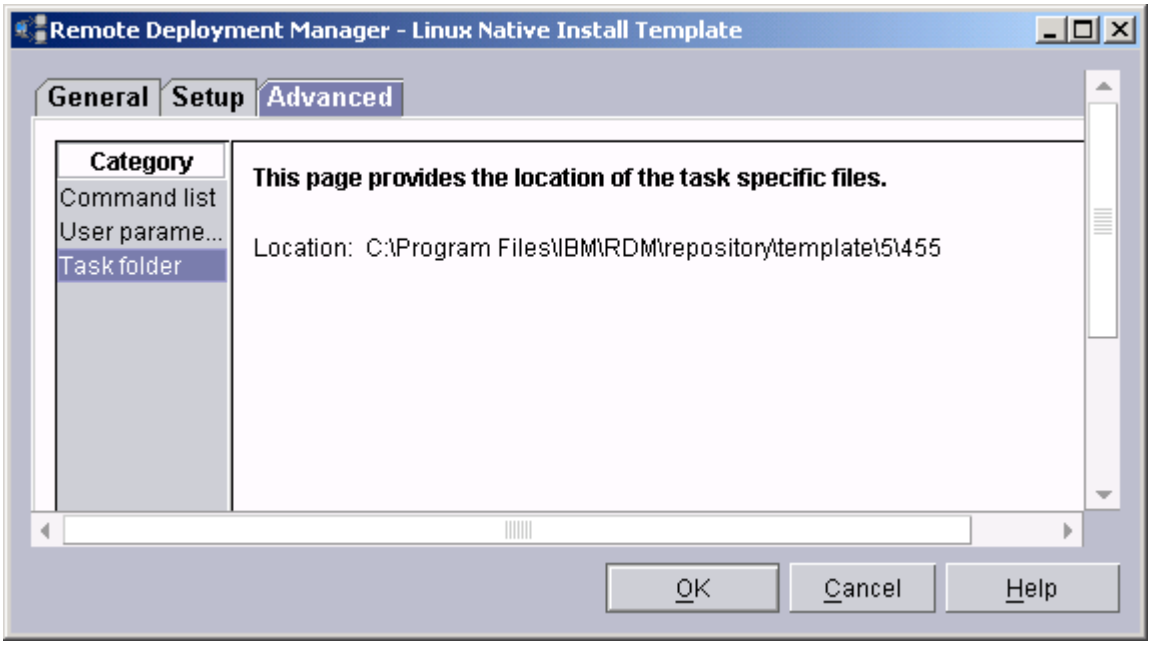


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



8. Click **OK** to update and validate the template property sheet.

Using the wizard

Most of the wizard pages are very similar to the tabs in the property sheet for this task. All the crucial information on each page can be changed using the **Back** button. Pressing **Next** causes validation on the page.

The **Finish** button, seen on the last page of the wizard, finalizes the task creation. A Linux install task folder will be created in the RDM 4.1 Master Repository. The name of the folder is the task number. The unattended answer file will be generated and saved in the folder, as well.

Power Restore

The Power Restore task performs backups and restores of the boot partition and the Master Boot Record. The task uses the Power Restore program, a light version of the Image Center technology from PowerQuest Deploy Center.

Power Restore Installation Restrictions and Limitations

Power Restore has the following restrictions:

- The Power Restore backup partition must be the same size as the boot partition
- The Power Restore backup partition must exist on the same drive as the boot partition
- The Power Restore backup partition must be the fourth partition table entry in the Master Boot Record
- Power Restore backups can only be made of the boot partition and the Master Boot Record; no other partitions might be backed up with Power Restore
- No more than two backup “image file” collections can exist in the Power Restore backup partition
- Restoring the Master Boot Record from a backup copy can repair a corrupted Master Boot Record but it cannot restore other changes made to the partitions when a tool like FDISK is used to add, delete or change partitions

Expected Results

A system can be in one of several states when a Power Restore task is run. The following table describes these states and their resulting actions:

State	Action
RDM 4.1-style Power Restore partition is on system	Selected Power Restore task is run
RDM 3.1-style Power Restore partition is on system	Power Restore partition and files are updated to RDM 4.1-style and selected Power Restore task is run
LCCM 3.0-style “Rapid Restore” or “Rave” partition is on system	Rapid Restore/Rave partition is removed and replaced with an RDM 4.1-style Power Restore partition and selected Power Restore task is run
No Rapid Restore/Rave or Power Restore partition is on system, but adequate* free space exists on system	Power Restore partition is created and selected Power Restore task is run
No Rapid Restore/Rave or Power Restore partition is on system and no adequate* free space exists on system	Task fails

* The Power Restore partition uses the same space as is used by the boot partition. Additional partitions (such as extended partitions with logical drives defined on them) might exist on the system prior to adding a Power Restore partition. No more than four partitions, including the Power Restore partition, might exist on a system.

Backwards Compatibility

The core tool used for Power Restore under RDM 4.1 is backwards compatible with Power Restore backups created under RDM 3.1 and later. However, it is incompatible with backups created with LCCM 3.0 and earlier in that it cannot read from or write to the backup partition type used by LCCM 3.0 and earlier. Instead, the Power Restore installation process will delete the old backup partition and replace it. If you attempt to perform a Save operation on a system with an LCCM 3.0-style Rapid Restore partition, that partition will be replaced with an RDM 4.1-style Power Restore partition and a new Power Restore-style backup image will be created.

If you attempt to perform a Restore operation on a system with an LCCM 3.0-style Rapid Restore partition, RDM will indicate a failure in restoring from the specified image file.

Power Restore as an RDM task

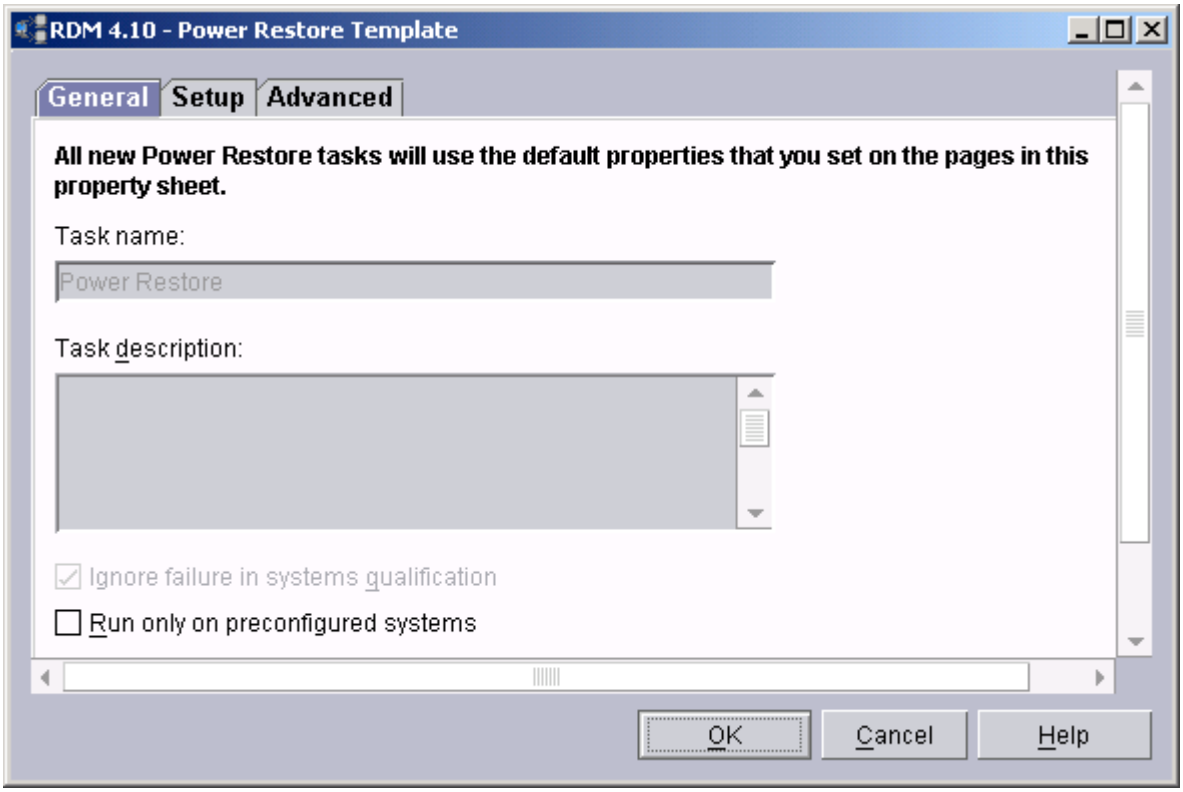
Power Restore tasks, including creating the Power Restore partition and backing up or restoring the boot partition and the Master Boot Record, are normally run as RDM tasks.

Right-click the **Power Restore** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows, however, the first option results in creating a new task while the second makes changes to the task template properties. Any changes you make to the template properties will be reflected in any new tasks created from that template.

Edit the template property sheet

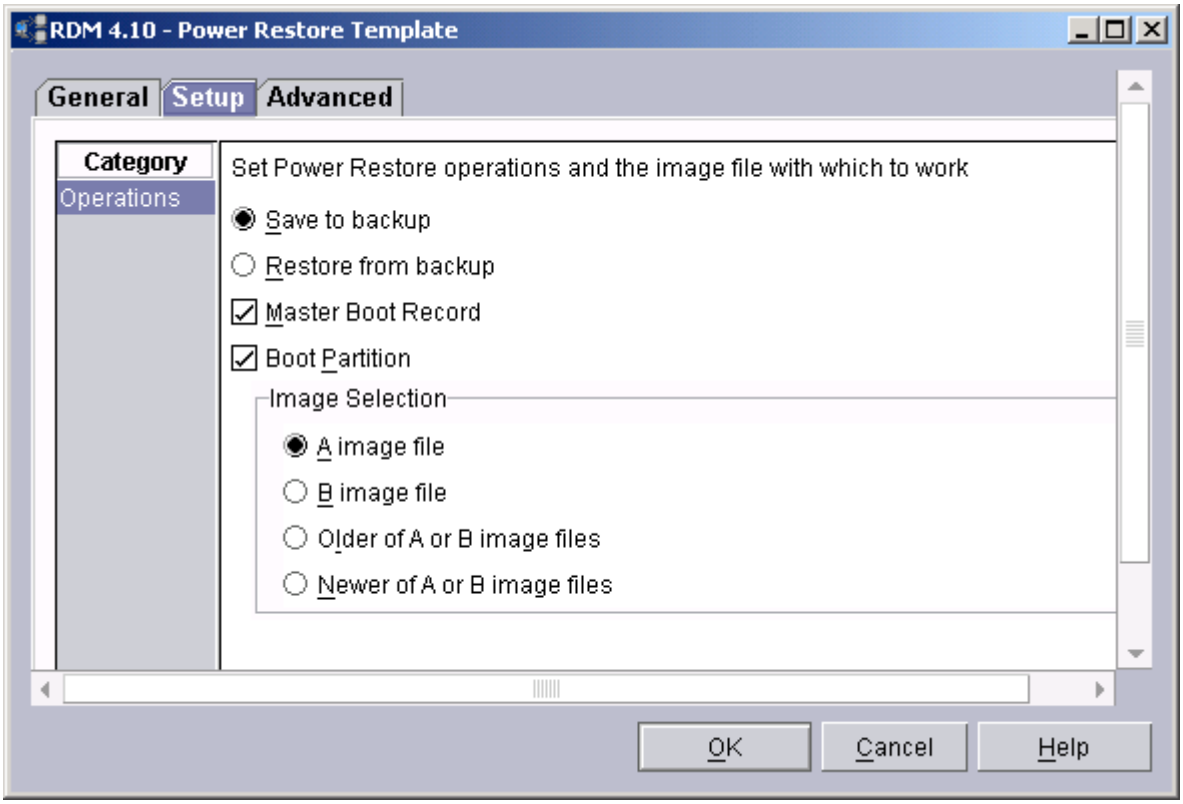
Complete the following steps to edit the Power Restore template:

1. Right-click the RDM **Power Restore** template in the IBM Director Tasks pane, and then select **Edit template** to open the Power Restore template, or *property sheet*. The property sheet contains 3 tabs: General, Setup, and Advanced.



2. Type a description (optional). You cannot change the name of the template.
3. Select the following check box, if applicable:

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.
4. Click the **Setup** tab. The Setup page defines the operations in Power Restore tasks.



5. Select the Power Restore operations.

   There are two main types of operations for Power Restore tasks: Save and Restore. Save operations involve saving a copy of the entire boot partition, the Master Boot Record, or both. Restore operations involve restoring the boot partition, the Master Boot Record, or both from backup copies, completely overwriting the current boot partition and Master Boot Record. If the **Save to backup** option is chosen, the task will be a Save operation. If the **Restore from backup** option is chosen, the task will be a Restore operation.

   With Save operations, the items you are saving are the boot partition, the Master Boot Record, or both. With Restore operations, the items you are saving are the boot partition or the Master Boot Record; not both. Selecting the **Master Boot Record** and **Boot Partition** check boxes will cause that item to be saved or restored. Depending on the operation, either or both of these items can be selected, but at least one of them *must* be selected.

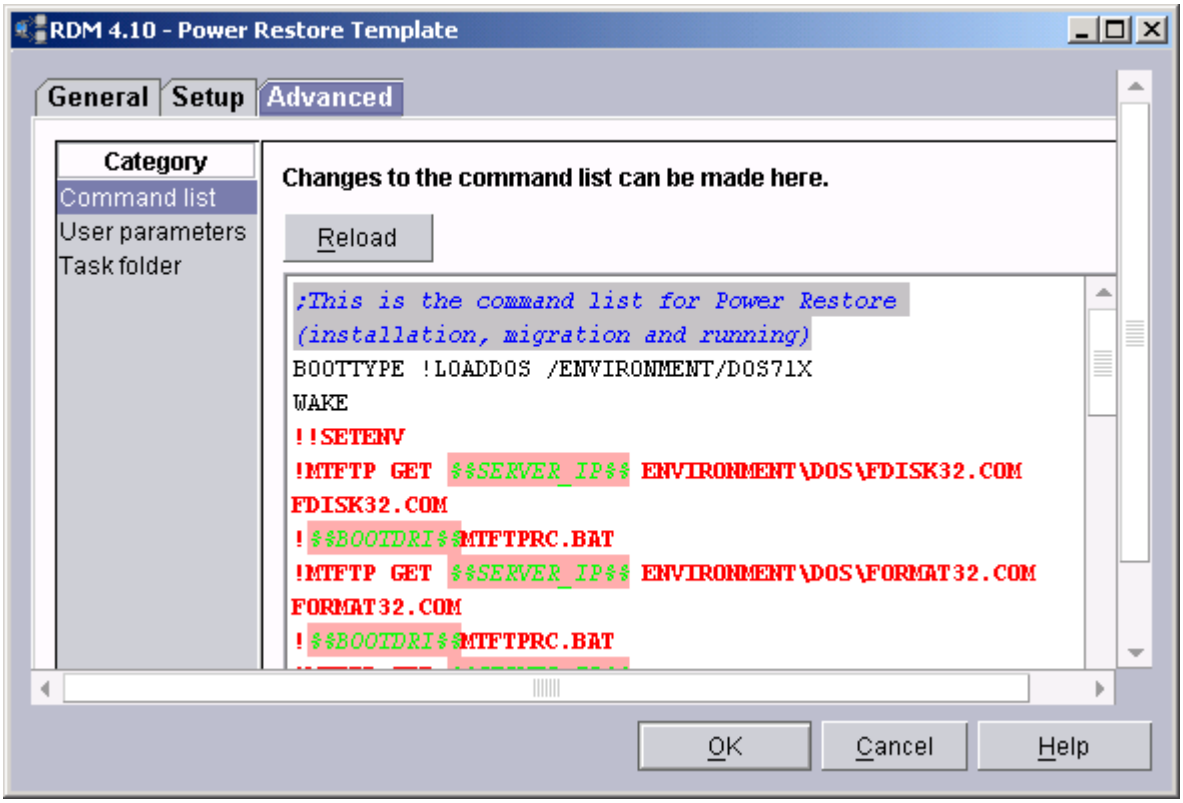
   Backups of the boot partition are saved in one or more files that are referred to collectively as image files. Up to two such image files can be saved to or restored from. These are referred to as the A image file and the B image file and are selected when you click the **A image file** or **B image file** button. You can also choose to save to or restore from the older or newer of the two image files, provided that two image files exist on the system. To save to the older image file, select the **Older of A or B image files** button. To save to the newer image file, you select **Newer of A or B image files**. If only a single image file exists on the system, click one of these two options to save to or restore from that image file. If no image files exist on the system, select to save to either of these options will save to the A image file. Selecting to restore from a non-existent image file will result in a failed Power Restore task.

These options are related only to the Boot Partition and are enabled *only* if you select the **Boot Partition** check box.

6. Click the **Advanced** tab. (This is optional as Power Restore tasks do not require any additional information defined in the Advanced tab.)
7. Type your values for each of the following categories:

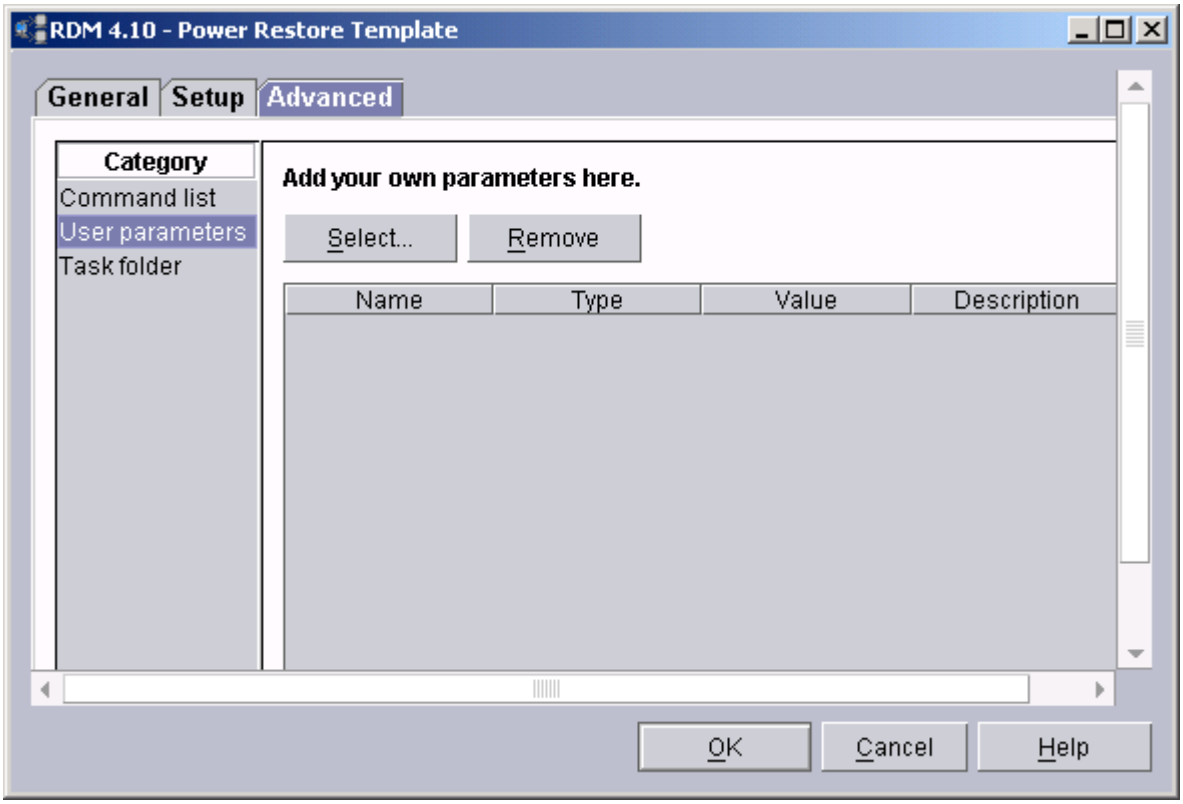
   Command list

   The Command list option displays the **Reload** button and a text box for editing the "command list". The command list is a list of RDM and DOS commands used to perform the Power Restore task. While it is possible to edit this command list to add commands to perform additional tasks, it is not advisable without a thorough understanding of RDM task commands. See the documentation on creating **Custom Tasks** for further details. Click **Reload** to restore the command list to its original state.



User parameters

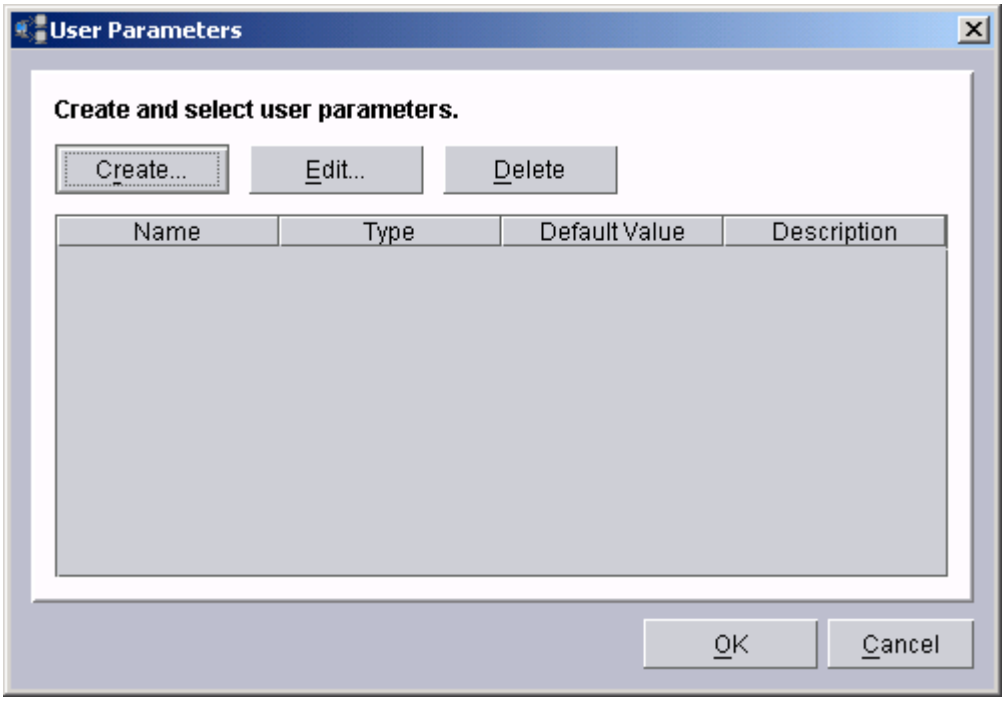
Opens a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. Power Restore tasks, by default, do not use any user-defined parameters. These would only be used for extending Power Restore tasks to include additional tasks. See the documentation on creating **Custom Tasks** for further details.



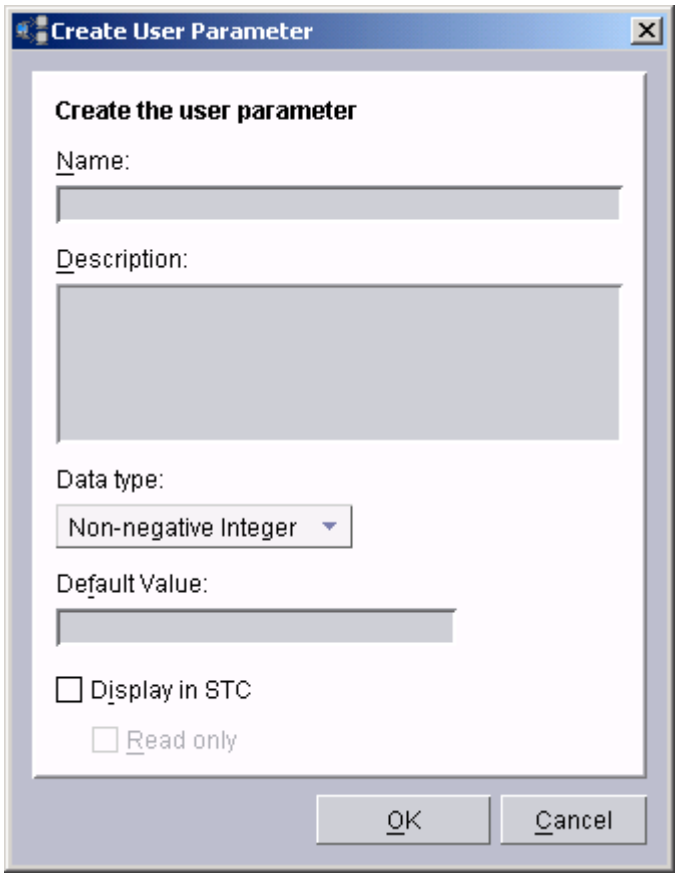
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

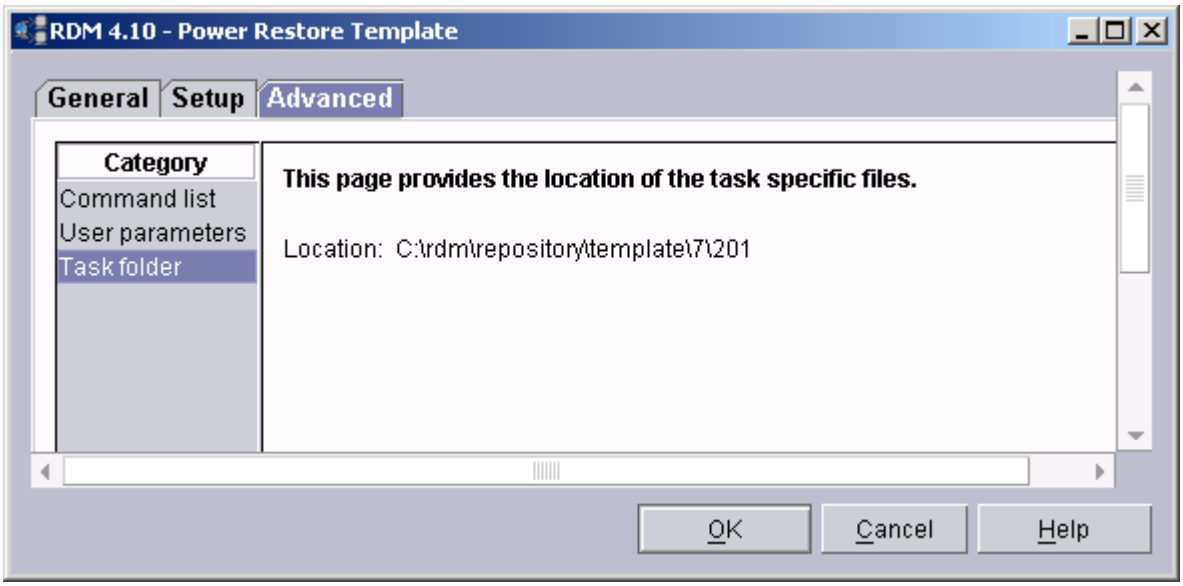


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page shows the path used for files used by the Power Restore task. Note that the path initially shown when a new task is being created is *not* the path that will be created for this task. To see the actual path, save the task by clicking **OK**, and then edit the task and view this option.



For more information on Power Restore, see Section 0, “Power Restore as a local task.”

RAID Clone Configuration

Use the RAID Clone Configuration task to clone a RAID configuration onto homogeneous systems (that is, systems with the exact same number and size hard disk drives attached to the exact same channels on the exact same type of RAID adapter).

Note: You must install ServeRAID with IBM Director in order for RDM RAID functions to work.

RDM supports cloning configurations on ServeRAID controllers (model 4.0 and later), and LSI53C1020/LSI53C1030 onboard controllers. There are two basic types of clone files for RDM:

- Configuration backup file (equivalent to the .ips file in RDM 3.1). This file is created as output from a backup command to the controller and might or might not be human readable. It is not intended to be manually modified but rather passed to the controller using an equivalent restore command for cloning. It can also be extracted locally at the managed system using the ipssend or cfg1030 (available in the rdm\local\env\71s subdirectory) command line utilities for ServeRAID controllers and LSI controllers, respectively.
- Configuration command file (equivalent to .rds file in RDM 3.1). You manually create this file that consists of a set of commands to create a configuration using the controller command line utility. In RDM 3.1, a separate utility existed to aid you in creating a .rds file. This utility has been dropped in RDM 4.1. You can modify existing RDM 3.1 .rds files to RDM 4.1 syntax or create new .rds files with a regular

text editor. Ideally, however, you may find it simpler to create RAID Custom Configuration tasks to accomplish the detailed configurations previously accomplished in .rds files.

Each type of clone file is further subdivided by the controller type it supports:

- ServeRAID Command File – A DOS batch file comprised of appropriate ipssendl commands, comments, and error-handling to configure a ServeRAID controller. The ipssendl command is a light version of the ServeRAID ipssend command-line configuration utility that supports a subset of the ipssend command set. RDM 3.1 .rds files cannot be used "as is". Their "%LCCMPATH%\ipssend" entries must be changed to "ipssendl".

  The following is an example of a ServeRAID Command File:

```
REM ServeRAID Command File for RDM 4.1
IPSSENDL SETCONFIG 1 DEFAULT NOPROMPT
if ERRORLEVEL 1 goto RDS_ERROR
IPSSENDL STRIPESIZE 1 32
if ERRORLEVEL 1 goto RDS_ERROR
IPSSENDL CREATE 1 LOGICALDRIVE NEWARRAY 500 1 1 0 3 0 NOPROMPT
if ERRORLEVEL 1 goto RDS_ERROR
IPSSENDL CREATE 1 LOGICALDRIVE A MAX 1 1 0 3 0 NOPROMPT
if ERRORLEVEL 1 goto RDS_ERROR
IPSSENDL CREATE 1 LOGICALDRIVE NEWARRAY MAX 5E 1 3 3 4 1 7 3 6 NOPROMPT
if ERRORLEVEL 1 goto RDS_ERROR
IPSSENDL SETSTATE 1 4 0 HSP
if ERRORLEVEL 1 goto RDS_ERROR
:RDS_ERROR
```

Note: You are responsible for correct syntax in a .rds file.

- ServeRAID Configuration Backup File – A file <cfgfile> created by booting the ServeRAID Utility diskette on a donor system and executing the following command:

  ```
  ipssend backup <controller#> <cfgfile>
  ```

  The data format in <cfgfile> is a ServeRAID proprietary binary format.

Note: The donor system should have the ServeRAID controller already configured before executing the backup command.

- LSI53C1020/1030 Command File – A DOS batch file comprised of appropriate cfg1030 commands, comments, and error-handling to configure an LSI153C1020/1030 controller. cfg1030 is the LSI command-line configuration utility. The following is an example of an LSI53C1020/1030 command file:

  ```
  REM LSI53C1020/1030 Command File for RDM 4.1
  CFG1030 SETCONFIG 1 DEFAULT NOPROMPT
  if ERRORLEVEL 1 goto RDS_ERROR
  CFG1030 CREATE 1 LOGICALDRIVE NEWARRAY 500 1 1 0 1 1
  if ERRORLEVEL 1 goto RDS_ERROR
  CFG1030 SETSTATE 1 1 2 HSP
  if ERRORLEVEL 1 goto RDS_ERROR
  :RDS_ERROR
  ```

- LSI53C1020/1030 Configuration Backup File – A file <cfgfile> created by booting a DOS boot diskette containing the cfg1030 utility on a donor system and executing the following command:

  ```
  cfg1030 backup <controller#> <cfgfile>
  ```

  The data format in <cfgfile> is an LSI proprietary binary format. The cfg1030 program can be copied onto a startable DOS diskette from the directory local\env\71s in the RDM installation path.

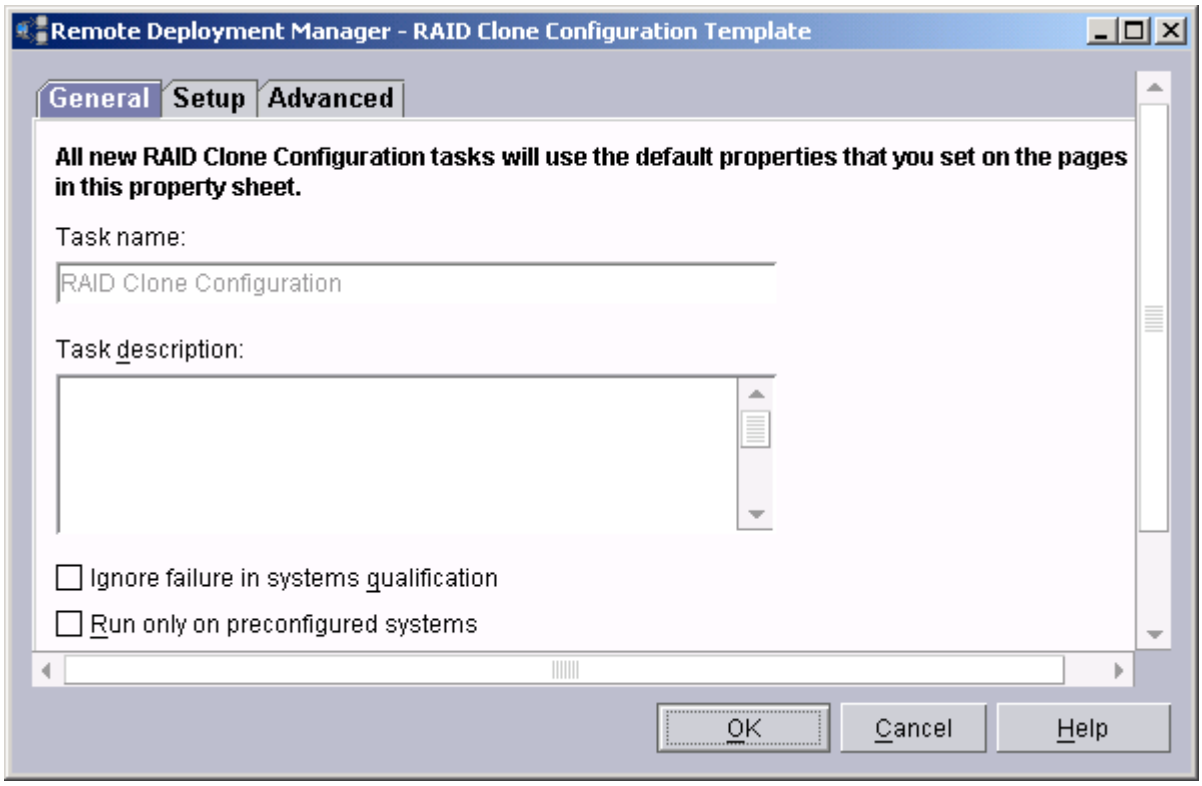
Note: The donor system should have the LSI controller already configured as desired before executing the backup command.

Right-click the RDM **RAID Clone Configuration** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows, however, one results in creating a new task while the other makes changes to the task template properties. Any changes you make to the template properties will be reflected in any new tasks created from that template.

Edit the template property sheet

Complete the following steps to edit the RAID Clone Configuration template:

1. Right-click the RDM **RAID Clone Configuration** template in the IBM Director Tasks pane, and then select **Edit template** to open the RAID Clone Configuration template property sheet. The property sheet contains 3 tabs: General, Setup, and Advanced.

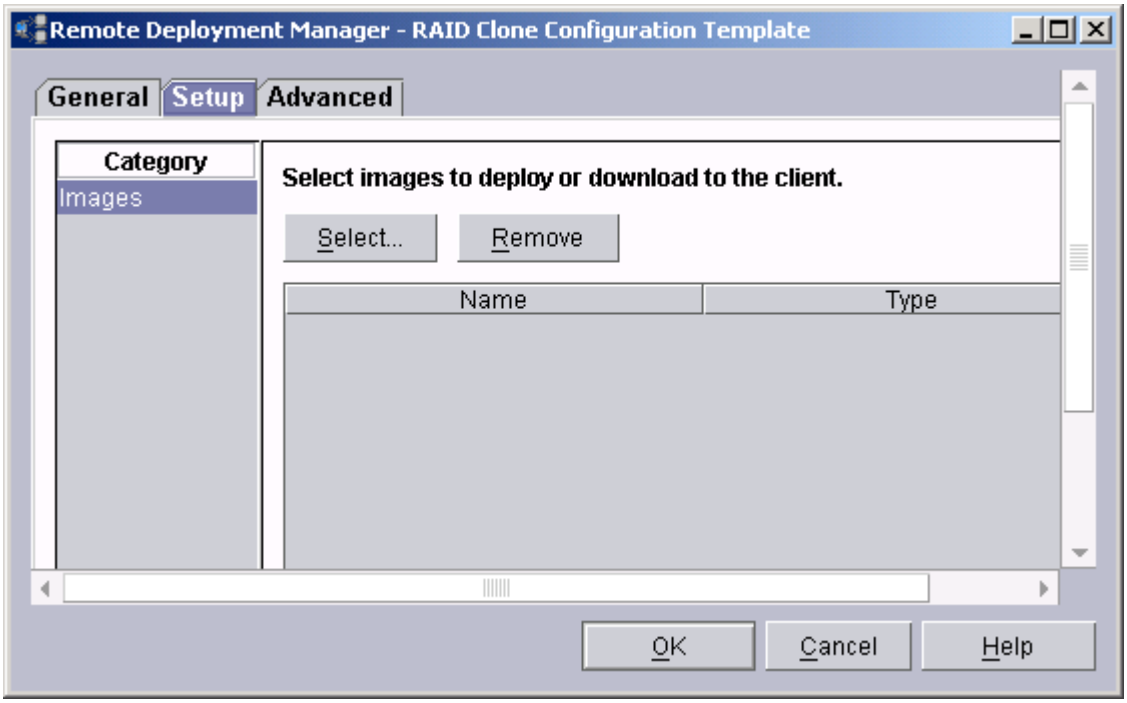


2. Type a description (optional). The task name is not available because you cannot change the name of the template.
3. Select the applicable check boxes:

Ignore failure in systems qualification. If the flag is checked, systems associated with this task will not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.

4. Click the **Setup** tab.



The list box contains all installation images previously selected for this template.

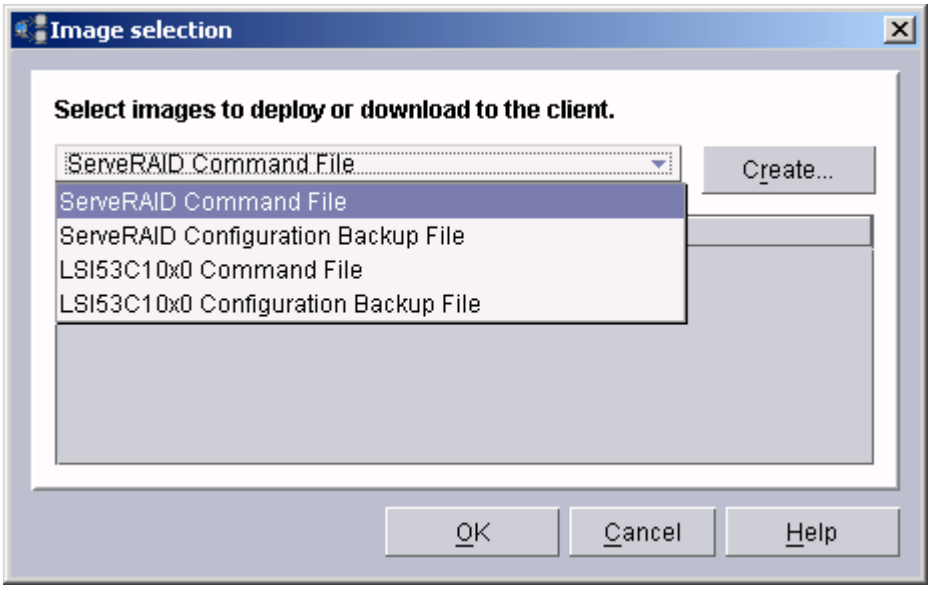
Select an image from the list box, or click **Select** to add an image (from the RDM repository) to the list in this window.

To remove an image from the list, select the image (within the list), and then select **Remove**.

Create a new image

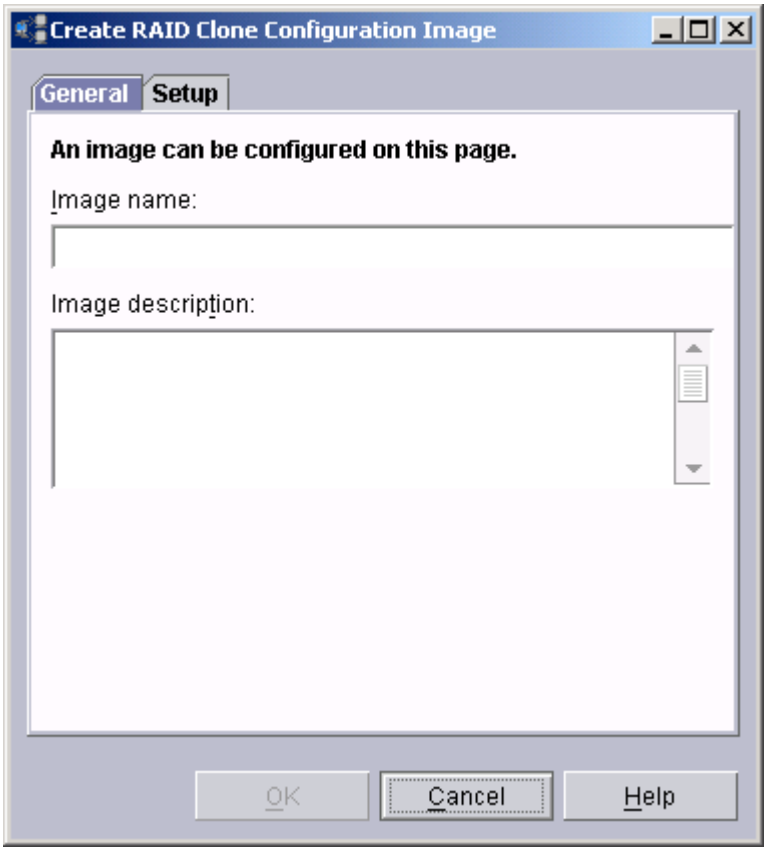
Complete the following steps to create a new image:

a. From the Setup page, click **Select**. This opens the Image Selection window that lists all RAID Clone Configuration images built by IM and collected in the Master Repository.

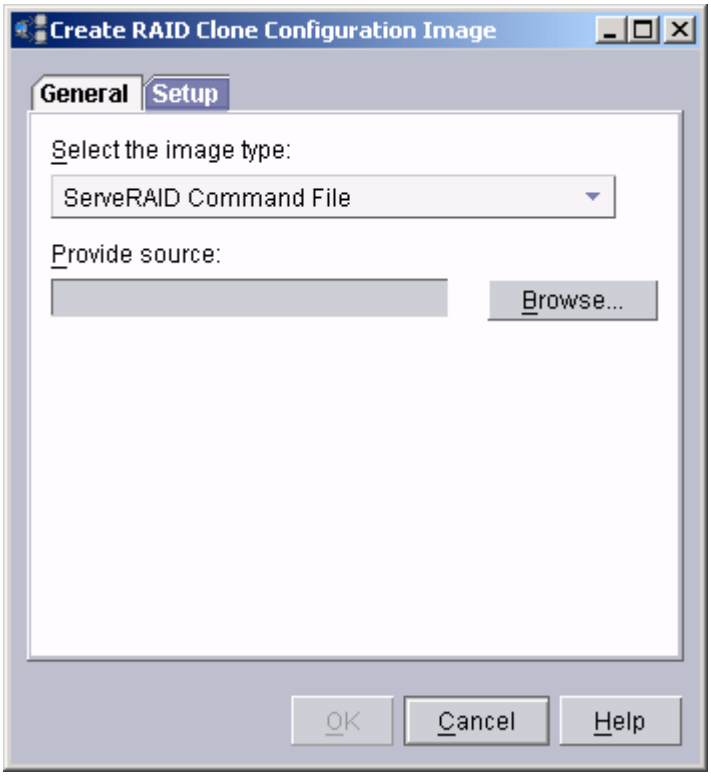


b. Click **Create**. This opens the Create Image window.

c. On the General page, type a name and description for the new image to be created.



d. Click the **Setup** tab and select the image type. Browse to the RAID source file.



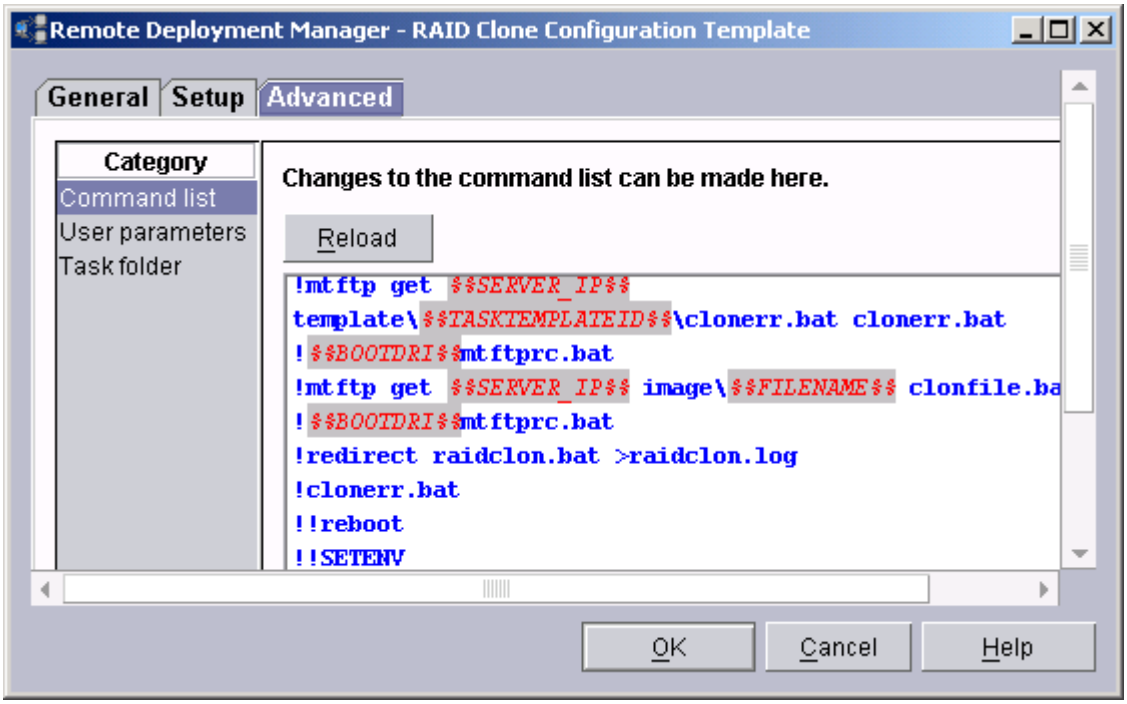
e. Click **OK**.

5. Click the **Advanced** tab.
6. Type your values for each of the following categories:

   Command list

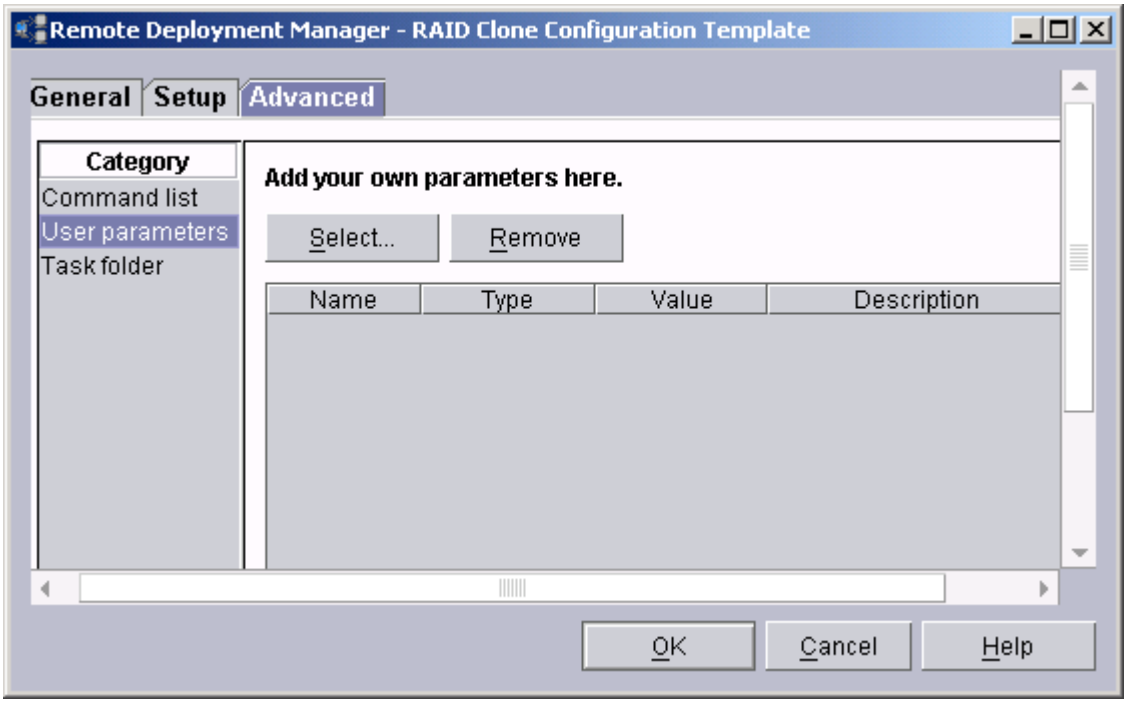
   The command list is a list of RDM and DOS commands used to perform the RAID Clone Configuration task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.

   Refer to Appendix A for information on commands and syntax within a command list.



User parameters

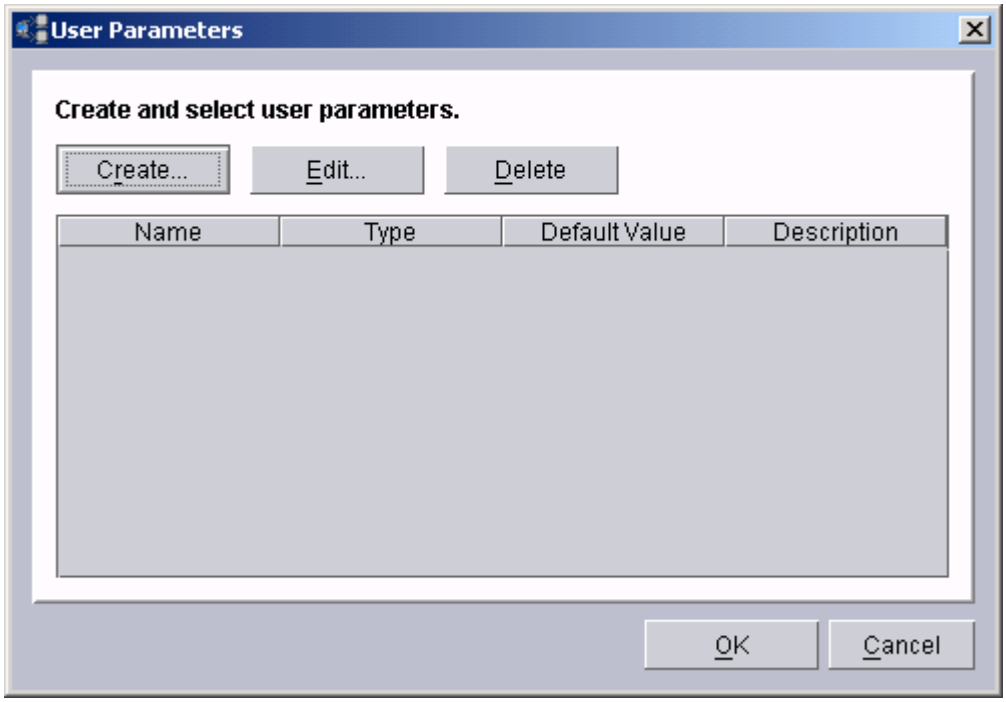
Opens a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. RAID Clone Configuration tasks, by default, do not use any user-defined parameters.



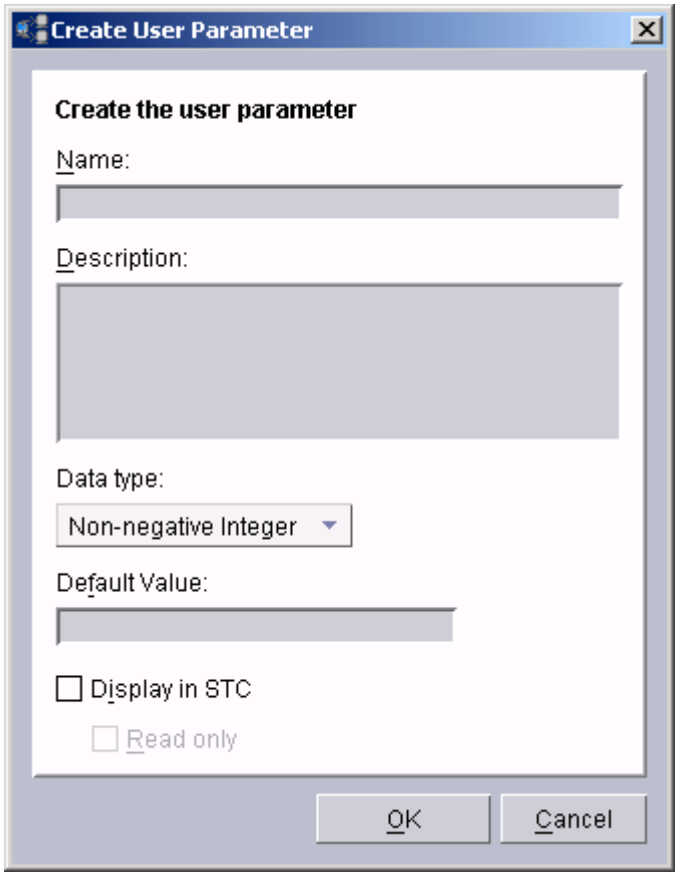
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

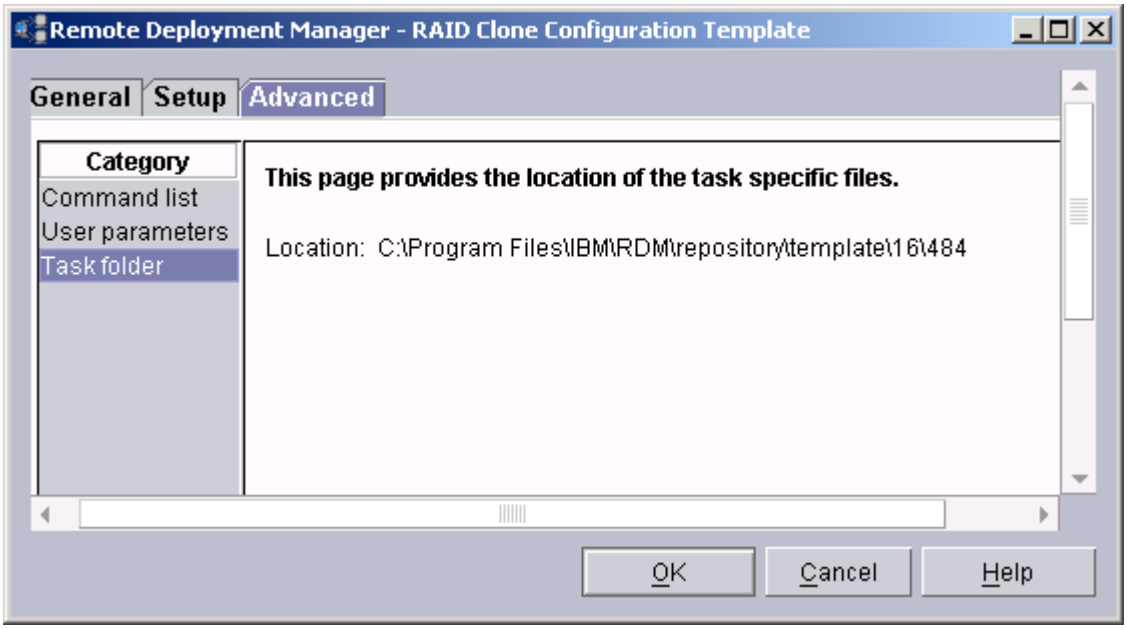


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



7. Click **OK** to update and validate the template property sheet.

RAID Custom Configuration

Use RAID custom configuration to establish rules in configuring RAID on your systems. You might designate the following parameters explicitly or by default:

- Stripe size
- Number of hot spares
- Number of arrays
- Maximum logical drive size
- RAID level of each array
- Number of physical drives in each array
- Number of logical drives in each array
- Explicit or relative size of each logical drive

Unlike clone configurations, which are specific to a particular hardware setup, custom configuration rules are general enough so that applications can use both heterogeneous and homogeneous systems.

A predefined set of the most general RAID configuration rules is installed as a built-in Express RAID Configuration task. These rules specify the following parameters:

- Stripe size – Default
- Number of hot spares – Default
- Number of arrays, RAID level, number of logical drives – Default
- Maximum logical drive size – Unlimited

The Express RAID Configuration task mirrors the logic performed by the ServeRAID Manager Express Configuration function today, without directly invoking the ServeRAID Manager itself.

Express Configuration performs the following actions:

- Creates arrays by grouping together same-sized physical drives.
- Creates one logical drive per array.
- Assigns a RAID level based on the number of physical drives in array:
  - An array with a single physical drive is assigned RAID level-0.
  - An array with two physical drives is assigned RAID level-1.
  - An array with three or more physical drives is assigned RAID level-5.
- Designates a hot-spare drive for the controller. If one or more arrays has four or more physical drives, the largest-sized drive from those arrays is designated the hot-spare drive.

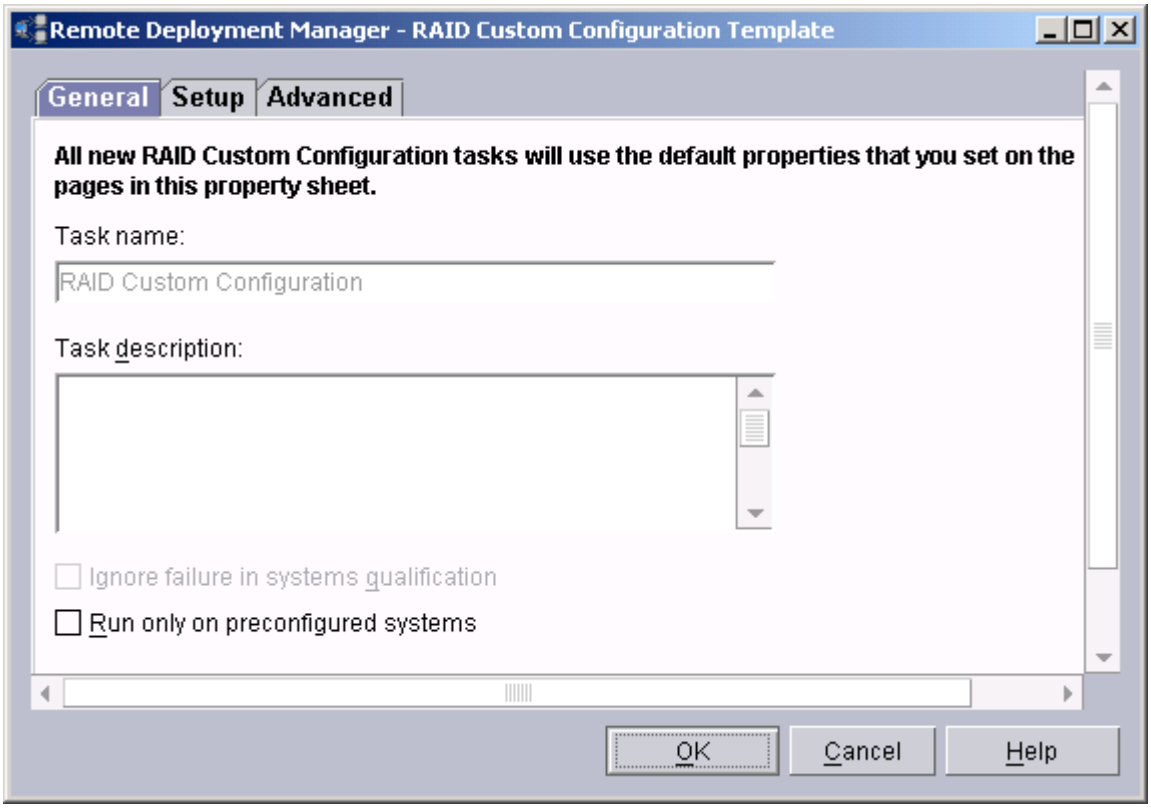
For many customers who have no need to fine-tune their systems, Express Configuration is ideal. It provides redundancy and performance gains without the need to understand RAID in detail. You could assign multiple heterogeneous systems to the Express Configuration task and have each automatically configured differently based on their drive configuration. Express Configuration knows nothing about the operating system to be installed. Because of this, it might create logical drives larger than that supported by some operating systems. In this case, you could detect this in the STC and choose to use a different RAID setup method.

Customers who require more control over their RAID configurations will create their own RAID custom tasks.

Edit the template property sheet

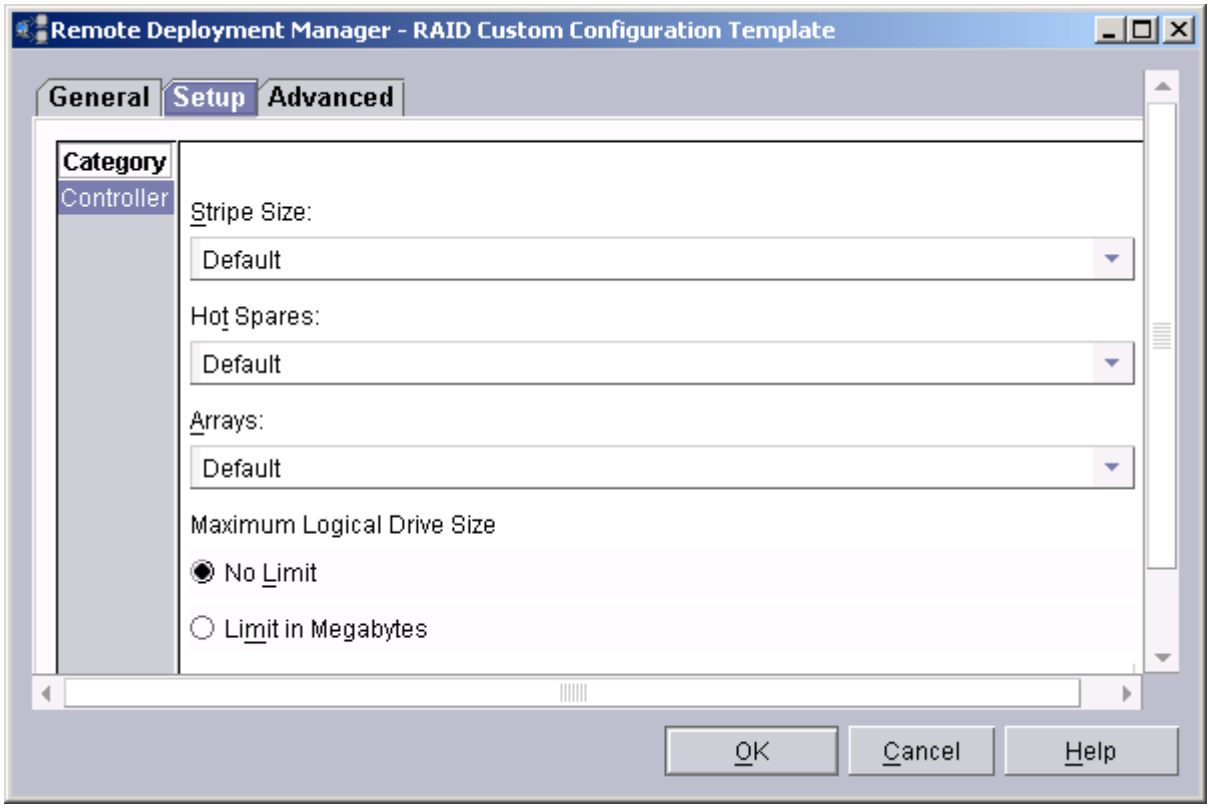
Complete the following steps to edit the **RAID Custom Configuration** template:

1. Right-click the RDM **RAID Custom Configuration** template in the IBM Director Tasks pane, and then select **Edit template** to open the RAID Custom Configuration template property sheet. The property sheet contains 3 tabs: General, Setup, and Advanced.



2. Type a description (optional). The task name is not available because you cannot change the name of the template.
3. Select the check boxes, if applicable:

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.
4. Click the **Setup** tab.



5. Select values for stripe size, hot spares, arrays, and drive size.

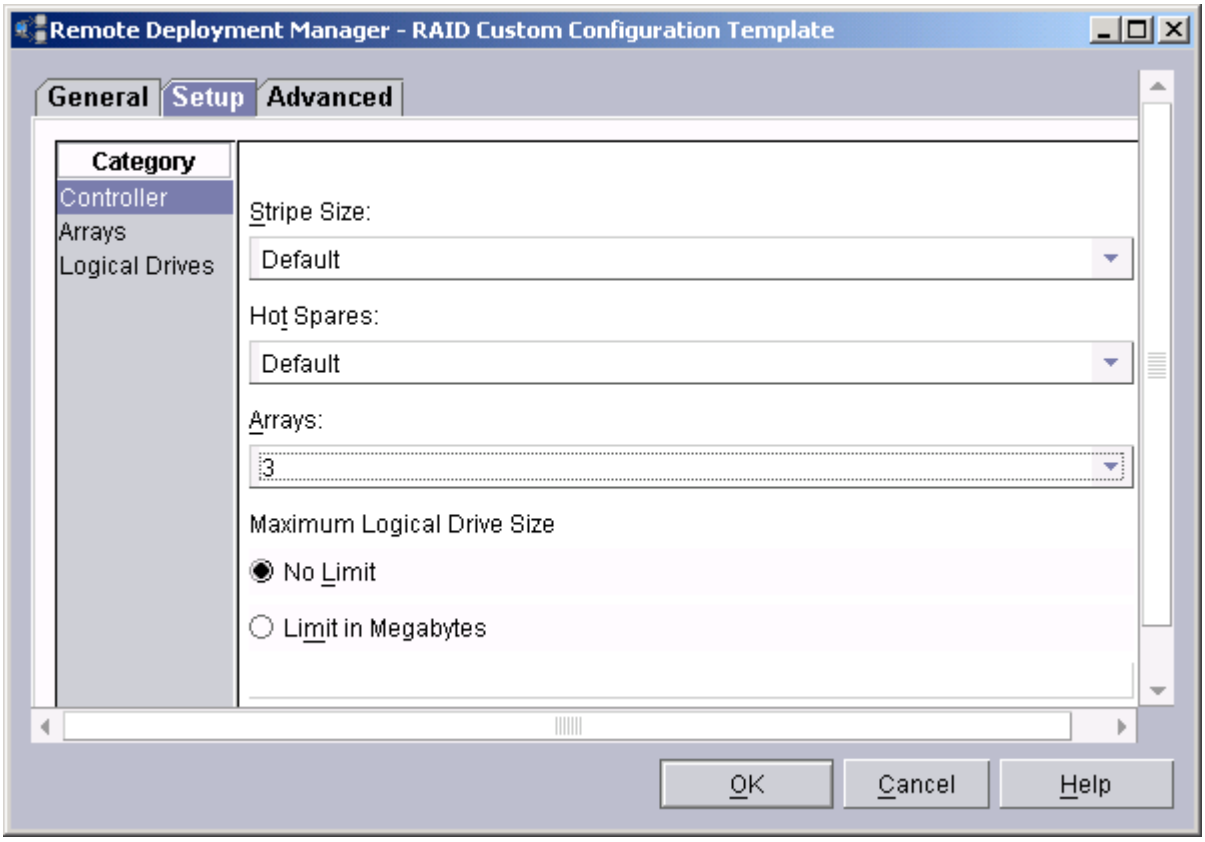
   With current support for just ServeRAID and LSI10x0 controllers, the *Stripe Size* might be any of the following values: Default, 8 K, 16 K, 32 K, 64 K, 1 M. The ServeRAID controller supports stripe sizes 8 K, 16 K, 32 K, and 64 K. The LSI controller only supports a 1 M stripe size. Therefore, if you create a task with a Default stripe size, ServeRAID controllers will be deployed with an 8 K stripe size and LSI controllers with a 1 M stripe size. Specifying a distinct stripe size (8 K, 16 K, 32 K, 64 K) for a task and applying that task to an LSI controller will not serve to disqualify the system. Rather the LSI controller will be configured to its normal 1 M stripe size.

   You might specify values Default, 0, 1, 2, 3, 4, 5, 6, 7, 8 for the number of hot spares. Default hot spares means 1, if a redundant array with no built-in hot spare is defined (that is, RAID level 1, 1E, or 5); otherwise, hot spares is 0.

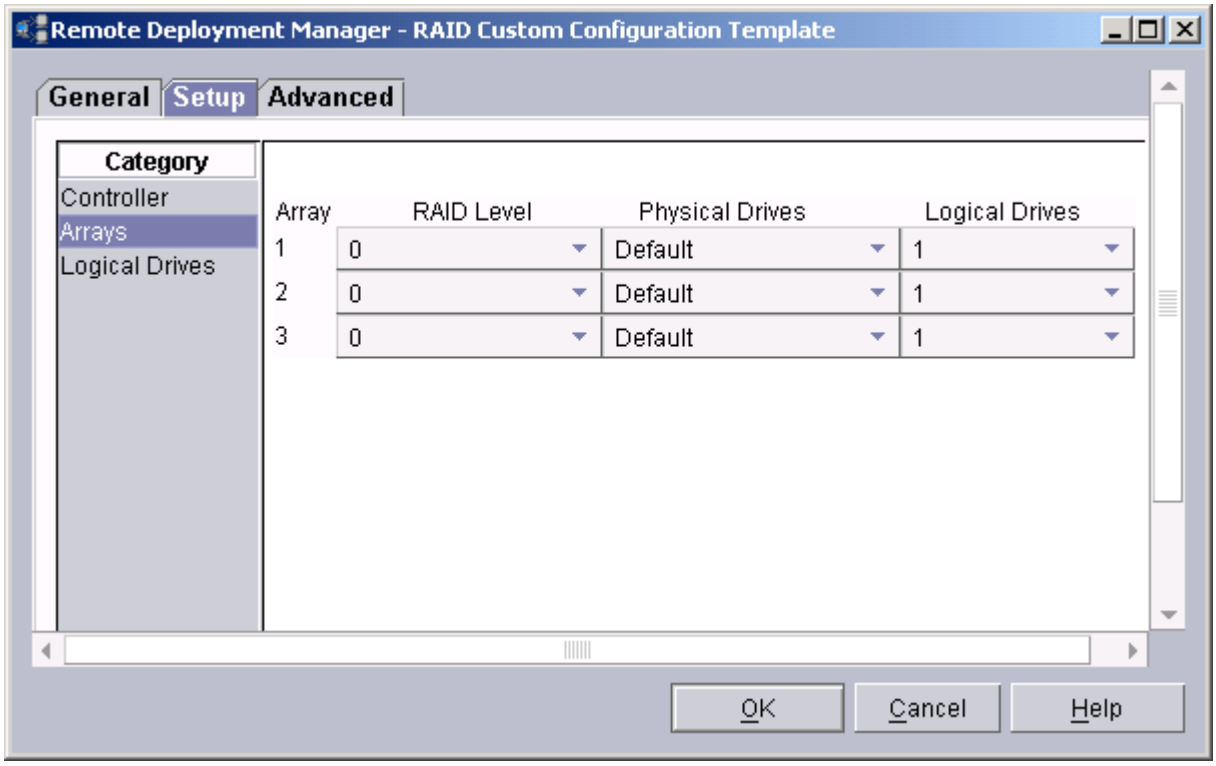
   You might specify values Default, 1, 2, 3, 4, 5, 6, 7, 8 for the number of arrays. Default arrays means to configure according to express configuration rules, grouping like-size drives into arrays. If you select value 1–8, two additional categories, **Arrays** and **Logical Drives**, are displayed in the left pane.

   If this screen is left with all default values, the task created is identical to the Express RAID Configuration Task.

   The maximum logical drive size is used to limit the size of logical drives allocated by percentage of space to conform to operating system restrictions. Specifying a maximum logical drive size will cause flagging if a fixed size in MB is selected and the fixed size exceeds the maximum logical drive size.



The number of array lines correspond to the number of arrays selected in the Controller pane. For each array, you must select the number of physical drives that should make up the array, the number of logical drives the array should be divided into, and the RAID level of all logical drives in the array. Although ServeRAID actually lets logical drives of different raid levels coexist in the same array, it is not a recommended configuration because it blocks the ability to perform logical drive migration. The RAID custom task will therefore not support heterogeneous raid levels in a single array.

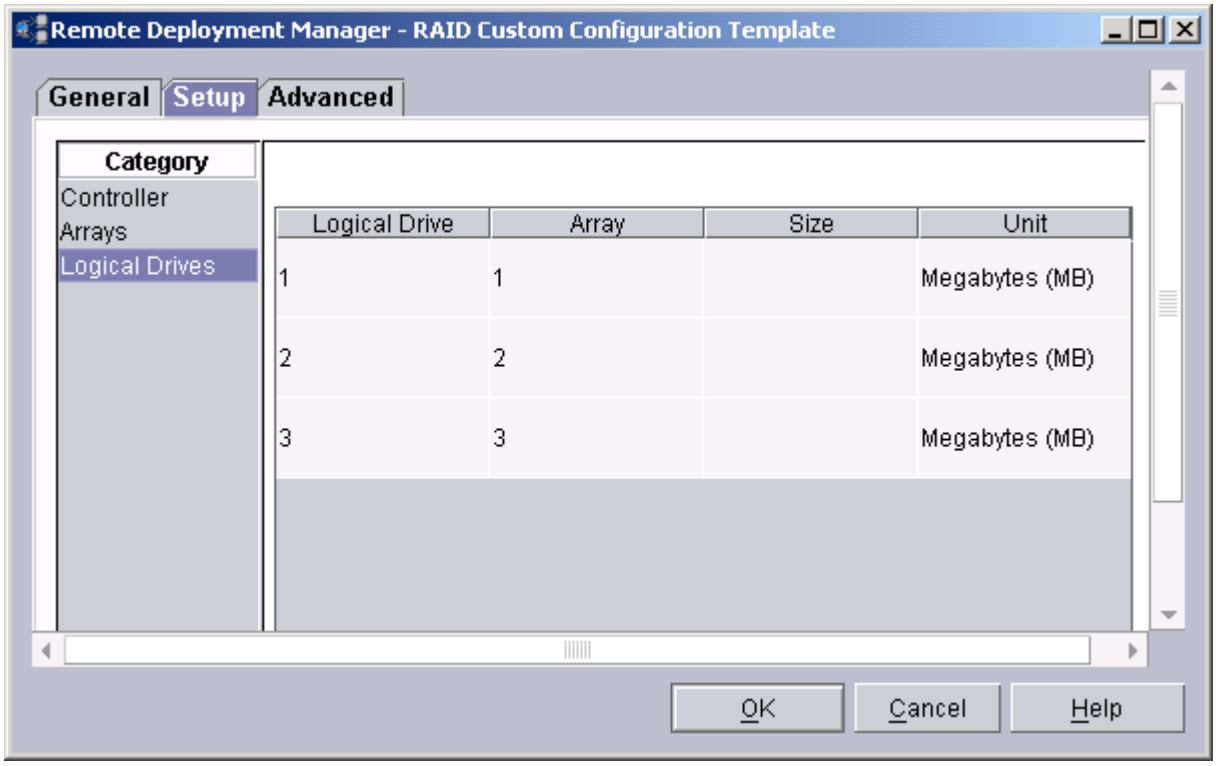


Select one of the following RAID levels: 0, 1, 1E, 5, 5E, 5EE.

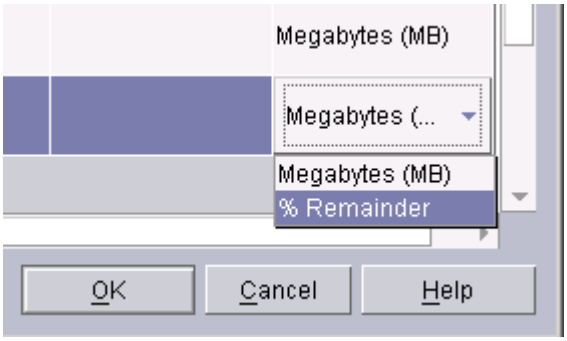
You might specify values Default, 1-16 for the number of physical drives. If Default is selected for an array, and it is not the last array, the minimum number of drives required for the specified RAID level will be allocated. If Default is selected for an array, and it is the last array, the maximum number of drives possible for the specified RAID level will be allocated constrained by the availability of same sized drives.

The selectable values for the number of logical drives will be controlled by the GUI such that a maximum of eight logical drives can be allocated. Therefore, if you select 8 arrays, you have no other choice for the number of logical drives in each array except 1. If, for example, you select 2 arrays, the selection boxes for the number of logical drives would initially have choices 1-7 for each with 1 currently selected. If you then change the number of logical drives for the first array to 5, the selection box for the number of logical drives for array 2 would automatically change to only allow selections 1-3.

In the Logical Drives category, there is one line for each logical drive in the configuration.



For each logical drive, the associated array number is displayed. You designate the size of the logical drive to be allocated either as an explicit value in megabytes or as a percentage of the remaining available space. During the configuration resolution process, all logical drives in an array specified with an explicit megabyte value will be allocated before the logical drives with relative percentage sizing in that array. What this means is that if you designate 3 logical drives in an array, with sizes 2000 MB, 50% Remaining, and 4000 MB, and the total available array space was 16 GB then logical drive 2 would be allocated 5 GB of space (.50 * (16 GB – 6 GB)) as opposed to 7 GB if the logical drives were simply allocated in numerical order.



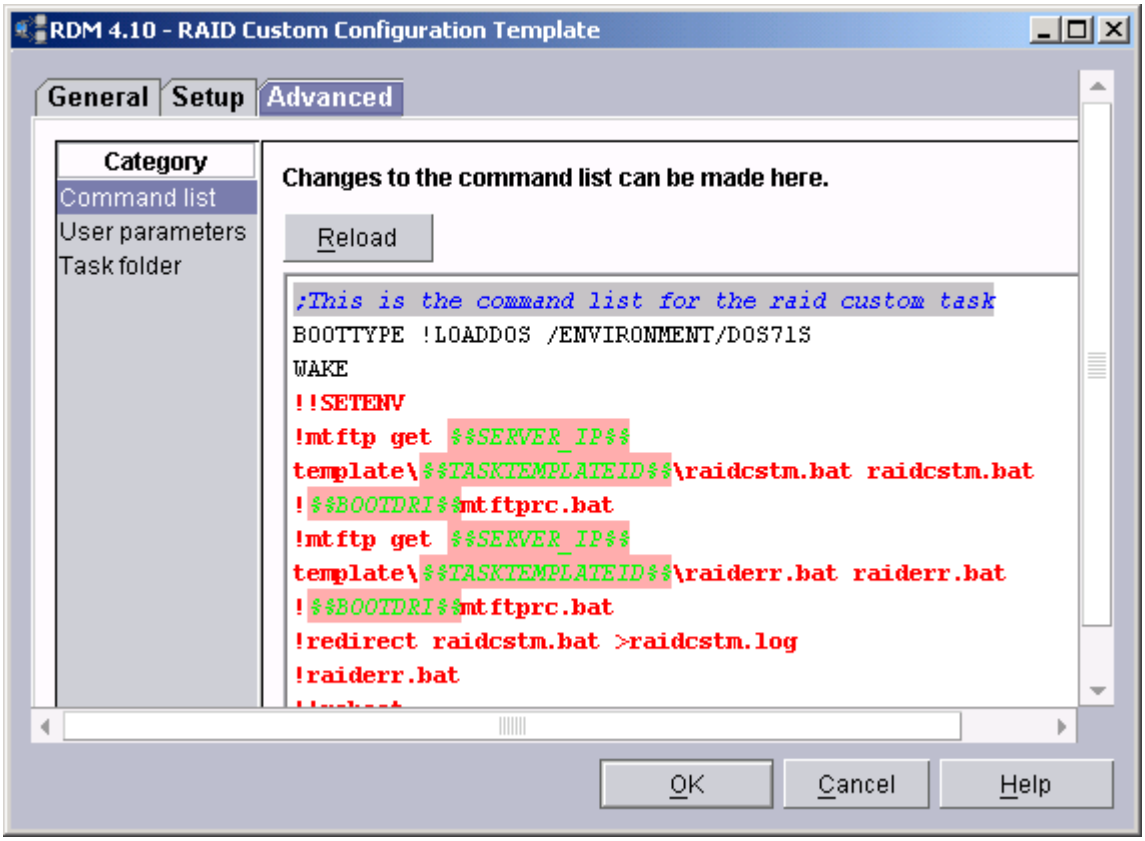
6. Click the **Advanced** tab.
7. Type your values for each of the following categories:

   Command list

   The command list is a list of RDM and DOS commands used to perform the RAID Custom Configuration task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory

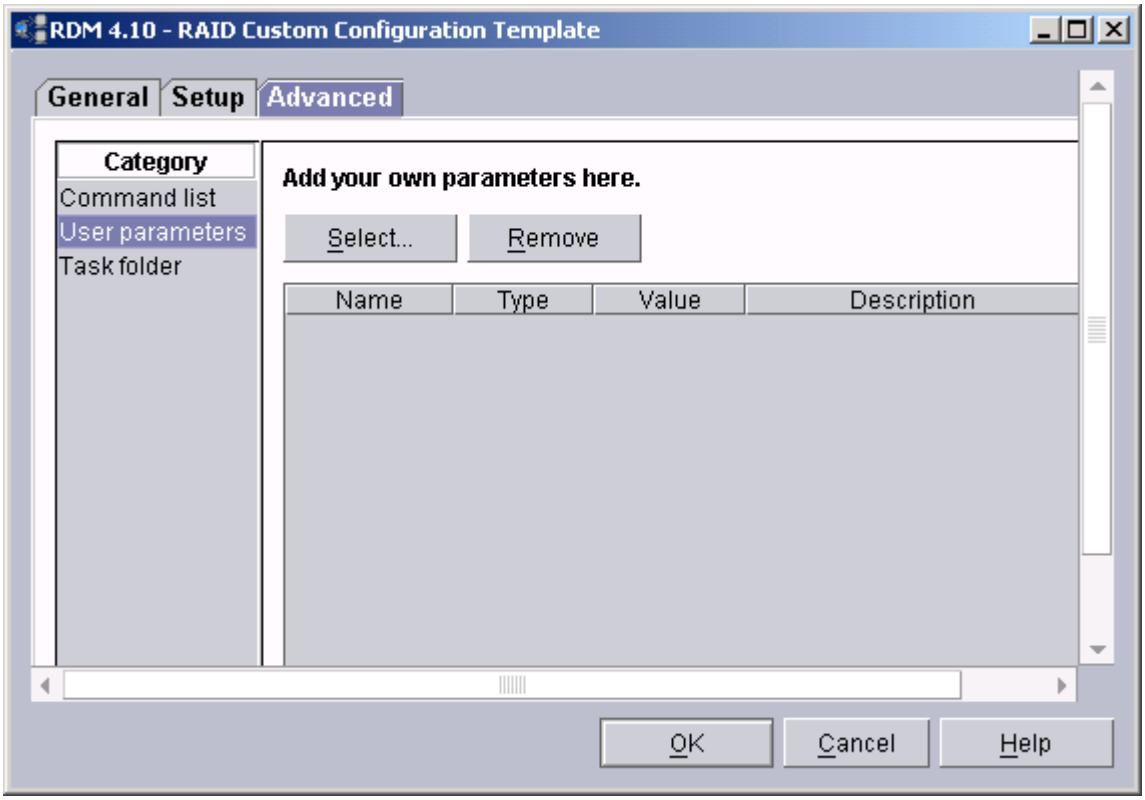
associated with the task. Click **Reload** to restore the command list to its original state.

Refer to Appendix A for information on commands and syntax within a command list.



User parameters

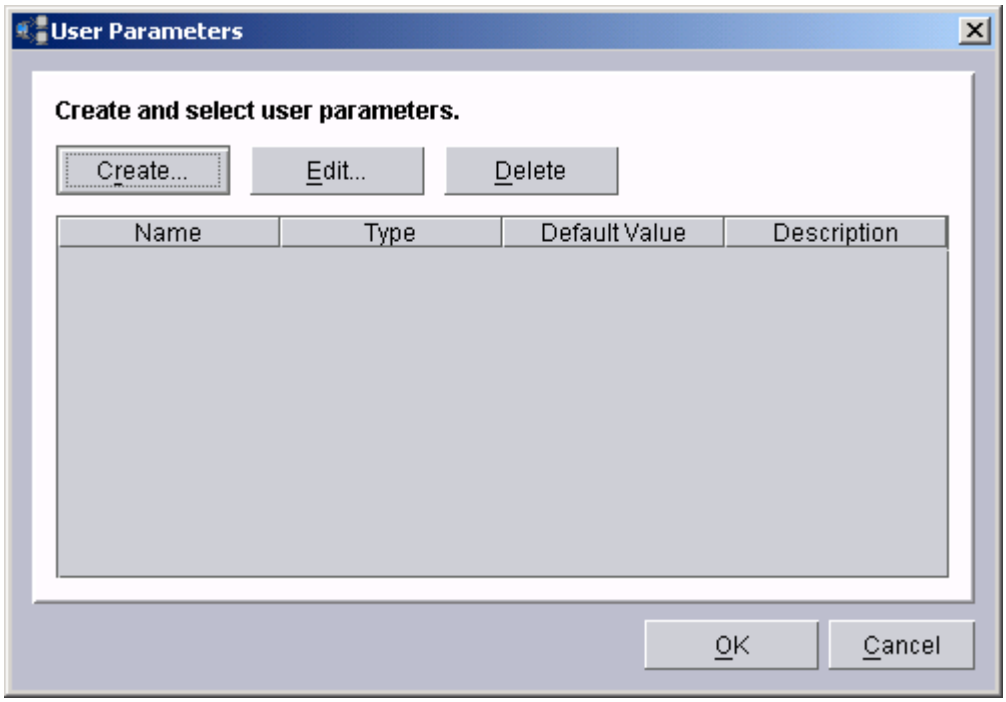
Displays a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. RAID Custom Configuration tasks, by default, do not use any user-defined parameters.



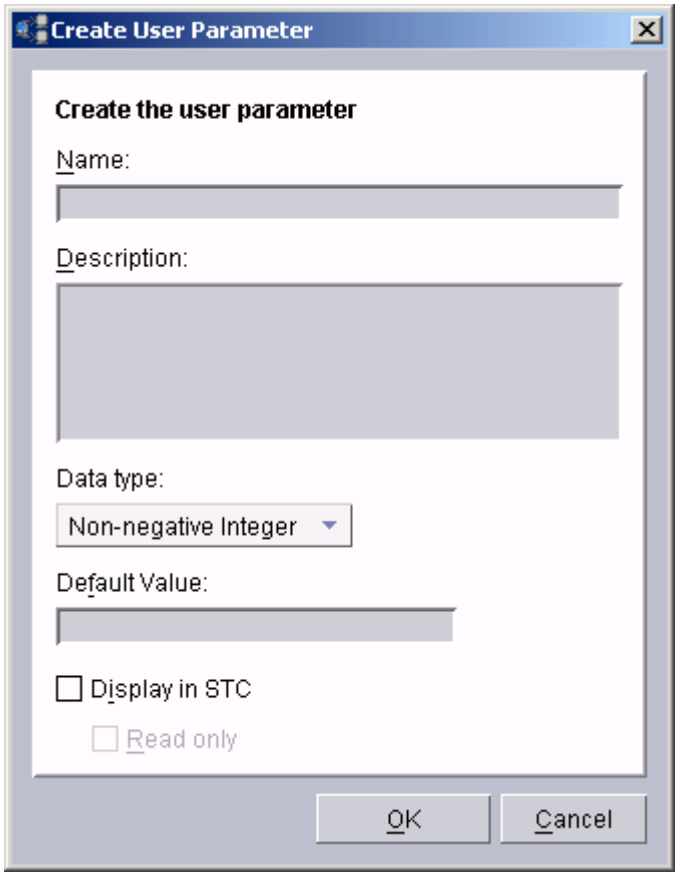
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

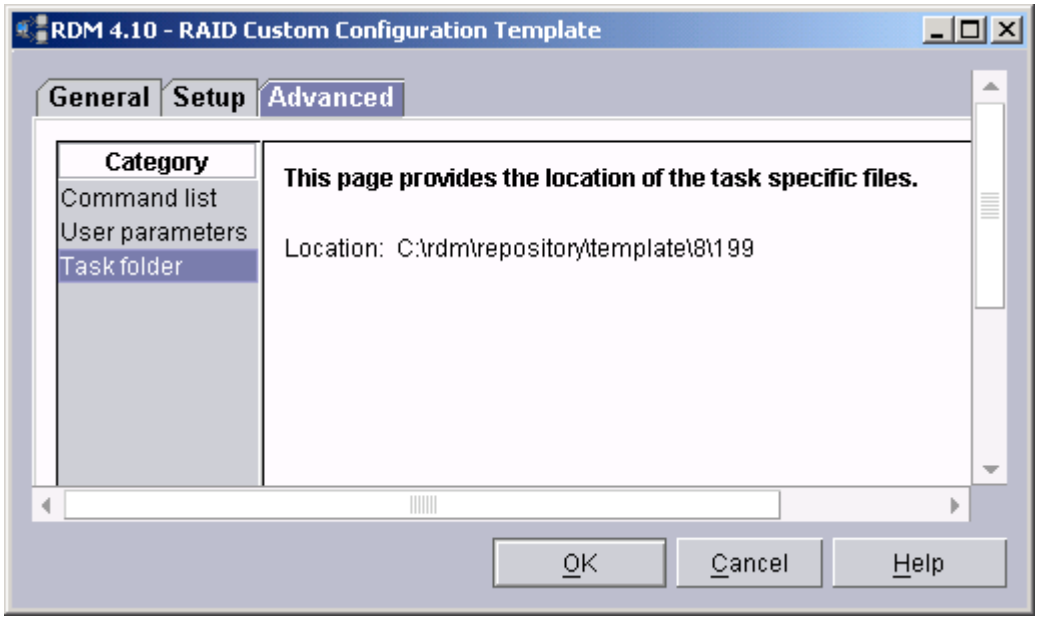


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



8. Click **OK** to update and validate the template property sheet.

Using the wizard

Most of the wizard pages are very similar to the tabs in the property sheet for this task. All the crucial information on each page can be changed using the **Back** button. Pressing **Next** causes validation on the page.

The **Finish** button, seen on the last page of the wizard, finalizes the task creation. A RAID Custom Configuration task folder will be created in the RDM 4.1 Master Repository. The name of the folder is the task number.

Scan

Scan is the inventory and topology discovery process for RDM. The goal of the Scan task is to provide you with the ability to create a task that performs a discovery function on their systems. A Scan task queries the installed hardware of the target system and updates the system record in the database. It does not cause any other action on the system. Scan automatically detects new systems that are booting to the network using PXE. When it finds a new system, RDM interrogates the system for hardware information, such as the serial number and network address, and updates the system record in the database.

Scan operates by discovering new systems attempting to boot from the network in the presence of an RDM Boot Service system, generates RDM system objects (Platform Managed Objects) for them, runs the default Scan task to perform hardware inventory, and optionally, prompts the end user to enter information. Scan is a continuous process, which might be left running permanently or might be switched on or off as required (scan is running by default).

IBM Director uses a “discovery” process to find new systems. Discovery happens while the operating system is running (on each system), by broadcasting a query which is seen by each IBM Director agent program running on a remote system. The agent responds, and the IBM Director server saves the responses, putting each newly discovered system

into its database, and onto the middle pane of the screen. This requires the IBM Director agent to be loaded beforehand. RDM, in comparison, is able to glean considerable configuration information from systems that might not even have an operating system installed. The RDM "scan" process occurs during boot-time, before the operating system is booted, or even installed. The PXE service tells the system where to get its bootstrap image, and that image contacts RDM. RDM then creates an entry in the IBM Director database (if it does not already exist), which is displayed in the middle pane of IBM Director.

Use the RDM property sheet (**Tasks → Remote Deployment Manager → RDM Options**) to define a single task to be the default Scan task for any newly discovered systems. When an unknown system requests work from the RDM server, it will be this task that runs. RDM comes with one built-in default Scan task that cannot be deleted, and for most uses, does not need to be changed. Scan task is the first task that you should process. Most of the RDM functions cannot be performed on a system until it has been successfully scanned in.

To start the task, drag and drop a group from the Groups pane, or a system from the Group Contents pane, onto a Scan task in the Tasks. The Scan task will refresh the system database with the latest hardware, Asset ID™, and optionally end user input.

Prior to running your first Scan procedure, set specific defaults for RDM so that each scanned system is assigned the appropriate values.

The Scan function collects details about new systems that boot to the network during the scan operation and for which no details are currently recorded in the RDM systems database. The details collected from a scan include such things as:

- Network address
- Type and model number
- Serial number
- Amount of random access memory (RAM) installed
- Hard disk drive capacity
- Network adapter
- Video adapter or chip set

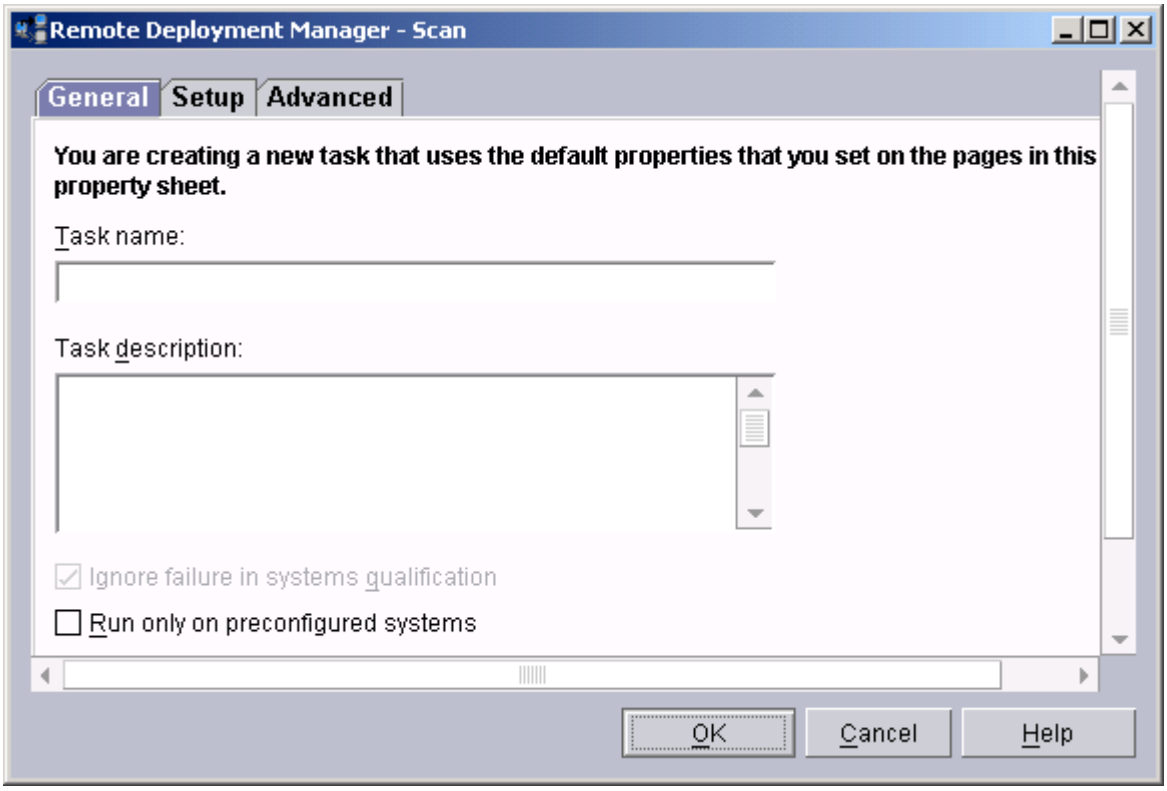
Right-click the **Scan** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows, however, one results in creating a new task while the other makes changes to the task template properties. Any changes you make to the template properties will be reflected in any new tasks created from that template.

By default, there is one **Basic Scan** task provided. To modify any of the **Basic Scan** properties, click **Scan → Basic Scan → Edit task.**

Create a new Scan task

Complete the following steps to create a Scan task:

1. Right-click the RDM **Scan** template in the IBM Director Tasks pane and select **Create new task** to open the Scan template.



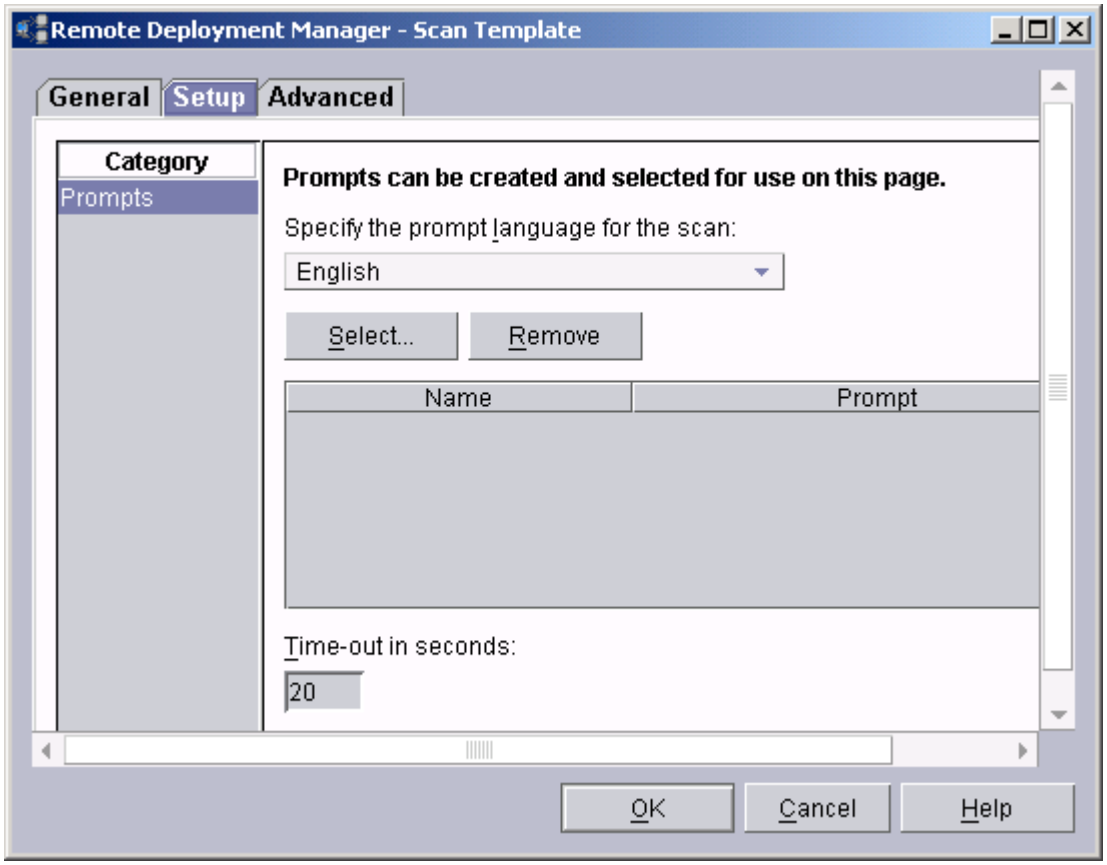
2. Type a new task name and a description (optional).
3. Select the check box, if applicable:

   Run only on preconfigured systems. Affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and select Run, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed. This means that when you drag unconfigured systems to a task, the task will refuse to run any system that you have not explicitly configured already, thus preventing possible damage.

4. Click the **Setup** tab. On the Setup page, you can view or create user prompts. The list box displays only the prompts that will be asked at every newly detected system by the scan process. Initially, the list will be empty until you add the prompts. Displaying questions during the scan operation is optional and only occurs if these questions are entered on this page. You can ask any question you want. That is, their actual meanings and uses are completely up you, as the RDM administrator. They can be viewed, edited, and used as the value to display in lists of systems. If you do not specify any user prompts, the scan process completes without end-user input.

   The **Time-out in seconds** box contains the number of seconds that the system waits for user input for each prompt. If no input is entered within that time, the scan

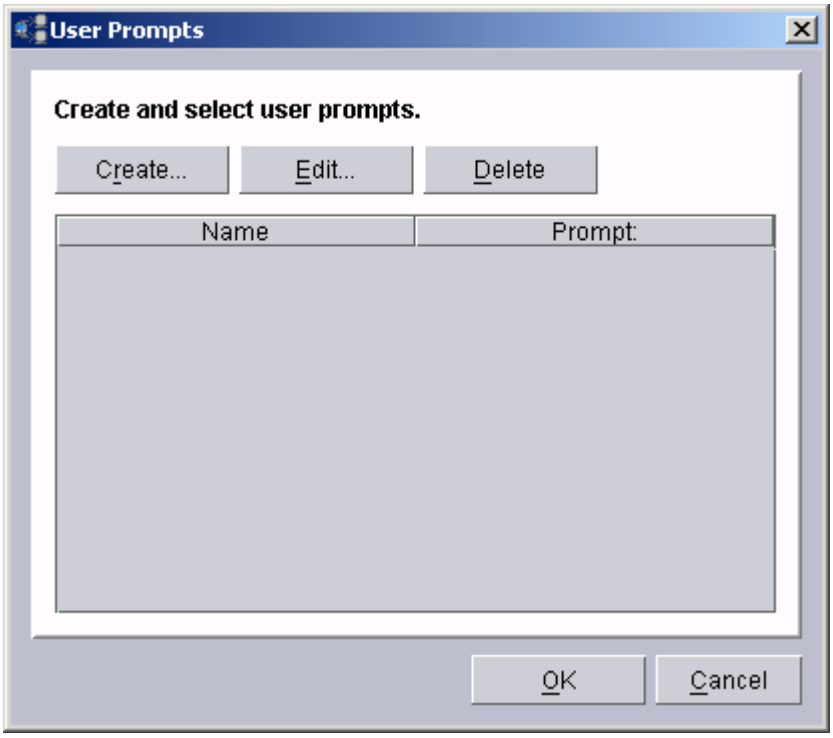
process completes or the system displays the next prompt (if any) without changing the value of the timed-out prompt. If no timeout is specified, the scan process waits indefinitely for input.



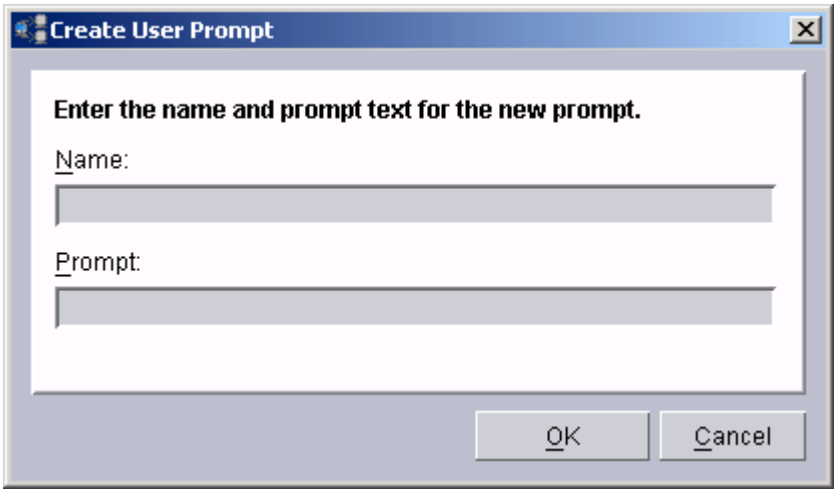
Create a user prompt

Complete the following steps to create a user prompt:

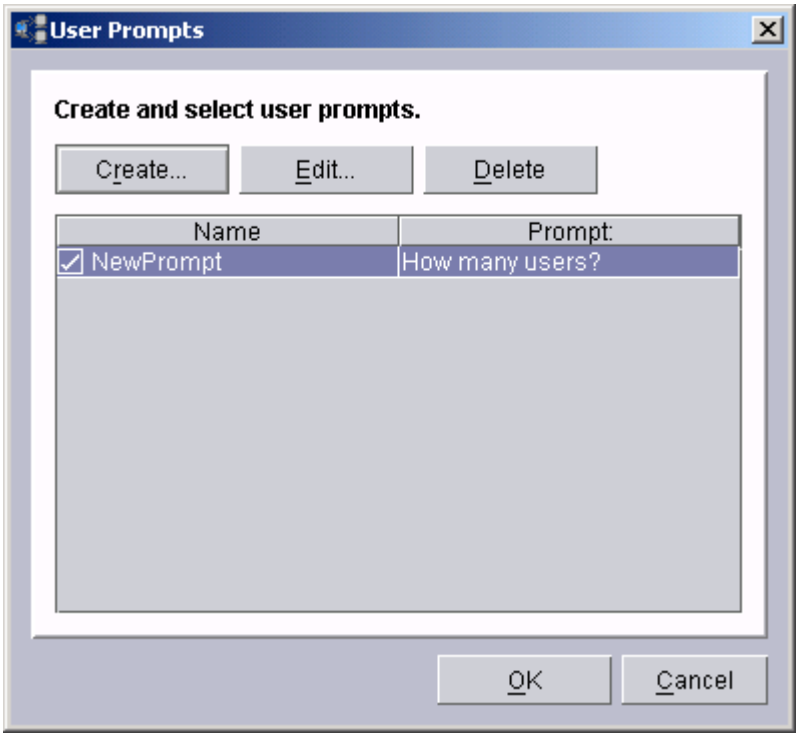
a. Click **Select**. This opens the User Prompts window.



b. Click **Create**. This opens the Create User Prompt window.



c. Type a name and the actual text of the prompt. Click **OK**.

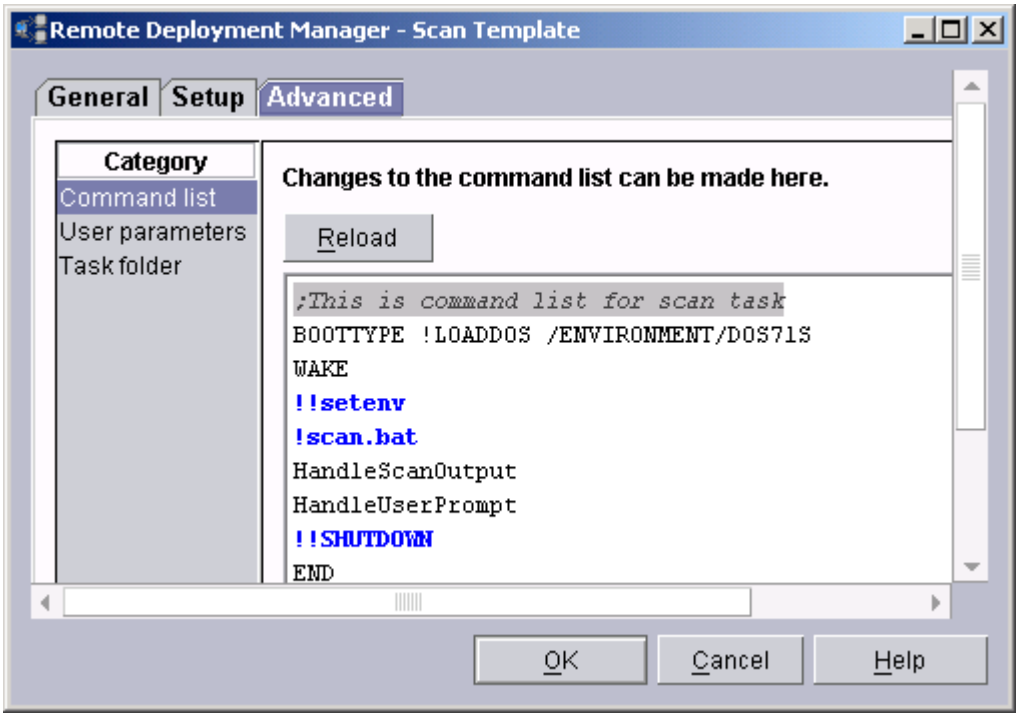


d. Select the check box to use the prompt, and then click **OK** to have the prompt appear in the list box on the Setup page.

5. Click the **Advanced** tab.
6. Type your values for each of the following categories:

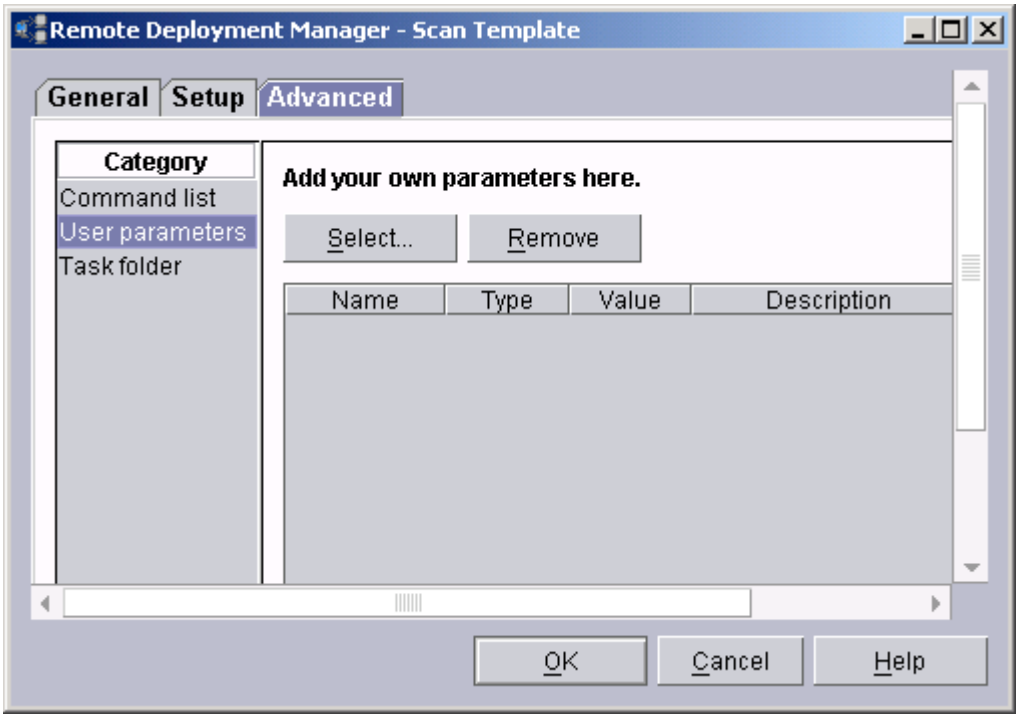
   Command list

   The command list is a list of RDM and DOS commands used to perform the Scan task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.



User parameters

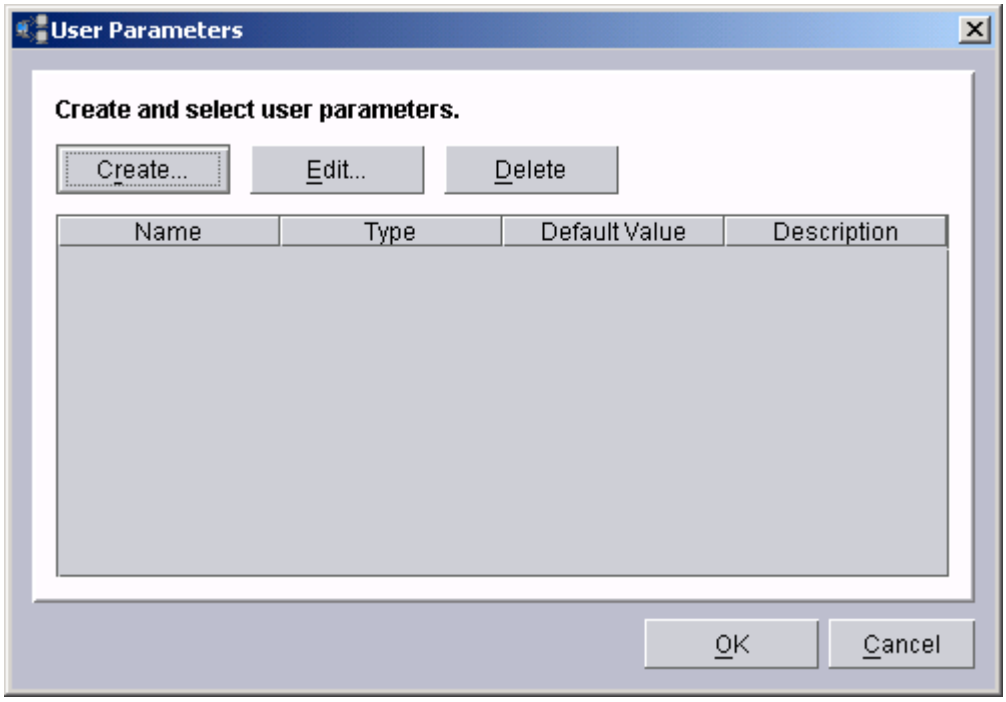
Displays a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. Scan tasks, by default, do not use any user-defined parameters.



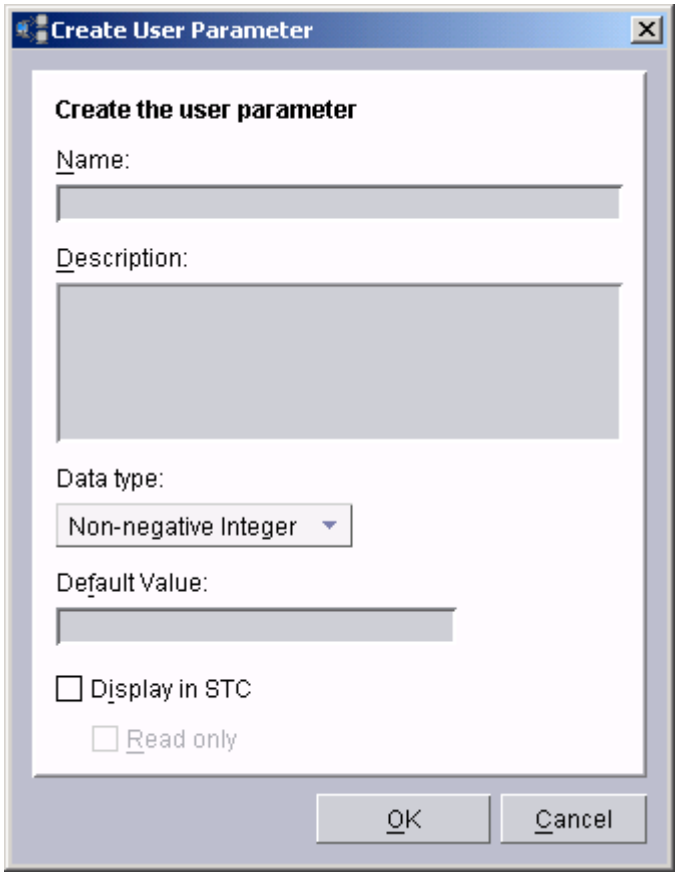
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

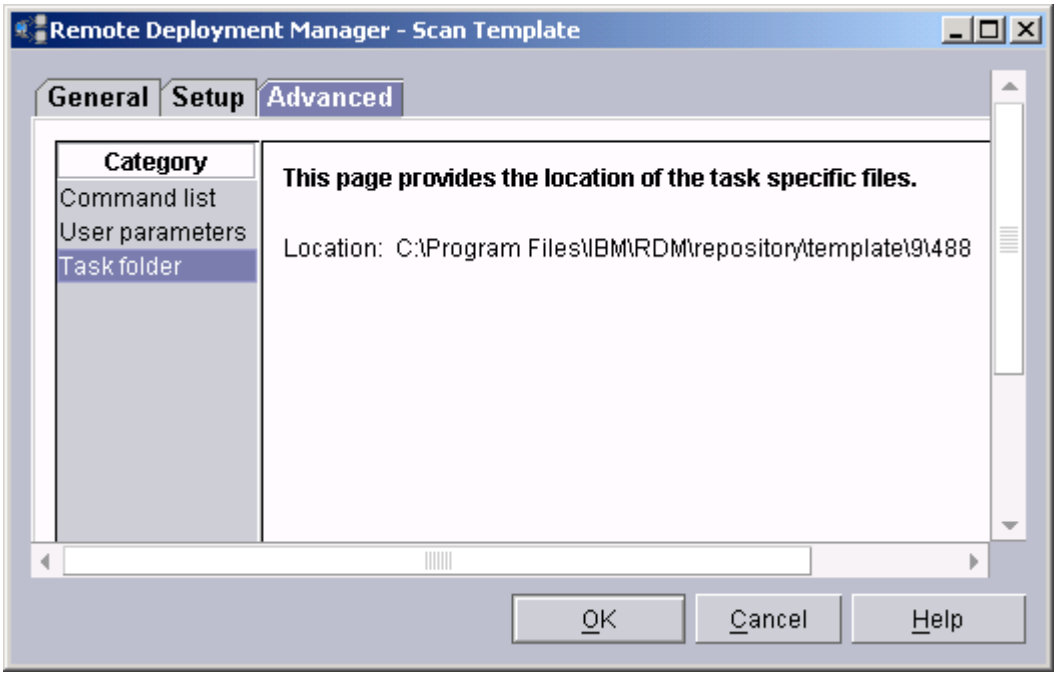


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



7. Click **OK** to create the task after you have entered all the information for the categories.

   The new task will appear in the IBM Director Tasks pane with the Scan template. Right-click the new task to edit or copy the task.

Edit or copy an existing Scan task

Right-click a **Scan** task in the Tasks pane to edit or copy that task. Use **Edit task** to modify the settings for that task. Copying is a convenient way to start creating a new task based on an existing task. Select **Copy task**, type a new task name, and then modify any settings to create a new task.

Configure systems for a Scan task

Right-click a Scan task and select **Configure systems** to open the System/Task Configuration (STC) window. The purpose of the STC window is to prompt RDM for system-specific information that is needed for the execution of a task. The STC window associates some number of systems with a task and defines all the parameters needed to execute that task on each of the systems. Exiting (by selecting **Run**) the STC window opens an IBM Director message box asking whether to schedule the task or to execute it now.

Scan feature troubleshooting

If during a scan a system did not boot to the network, follow these steps to troubleshoot the problem:

1. Check the *RDM Compatibility Guide* for information about your computer and its network adapter. The guide is available on the RDM home page.
2. Verify that the computer contains a supported network adapter:
   - Integrated Ethernet or Token-Ring subsystem that supports PXE.
   - Ethernet or Token-Ring adapter that supports PXE.

3. Change the network adapter settings. These settings can be accessed by pressing CTRL+S (or some other key combination, such as CTRL+ALT+B, depending on which adapter you have) while the computer is starting. The important settings are:
   - Network boot protocol: should be PXE.
   - Boot order: should be local drives first.

   Save the changed settings, and then reboot.
4. Change the system configuration. These settings can be accessed by pressing F1 while the computer is starting (or some other key, depending on which model computer you have). Save after changing the settings, and then reboot the system. The important settings are:
   - Start options, primary boot sequence. Make sure "network" is before any "hard drive":
     1. Diskette 0
     2. CD-ROM
     3. Network
     4. Hard drive 0
   - Start options, alternate boot sequence. Some computers do not have an alternate boot sequence. If present, the settings should be:
     1. Diskette 0
     2. Network

Note: Some computers and network adapters have the ability to connect to the network when a specific key sequence is pressed after a manual power-on. If your computer has this capability and it also has an alternate boot sequence, it is not necessary to set “network” before “hard drive” in its primary boot sequence.

   - Wake on LAN. If supported, it should be enabled. You will have to turn on a computer without the Wake on LAN feature manually every time you process it with RDM.
5. Although in most cases it is not necessary, you might need to flash update the firmware on your network adapter or the BIOS on your computer before scanning it with RDM. If so, download the applicable driver or BIOS code update from the IBM Web site and follow the instructions, and then reboot the system.

Viewing the system log for a failing system

If you get an error during the initial scan of a system, no system log will be created. This means that there is no detailed error description available.

Complete the following steps to debug this situation:

1. If the IBM Director Console contains a new, incomplete entry in the Group Contents pane, delete it.
2. Power the system on again, in a way that forces a network boot. Press the system F8 key immediately after you see the "Starting PC DOS" message on the system monitor.
3. Step through the batch files, one statement at a time, by pressing the system Y key for each statement.

If the error recurs, you will be able to see the error on the system monitor. If the error does not occur, you can safely ignore the original error.

Script

The Script task is one of the most common tasks run. A Script task consists of a list of subtasks (existing tasks) that are delivered in the order you specify. Typically, a Script task consists of all the steps required to roll out a system, for example flash the system firmware, update CMOS, and install Windows. You select from all available tasks to be included in the script task.

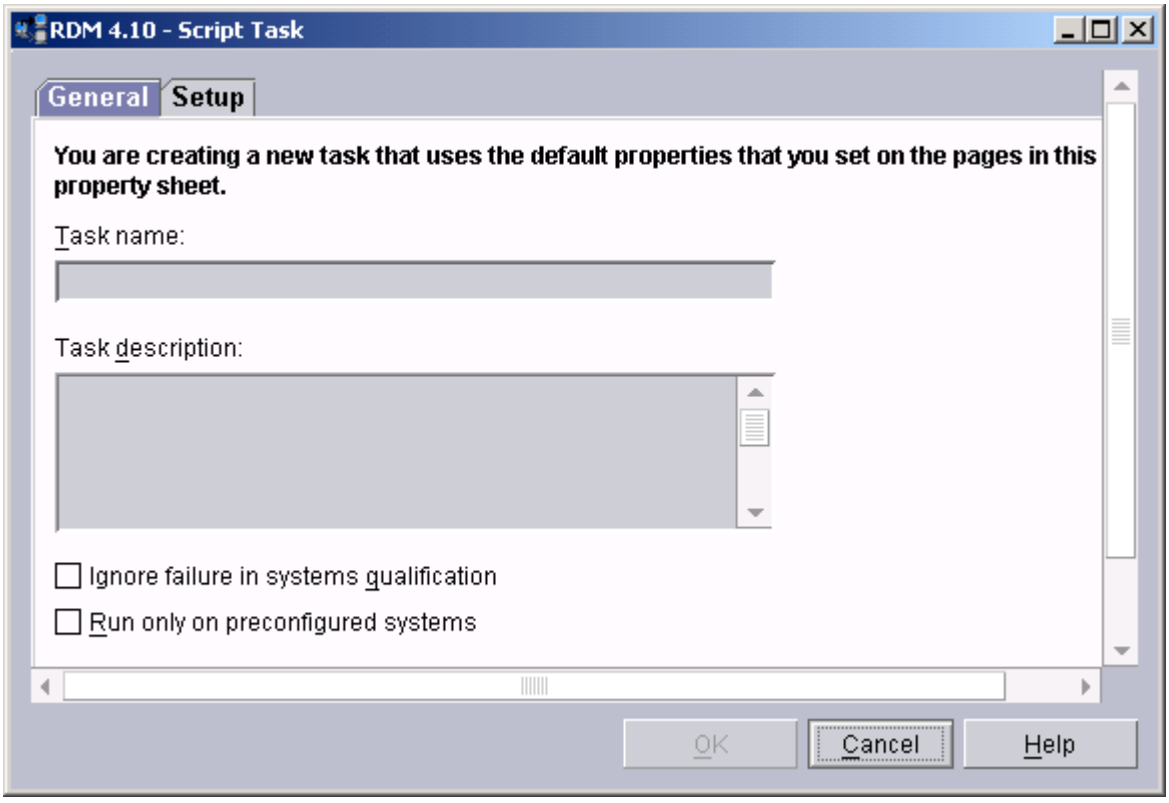
The Script task template property sheet is relatively simple. The details used for running the component tasks are managed by the tasks themselves. The property sheet consists of two tabs. The General page contains the standard information expected for all tasks (for example, a task name and description). The Setup page lists the tasks from which you choose.

Right-click the RDM **Script** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows, however, one results in creating a new task while the other makes changes to the task template properties. Any changes you make to the template properties will be reflected in any new tasks created from that template.

Create a new Script task

Complete the following steps to create a new Script task

1. Right-click the **Script** template in the IBM Director Tasks pane and select **Create new task.**

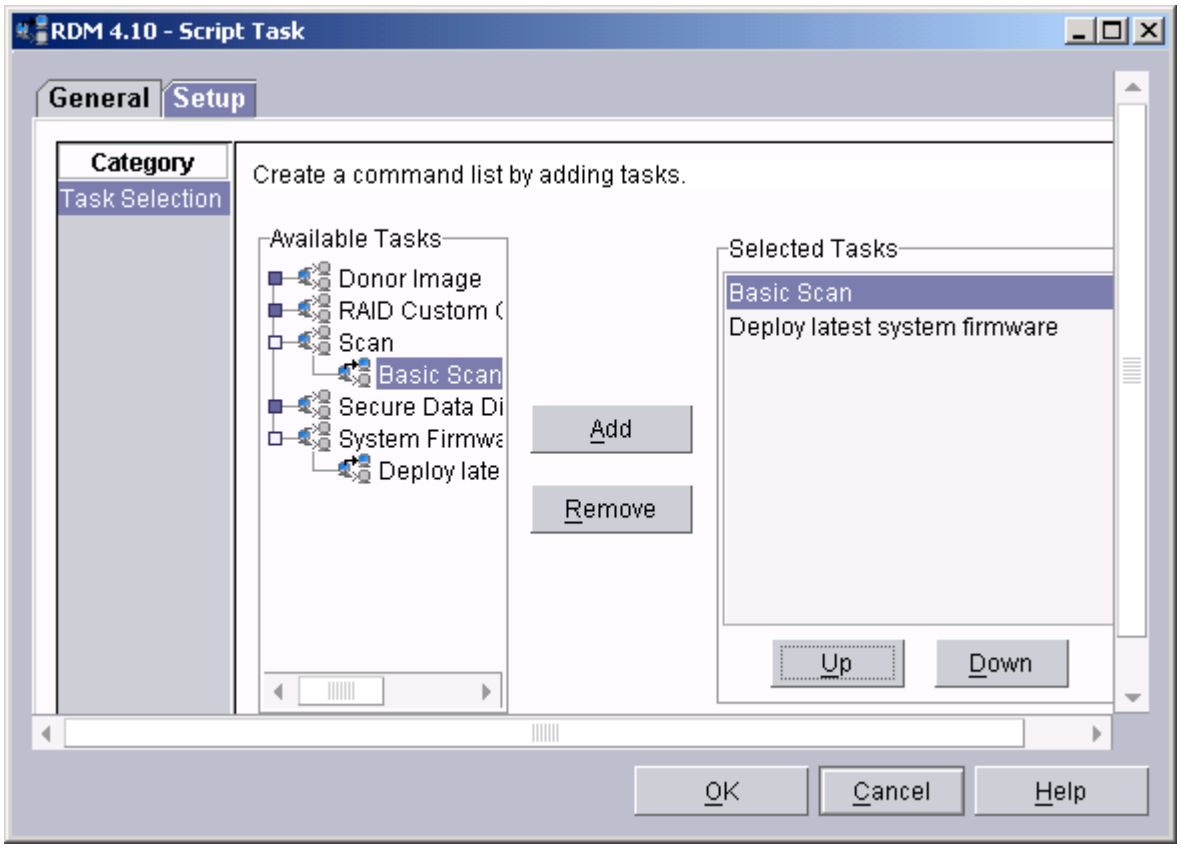


2. Type a task name and a task description (optional).
3. Select the applicable check boxes:

Ignore failure in systems qualification. If the flag is checked, systems associated with this task will not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.

4. Click the **Setup** tab.
5. Select the tasks to include in the new Script task.



The **Available Tasks** box contains a tree view of all RDM tasks. The **Selected Tasks** box contains an ordered list of the tasks that are contained in this Script task. The tasks are run in the order in which they occur in this list (top task first).

In turn, select each of the tasks from the previous sections, and then select the **Add** button. When you click **Add**, the highlighted tasks are copied from the **Available Tasks** box to the **Selected Tasks** box. You could instead just drag each task to the **Selected Tasks** control.

Make sure that you order the tasks in the **Selected Tasks** box correctly. Drag each task up or down to its proper position. You can also move items up or down by using the **Up** and **Down** buttons. Highlight one item or multiple consecutive items, and then click **Up** or **Down** to change their order sequence.

When you click **Remove**, the highlighted tasks are removed from the **Selected Tasks** control.

Click **OK** to create the task.

The task will appear in the IBM Director Tasks pane with the Script template. Right-click the new task to edit, delete, or copy the task.

Qualification under the Script task

When you select the **Ignore errors in Qualification** check box for a Script task, the selection only applies to that Script task and *not* its subtasks. The purpose for ignoring qualification errors on a Script task is to handle those situations in which one subtask depends upon the work of another subtask to be complete before its own qualification can pass. For example, a system with an unconfigured RAID array will generate errors when qualification for a Windows Native Install (WNI) task is executed against that system. However, with a Script task, you can put a RAID Custom Configuration task before a WNI task to enable the RAID to be configured before the WNI task is executed. The Script task will execute the individual subtask qualifications as part of its own qualification and report errors in this situation unless you select the **Ignore errors in Qualification** check box in the Script task.

The above mentioned situation could also be handled by selecting the **Ignore errors in Qualification** check box on the WNI task. That solution might not be desired, especially if that task is also used on other systems outside of the Script task. Some errors that could be caught by qualification would not be realized until running the task against a system.

When two tasks are included in a Script task, and one task depends on the other to configure hardware, selecting the **Ignore errors in Qualification** check box in the Script task is the recommended course of action.

Secure Data Disposal

The Secure Data Disposal Task removes (that is, “scrubs”) data from the system hard disk drives (some or all partitions on the drive) prior to system disposal or redeployment. All drives that are accessible to the BIOS code can be scrubbed.

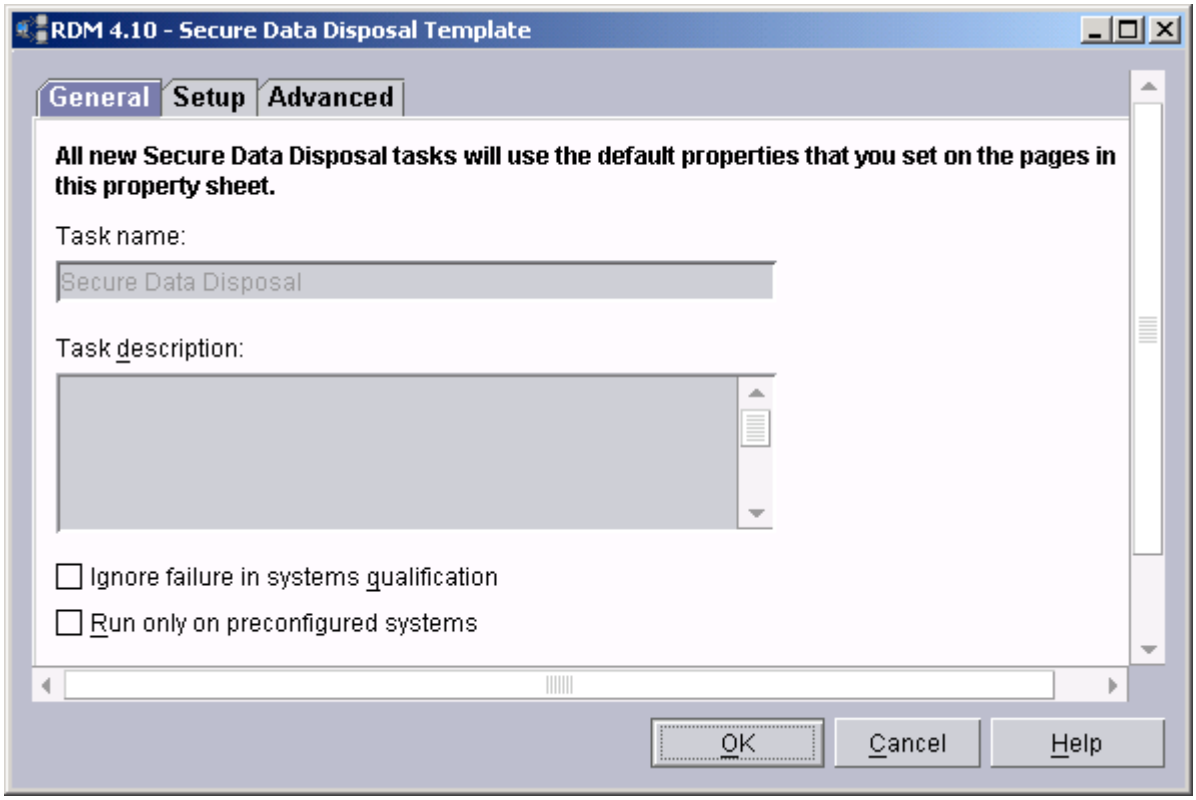
Right-click the RDM **Secure Data Disposal** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows, however, the first option results in creating a new task while the second makes changes to the task template properties. Any changes you make to the template properties will be reflected in new tasks created from that template.

There are four built-in tasks, Levels 1-4, of disposal algorithms.

Edit the template property sheet

Complete the following steps to edit the Secure Data Disposal template:

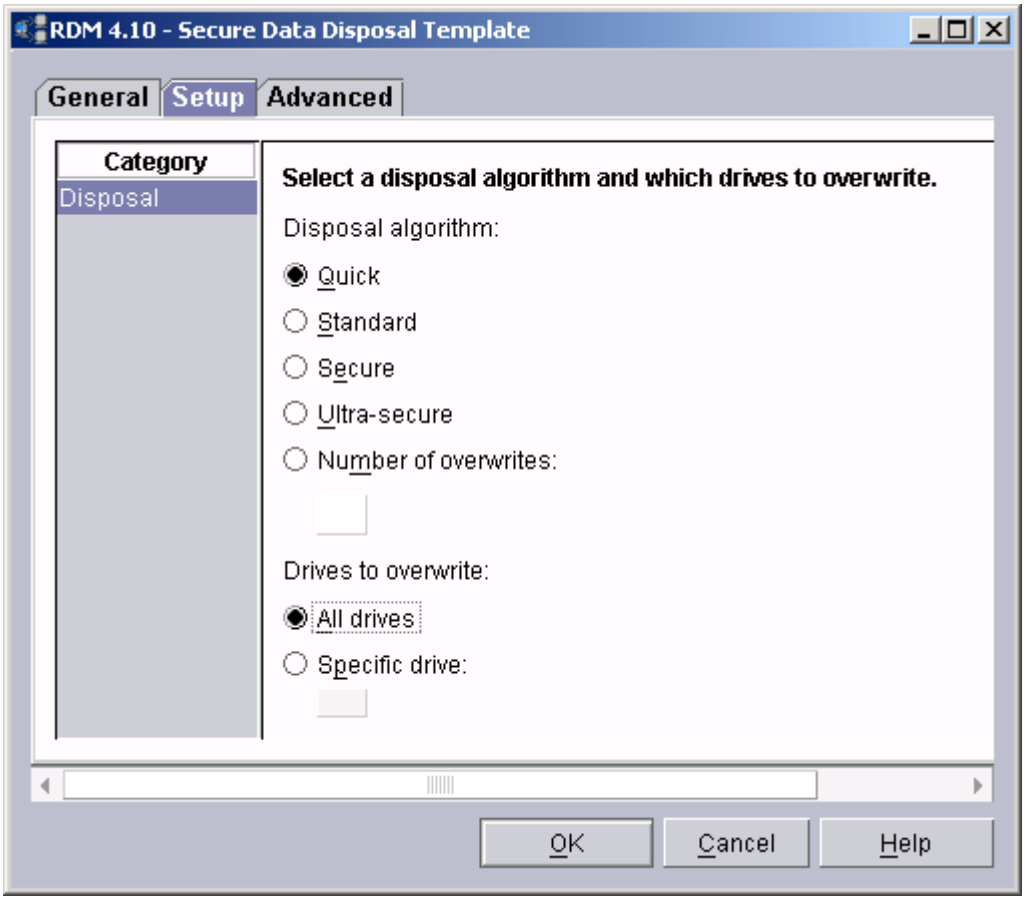
1. Right-click the **Secure Data Disposal** template, and then select **Edit template** to open the Secure Data Disposal template. The template contains 3 tabs: General, Setup, and Advanced.



2. Type a task description (optional). The task name is not available because you cannot change the name of the template.
3. Select the applicable check boxes:

   Ignore failure in systems qualification. If the flag is checked, systems associated with this task will not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.
4. Click the **Setup** tab. The Setup page lists a category in the left pane and its properties in the right pane.



5. Select from the following built-in algorithms that scrub all hard disk drives on the system:

   Quick – Overwrites the Master Boot Record, the first 100 sectors of each partition, and the last 2 sectors on every hard disk drive installed on the system. The pattern used for the overwrite operation is 0x0000. It is intended to make files inaccessible to normal file-system-based tools. The disposal algorithm for **Quick** corresponds to the /L=1 parameter for SCRUB3.EXE.

   Standard – Overwrites every sector of every hard disk drive installed on the system with zeros (0x0000). It is intended to make data inaccessible by any software technique. The disposal algorithm for **Standard** corresponds to the /L=2 parameter for SCRUB3.EXE.

   Secure – Overwrites every sector on every hard disk drive installed on the system 4 times with the following patterns (in this order):

   1. A random pattern
   2. The bit-wise complement of the first random pattern
   3. A different random pattern
   4. A 0x0000 pattern

   It is intended to make the data inaccessible by any technique. The disposal algorithm for **Secure** corresponds to the /L=3 parameter for SCRUB3.EXE. It meets DoD standards.

   Ultra-Secure – Overwrites every sector on every hard drive installed on the system 7 times with the following patterns (in this order):

1. A random pattern
2. The bit-wise complement of the first random pattern
3. A different random pattern
4. The bit-wise complement of the second random pattern
5. A third random pattern
6. The bit wise complement of the third random pattern
7. A 0x0000 pattern.

It is intended to make the data inaccessible by any technique. The disposal algorithm for **Ultra-secure** corresponds to the /L=4 parameter for SCRUB3.EXE. It meets DoD standards.

Note that there might be sectors that are not accessible to the BIOS code calls, because of internal remapping of damaged sectors by the drive controller. This Task does not erase these sectors.

Number of overwrites – Corresponds to the /W=<m> parameter for SCRUB3.EXE. If the user chooses this, the adjacent entry field is enabled. You must type <m>, the total number of overwrites, as an integer (or use the spin button to select an integer).

Drives to overwrite:

All drives – Corresponds to the /D=ALL parameter for SCRUB3.EXE.

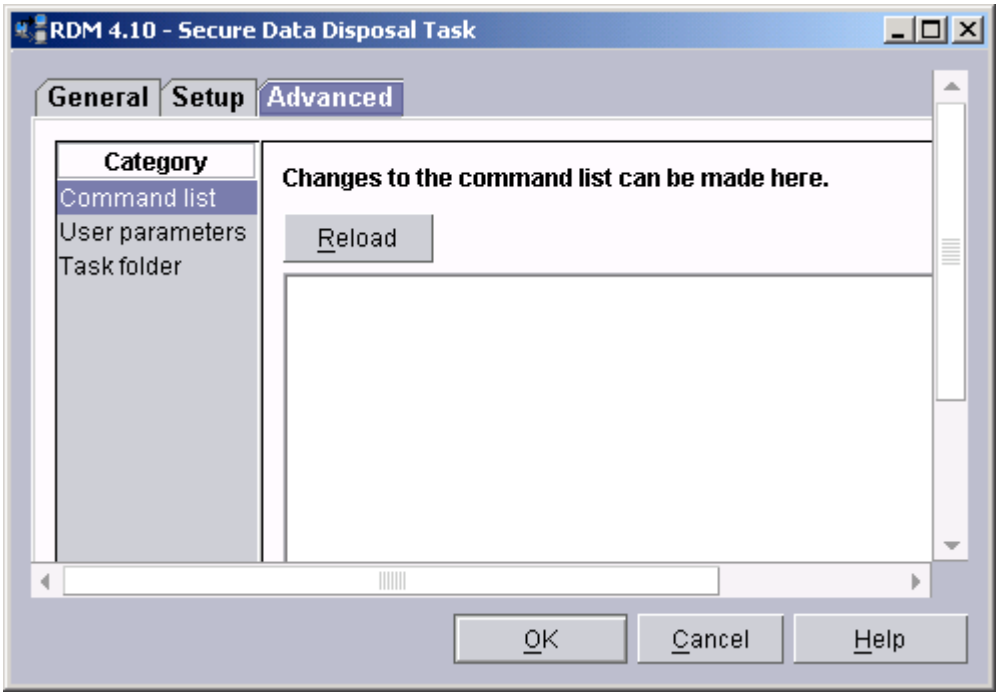
Specific drive – Corresponds to the /D=<n> parameter for SCRUB3.EXE. If you choose this option, type or select <n>, the drive number. Drive numbering starts at 1, *not* 0.

6. Click the **Advanced** tab.
7. Type your values for each of the following categories:

Command list

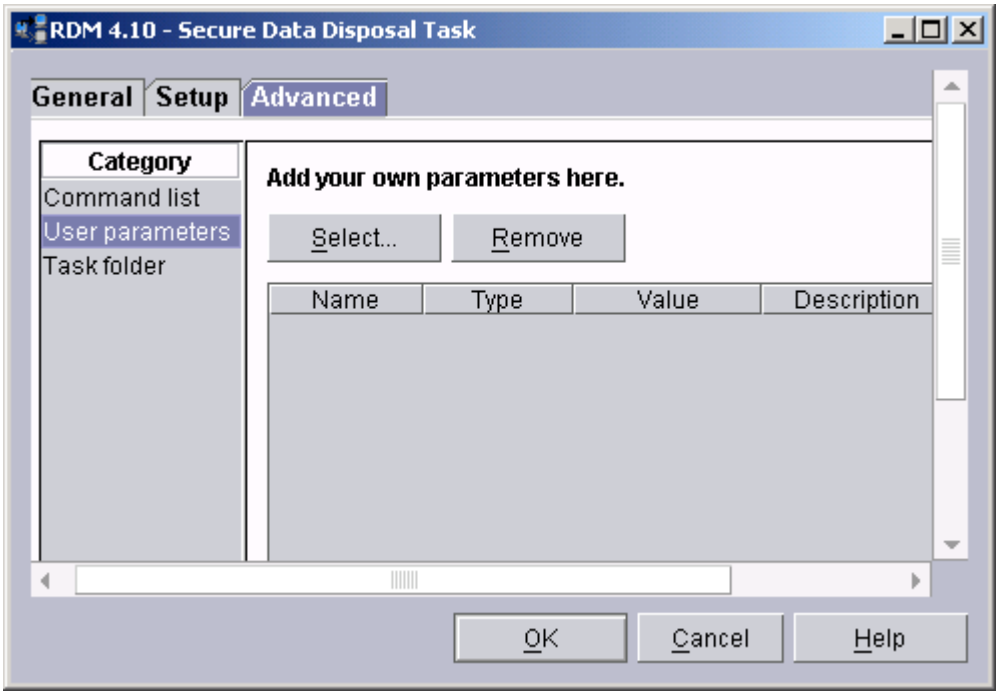
The command list is a list of RDM and DOS commands that perform the Secure Data Disposal task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.

Refer to Appendix A for information on commands and syntax within a command list.



User parameters

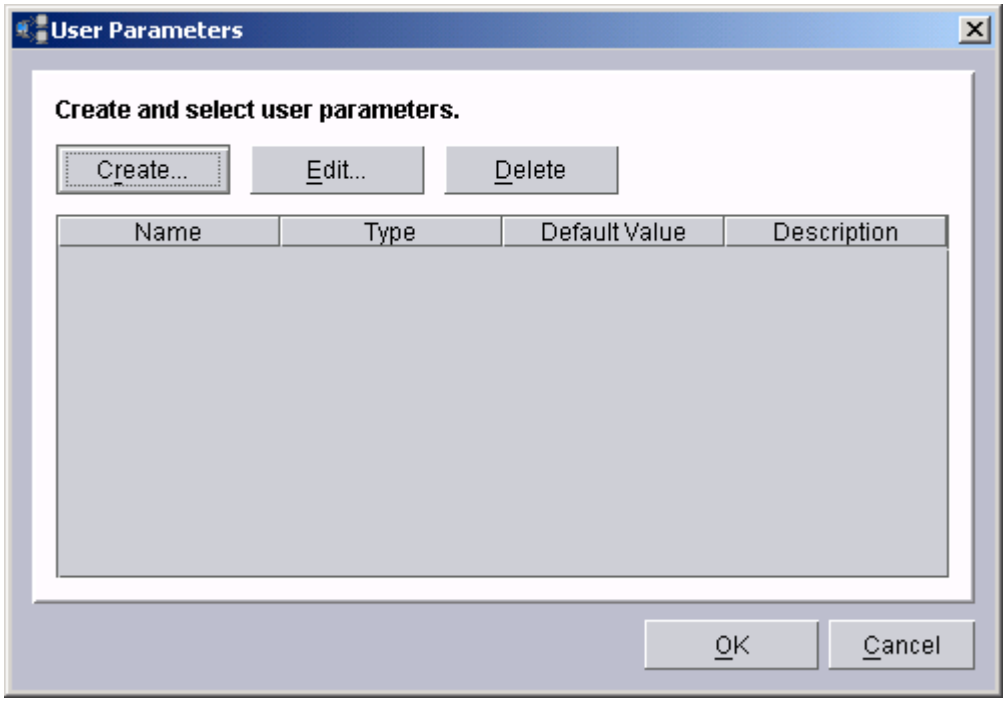
A list box displays the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box and, as a result, the task. Secure Data Disposal tasks, by default, do not use any user-defined parameters.



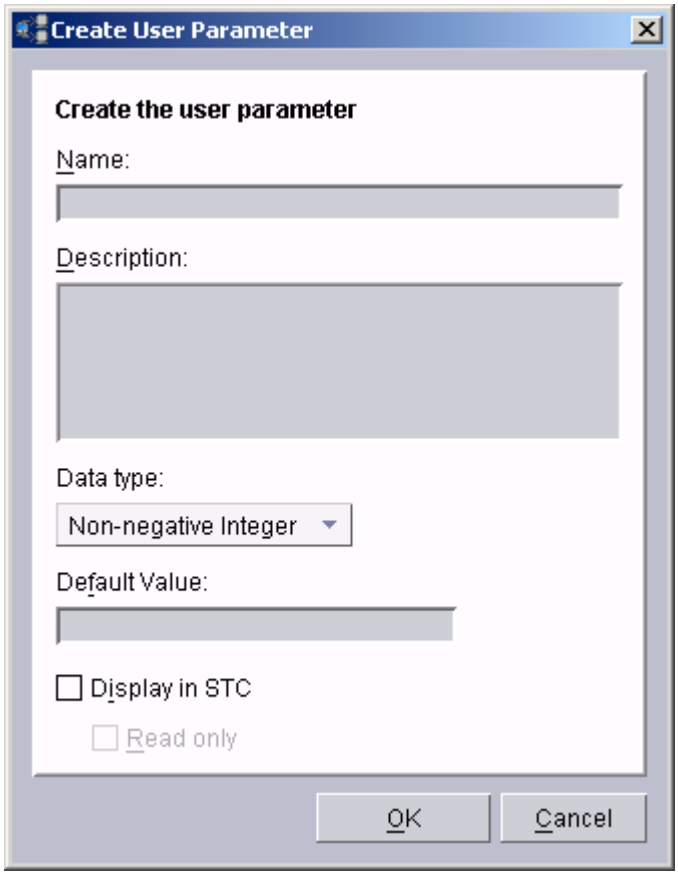
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

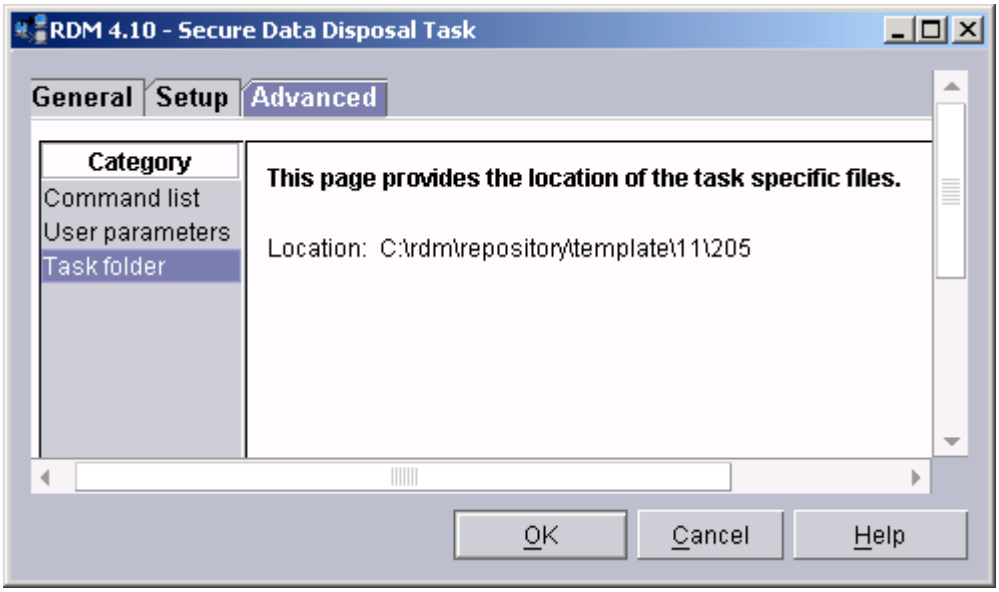


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



8. Click **OK** to create the task. The new task appears in the IBM Director Tasks pane with the Secure Data Disposal template.

System Firmware Flash

The purpose of the System Firmware Flash task is to update the system firmware (such as BIOS or embedded controller on 32-bit systems) on one or more client systems.

There are two distinct kinds of System Firmware Flash tasks in RDM:

- **Latest version** – The System Firmware Flash images used in this task are the latest versions available in the RDM Master Repository. When you install RDM, a built-in task of this type will be created. This task can also be a convenient way to test a new system firmware version before deploying it to production systems.

  There is one built-in task named **Deploy Latest BIOS** that is included with this template.

- **Specific version** – You can select specific System Firmware Flash images to be used in the task. A necessary condition is that all System Firmware Flash images selected (for a single System Firmware Flash Task) must have different Product Codes.

Right-click the RDM **System Firmware Flash** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both open similar windows, however, one results in creating a new task while the other makes changes to the task template properties. Any changes you make to the template properties will be reflected in any new tasks created from that template.

Upgrade the BIOS level

The BIOS code level of the system is part of the information collected during the scan process. Upgrade the BIOS code level if updates to the BIOS function are required or if a change to the system BIOS language is necessary.

If updates are required, IBM makes the new files available through bulletin board systems, publicly accessible servers, the World Wide Web, or similar means. BIOS code updates are distributed as self-extracting executable (.exe) files. Download the .exe file

and run it. The .exe file will prompt you with instructions for creating an update diskette. In the following procedure, this diskette is referred to as the BIOS flash diskette.

RDM uses the following BIOS naming convention:

XXYYZZz

XX = Product Code.

YY = Release Type. Supported types by RDM:

JT = System BIOS Diskette for any language (includes Japanese). The diskette label must be set to XXJTZZz.

J2 = System BIOS Diskette for Japanese systems. The diskette label must be set to XXJ2ZZz.

KT = This is the value stored in the SMBIOS table. The value in SMBIOS will be set to XXKTZZz.

ZZz = Build Level.

ZZ = Build ID. A numeric representation of the BIOS code build level. RDM treats the largest number as the most recent BIOS version.

z = Revision. RDM ignores this character.

Note: Your BIOS diskette should have the first 2 digits/characters that match the BIOS type. If there is no match (for example, a non-IBM system), you can still flash the BIOS by selecting the Ignore failure in systems qualification checkbox when deploying the task.

Updating the BIOS code level for a system is a two-step process. First, you must create a BIOS Update image from the BIOS flash diskette, and then apply this image to update the BIOS code level for specific systems.

Create the BIOS update image

Complete the following steps to create the BIOS image:

1. Write protect the BIOS flash diskette.
2. Insert the diskette into the diskette drive.
3. Select **Tasks → Remote Deployment Manager → Image Management**.
4. Select **Create**.
5. Select System Firmware Flash and click **OK**.
6. On the General page of the Image Management window, type a name and a description.
7. Click the **Setup** tab and select an image type from the drop-down list.
8. Click **Read diskette**. The diskette is read and the remaining fields (Product type, Level, Executable name, Executable parameters) are filled in automatically.

Note: If you change the level name generated from the BIOS flash diskette and download this to a system, the BIOS code level shown in the BIOS setup windows of the system will not match the Current BIOS Level field. This is because the BIOS program has the original level name embedded within the program code.

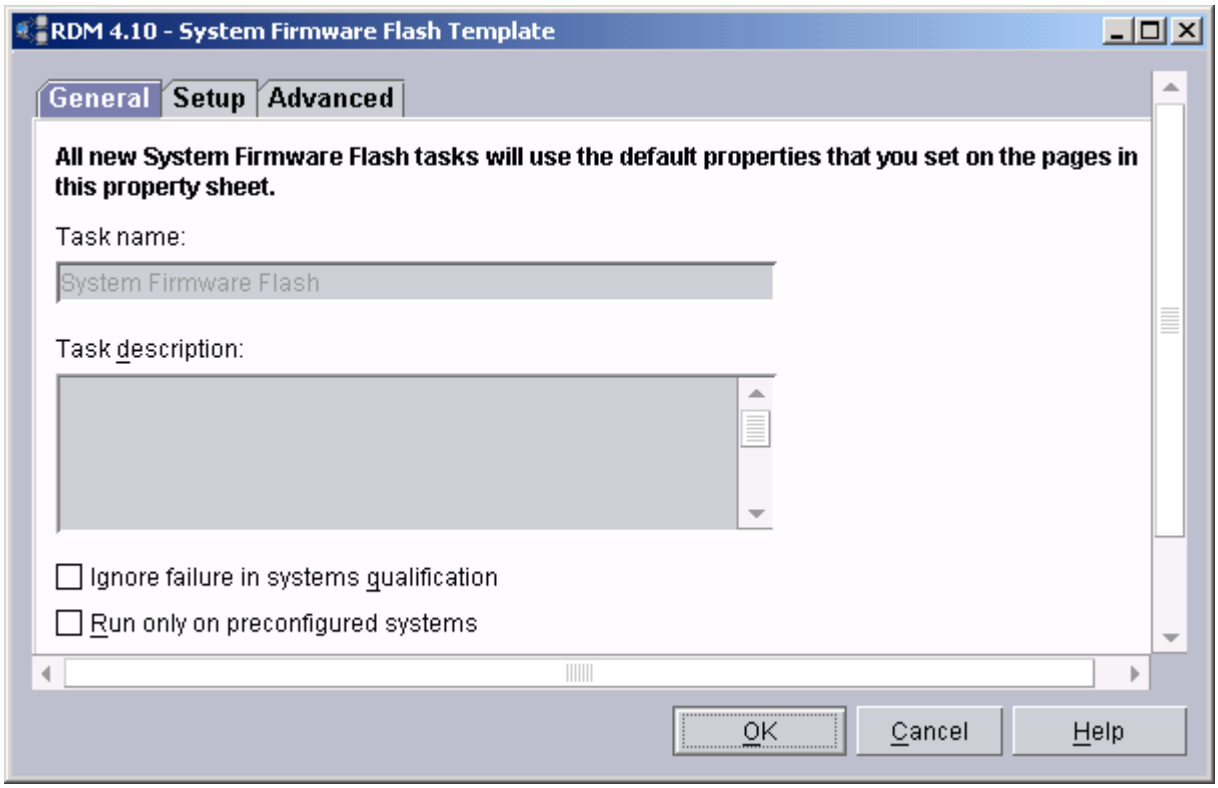
9. Click **OK.**

Create a new System Firmware Flash task

1. Right-click the System Firmware Flash template, and then select Create new task.
2. Type a task name and a task description (optional).
3. Select the applicable check boxes:

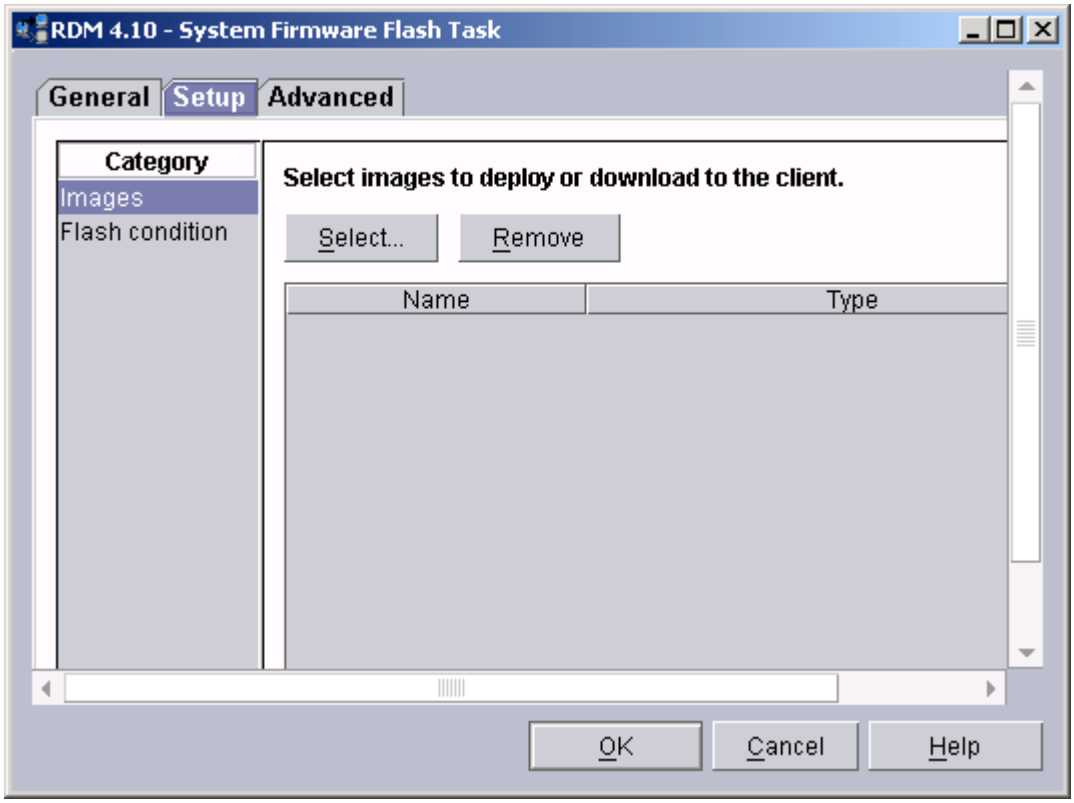
   Ignore failure in systems qualification. If the flag is checked, systems associated with this task do not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.



4. Click the **Setup** tab. Type your values for each of the following categories:

Images



The list box contains all installation images previously selected for this template.

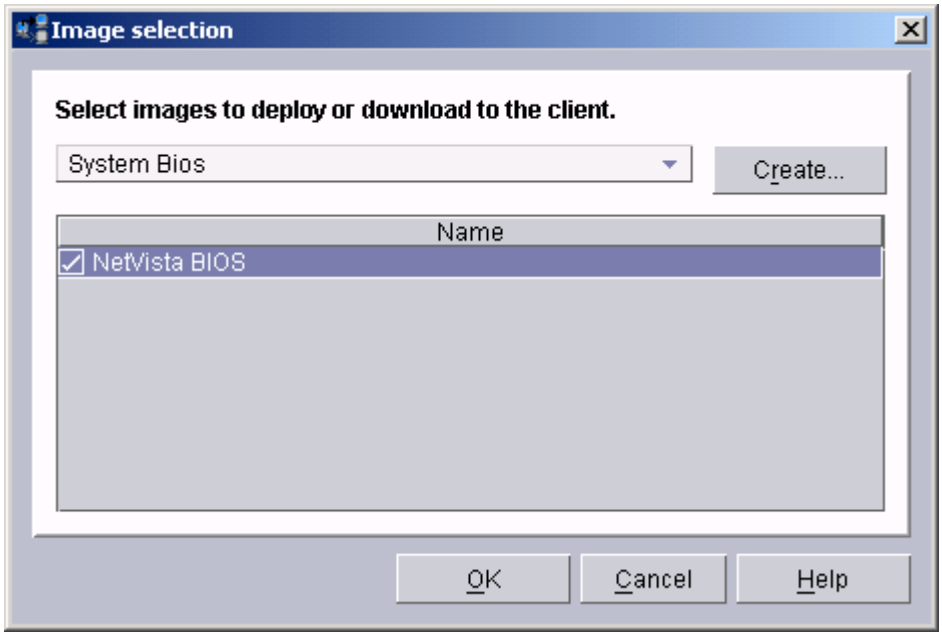
Select an image from the list box, or click **Select** to add an image (from the RDM repository) to the list in this window.

To remove an image from the list, select the image (within the list), and then select **Remove**.

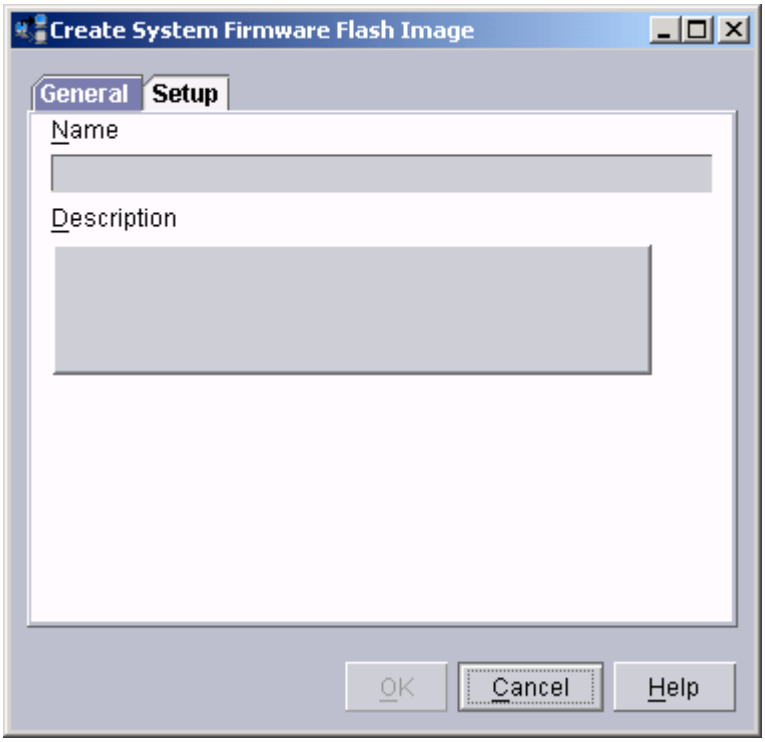
Create a new image

Complete the following steps to create a new image:

a. Click **Select** on the Setup page.

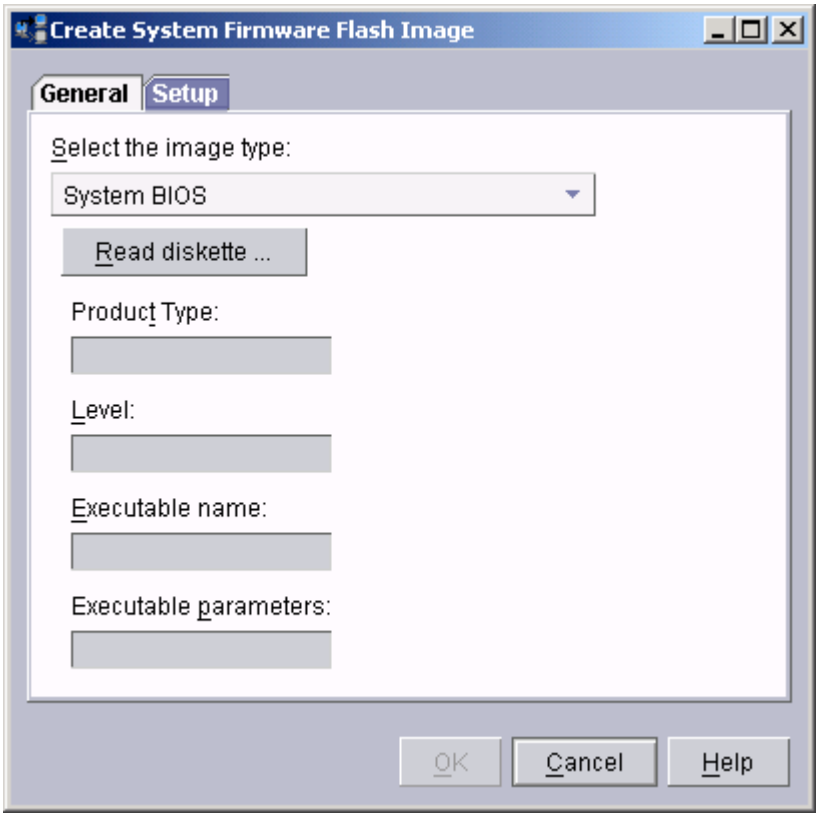


b. Click **Create**. This opens the Image Management window.



c. On the General page, type a name and description for the new image to be created.

d. Click the **Setup** tab and select the image type.

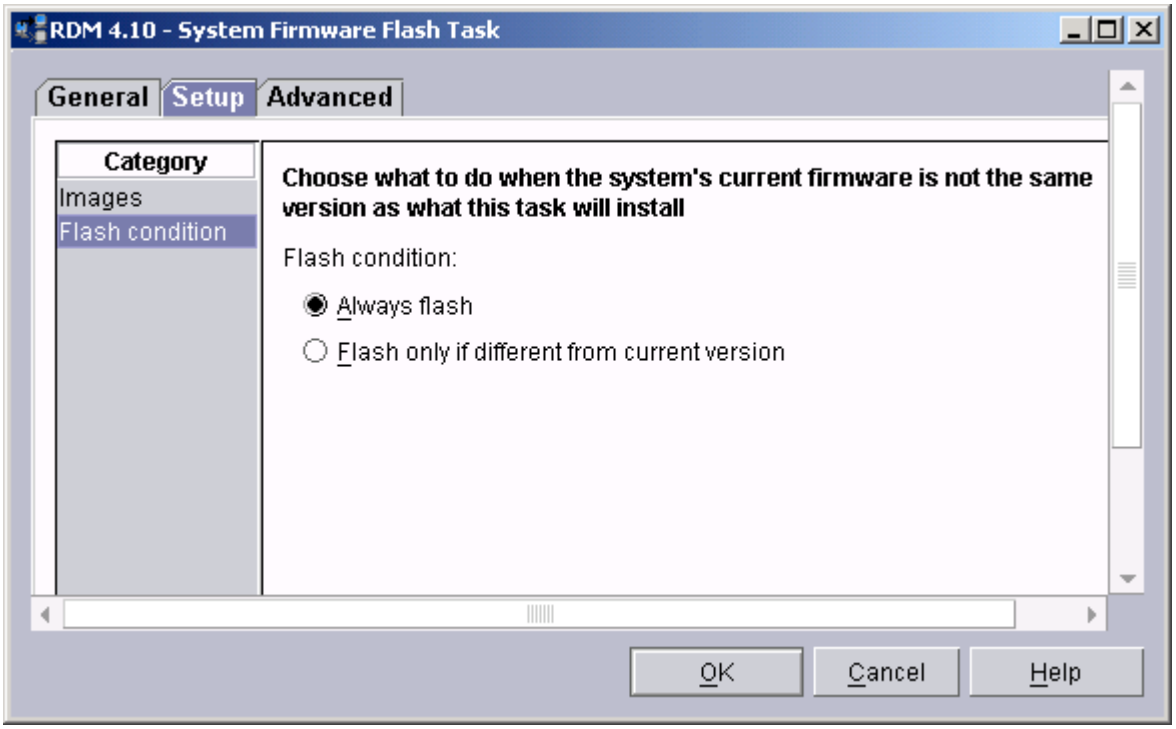


e. Insert your BIOS diskette into the system diskette drive and click **Read diskette**.

   At that point, the program reads the volume label of the diskette. All IBM BIOS diskettes have a volume label (7 to 8 characters) that indicates the type of systems for the BIOS, the level of BIOS, and the NLS type of the BIOS. With this information, the remaining fields of the window (Product type, Level, Executable name, and Executable parameters) are filled in automatically.

f. Click **OK** to create the firmware image.

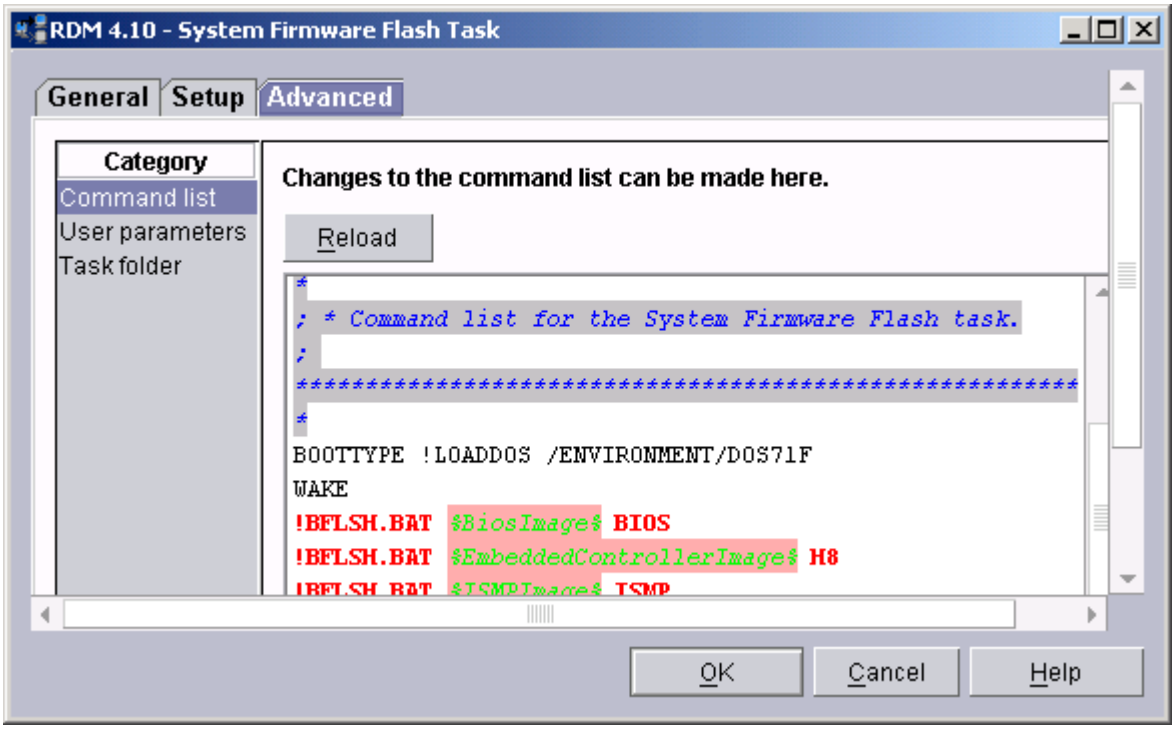
Flash condition



5. Click the Advanced tab to edit Command list changes and user parameters.
6. Type your values for each of the following categories:

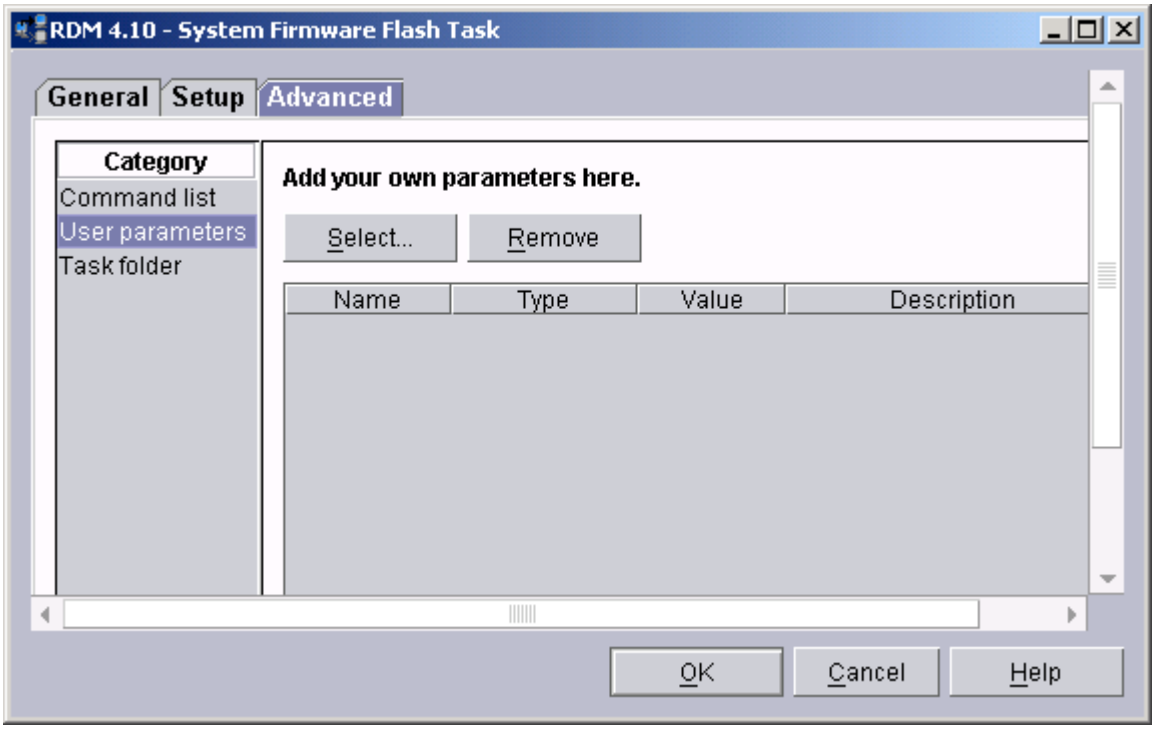
Command list

The command list is a list of RDM and DOS commands used to perform the System Firmware Flash task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.



User parameters

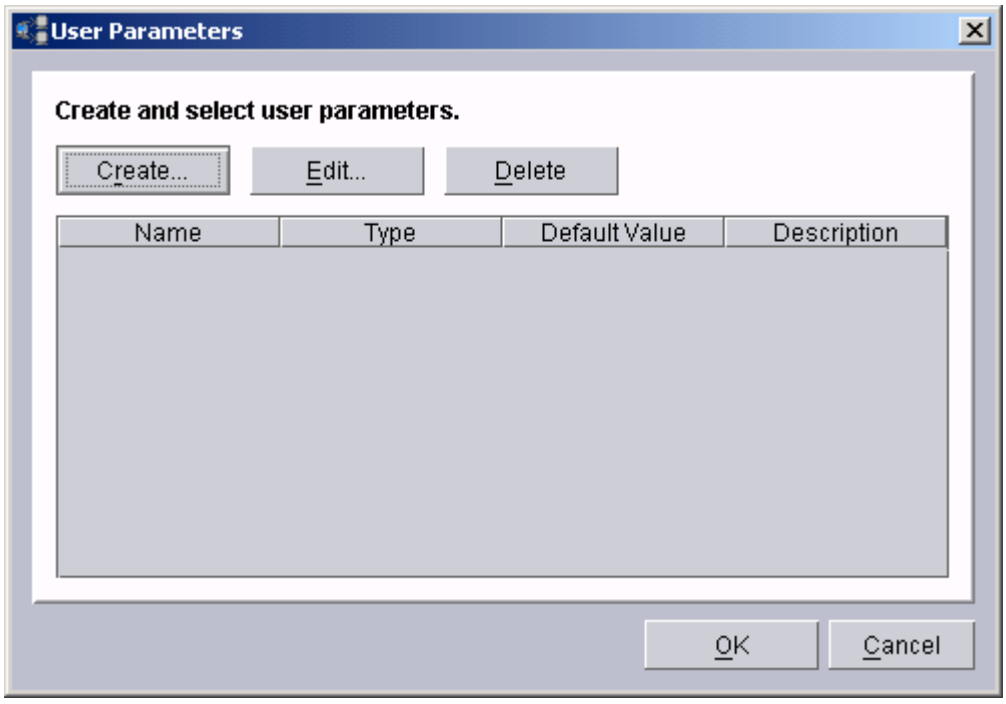
Displays a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. System Firmware Flash tasks, by default, do not use any user-defined parameters.



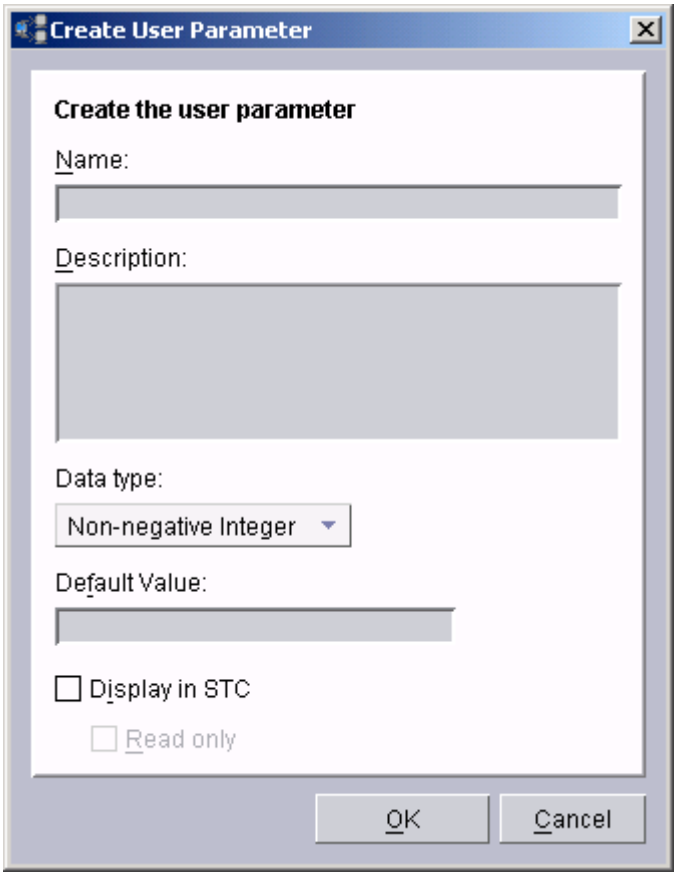
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

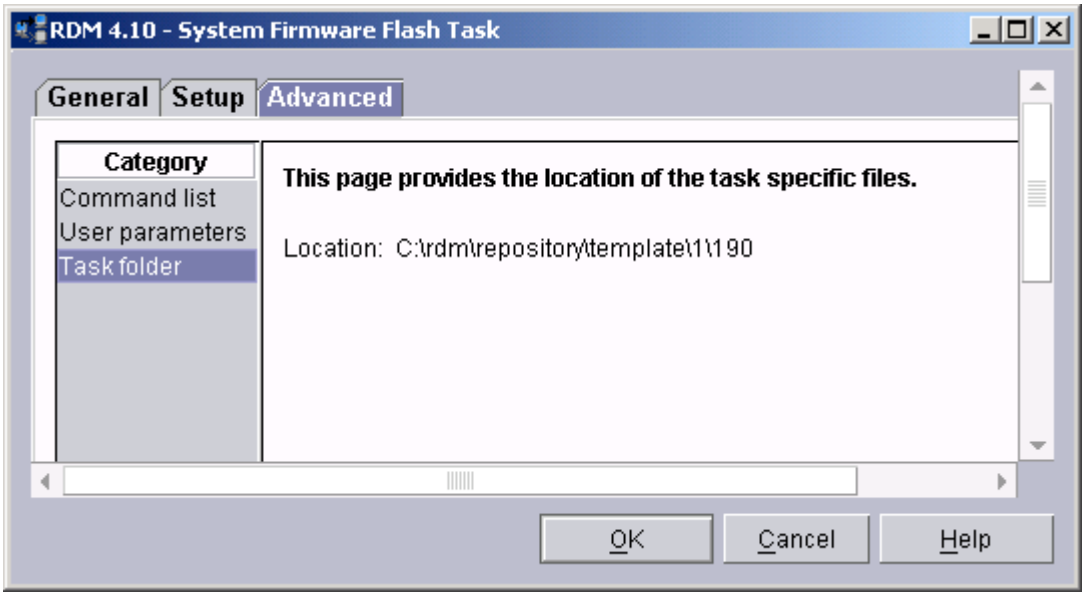


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



7. Click **OK** to create the task after you have entered all the information for the categories.

The new task will appear as a subtask to the **System Firmware Flash** template in the IBM Director Tasks pane. Right-click the new task to edit or copy the task.

Windows Clone Install

The purpose of a Windows Clone Install task is to prepare unattended loading of one selected Windows clone image (using a PowerQuest tool) to one or more target system computers. You select one image from a list of Windows clone images that the Image Management (IM) has imported into the Master Repository. The same image can be downloaded to multiple systems. You can choose to skip System/Task Configuration (STC), to allow a Power Restore backup, as well as to provide your own customer folder to be copied to the target computer disk.

The PowerQuest software provides supports for Ethernet and Unicast protocols only. Token Ring and Multicast are not supported for this task. Multicast is supported for the rest of RDM. You can upgrade to the full-function version of the PowerQuest DeployCenter tool that does support Multicast.

The clone installation image (cloned from a donor computer) contains the software designed to meet the requirements of a specific end user, department, or group of end users that perform similar tasks. The image consists of an exact bit-by-bit copy of a donor computer. (There are also batch files in the boot environment or in the template directory to control the RDM processing.)

Right-click the RDM **Windows Clone Install** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both are similar but you use the wizard to create a new task while the property sheet is used to edit the task template. Any changes you make to the template properties will be reflected in any new tasks created from that template.

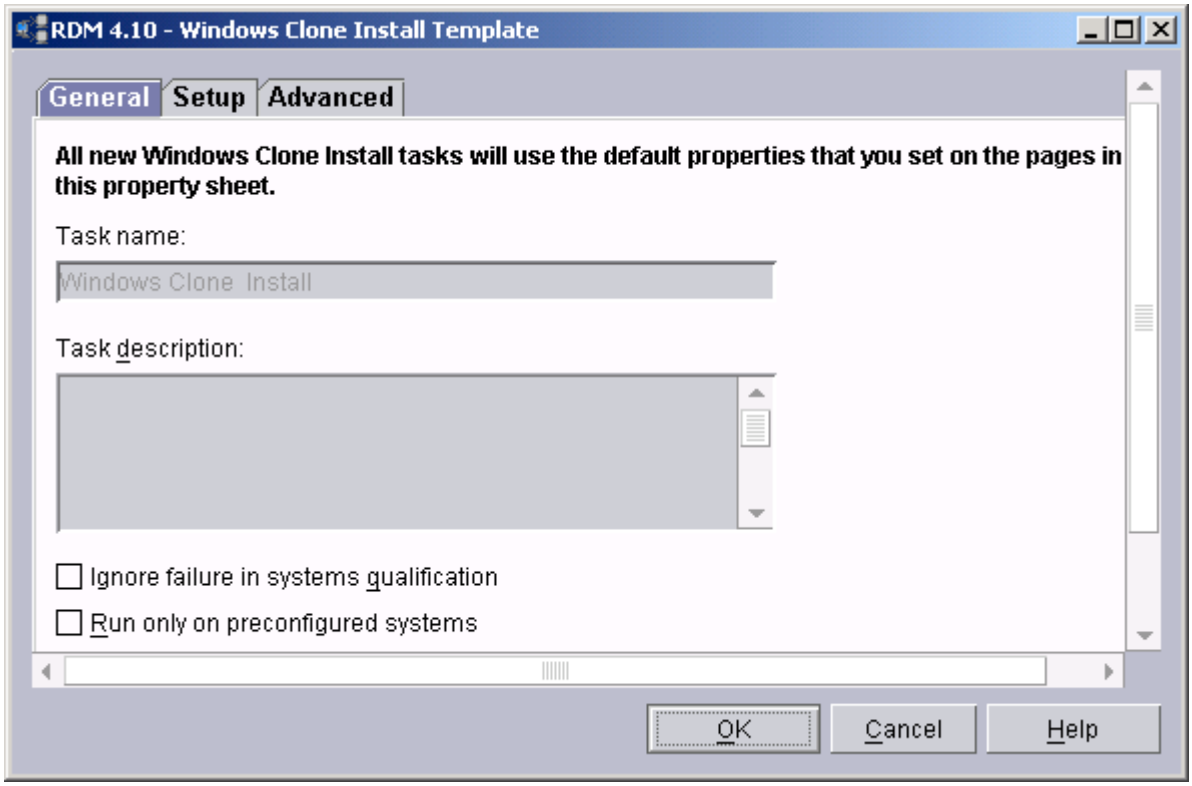
In creating a new unattended Windows Clone Install task using the wizard, you are guided through a series of panels in a predefined order, filling in answers or changing the default answers on all the questions asked. Use the property sheets to make changes to the Windows Clone Install template and to create installation images (but not a new task).

Note: In order to complete a Windows Clone Install task on an image that has a Windows XP operating system, you must run sysprep and make sure to select the "run mini-setup" check box.

Edit the template property sheet

Complete the following steps to edit the Windows Clone Install template:

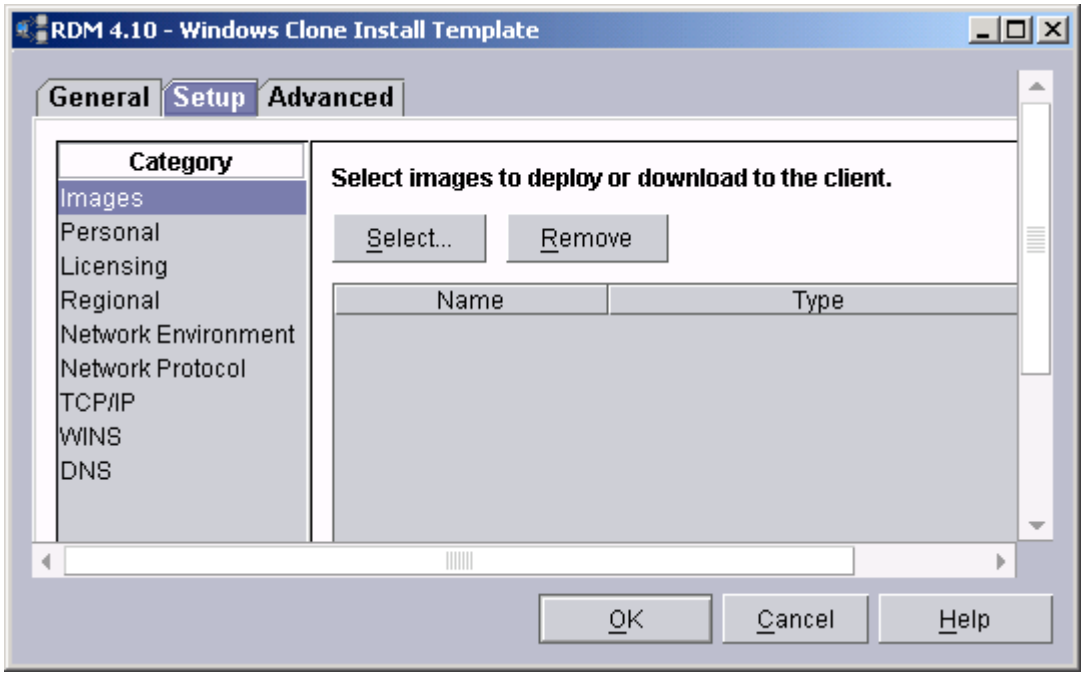
1. Right-click the **Windows Clone Install** template, and then select **Edit template** to open the Windows Clone Install template, or *property sheet*. The property sheet contains 3 tabs: General, Setup, and Advanced.



2. Type a description (optional). The task name is not available because you cannot change the name of the template.
3. Select the applicable check boxes:

   Ignore failure in systems qualification. If the flag is checked, systems associated with this task will not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.
4. Click the **Setup** tab. The Setup page has a list of categories in the left pane from which you choose and set their properties in the right pane.



5. Type your values for each of the following categories:

   Images Category

   The list box contains all installation images previously selected for this template.

   Select an image from the list box, or click **Select** to add an image (from the RDM repository) to the list in this window. Initially, the list box (shown previously) is empty. As you select images, an accumulative list is displayed.

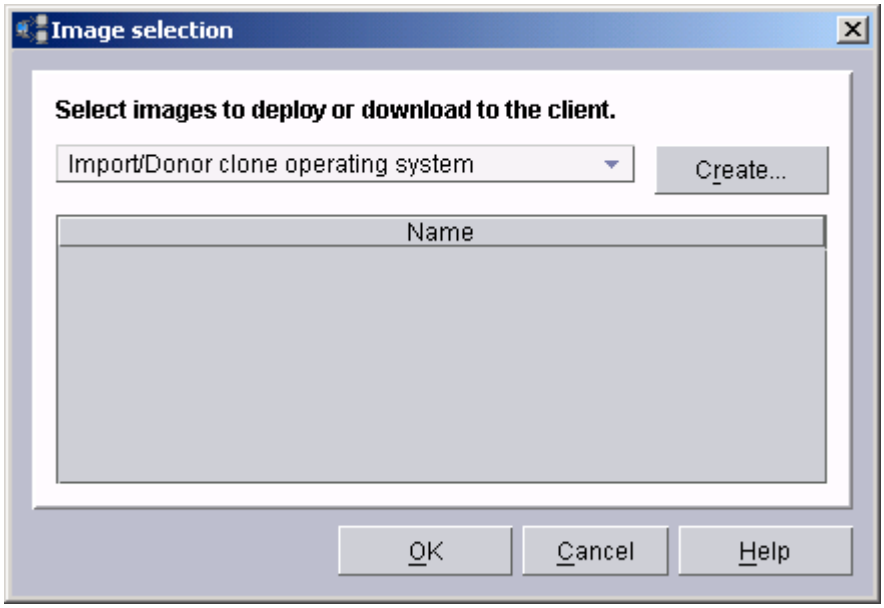
   To remove an image from the list, select the image (within the list), and then click **Remove**.

   Create a new image

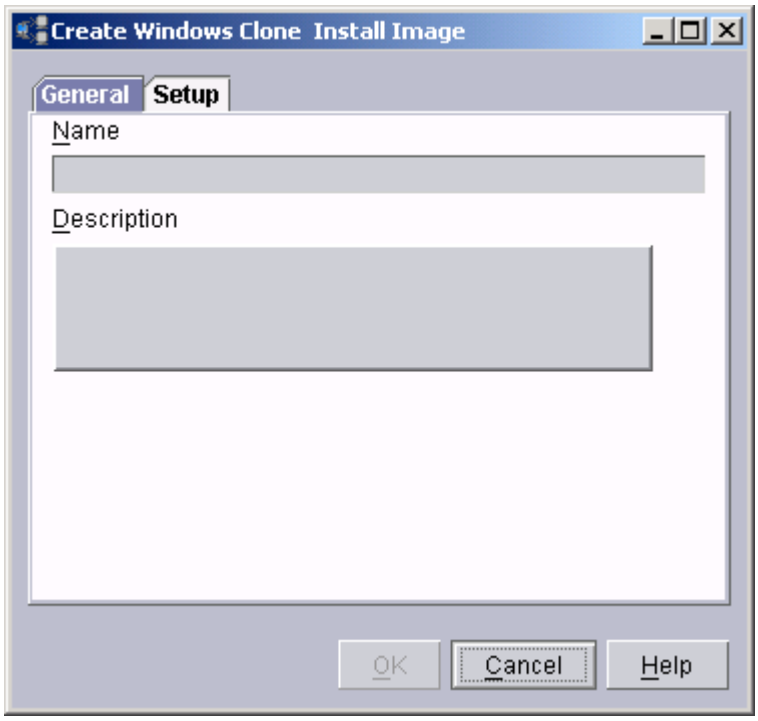
   Complete the following steps to create a new image:

   a. From the Setup page of the Windows Clone Install template, click **Select**. This opens the Image Selection window.

.

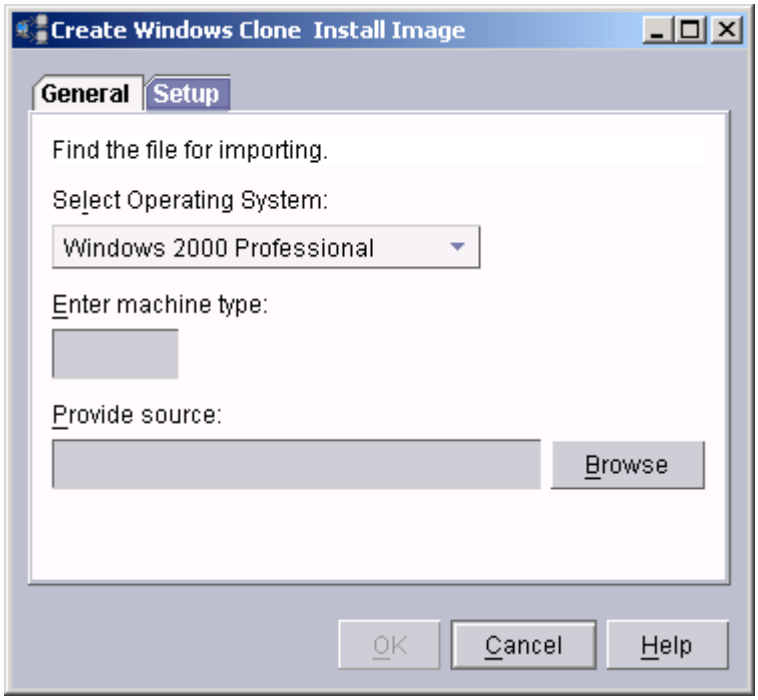


b. Click **Create**.



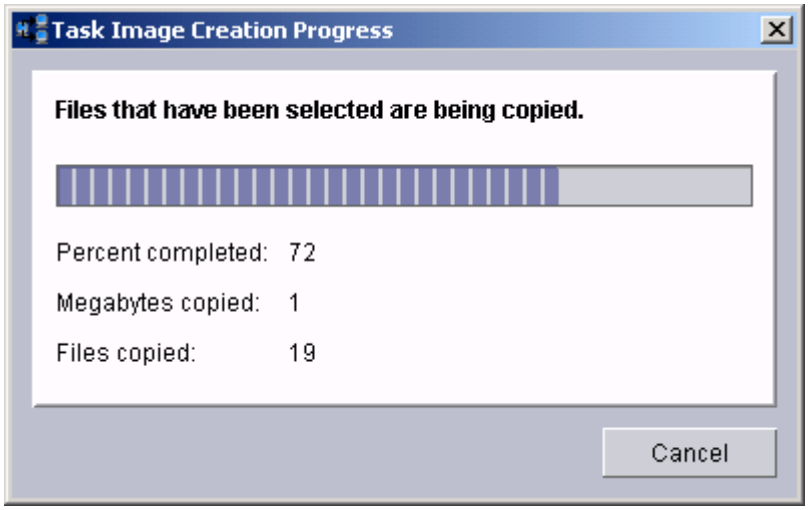
c. On the General page, type a name and description for the new image to be imported.

d. Click the **Setup** tab and select the operating system, type the product type (the 4 digit model number of the system the clone image was obtained from), and specify or browse to the source of the file to be imported.

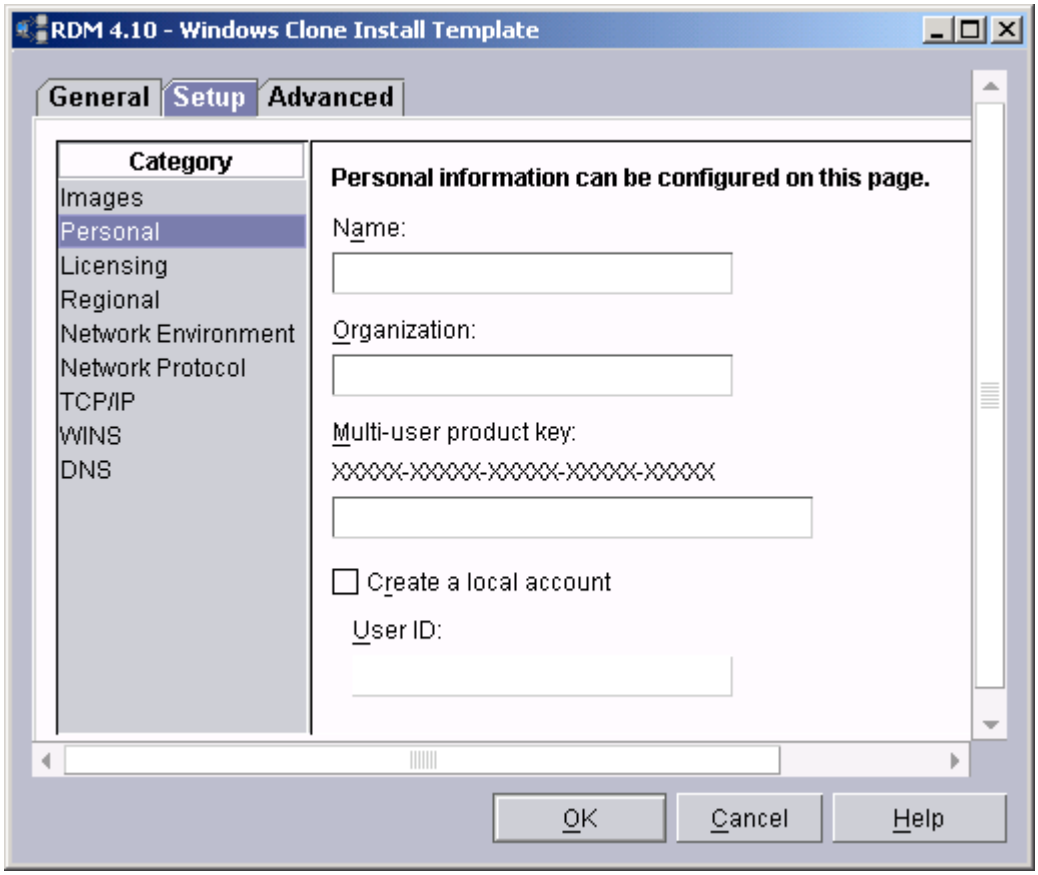


e. Click **OK**.

A progress bar is displayed during the file transfer to IBM Director Server, if needed, and during image creation.



Personal Category



Name
The name of the registered user of the system, for example, *John Doe*.

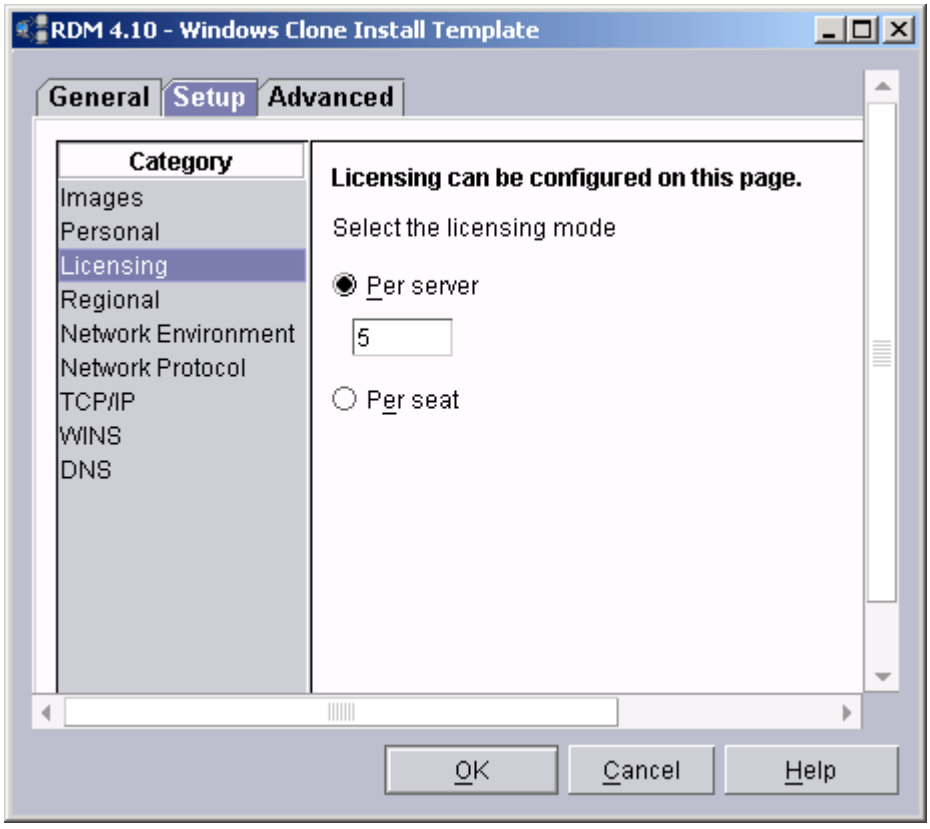
Organization
The company name for the system being deployed, for example, *IBM Corporation*.

Multi-user product key
This is the Certificate of Authorization for the Windows operating system being deployed. The CD Key format has a length of 29 characters, formatted in five 5-character alphanumeric tokens separated by hyphens.

Create a local account
Select this check box if you want to create a local user on the system being deployed.

User ID
The name of the local userid that is created if you select the **Create a local account** box.

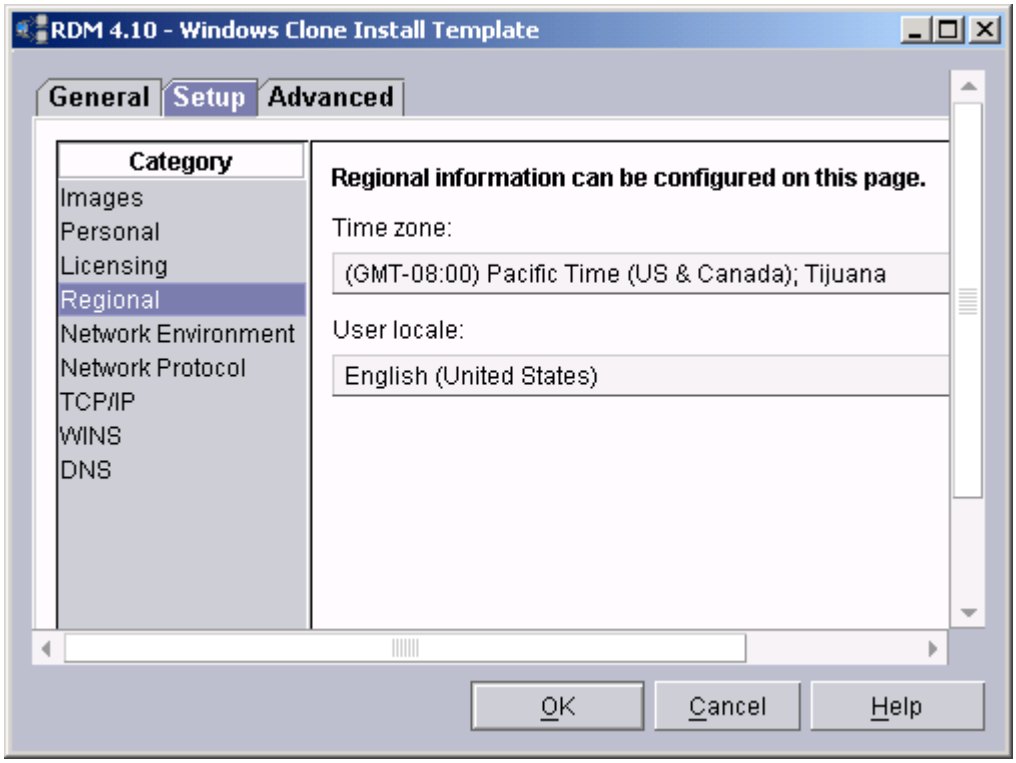
Licensing Category



Licensing modes
A choice of *Per server* or *Per seat*. If you select *Per server*, you must also type the number of system licenses you have purchased for this server.

Server licensing count
Minimum count is 5.

Regional Category



Use the Regional category to select values for time zone and locale system-level task parameters.

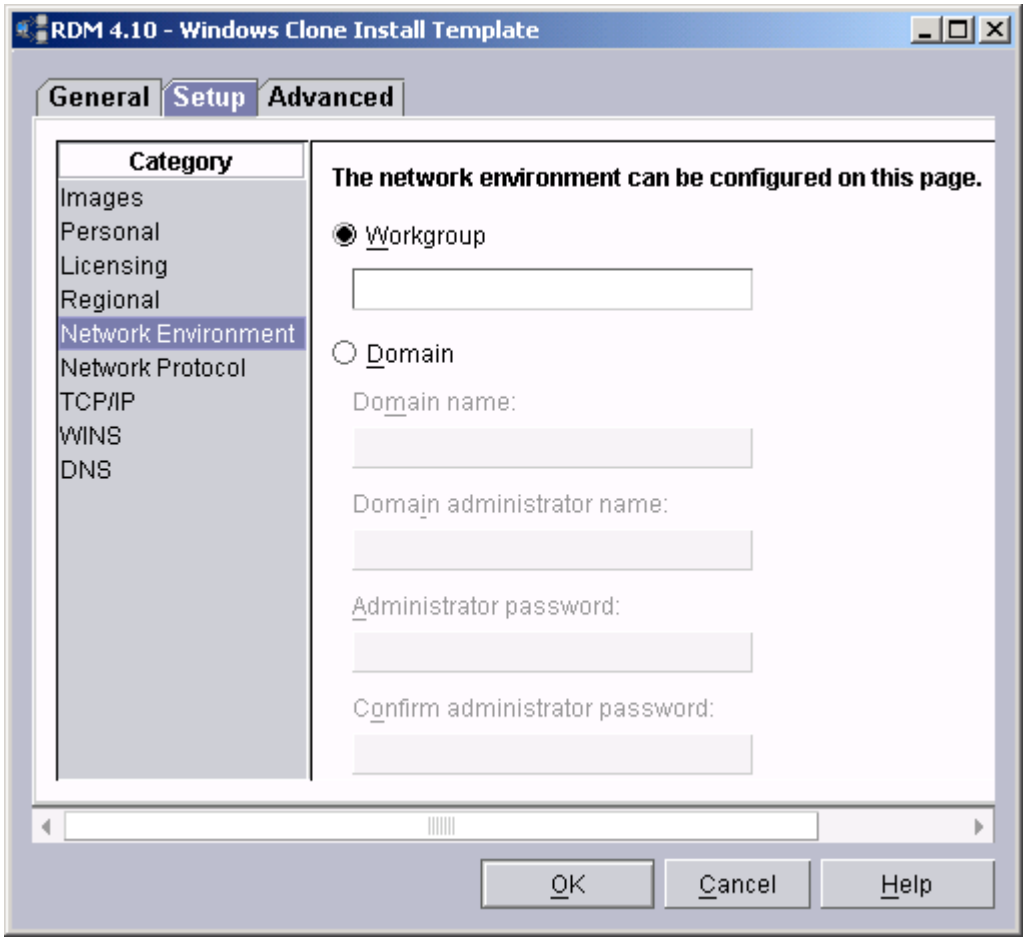
Time zone
A dropdown combo box with static entries loaded from the database or master.ini file.

System language
Select the system language from a dropdown list.

User locale
Language to display.

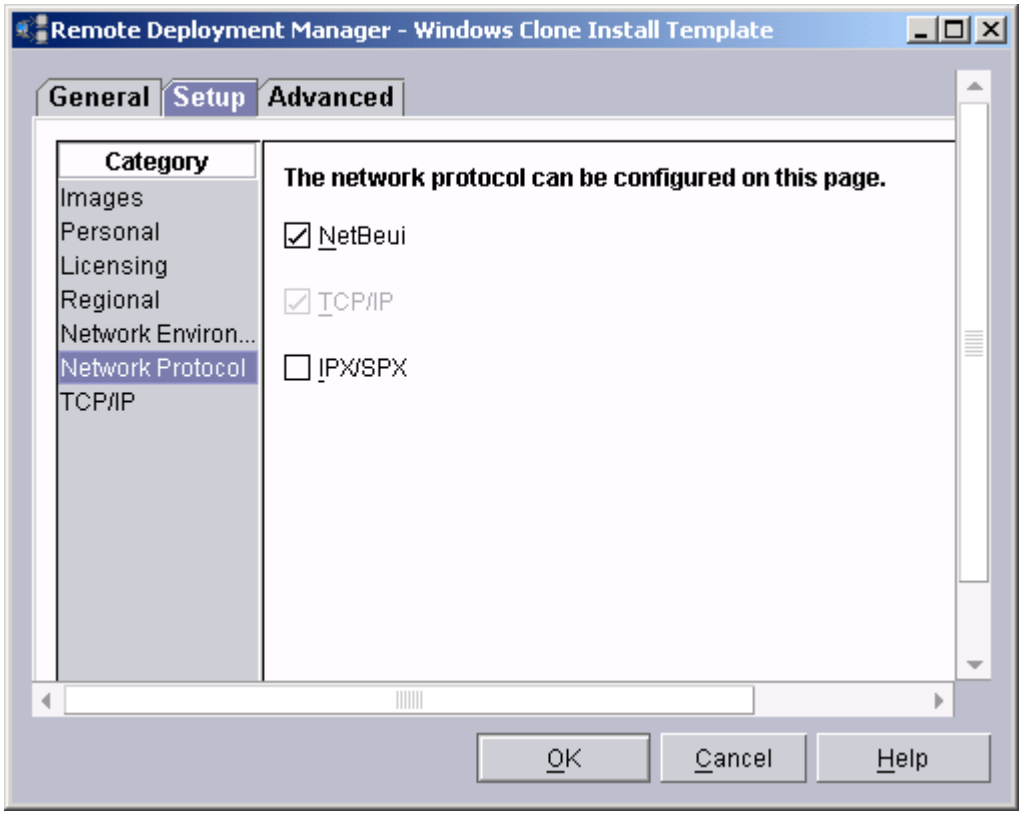
Keyboard
Select the keyboard language from a dropdown list.

Network Environment Category



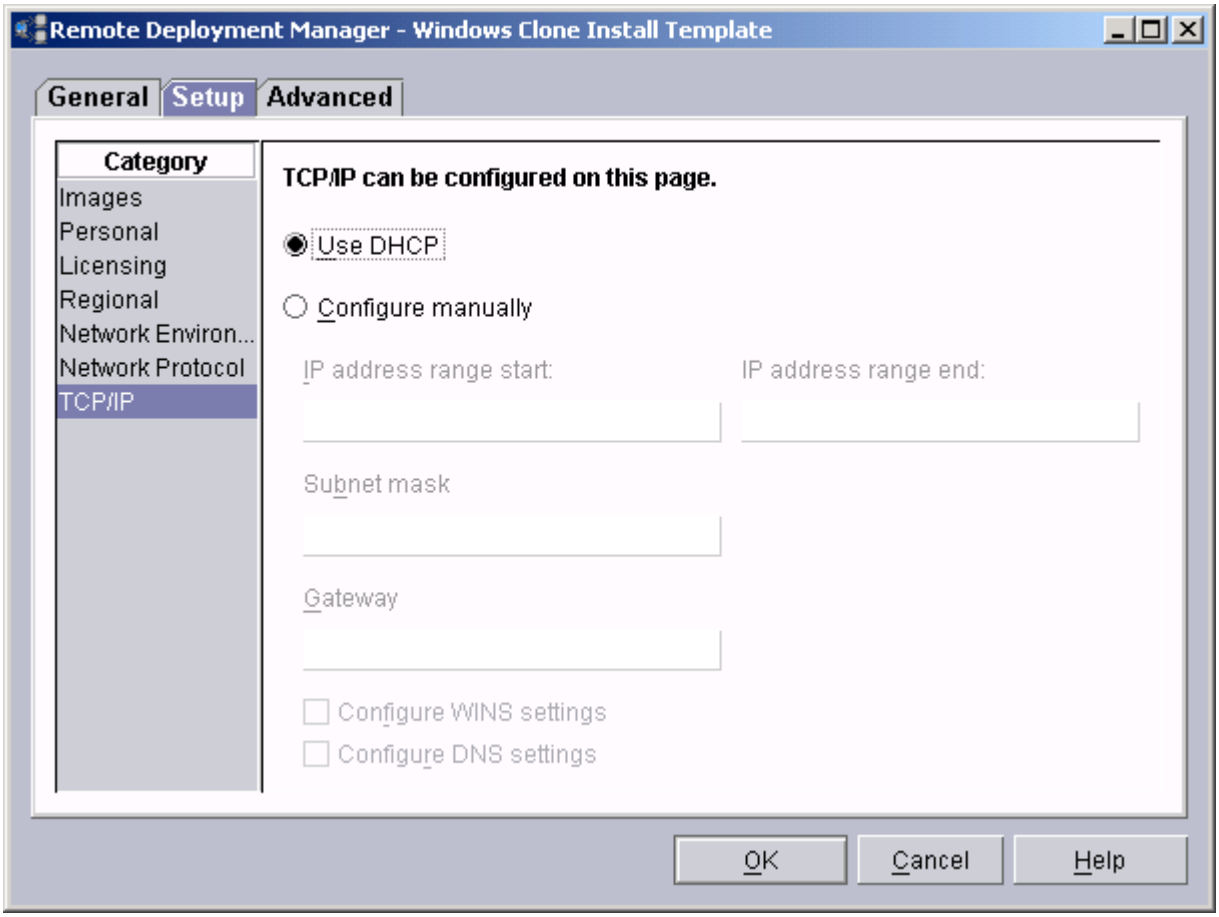
Type the name of the workgroup or domain to which your system belongs. To join a workgroup, select the **Workgroup** radio button and type the workgroup name. To join a domain, select the **Domain** radio button and type the domain name. For Windows 2000 Professional and Windows XP Professional, you must also type the Administrator name and password.

Network Protocol Category



- **NetBEUI** is a non-routable protocol for use within peer-to-peer networks.
- **TCP/IP** is a routable protocol for use across networks. The TCP/IP protocol is always checked by default.
- **IPX/SPX** provides connection services similar to TCP/IP and is used by Novell Netware operating systems.

TCP/IP Category



TCP/IP configuration

Use this window to set up the TCP/IP protocol settings to be used on the target system. Access this window from the Setup tab or in the wizard. You can specify TCP/IP settings to be assigned through DHCP or to be configured manually.

Manual configuration

You have two choices for implementing manual configuration:

1. You can leave the IP address range blank. You then manually assign an IP address to each system during System Task Configuration (STC). This option is the best choice if either of the following conditions apply:
   - You have multiple subnets. RDM does not check for unique IP addresses on multiple subnets.
   - You use multiple installation tasks of a single type, or multiple types of installation tasks (such as, Windows Clone, Windows Native and Linux Native). RDM validates unique IP addresses within a single task, not across multiple tasks. If there is any overlap of address ranges within tasks, duplicate IP addresses are possible.
2. You can specify an IP address range. RDM then assigns an IP address to each system during system qualification. This option can be used for deploying tasks on a single subnet. An example is a classroom lab where you redeploy the same image on

all systems before every class. You could set up a classroom installation task with the reserved range of addresses for the classroom.

Field descriptions

Select either **Use DHCP** or **Configure manually**.

Note: If Use DHCP is selected, no other values are needed. A DHCP server must be present on the network. If Configure manually is selected, the other fields are enabled, and their set up notebook is available in the Category list and through the wizard.

For manual configuration, the following fields are enabled:

Starting IP address

Type the starting IP address for the range of available addresses to be assigned to target systems. RDM uses the IP address range to select a unique IP address for each target system when the system is qualified. The range of values can be obtained from your network administrator. You can leave this field blank. If you specify a Starting IP address, you must also specify an Ending IP address.

Note: If you specify a range of IP addresses, you must make sure there is no overlap of the range with any other installation task. RDM validates unique IP addresses within the individual task, not across multiple tasks.

Ending IP address

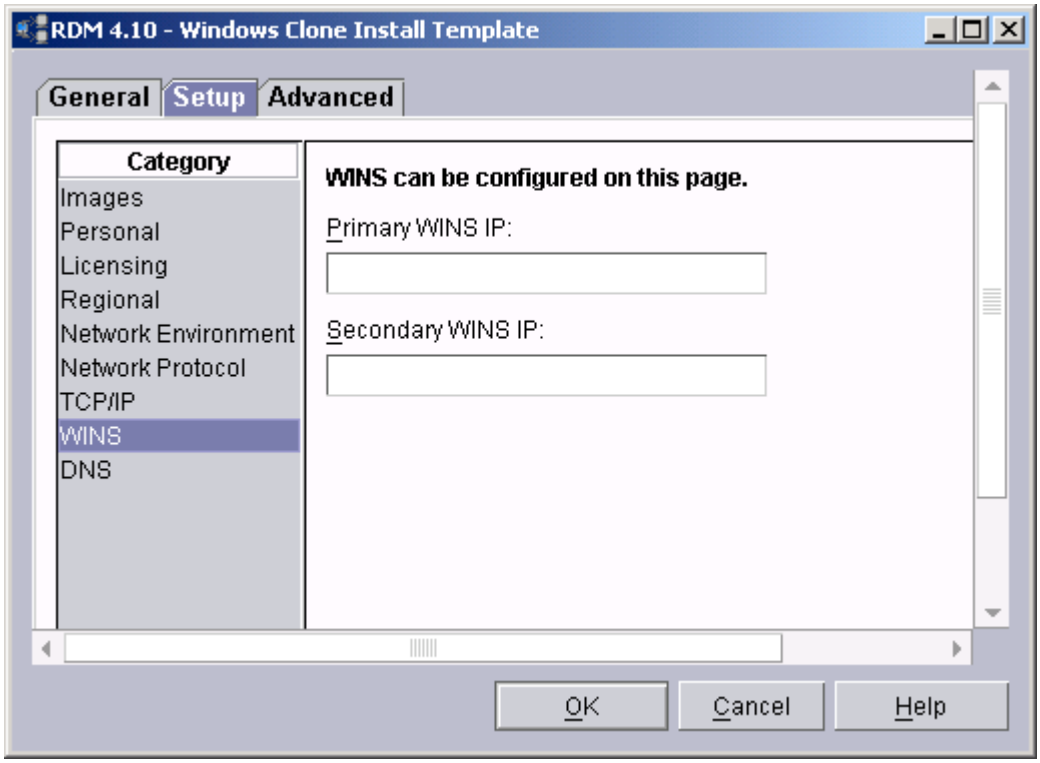
Type the ending IP address for the range of available addresses to be assigned to target systems. This parameter is required if you specify a Starting IP address.

Subnet mask
The default value is set in the template property sheet. It is a required system parameter whose value is required before an unattended installation is to begin. The value can be entered now in the task creation phase or in the System Assignment and Configuration phase.

Gateway IP
The default value is set in the template property sheet. It is an optional system parameter whose value is not required.

If you select to configure either WINS or DNS settings, WINS and DNS categories are added to the list.

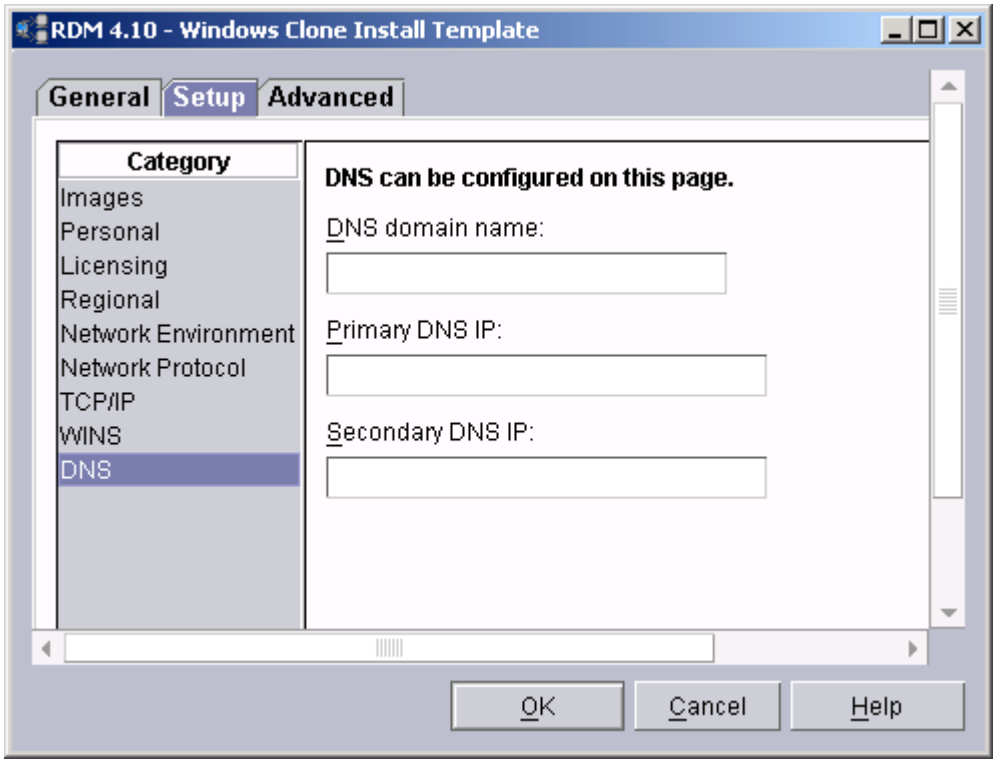
WINS Category



Primary WINS IP
The default value is set in the template property sheet. When the task is customized to configure the WINS settings, the primary WINS Server IP address becomes a required system parameter that the user must provide a value. The value can be entered in the task phase or in the System Assignment and Configuration phase.

Secondary WINS IP
The default value is set in the template property sheet. It is an optional system parameter whose value is not required.

DNS Category



DNS domain name
The default value is set in the template property sheet. When the task is customized to configure the DNS settings, the DNS domain name and the primary DNS Server IP address become required system parameters for which you must provide values. The secondary DNS Server IP address is optional. Those values can be entered in the create task phase or in the System Assignment and Configuration phase.

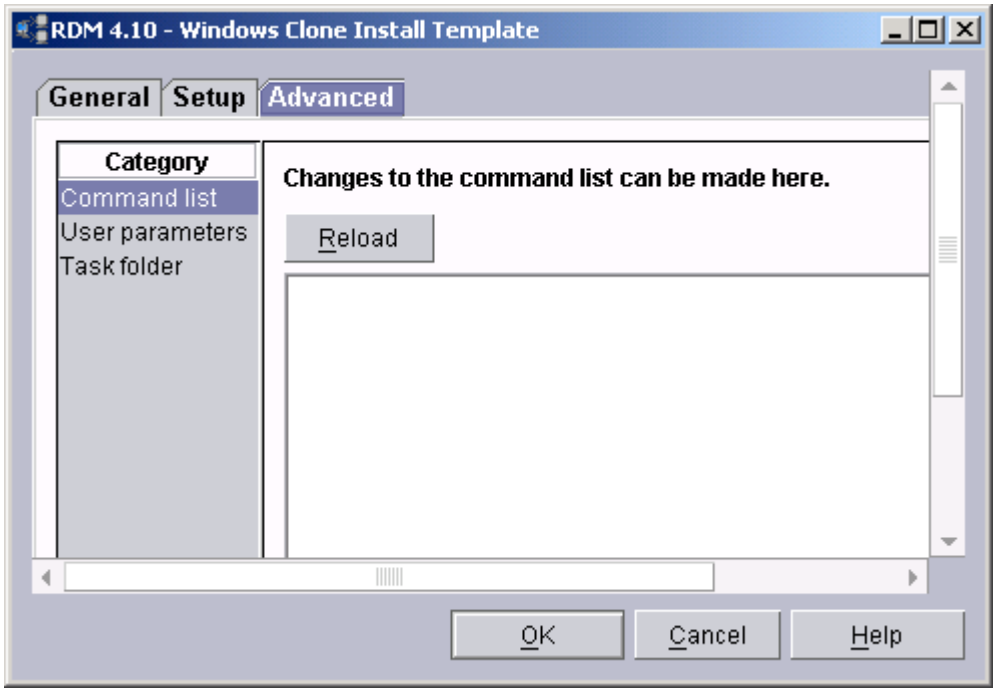
Primary DNS IP
The default value is set in the template property sheet. It is a required system parameter the user must provide a value to. The value can be entered in the create task phase or in the System Assignment and Configuration phase.

Secondary DNS IP
The default value is set in the template property sheet. It is an optional system parameter whose value is not required.

6. Click the Advanced tab to start editing Command list changes and user parameters.
7. Type your values for each of the following categories:

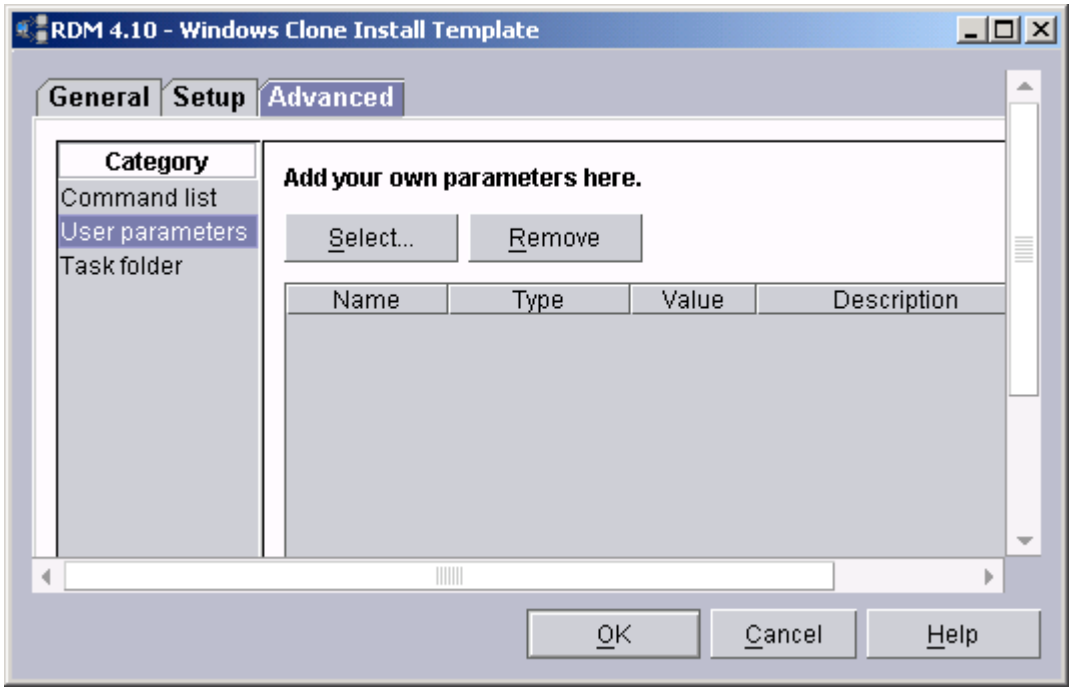
Command list

The command list is a list of RDM and DOS commands used to perform the Windows Clone Install task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.



User parameters

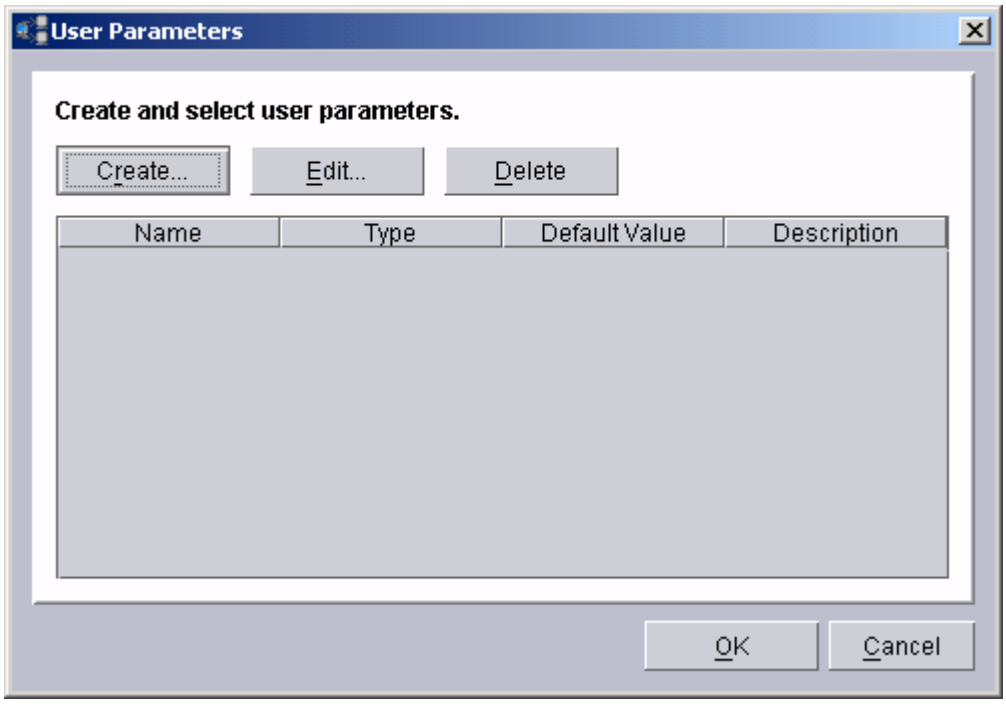
Displays a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. Windows Clone Install tasks, by default, do not use any user-defined parameters.



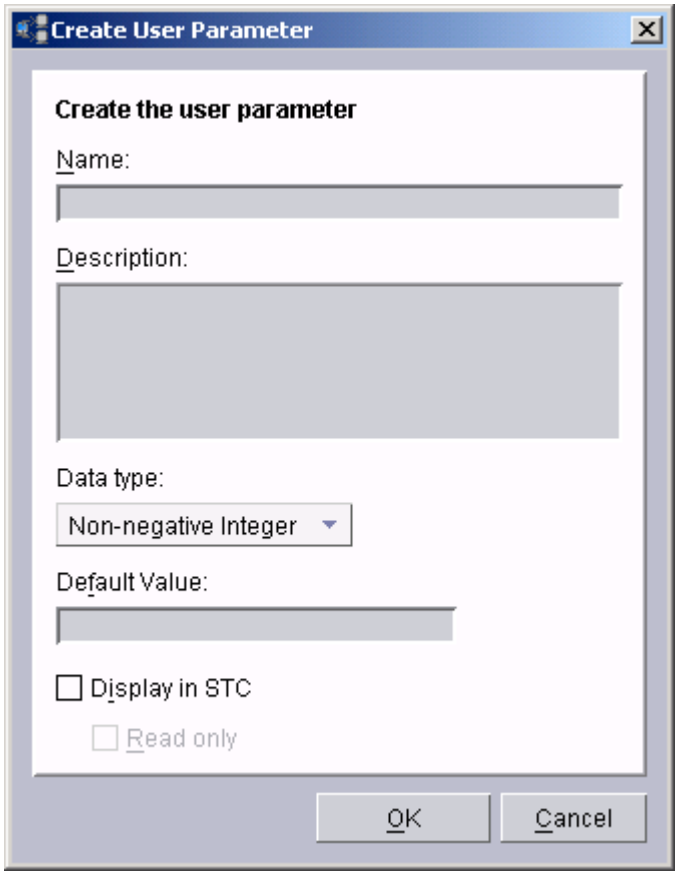
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

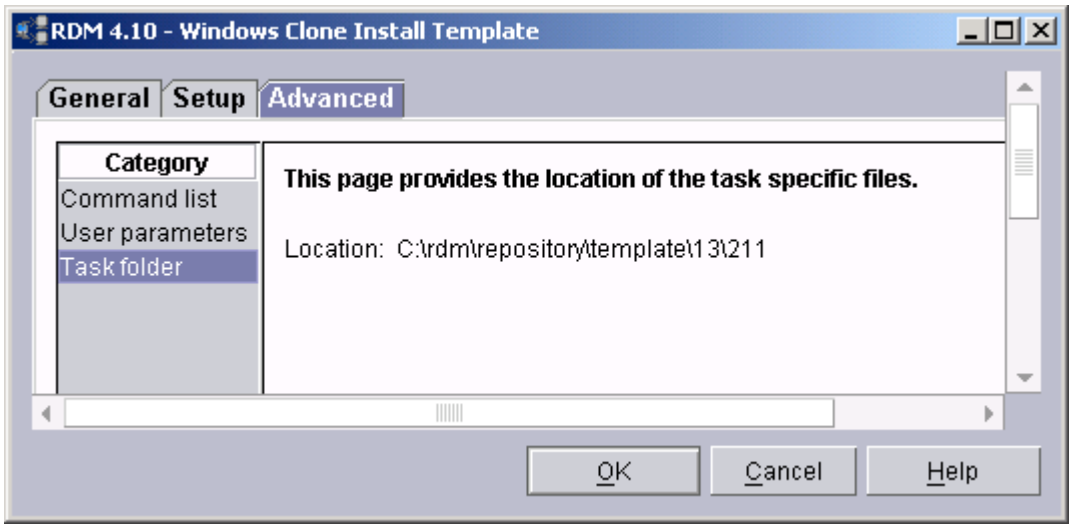


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



8. Click OK to validate the property sheet.

Using the wizard

Most of the wizard pages are very similar to the tabs in the property sheet for this task. All the crucial information on each page can be changed using the **Back** button. Pressing **Next** causes validation on the page.

The **Finish** button, seen on the last page of the wizard, finalizes the task creation. A Windows Clone Install task folder will be created in the RDM Master Repository. The name of the folder is the task number.

Modifying the Windows Clone Install answer file

When you clone a system that has a Windows administrator password on the image, RDM assumes you have a blank administrator password for any image used by the Windows Clone Install task; however, this is not always the case. If an administrator password exists, you must modify the answer file associated with the Windows Clone Install task using that image.

To modify the Windows Clone Install answer file, complete the following steps:

1. Create a Windows Clone Install task with the template wizard.
2. Edit the Answer File in the appropriate Task Folder. Determine the Task Folder by completing these steps:
    a. Right-click the newly created Windows Clone Install task.
    b. Click the **Edit** task.
    c. Click the **Advanced** tab.
    d. Click **Task Folder** in the Category pane, where a directory location is specified.
3. Navigate to the specified directory and open the file, Answer2.txt.
4. Find the [GUIUnattended] section of the Answer2.txt file.
5. Edit the AdminPassword=* key to equal your password, for example:

```
AdminPassword="myPassword"
```

6. Exit the folder and run the newly-created Windows Clone Install task from the RDM Console.

IBM Director Agent 4.1 and cloning

When installing IBM Director Agent 4.1 on Windows 2000 or Windows XP, certain files and settings are saved by IBM Director Agent to uniquely identify the system. If not handled properly, a donor image that includes the IBM Director Agent may incorrectly cause an IBM Director Server to identify all the target systems as the same computer. This section describes a procedure that may be used to ensure that when a donor image with IBM Director Agent 4.1 is deployed to multiple target systems, each system will be uniquely identifiable by the IBM Director Server.

Donor system preparation

A donor system which includes IBM Director Agent 4.1 is prepared the same way as other donor systems with one important caveat: If the IBM Director Agent includes web-based access, the IBM Director Agent browser should be executed once to ensure that it is initialized and working properly. To do this, select **IBM Director Agent browser** from the IBM Director folder in the Applications section of the Start menu. You may find that to successfully initialize the browser that you will need to install additional files. Once you are able to log in to the browser, your IBM Director Agent installation should be ready.

Before continuing with donor preparation, note in which directory the IBM Director Agent has been installed. By default, this directory will be:

C:\Program Files\IBM\Director

If you have included the web-based access for IBM Director Agent, go to the IBM Director Agent installation folder, then enter the websrv folder, and then the conf folder. Copy the httpd.conf file to a floppy diskette or network drive in order to get it to a folder on the RDM Server machine. If the IBM Director Agent has been installed in the default directory, the full path of that file will be:

C:\Program Files\IBM\Director\websrv\conf\httpd.conf

This file will be modified in order to facilitate making the web-based access unique for each target machine.

Close the IBM Director Agent browser, and then complete the steps needed to prepare the donor, such as installing other applications and running Microsoft SysPrep.

RDM task modifications

Once you have captured the donor image and created the RDM Clone Install task, you can then make the necessary modifications to ensure that IBM Director Agent will be unique on each target system. First, identify the folder in which your task data is located.

Identifying the task folder

1. Right-click on the task and choose **Edit Task…**.
2. In the Task Notebook, choose the **Advanced** tab.
3. In the left-hand pane, select **Task folder**. The task folder location is shown in the main panel.
4. You can close the Task Notebook by selecting **Cancel** or **OK**.

Now that you have located the task folder, open that folder in Windows Explorer. We will be adding files to that directory and modifying the Command List.

DA-FIX.BAT

This file will be executed in the Windows environment after the clone image has been deployed to the target system. Create a file named **da-fix.bat** and include the following content:

```
del "c:\program files\ibm\director\data\twgmach.id" /F
del "c:\program files\ibm\director\data\netdrvr.ini" /F

"c:\program files\ibm\director\bin\twgipccf" /r:c:\diragent.rsp

REM This line only needed if web-based access is included

move /Y "c:\httpd.con" "c:\program
files\ibm\director\websrv\conf\httpd.conf"

regedit /s c:\DirRest.reg
```

Note that one of the lines will not be needed if web-based access was not included in the IBM Director Agent installation.

DIRAGENT.RSP

This file is used in the da-fix.bat script to configure the IBM Director Agent. Create a file named **diragent.rsp** and include the following content:

```
[Agent]=Y
Driver.TCPIP=1
WakeOnLan=1
ReqUserAuthToScreen=0
DisableScreenSaver=0
DisableWallpaper=0
;AddKnownServerAddress=TCPIP::xx.xx.xx.xx
ShutdownDoesPoweroff=0
```

Optionally, if the comment is removed before the `AddKnownServerAddress` statement (that is, delete the semicolon), the IP Address of the Director Server is substituted for **xx.xx.xx.xx**, and if the Discovery Preference of the Director Server has been specified as "Automatically Add Unknown Systems That Contact The Server", the new system will automatically be "discovered" and inventoried.

DIRAGT.BAT

This file will be executed in the DOS environment after the clone image has been deployed to the target system. Create a file named **diragt.bat** and include the following content:

```
mtftp get %SERVER_IP% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\da-fix.bat a:\da-fix.bat
PQAccD /copy a:\da-fix.bat 1:\da-fix.bat
mtftp get %SERVER_IP% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\diragent.rsp a:\diragent.rsp
PQAccD /copy a:\diragent.rsp 1:\diragent.rsp
mtftp get %SERVER_IP% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\dirrest.reg a:\dirrest.reg
PQAccD /copy a:\dirrest.reg 1:\dirrest.reg

del A:\custimg\pqagent.bat
mtftp get %SERVER_IP% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\pqagent.bat A:\custimg\pqagent.bat
del A:\custimg\pqagent.reg
mtftp get %SERVER_IP% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\pqagent.reg A:\custimg\pqagent.reg

REM These next 4 lines needed if web-based access is included in Director Agent
mtftp get %SERVER_IP% environment\dos\lccustom.exe A:\lccustom.exe
mtftp get %SERVER_IP% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\httpd.con a:\httpd.con
lccustom a:\httpd.con
PQAccD /copy a:\httpd.con 1:\httpd.con
```

Note that there are 4 lines which should not be included if the Director Agent installation did not include web-based access.

DIRREST.REG

At the end of the GUI setup, the IBM Director Agent services are temporarily set to Manual so additional changes can be made. Create a file named **direst.reg** and include the following content:

```
Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\TWGIPC]
"Start"=dword:00000002

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\DirWbs]
"Start"=dword:00000002
```

Note that the text in *italics* is only needed if the Director Agent includes web-based access.

HTTPD.CONF

This file is only necessary (and available) if the IBM Director Agent was installed with web-based access on the donor system.

As stated in a previous section, this file should have been copied from donor system and placed on the RDM server. Move **httpd.conf** to the task directory on the RDM server, and rename it **httpd.con** (i.e., without the 'f'). Now open the file in a text editor and find the line with the text string "DirectorAgentServerName". Change the original system name to %COMPUTERNAME%:

```
define DirectorAgentServerName %COMPUTERNAME%
```

PQAGENT.BAT

In order to include customizing of the IBM Director Agent as part of the clone task work, some of the RDM files will be copied into the task folder and modified.

Copy **pqagent.bat** from **local\env\71c\custimg** under the RDM installation directory. If you installed RDM in the default location, the full path for the file is:

C:\Program Files\IBM\RDM\local\env\71c\custimg\pqagent.bat

Add one line to the file as indicated below (in bold):

```
…
REM Setup up cleanup for next boot
regedit /s c:\pqclean.reg
call c:\da-fix.bat
REM RUN Windows RDAgent
…
```

PQAGENT.REG

Copy **pqagent.reg** from **local\env\71c\custimg** under the RDM installation directory. If you installed RDM in the default location, the full path for the file is:

C:\Program Files\IBM\RDM\local\env\71c\custimg\pqagent.reg

Make the changes as indicated below (in bold):

```
Windows Registry Editor Version 5.00

[HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\RunOnce]
"PQAgent"="c:\\pqagent.bat"

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\TWGIPC]
"Start"=dword:00000003

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\DirWbs]
"Start"=dword:00000003

[HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\ComputerName\ComputerName]

"TWGMachineID"=hex:
```

Command List

The Command List for the task can either be edited from this directory or through the Advanced tab in the Task Notebook. The following shows the complete CommandList file for the tasks, with the modifications in **bold**:

```
;This is command list for clone Full deployment task
BOOTTYPE !LOADDOS /ENVIRONMENT/DOS71C
WAKE
!!SETENV
TIMEOUT 240
!deploy\deploy.bat
!!REBOOT
!custimg\setUser.bat
!!SETENV
!mtftp get %%SERVER_IP%% template\%%TASKTEMPLATEID%%\%%TASKTOID%%\diragt.bat diragt.bat
!mtftprc
!diragt.bat
!custimg\custimg.bat
BOOTTYPE !BOOTLOCAL
!!REBOOT
!!SHUTDOWN
END
```

Summary

Here is a recap of the steps necessary for including IBM Director Agent in a Windows Clone Install task:

1. If the IBM Director Agent includes web-based access, copy the **httpd.conf** file to the RDM Server before running Microsoft SysPrep.
2. Create **da-fix.bat** in the task folder.
3. Create **diragent.rsp** in the task folder.
4. Create **diragt.bat** in the task folder.
5. Create **direst.reg** in the task folder.
6. Copy **httpd.conf** to the task folder and rename it **httpd.con**, and then modify it.
7. Copy **pqagent.bat** to the task folder and modify it.
8. Copy **pqagent.reg** to the task folder and modify it.

After these steps have been completed, the task should be able to deploy a Windows Clone image and enable the installed Director Agent to uniquely identify the target system.

Windows Native Install

The Windows Native Install task provides you with a way to gather operating system and application installation information in advance and to save the information as a Windows Native Install task instance. After systems have been assigned their individualized information, the operating system and applications installation and configuration to these systems can take place without any further user attendance. A successfully completed new task will have a folder created for it in the RDM Server with the folder name derived from the task name.

Right-click the RDM **Windows Native Install** template in the IBM Director Tasks pane to display two options: **Create new task** and **Edit template**. Both are similar but you use the wizard to create a new task while the property sheets make changes to the task template only. Any changes you make to the template properties will be reflected in any new tasks created from that template.

In creating a new unattended Windows Native Install task using the wizard, you are guided through a series of panels in a predefined order, filling in answers or changing the default answers on all the questions asked. Use the property sheets to make changes to the Windows Native Install template and to create installation images (but not a new task).

Note: WNI task configuration uses the client *system name* to be client *computer name*, if the client computer name does not exist.

If the assigned computer name is invalid, the computer name is changed using the following rules:

- Remove spaces and invalid characters from computer name. Invalid characters include:

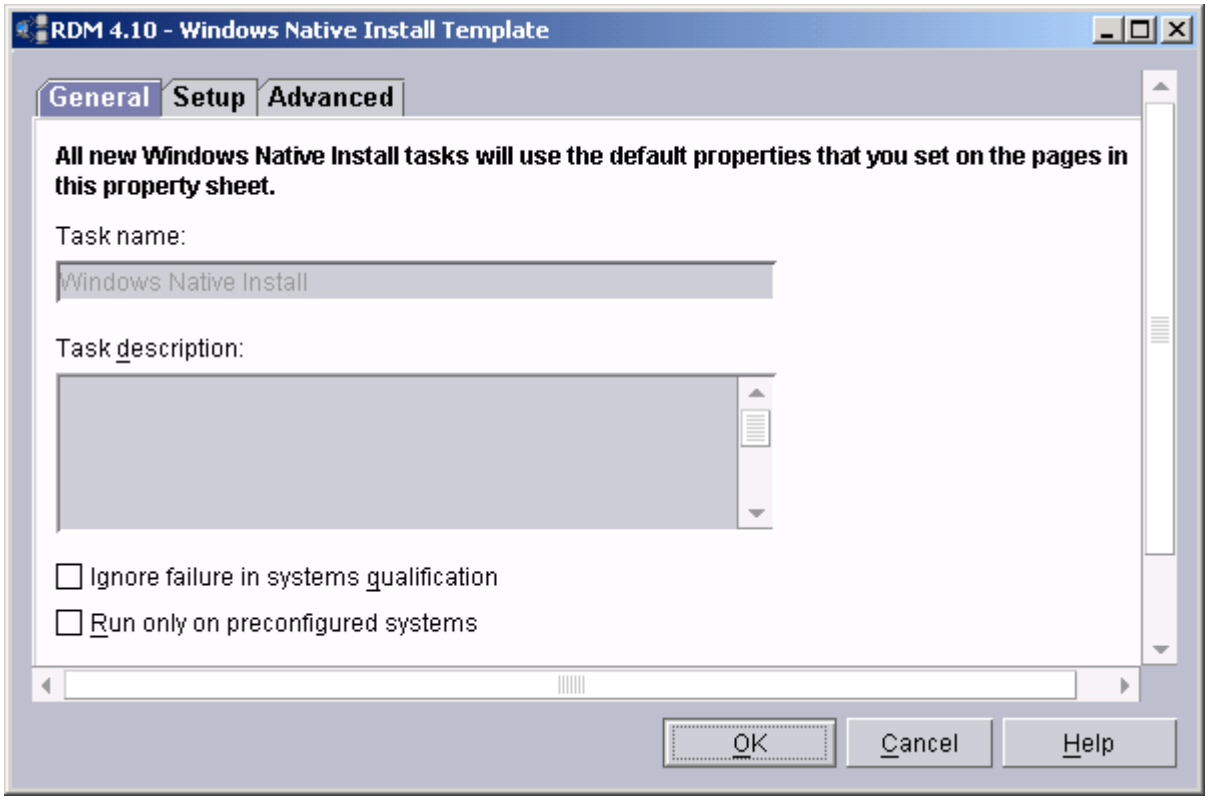
  `~!@#$%^&*()=+[]{}\|;:'",<>/?.

  For example, *pearl rfrsh* would be changed to *pearlrfrsh*.
- If the computer name is too long (greater than 63 characters), truncate from the end to make it shorter or equal to 63 characters long
- If the computer name contains all digits, append the letter *a* in front (for example, *12345* would be changed to *a12345*).
- If the computer name is duplicated, add _1, _2, and so on, to the end of the duplicate computer name.

Edit the template property sheet

Complete the following steps to edit the Windows Native Install template:

1. Right-click the **Windows Native Install** template, and then select **Edit template** to open the Windows Native Install template, or *property sheet*.

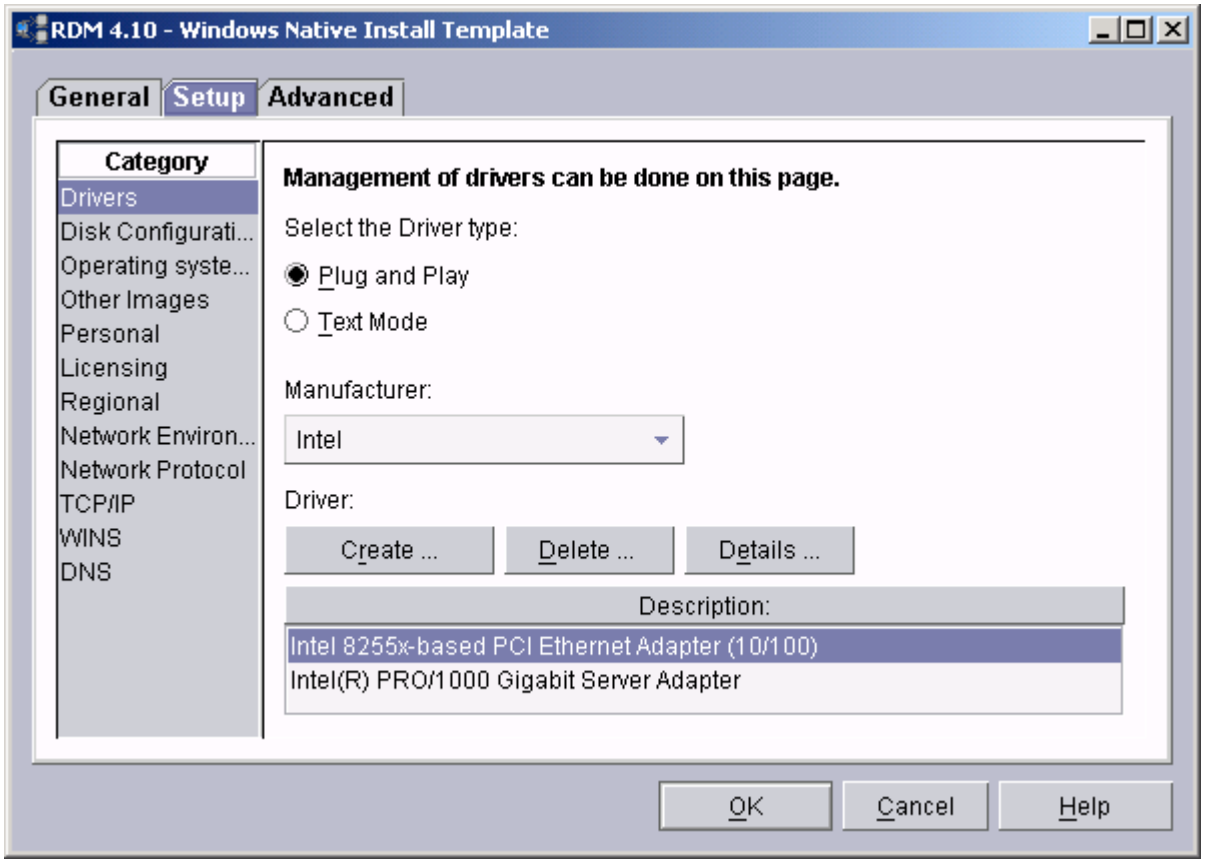


2. Type a description (optional). The task name is not available because you cannot change the name of the template.
3. Select the applicable check boxes:

   Ignore failure in systems qualification. If the flag is checked, systems associated with this task will not go through the qualification phase, whether during a drag-and-drop action or right before running the task.

   Run only on preconfigured systems. This affects configuration data for systems that you have not previously configured (using STC). Normally (with the box unchecked), RDM will create new "default" configuration data when an unconfigured system is dragged to a task. You can drag a "new" system and click **Run**, without going through the Configure (STC) phase. If the box is checked, however, that operation is suppressed.
4. Click the **Setup** tab. The Setup page lists categories in the left pane from which you choose and set their properties in the right pane.
5. Type your values for each of the following categories:

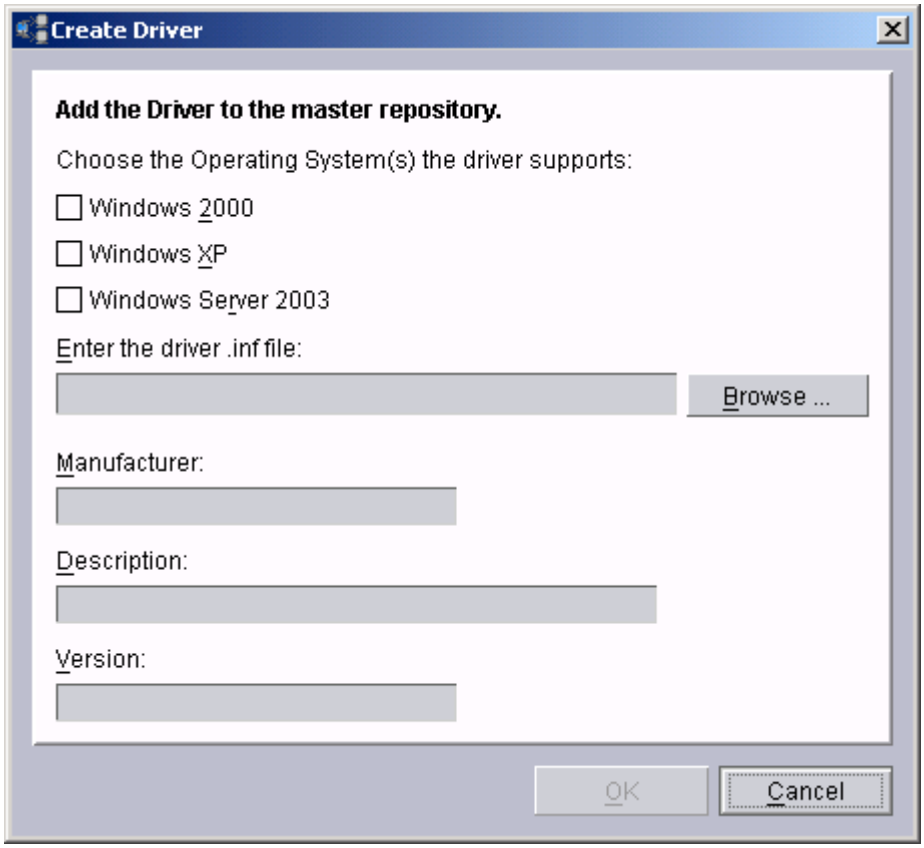
Drivers Category



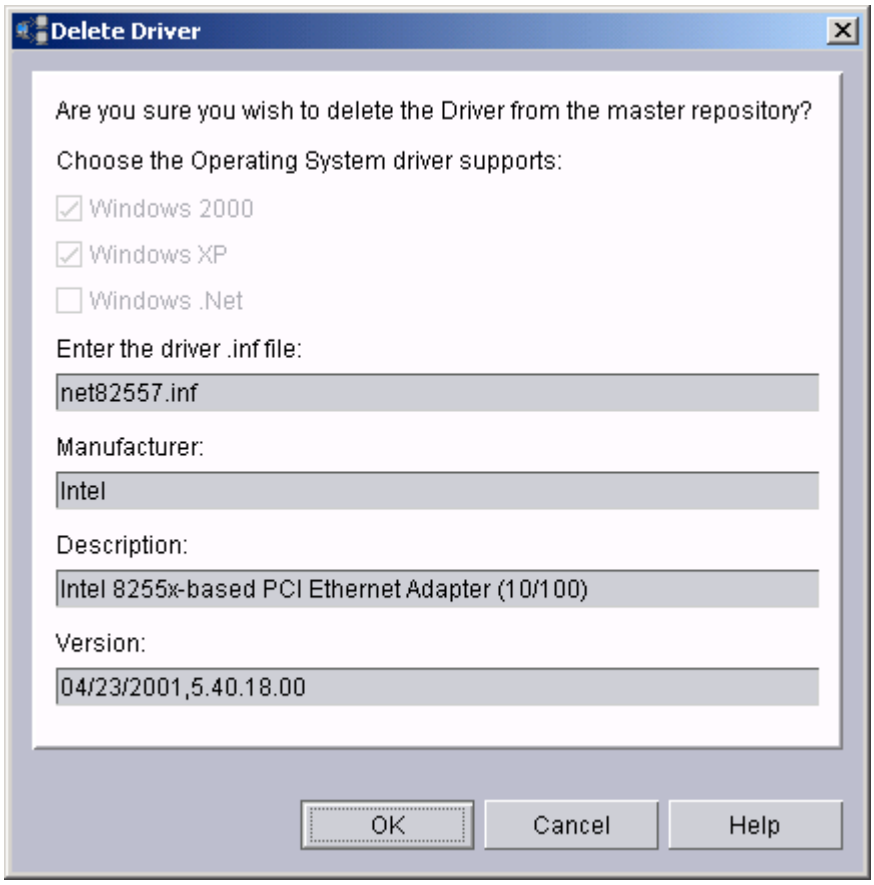
Driver Type – Selects the type of driver to add. Select "Plug and Play" button to add PNP drivers, or "Text Mode" for text mode drivers.

Manufacturer - Displays drivers by their manufacturer. Select one and click **OK**.

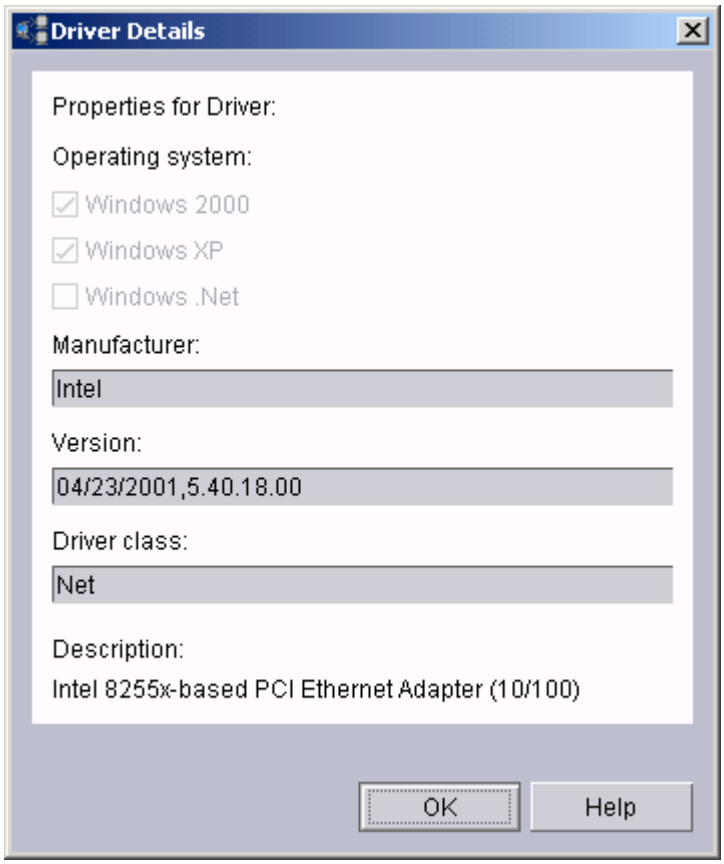
Create – Adds the specified driver to the Master Repository. Select the supported operating systems and then type or browse for the particular .inf file for the device driver. The remaining fields of the window (Manufacturer, Description, and Version) are filled in automatically. Click **OK.**


Create Driver
Add the Driver to the master repository.
Choose the Operating System(s) the driver supports:
Windows 2000
Windows XP
Windows Server 2003
Enter the driver .inf file:
Browse ...
Manufacturer:
Description:
Version:
OK
Cancel

Delete - Displays details of the selected driver. Click **OK** to delete driver from the Master Repository; otherwise, click **Cancel** to close the window.



Details - Provides details of the selected driver. Click **OK** to close the Driver Details window.



Adding a device driver

To add a device driver to RDM, complete these steps:

1. Right-click on Windows Native Install template.
2. Select "Edit template,,,".
3. In the Windows Native Template, select "Setup" tab.
4. Select the Drivers category to get to Management of drivers screen.
5. Select the "Plug and Play" button to add PNP drivers, or "Text Mode" for text mode drivers.
6. Click **Create** to import a driver into RDM.
7. In Create Driver dialog box, select the OS type this driver supports.
8. Click **Browse** to point RDM to the driver's inf file or textsetup.oem file if text mode is selected.
9. Click **Ok** if the information collected by RDM is correct.

The new driver will now be used by the Windows Native Install OS deployment process until it is removed.

Deleting a device driver

To delete a device driver from RDM, complete the following steps:

1. Repeat steps 1-5 (above).

Note: Drivers are sorted by manufacturer name. To get to the correct driver, you must pick/select the manufacturer name from the drop down box.

2. Highlight the driver you want to delete.
3. Click **Delete**. A Delete Driver dialog box appears.
4. Verify the information presented. If you still want to continue, click **Ok**.

Viewing device drivers

To view a device driver from RDM, complete the following steps:

1. Repeat steps 1-5 (from above).
2. Highlight the driver in question.
3. Click **Detail**.
4. Click **Ok**.

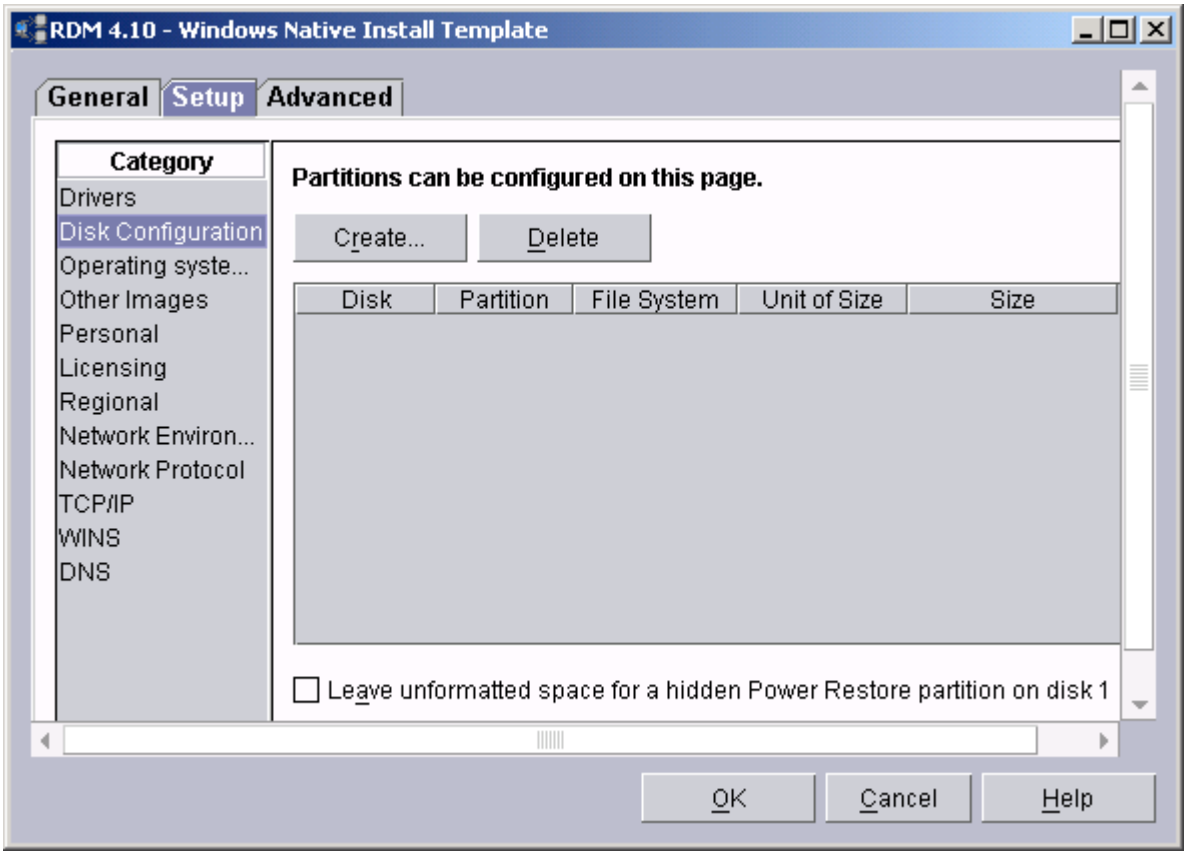
Adding a HAL driver

To add a HAL driver to the RDM repository, complete the following steps:

Note: Before adding the HAL, you need to know the model or machine type that this HAL driver will support.

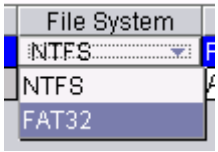
1. Use the same method of adding a text mode driver to add the HAL.
2. Go into the RDM repository, c:\program files\ibm\rdm\repository. Under this directory is the subdirectory wnihal. Open the hal.properties file using a text editor.
3. Create a new entry in the hal.properties file with a key "newXX=", for example:
   ```
   new34=f000.lca
   ```
   Replace the key "newXX" with the actual model type of the machine, for example:
   ```
   6833=f000.lca
   ```
   In this example, the new HAL will support model type 6833.
4. Save the file and exit text editor. Deploy the client.

Disk Configuration Category

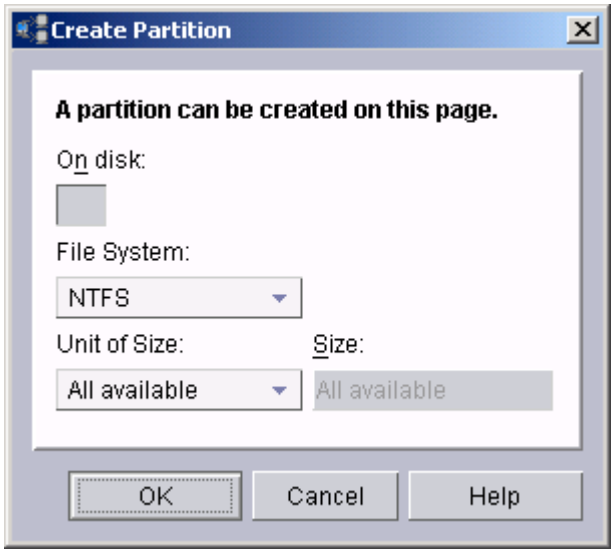


The check box reserves unformatted space for a Power Restore partition only on the primary (boot) partition. Note that this task will not actually create the Power Restore partition, and it will not cause Power Restore to run. To deploy Windows and create a Power Restore backup, run a Script task that contains a Windows (Native or Clone) Install task, followed by a Power Restore task.

Click the individual grid cell to change the individual fields for File System, Unit of Size, and Size directly for a particular disk/partition.

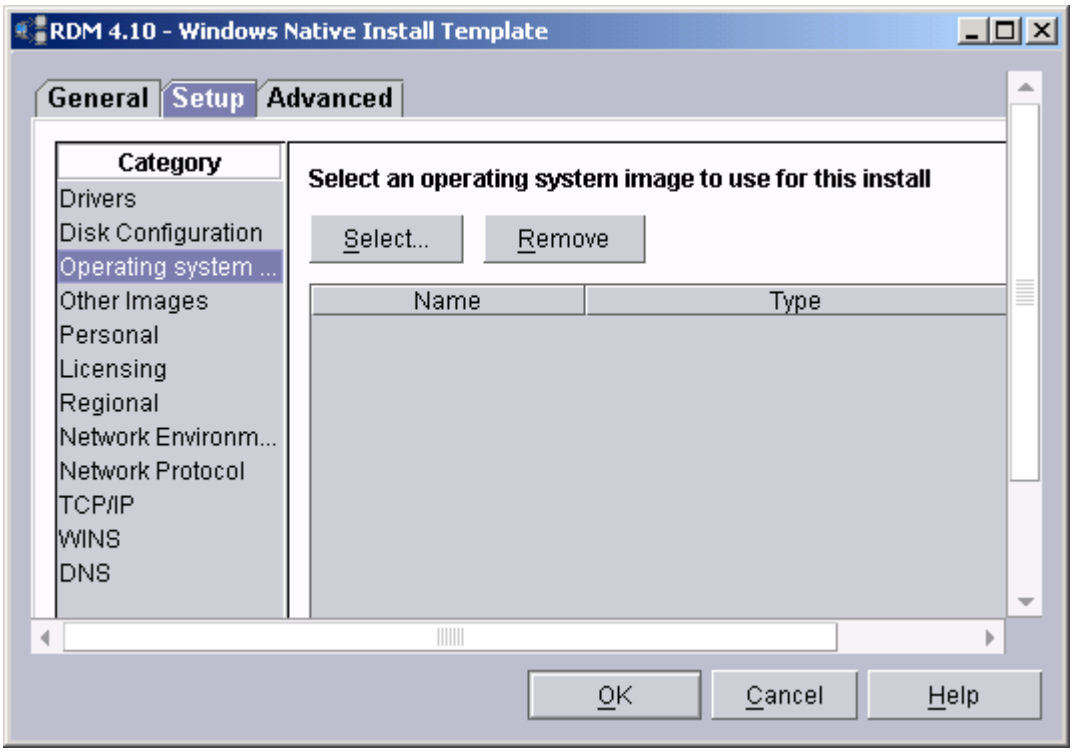


Create - Creates a disk partition. Specify the disk number, the type of file system, and the size. Click **OK**.



Delete - Deletes the selected disk or partition.

Operating System Images Category



The list box contains all installation images previously selected for this template.

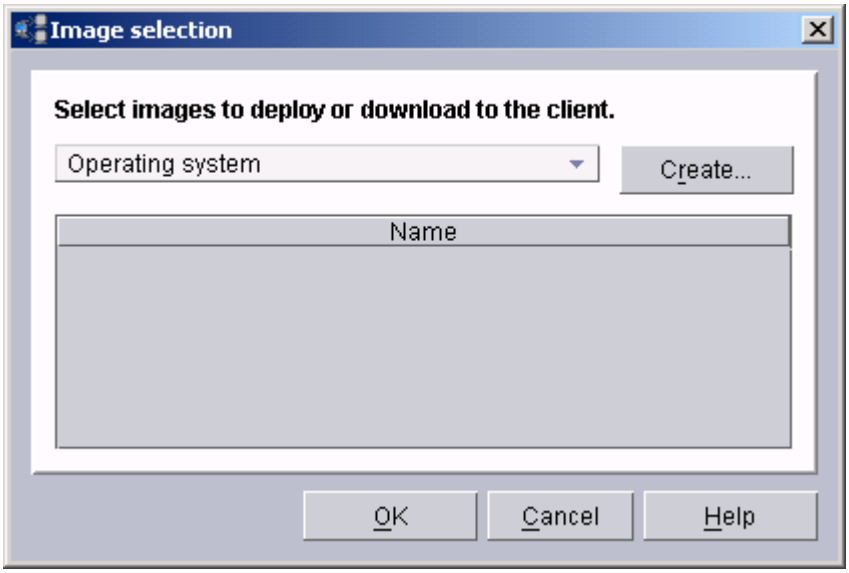
Select an image from the list box, or click **Select** to add an image (from the RDM repository) to the list in this window.

To remove an image from the list, select the image (within the list), and then click **Remove**.

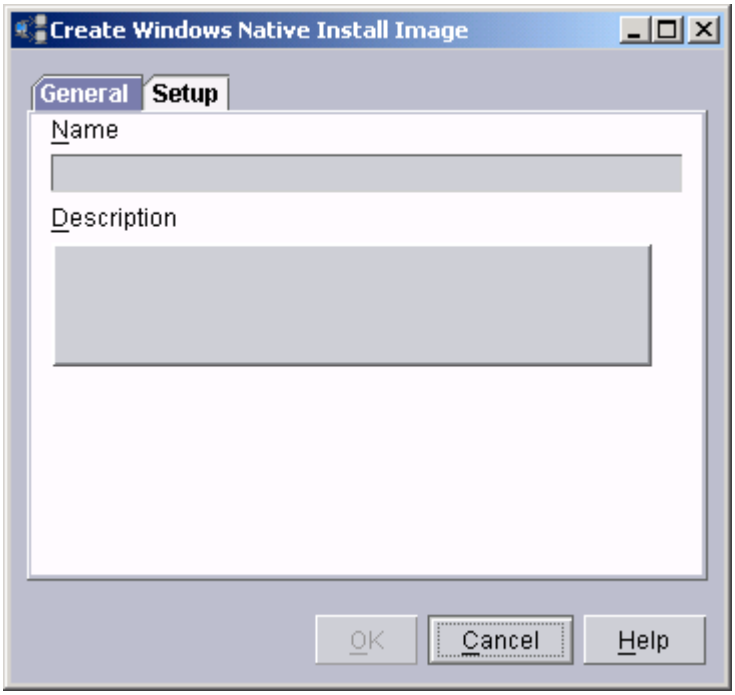
Create a new image

Complete the following steps to create a new image:

a. From the Setup page of the Windows Native Install template, click **Select**. This opens the Image Selection window.

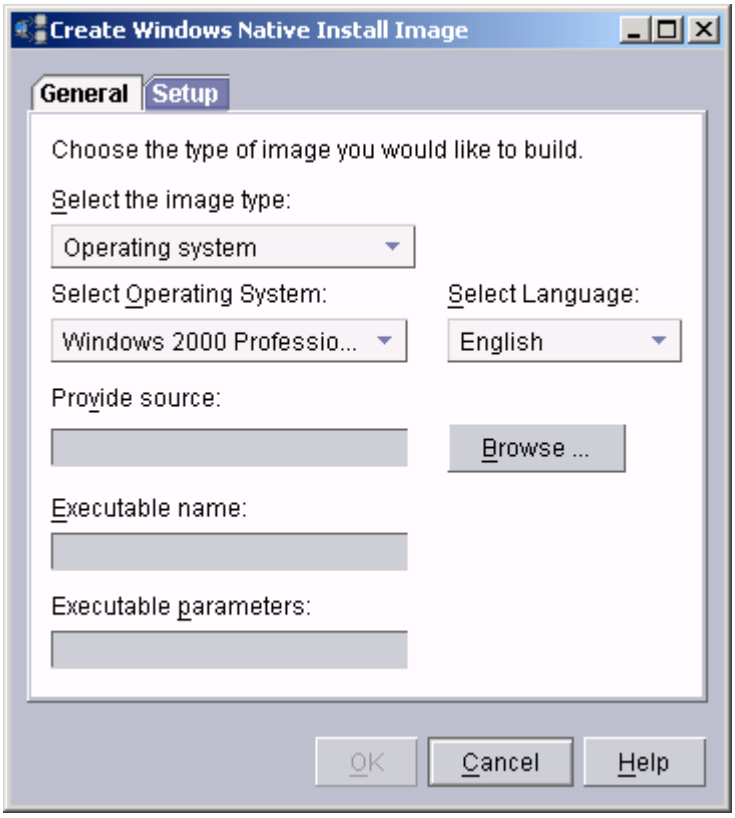


b. Click **Create**. This opens the Image Management window.



c. On the General page, type a name and description for the new image to be created.

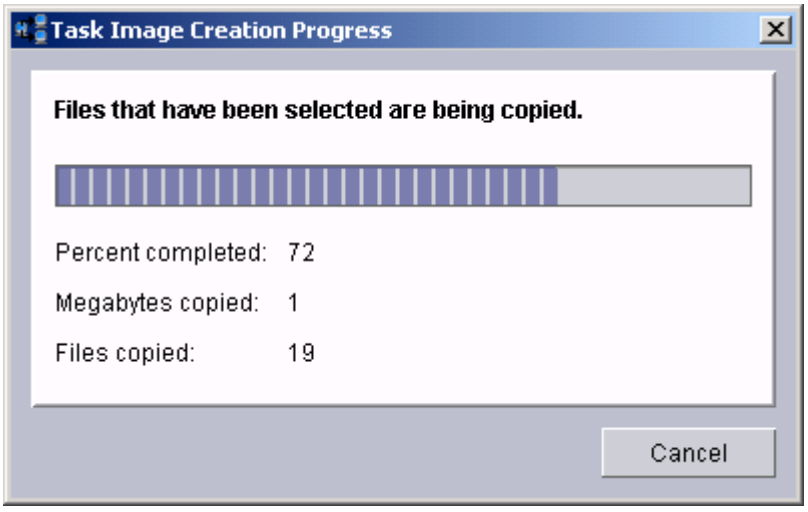
d. Click the **Setup** tab and select the image type and operating system type. The associated parameters change to reflect the type of image selected. Type the path to the source files or browse to the source of the image that you want to create.



If you click **Browse**, the file you are looking for is called out in the title of the browse box. Once the file is selected, the remaining fields (Executable name and Executable parameters) are automatically filled in.

e. Click **OK**.

A progress bar is displayed during the file transfer to IBM Director Server, if needed, and during image creation.



Other Images Category

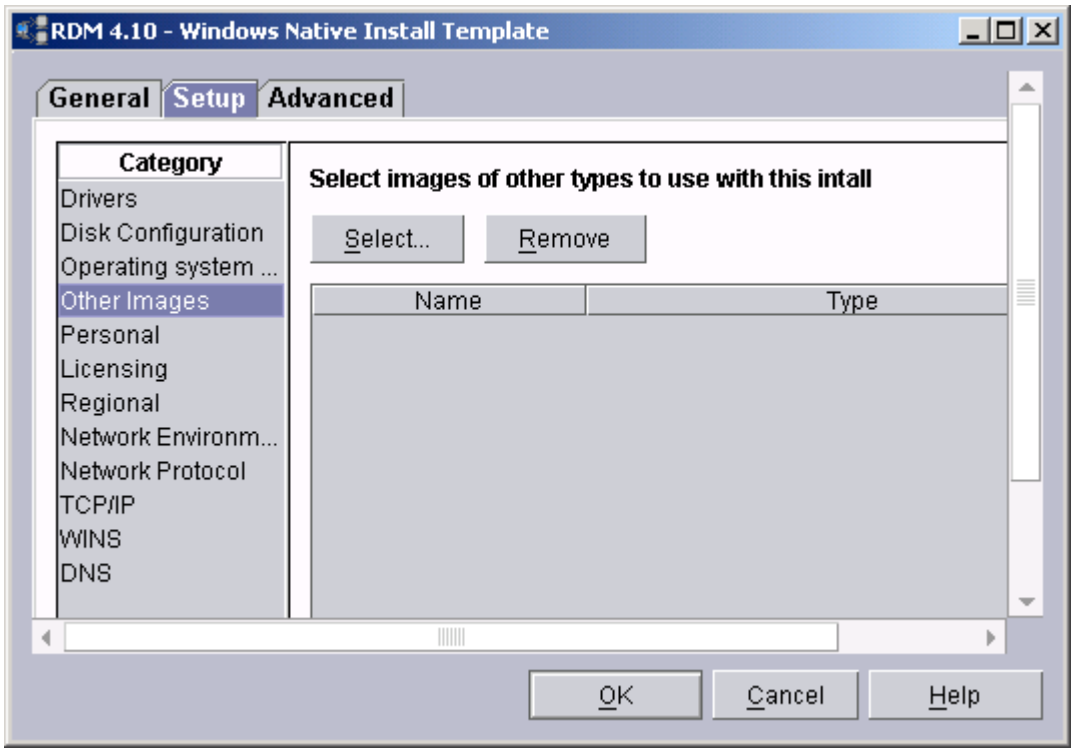
From this window, you select images, other than operating system images, to install. Initially, the list box is empty. As you select images, an accumulative list is displayed. When the list is complete, select an image and click **OK**.

Complete the following steps to create an installation image:

1. Click **Select** to choose from different types of installation images collected in the Master Repository, such as service packs, applications, and custom files.

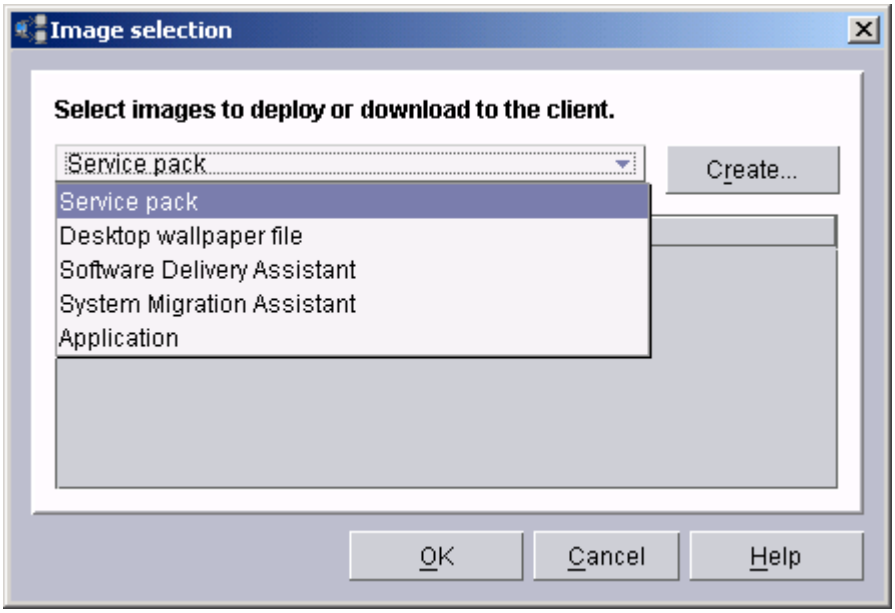
   Click **Select** to open the Image Selection window from which you can select from images stored in the Master Repository, or click **Create** to create a new image.

   To remove an image from the list, select the image (within the list), and then click **Remove**.



2. Select the type of image to deploy. The selection determines which images from the Master Repository are displayed in the list box. Select an image and click **OK**. To create a new image instead, click **Create**.

   To create a new image, follow the steps outlined in the previous category (Operating System Images).



Desktop wallpaper file. Wallpaper can only deployed to the local administrator of the system. If you login as administrator of the domain (a separate account from the local administrator), you will not see the wallpaper.

Software Delivery Assistant (SDA) images. SDA is a stand-alone application that creates an image file to install applications on system computers. It bundles up the setup.exe and install files from an application installation CD-ROM and creates an image and supporting batch files with the instructions for installation of the program. To create an SDA image that can be used by RDM, complete the following steps:

1. Install SDA on your system.
2. Follow SDA instructions to pack the software to distribute.
3. Change the working directory to the SDA Installer directory.
4. Create a self-extracting executable zip file from the previously packed software.

For example, install SDA software in the c:\SDA Installer directory and pack the application to the c:\SDA Installer\MySoftware directory. With the pkzip program installed, type the following commands:

```
cd "SDA Installer"
pkzip -sfx -add -dir=current MySoftware.exe MySoftware\*
```

MySoftware.exe will be used by the Image Manager to create the SDA image.

To install Director Agent with default options as part of a Windows Native Install task:

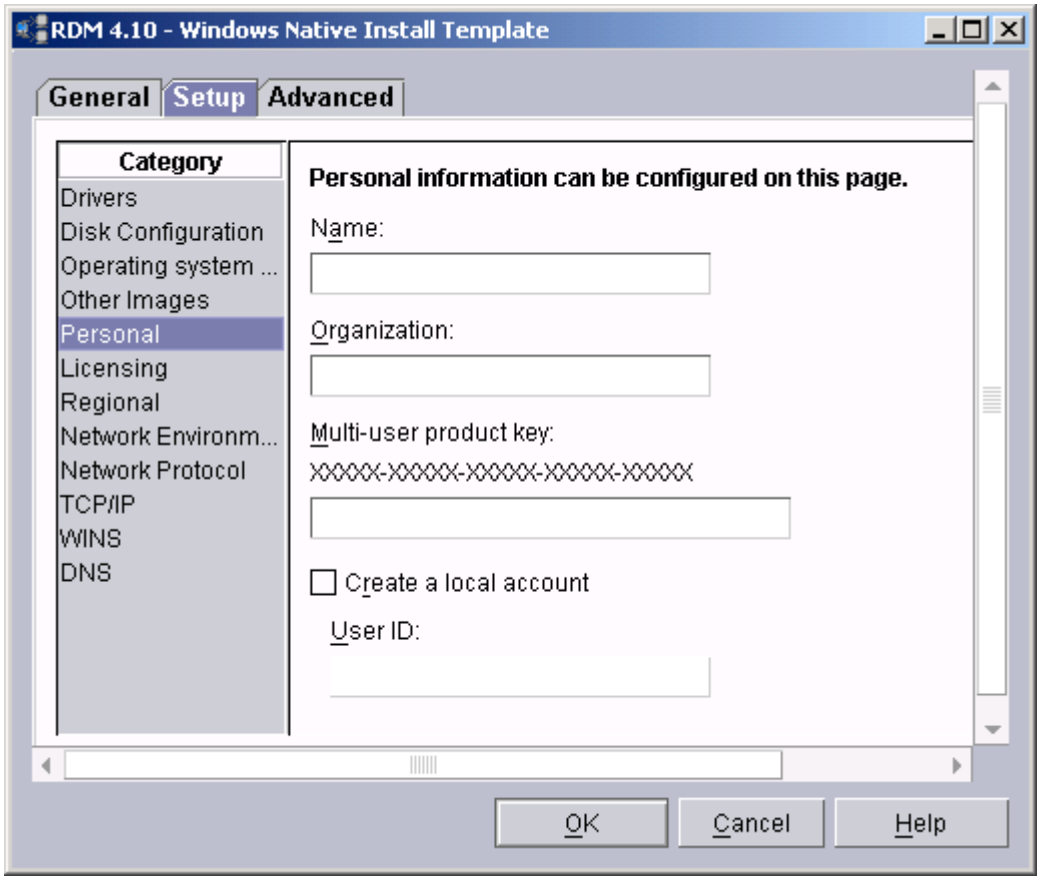
1. Create a Windows Native Install Application image.
2. Navigate to the appropriate directory on the IBM Director CD1.
3. Select ibmsetup.exe.
4. Enter "silent waitforme" as the parameters.

To install Director Agent with custom options as part of a Windows Native Install task:

1. Copy the Director Agent installation files from the IBM Director CD to a folder on your hard drive.
2. Edit the diragent.rsp file to include the options that you would like to include with the installation.
3. Create a Windows Native Install Application image.
4. Navigate to the Director Agent installation files directory on the hard drive.
5. Select ibmsetup.exe.
6. Enter “silent waitforme” as the parameters.

Personal Category

Type the information and click **OK**.



Name
The name of the registered user of the system.

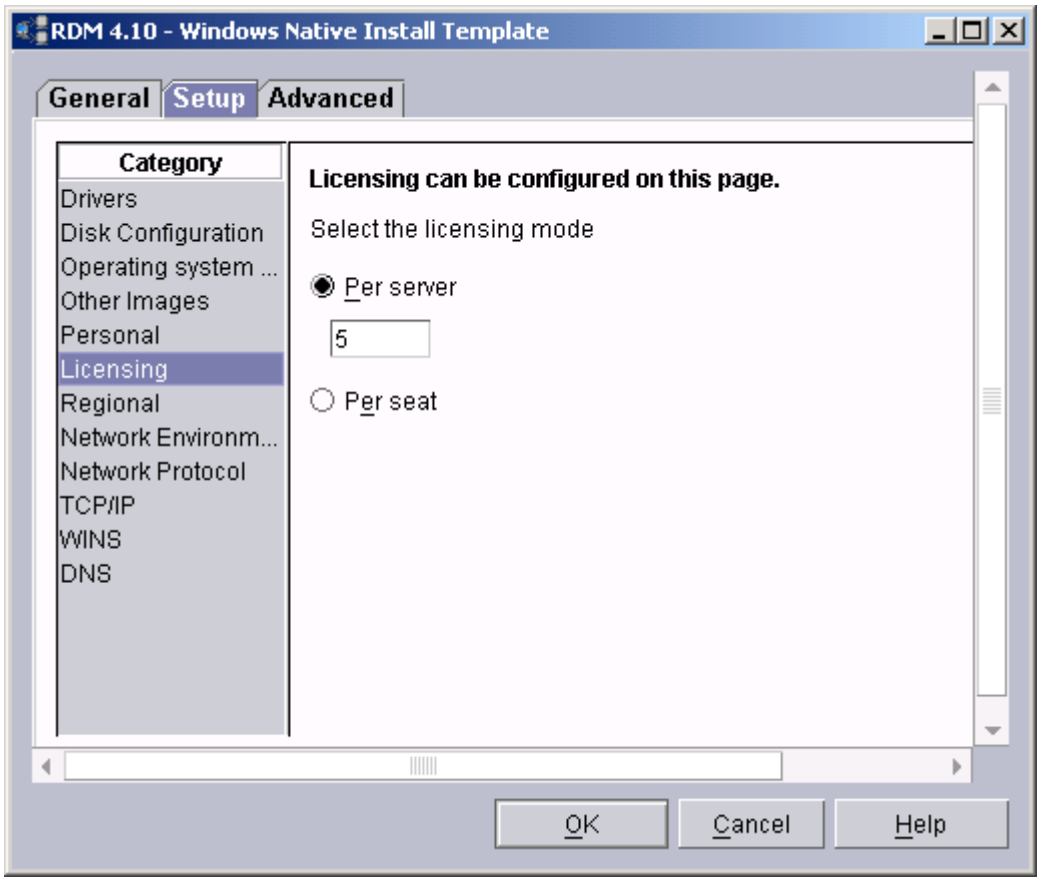
Organization
The name of the company (or other organization) to which the registered user belongs.

Multi-user product key
The CD Key format for the selected operating system has a length of 29

characters, formatted in five 5-character alphanumeric tokens separated by hyphens.

User ID
The name of the local userid that is created if you select the **Create a local account** box.

Licensing Category

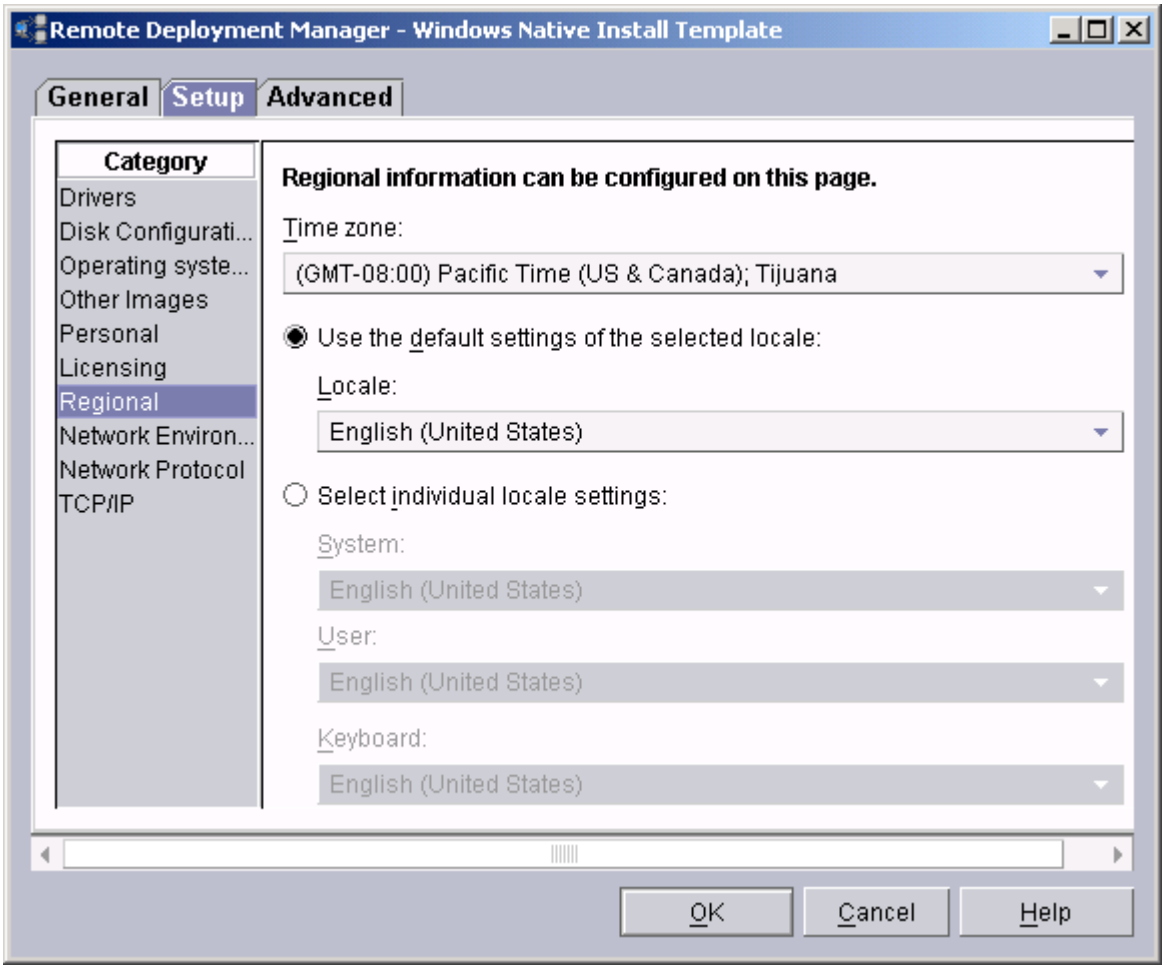


For this release, the only stand-alone servers are deployed.

Licensing modes
A choice of *Per server* or *Per seat*. If you select *Per server*, you must also type the number of system licenses you have purchased for this server.

Server licensing count
Minimum count is 5.

Regional Category

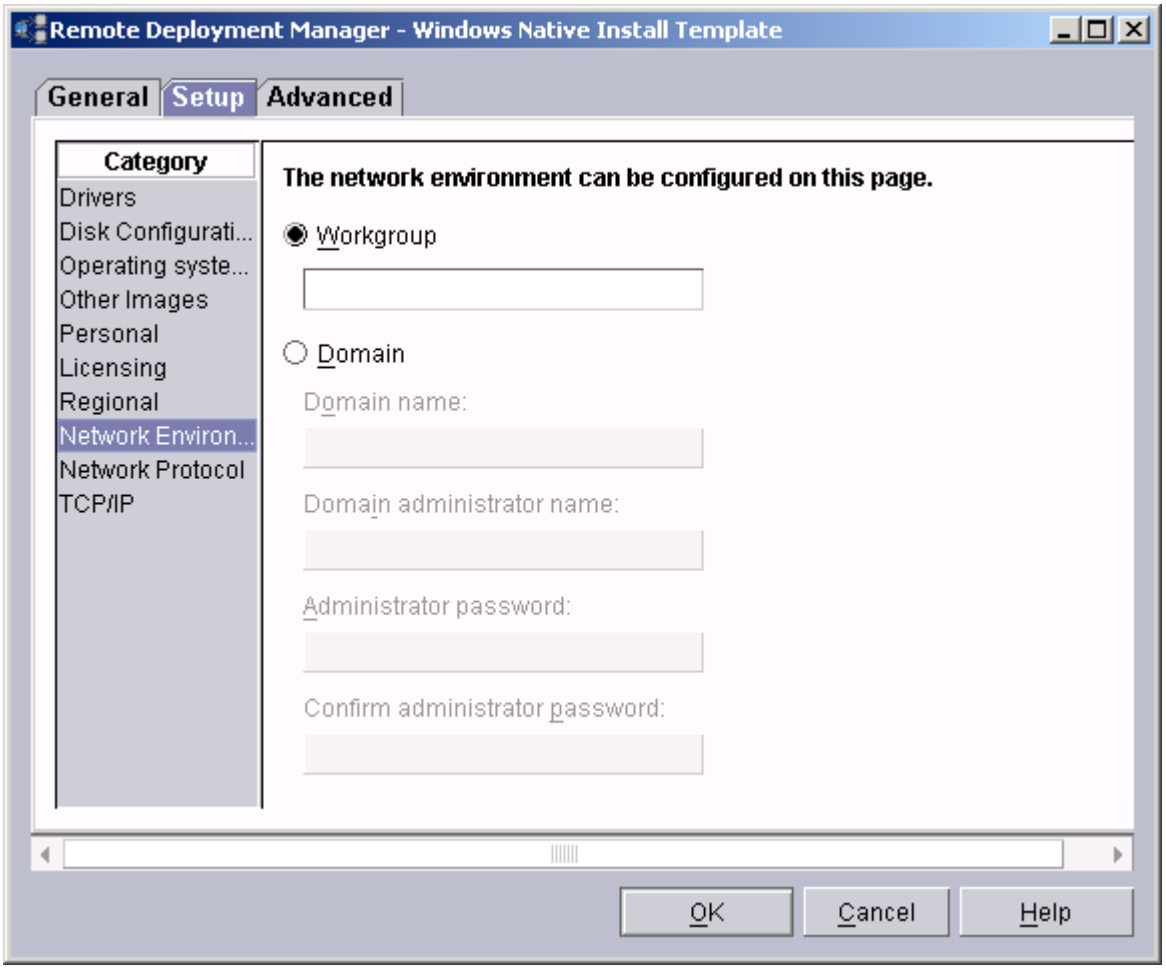


Use the Regional category to select values for time zone and locale system-level task parameters.

Time zone
A dropdown combo box with static entries loaded from the database or master.ini file.

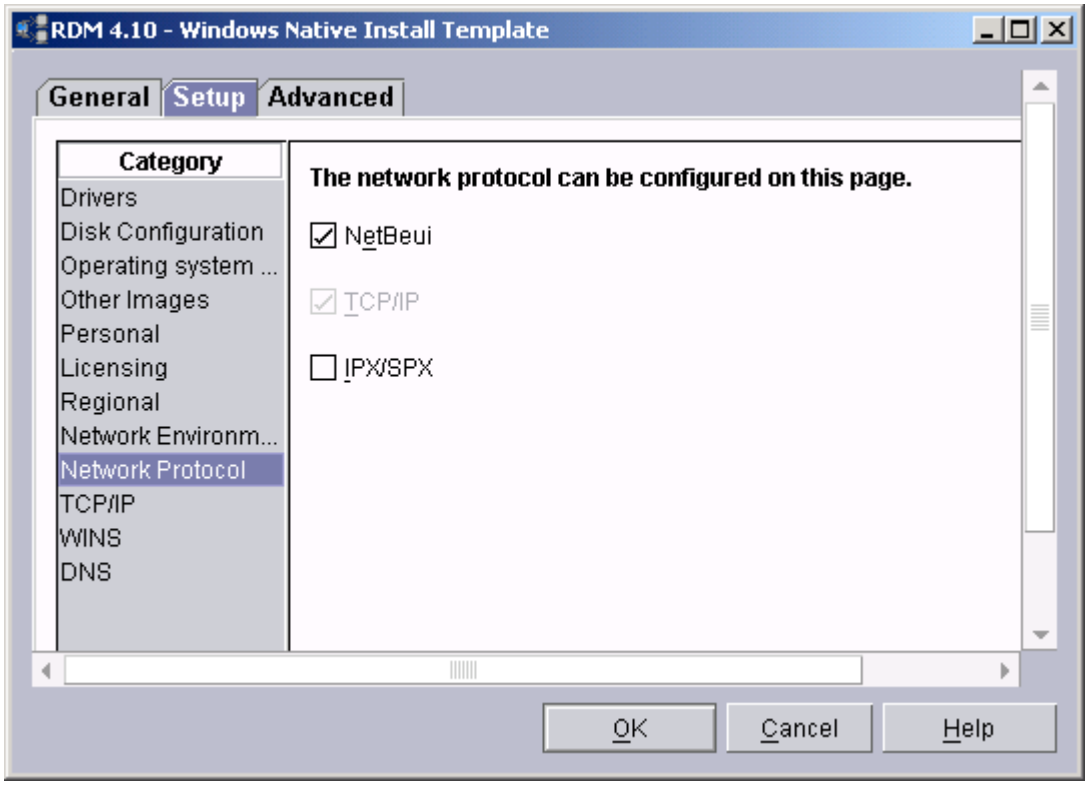
Locale settings
Use the default settings of the selected local or specify individual settings for system, user, and keyboard.

Network Environment Category



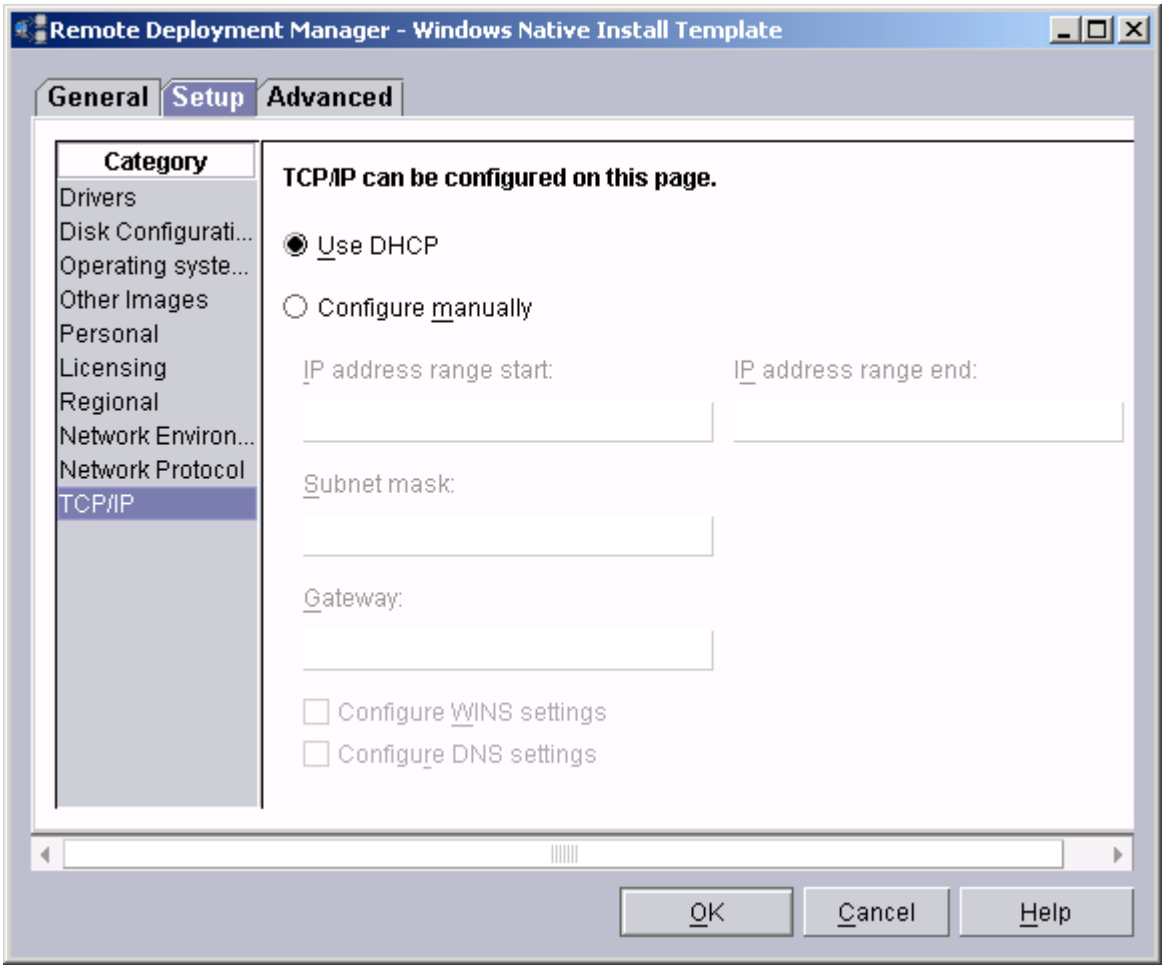
Type the name of the workgroup or domain to which your system will belong. To join a workgroup, select the **Workgroup** radio button and type the workgroup name. To join a domain, select the **Domain** radio button and type the domain name. For Windows 2000 Professional and Windows XP Professional, you must also type the Administrator name and password.

Network Protocol Category



- **NetBEUI** is a non-routable protocol for use within peer-to-peer networks.
- **TCP/IP** is a routable protocol for use across networks. The TCP/IP protocol is checked by default.
- **IPX/SPX** provides connection services similar to TCP/IP and is used by Novell Netware operating systems.

TCP/IP Category



TCP/IP configuration

Use this window to set up the TCP/IP protocol settings to be used on the target system. Access this window from the Setup tab or in the wizards. You can specify TCP/IP settings to be assigned through DHCP or to be configured manually.

Manual configuration

You have two choices for implementing manual configuration:

1. You can leave the IP address range blank. You then manually assign an IP address to each system during System Task Configuration (STC). This option is the best choice if either of the following conditions apply:
   - You have multiple subnets. RDM does not check for unique IP addresses on multiple subnets.
   - You use multiple installation tasks of a single type, or multiple types of installation tasks (such as, Windows Clone, Windows Native and Linux Native). RDM validates unique IP addresses within a single task, not across multiple tasks. If there is any overlap of address ranges within tasks, duplicate IP addresses are possible.

2. You can specify an IP address range. RDM then assigns an IP address to each system during system qualification. This option can be used for deploying tasks on a single subnet. An example is a classroom lab where you redeploy the same image on all systems before every class. You could set up a classroom installation task with the reserved range of addresses for the classroom.

Field descriptions

Select either **Use DHCP** or **Configure manually**.

Note: If Use DHCP is selected, no other values are needed. A DHCP server must be present on the network. If Configure manually is selected, the other fields are enabled, and their set up notebook is available in the Category list and through the wizard.

For manual configuration, the following fields are enabled:

Starting IP address

Type the starting IP address for the range of available addresses to be assigned to target systems. RDM uses the IP address range to select a unique IP address for each target system when the system is qualified. The range of values can be obtained from your network administrator. You can leave this field blank. If you specify a Starting IP address, you must also specify an Ending IP address.

Note: If you specify a range of IP addresses, you must make sure there is no overlap of the range with any other installation task. RDM validates unique IP addresses within the individual task, not across multiple tasks.

Ending IP address

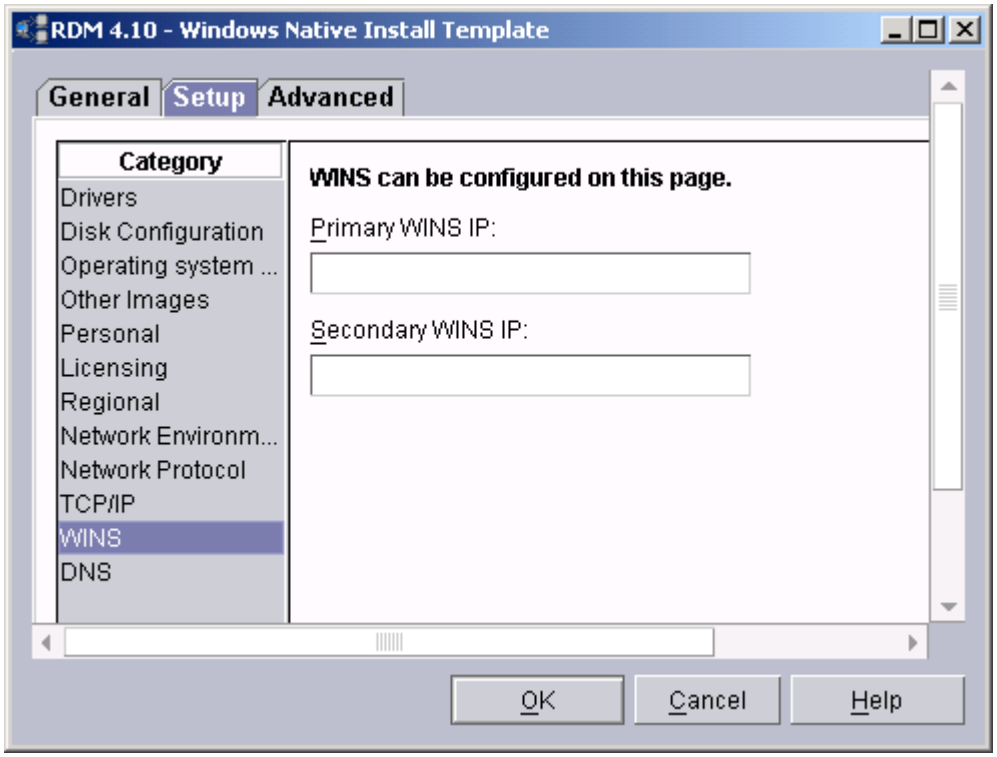
Type the ending IP address for the range of available addresses to be assigned to target systems. This parameter is required if you specify a Starting IP address.

Subnet mask
The default value is set in the template property sheet. It is a required system parameter whose value is required before an unattended installation is to begin. The value can be entered now in the task creation phase or in the System Assignment and Configuration phase.

Gateway IP
The default value is set in the template property sheet. It is an optional system parameter whose value is not required.

If you select to configure either WINS or DNS settings, WINS and DNS categories are added to the list.

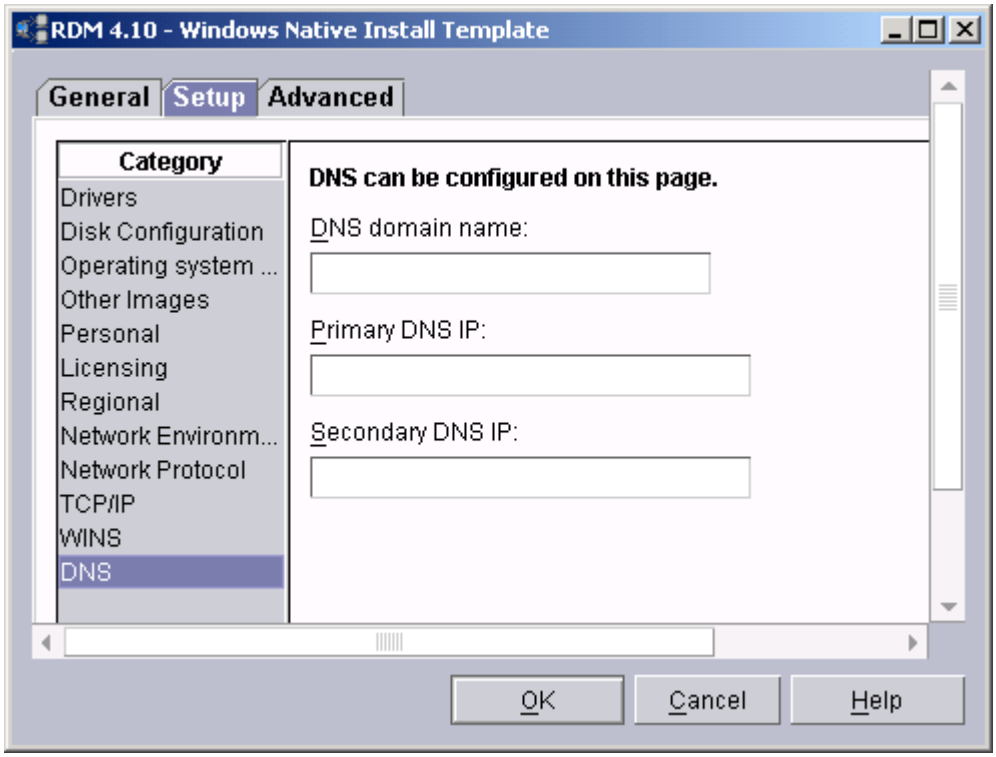
WINS Category



Primary WINS IP
The default value is set in the template property sheet. When the task is customized to configure the WINS settings, the primary WINS Server IP address becomes a required system parameter for which you must provide a value. The value can be entered in the task phase or in the System Assignment and Configuration phase.

Secondary WINS IP
The default value is set in the template property sheet. It is an optional system parameter whose value is not required.

DNS Category



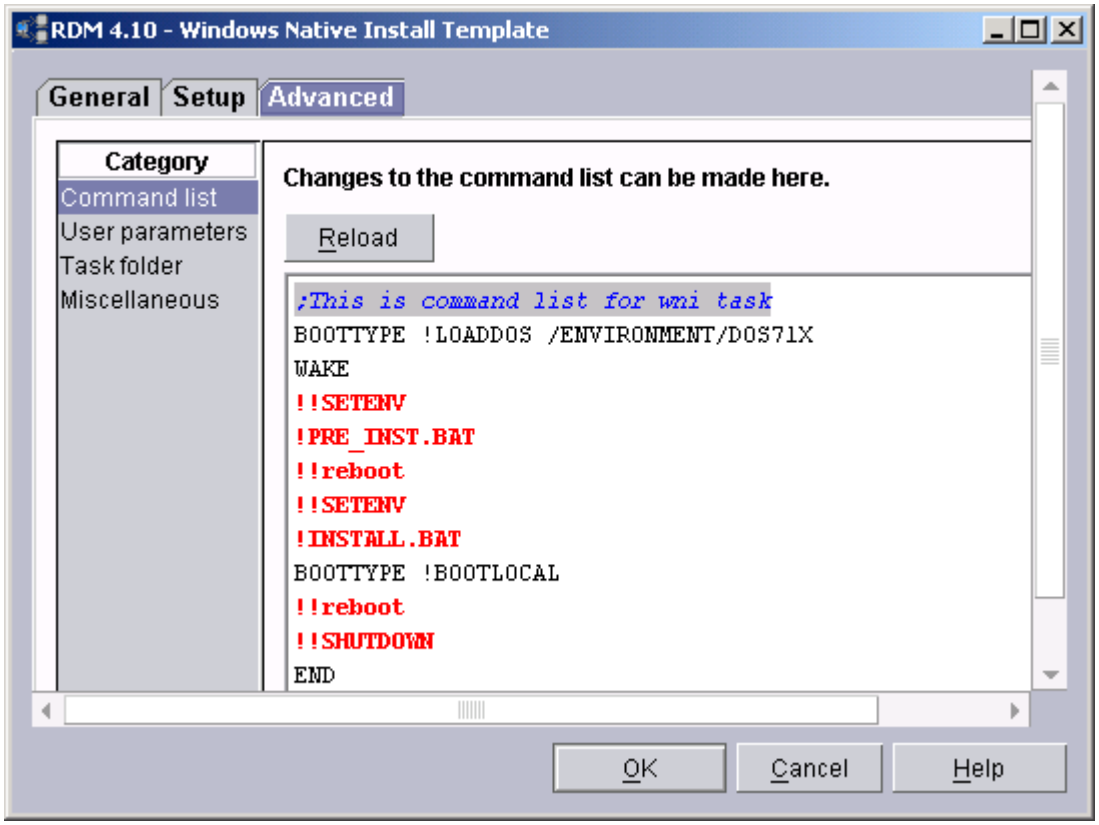
DNS domain name
The default value is set in the template property sheet. When the task is customized to configure the DNS settings, the DNS domain name and the primary DNS Server IP address becomes required system parameters to which you must provide values. The secondary DNS Server IP address is optional. Those values can be entered in the create task phase or in the System Assignment and Configuration phase.

Primary DNS IP
The default value is set in the template property sheet. It is a required system parameter for which you must provide a value. The value can be entered in the create task phase or in the System Assignment and Configuration phase.

Secondary DNS IP
The default value is set in the template property sheet. It is an optional system parameter whose value is not required.

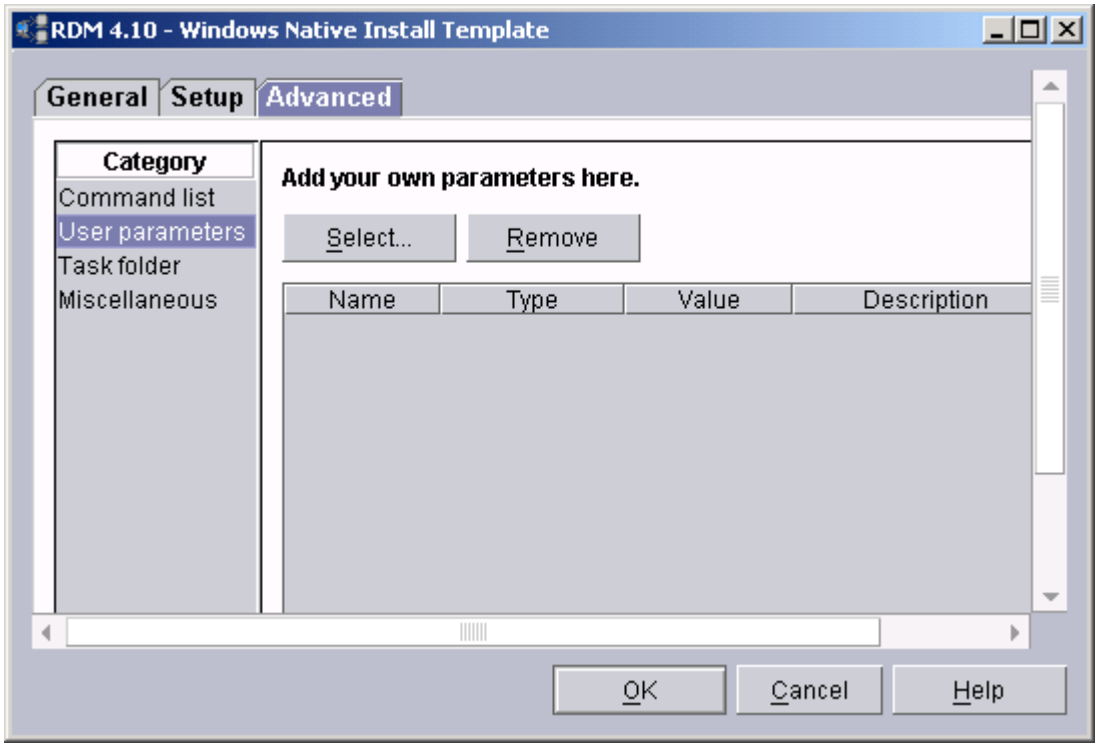
3. Click the **Advanced** tab to start editing Command list changes and user parameters.
4. Type your values for each of the following categories:

Command list



The command list is a list of RDM and DOS commands used to perform the Windows Native Install task. You are responsible for the order and contents of the lines, and for assuring that the files that support the commands contained within these lines are present in the image, preboot environment, or template directory associated with the task. Click **Reload** to restore the command list to its original state.

User parameters

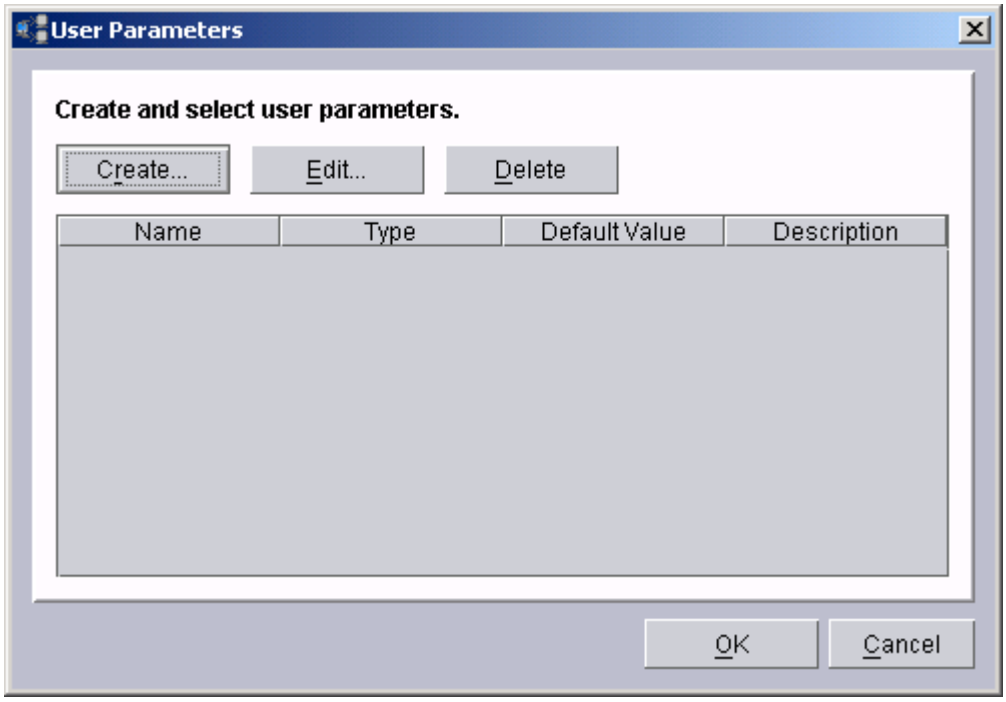


Displays a list box of the parameters that will be added to the task. During task execution, they are used on the system being deployed. Click **Select** to create, add, and edit user parameters in the list box for this task. **Remove** deletes the selected parameters from the list box, and as a result, the task. Windows Native Install tasks, by default, do not use any user-defined parameters.

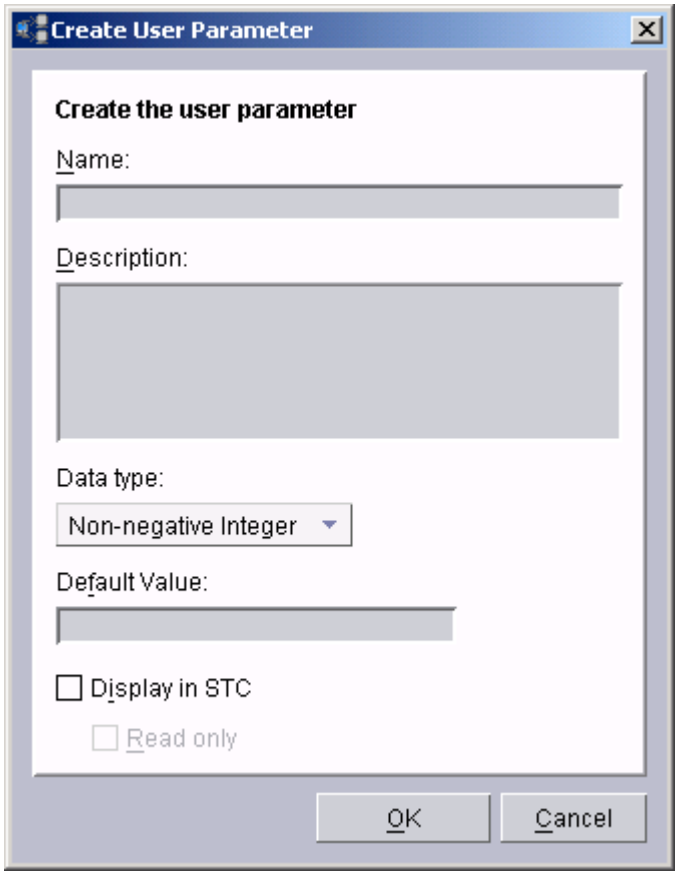
Create user parameters

Complete the following steps to create user parameters:

a. Click **Select**. The User Parameters window opens.



b. Click **Create**. The Create User Parameter window opens.

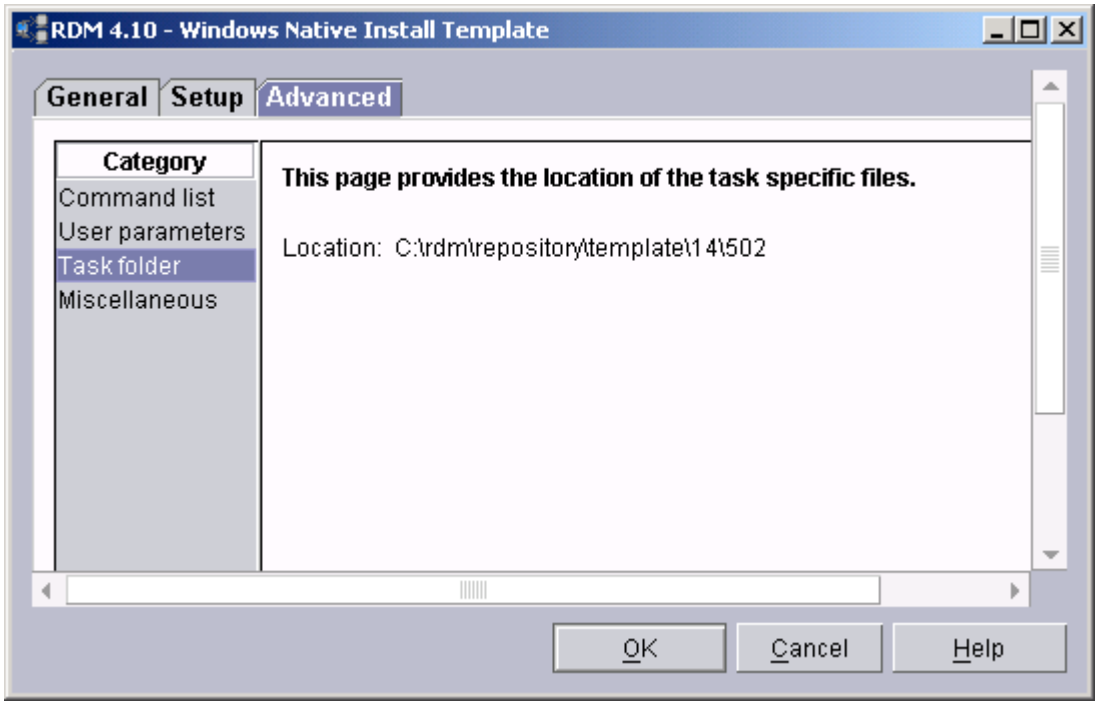


c. Type a parameter name, description, data type, default value, and whether or not it should display in the System/Task Configuration (STC) table.

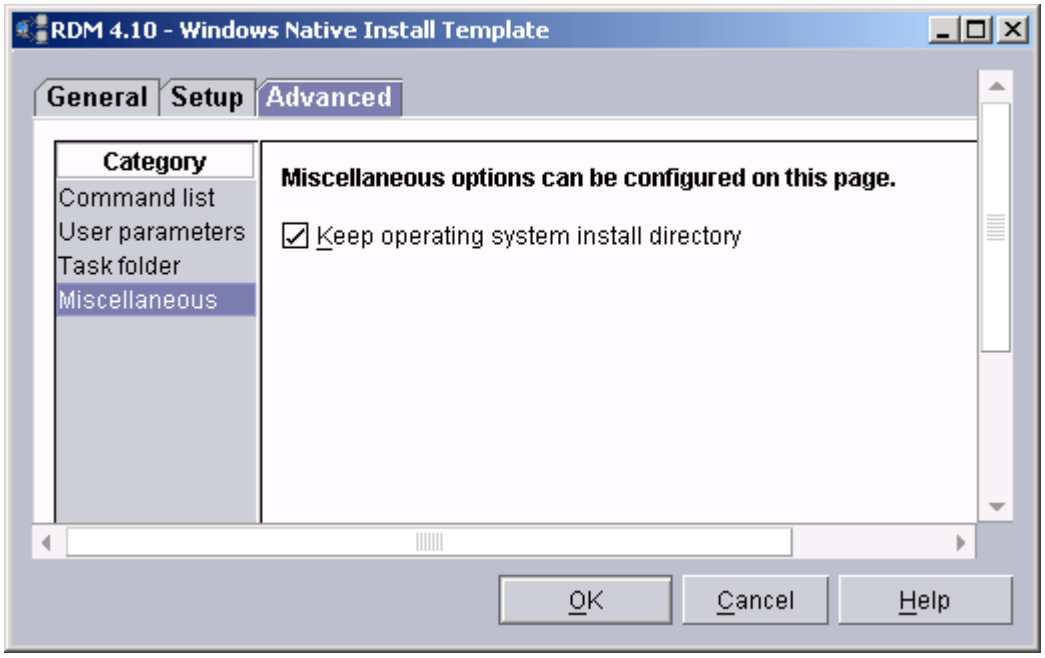
d. Click **OK**. The parameter is now listed in the previous User Parameters window from which you can select the parameter (by selecting the check box) to be included with this task.

Task folder

This page is informational only and provides the location of the task files. The Task folder provides the full path to where the CommandList file is stored. It gives you a way to use your favorite text editor to create the actual contents of the file.



Miscellaneous



Select this check box to preserve the i386 directory after Windows deployment.

5. Click **OK** to validate the property sheet.

Using the wizard

Most of the wizard pages are very similar to the tabs in the property sheet for this task. All the crucial information on each page can be changed using the **Back** button. Pressing **Next** causes validation on the page.

The **Finish** button, seen on the last page of the wizard, finalizes the task creation. A Windows Native Install task folder will be created in the RDM Master Repository. The name of the folder is the task number. The unattended answer file will be generated and saved in the folder, as well.

Chapter 4. Tools

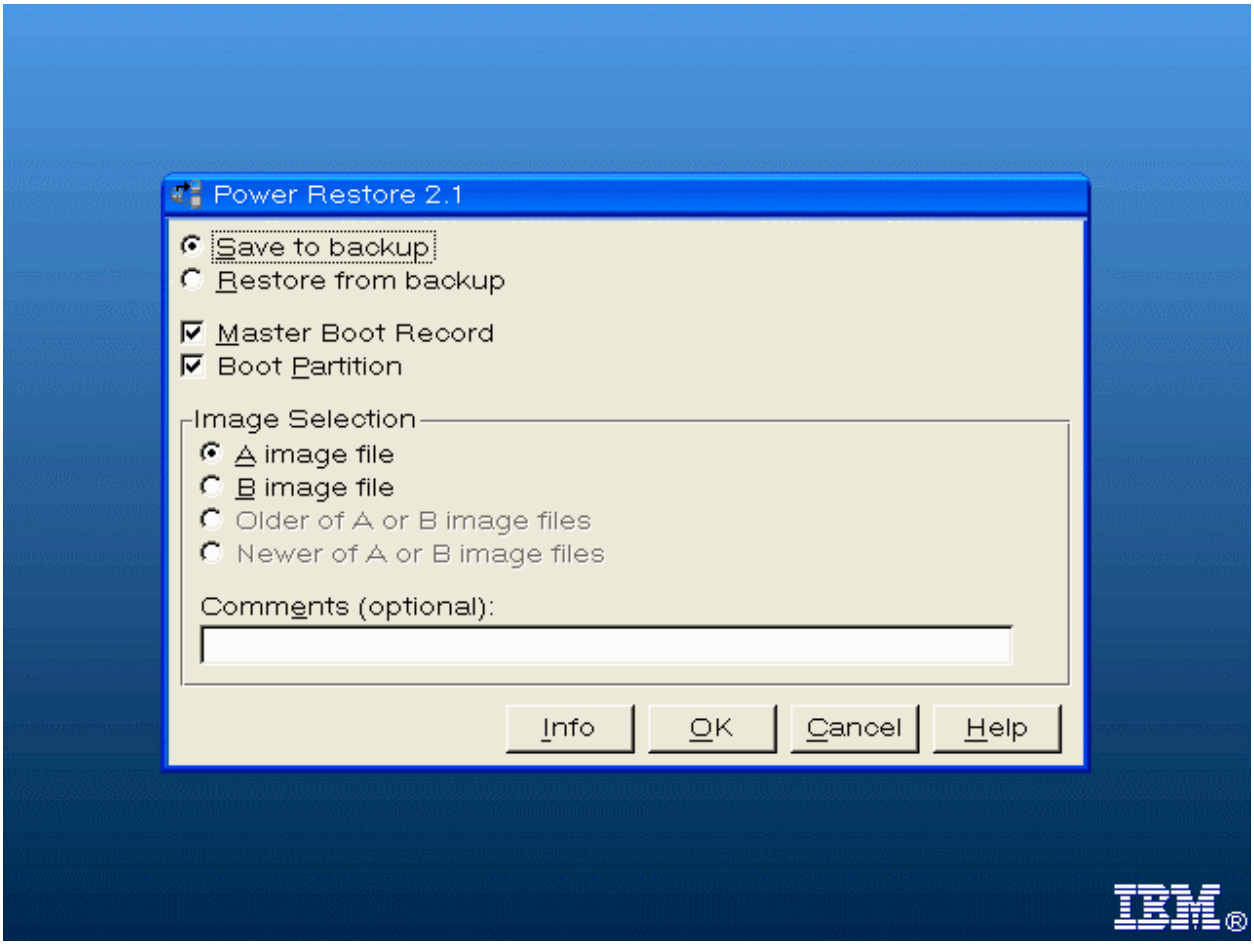
This chapter describes Power Restore tasks.

Power Restore as a local task

Power Restore tasks, including creating the Power Restore partition and backing up or restoring the boot partition and the Master Boot Record, are normally run as RDM tasks. However, they can also be run without RDM as a “local” task. You will also have the following abilities:

- Start the Power Restore backup and restore operations from a startable diskette or CD-ROM.
- Start the Power Restore backup and restore operations by pressing a function key, such as **F11**, during the boot process on the PC (provided IBM Boot Manager has been installed).
- Create the Power Restore partition from a startable diskette or CD-ROM.
- Install IBM Boot Manager from a startable diskette or CD-ROM.

When run as a “local” task, Power Restore displays a familiar style interface. If the System has a video card capable of a 640 x 480 resolution, 256-color graphics mode and the Power Restore executable is set for use with ASCII (as opposed to Double-Byte Character Set) codes, the interface looks like this:



Power Restore graphics-based user interface.

If the System is *not* capable of a 640 x 480 resolution, 256 color graphics mode or if the Power Restore executable is set for use with Double-Byte Character Set (as opposed to ASCII) codes, the interface uses a text-mode variation on the windowed interface:

Power Restore text-based user interface.

Use the user interface to perform the following tasks:

- Select whether to perform a Save operation or a Restore operation
- Select whether to perform the operation on the Master Boot Record, the boot partition or both
- Select which image file to save the boot partition to or restore it from (if applicable)
- Define optional comments related to the selected image file on Save operations
- View optional comments related to the selected image file on Restore operations
- View the dates of the image files (if they exist)
- View a help window on the use of the user interface
- View information about the partition table on the boot drive

The user interface is designed to prevent you from making inappropriate choices, such as attempting to restore the boot partition from a non-existent image file.

Installing/starting Power Restore from startable diskette or CD-ROM

You can install or start Power Restore from a startable disk (either a diskette or a CD-ROM). In fact, both processes use the same disk. However, you must first prepare the diskette, and then create the startable CD-ROM from the diskette image to use a startable CD-ROM. Preparing the diskette involves formatting it as a boot diskette and then copying specific files onto it. Next, you have to change the BIOS settings on the system to boot from the diskette or CD-ROM, depending on which type of disk you want to use. Typically, managed systems try to boot from the network first, and then from the hard disk drive. The next step is to insert the applicable disk and reboot or power-up the system. After that, you either follow the onscreen instructions or wait until the system powers off.

There are several states in which a system could be when it is booted from the Power Restore diskette or CD-ROM. These states and their resulting actions include:

State	Action
RDM 4.1-style Power Restore partition is on system	Power Restore interface is displayed
RDM 3.1-style Power Restore partition is on system	Power Restore partition and files are updated to RDM 4.1-style and Power Restore interface is displayed
LCCM 3.0-style “Rapid Restore” or “Rave” partition is on system	Rapid Restore/Rave partition is removed and replaced with an RDM 4.1-style Power Restore partition and Power Restore interface is displayed
No Rapid Restore/Rave or Power Restore partition is on system, but adequate* free space exists on system	Power Restore partition is created and Power Restore interface is displayed
No Rapid Restore/Rave or Power Restore partition is on system and no adequate* free space exists on system	Error message is displayed

* The Power Restore partition uses the same space as is used by the boot partition. Additional partitions (such as extended partitions with logical drives defined on them) might exist on the system prior to adding a Power Restore partition. No more than four partitions, including the Power Restore partition, might exist on a system.

When the Power Restore interface is displayed, you select which actions are to be performed, and then click **OK** to perform them or **Cancel** to exit without performing any Save or Restore actions. When the selected action (if any) has finished, the system will power off. Note that some systems cannot be powered off by software and must be powered off manually.

Creating the Power Restore installation/start diskette or CD-ROM

To create a startable Power Restore Installation/Start diskette, complete the following steps:

1. Insert a blank diskette into drive A on the RDM server
2. From the rdm\repository\environment\dos\restore folder on the RDM server, run the **build_pr.bat** batch file

A startable Power Restore Installation/Start CD-ROM can be made using any of several popular CD-authoring software packages, a CD-ROM recorder, a CD-R or CD-R/W disc and the Power Restore Installation/Start diskette as the boot image.

Starting Power Restore from IBM Boot Manager for Power Restore

IBM Boot Manager can also be used to run Power Restore on a system. Instead of booting from a startable diskette or CD-ROM, the system is booted from the hard disk drive. A message will briefly appear, prompting you to press a key (usually the **F11** key) if you wish to run Power Restore. If you press the key during the first few seconds after the prompt appears, the system will boot from the Power Restore partition and run Power Restore. If you do not press the key during that time, the system will boot from the normal boot drive. This approach requires both Power Restore and a customized version of IBM Boot Manager to have been installed on the system.

Installing IBM Boot Manager for Power Restore

IBM Boot Manager for Power Restore cannot be installed as an RDM task. To install IBM Boot Manager for Power Restore on a system, set the system to boot from the diskette drive or CD-ROM, insert the IBM Boot Manager Installation diskette or CD-ROM in the appropriate drive, and power up the system. The installation is automatic and requires one reboot. When it is finished, it will prompt you to remove the diskette or CD-ROM and to power the system off.

Note that installing IBM Boot Manager for Power Restore requires Power Restore to have been previously installed on the system.

Creating the IBM Boot Manager for Power Restore installation diskette or CD-ROM

To work with IBM Boot Manager, the Power Restore partition must be formatted as a startable FAT32 drive. IBM PC DOS 7.1, while it does understand the FAT32 file system, cannot be used if the physical start of the partition is more than approximately four gigabytes from the physical start of the drive. As most modern hard disk drives are much larger than eight gigabytes, versions of Microsoft DOS that work with FAT32, such as those that came with Windows 98 and Windows 98 Second Edition, must be used. IBM does not have the legal right to provide the files needed to make startable diskettes using Microsoft DOS. You will have to provide Microsoft Windows 98 or Windows 98 Second Edition.

To create a startable IBM Boot Manager for Power Restore Installation diskette, perform the following steps:

1. From Microsoft Windows 98 or Windows 98 SE, format a diskette with system files by either using the `format a: /s` command from a Command Prompt window or right-click the diskette icon in My Computer or Windows Explorer, choosing the Format option, and then selecting the *Copy system files* check box in the Format window.
2. Copy the sys.com, himem.sys, and ramdrive.sys files from the Windows 98 or Windows 98 SE system to the diskette (in default installations, the files himem.sys and sys.com can be found in the \windows folder and the file ramdrive.sys can be found in the \windows\command folder).
3. Insert the diskette into drive A on the RDM server.

4. Run the build_bm.bat batch file from the rdm\repository\environment\dos\restore folder on the RDM server.

A startable IBM Boot Manager for Power Restore Installation CD-ROM can be made using any of several popular CD-authoring software packages, a CD-ROM recorder, a CD-R or CD-R/W disc and the IBM Boot Manager for Power Restore Installation diskette as the boot image.

Removing IBM Boot Manager for Power Restore

To remove IBM Boot Manager for Power Restore, perform the following steps:

1. Create a startable DOS diskette
2. Copy the following files from the IBM Boot Manager for Power Restore Installation Diskette or CD-ROM to the new IBM Boot Manager for Power Restore Uninstall Diskette:

   BMGR.EXE
   BMGR.SCR
   BOOT.BIN
   PR2.COM
3. Boot the system using the IBM Boot Manager for Power Restore Uninstall Diskette
4. Run the following commands, either directly or from a batch file:

```
BMGR /R
PR2 /U
```

5. Remove the IBM Boot Manager for Power Restore Uninstall Diskette and power the system down

Removing the Power Restore partition

To remove the Power Restore partition, perform the following steps:

1. Create a startable DOS diskette
2. Copy FDISK.COM or FDISK.EXE (depending on whether you are using IBM PC DOS or Microsoft MS DOS) to the new Power Restore Uninstall Diskette
3. Copy the PR2.COM file from the Power Restore Installation Diskette or CD-ROM to the new Power Restore Uninstall Diskette
4. Boot the system using the IBM Boot Manager for Power Restore Uninstall Diskette
5. Run the PR2 /F command, either directly or from a batch file:
6. Run FDISK
7. Choose the option to delete a partition or logical drive
8. Choose the option to delete a non-DOS partition
9. Select the *last* non-DOS partition and delete it
10. Exit FDISK
11. Remove the Power Restore Uninstall Diskette and power the system down

Note that this process frees up the space used by the Power Restore partition but does *not* add that space to any existing partitions. Also note that failure to perform **step 5** will cause subsequent attempts to install Power Restore on the system to fail as the Power

Restore installation process will incorrectly deduce that a Power Restore partition still exists on the system.

Remove IBM Boot Manager for Power Restore if you are removing the Power Restore partition.

Chapter 5. Scenarios

The scenarios presented here are not intended to be complete or comprehensive. Instead, they are presented with the idea of illustrating particular items of user interaction, which are generally used in multiple places within RDM

Resetting IBM Director with twgreset command

The twgreset command resets the IBM Director persistent storage and resets the database tables, if the installation is an IBM Director server. Run this command only if you want to go back to a pristine installation without having to reinstall IBM Director, or if there has been corruption of persistent data.

Attention: Use the twgreset command only when instructed by the IBM Director program or documentation.

To run the twgreset command, complete the following steps on the RDM server and the RDM Remote D-Server:

On the RDM server

1. Type the following commands:

   ```
   net stop twgipc
   twgreset
   ```

2. Uninstall RDM 4.1
3. Install RDM 4.1
4. Wait for IBM Director to start (green circle appears)

On each RDM Remote D-Server

1. Type the following commands:

   ```
   net stop dserver
   net start dserver
   ```

2. Enable the D-Server with the user interface

Configuring a customized System Firmware Flash task

The purpose of this scenario is to create a new System Firmware Flash task.

1. Right-click **System Firmware Flash** in the IBM Director Tasks pane, and click **Create new task**. This opens the task creation notebook.
2. Type a name and description for the task on the General page.
3. Click the **Setup** tab.
4. Select the **Images** category on the Setup page, and click **Select**. This opens an Image Selection window.

5. Select the check box for each system firmware image you want this task to use, and then click **OK**. (Optionally, you could first use **Create** to configure a BIOS image from the BIOS flash diskette.)
6. Select **OK** on the property sheet window to create the new task.

At this point, you are ready to use this new task to deploy the system firmware to systems.

You could also click the **Advanced** tab on the task template property sheet to configure your own modifications to the standard firmware flash processing.

Creating a customized Windows Clone Install task

In this scenario, the task is to set up a generic unattended installation for Windows 2000 Professional with Service Pack 2. The target systems will have IP protocol support and use DHCP. A local backup image will be created for Power Restore.

1. Prepare a donor computer to be the basis of the clone by running sysprep.exe on the donor computer to remove the unique system information.
2. Create a clone image by running the built-in **Get Donor** task, which runs the Power Quest program **PQIDplyZ.exe** to create the image of the donor computer and store it in the Master Repository. The output of the **PQIDplyZ.exe** program is a *.pqi* file.
3. Right-click the **Windows Clone Install** task in the Tasks pane of the main console and select **Create new task.**
4. Type a name and description for the new task (for example, *W2000 SP2 with DHCP*), and then click **Next**.
5. Click **Select**. Select an image and click **OK** and then click **Next**. If there are no images listed from which to choose, create one.
6. Type your personal information for the task (name, organization, multi-user product key, and User ID if you want to create a local account). Click **Next**.
7. Select the regional information for time zone, system language, user locale, and keyboard. Click **Next** to continue.
8. Configure the network environment by typing either a Workgroup or Domain name. If you select Domain, you will also need to fill in Domain administrator name, Administrator password, and confirmation of that password. Click **Next** to continue.
9. Select the network protocols to use. (TCP/IP is always selected by default). Click **Next** to continue.
10. Configure TCP/IP by selecting DHCP.
11. Click **Finish** to complete the task creation. The new task will appear underneath the **Windows Clone Install** task in the Tasks pane.

Run Script task to perform System Firmware Flash and Windows Clone Installation tasks

The purpose of this scenario is to run a Script task, which has already been created, to perform System Firmware Flash and Windows Clone Installation on all newly discovered systems. The task will be set to run immediately, rather than scheduled.

1. Create a Script task for System Firmware Flash and Windows Clone Install tasks as described in the previous scenario.

2. Drag the newly discovered systems from the Group Contents pane in the main console, and drop them on the newly created Script task in the Tasks pane. Select **Run systems**.
3. Click **Now** when asked whether to execute the task now or schedule for later.
4. The Execution History window appears with status for each of the systems. From there, the System Log window can be opened to view task status for each target system.

Updating systems with selected system firmware levels to latest system firmware level

In this scenario, after new System Firmware Flash levels are imported into RDM, a new group of systems is created, based on System Firmware version, and then the System Firmware levels of this new group is updated.

1. Import the new Flash levels by copying the files from the IBM ftp site and import them into the Master Repository using IM.
2. Select **New Dynamic** from the context menu of the Groups pane.
3. Expand the *Inventory (PC)– Firmware– Version* branch of the Available Criteria pane.
4. Select the System Firmware versions to be upgraded and click **Add**.
5. Click **File** and **Save As** and type a name for the new group.
6. Drag the new group from the Groups pane and drop it on the latest **System Firmware Flash** task in the Tasks pane.
7. Click **Now** when asked if you want to execute the task now or schedule for later.

The Execution History window opens with status for each of the systems. From there, the System Log window can be opened to view task status for each target system.

Updating systems with selected system firmware levels

In this scenario, a new dynamic group of systems is created, based on System Firmware Flash levels.

1. Import the new Flash levels by copying the files from the IBM ftp site and import using the System Firmware import utility.
2. Create a new dynamic group in the Groups pane, based on the System Firmware versions or levels of the systems to be upgraded.
3. Drag this new group to the Tasks pane and drop it on the System Firmware Flash task.
4. Click **Schedule** when asked if you want to perform the task now or schedule for later. The Scheduler window opens.
5. Click **Save** and type a name for the job.
6. Fill in STC information, if applicable, and select **OK** to allow the job to kick off at the scheduled time.

Creating a Custom task to update network adapter firmware

The purpose of this scenario is to create a Custom task to update the IBM Token Ring network adapter firmware.

1. Prepare the files you need for a Custom image:
   a. Obtain the firmware update diskette from the IBM web site.
   b. Copy all files except the 3 DOS operating system files to your RDM server, say into an empty C:\TRFLASH directory.
   c. Create a file C:\TRFLASH\TRFLASH.BAT containing the following lines:

```
%RAMDSK%
SET FLASHUP=OK
CD TRFLASH
IBMFLASH.EXE
TREBOOT.EXE
```

2. Create the custom image:
   a. Click **Tasks** → **Remote Deployment Manager** → **Image Management** on the Director console.
   b. Select **Create**, **Custom**, and **OK** to display the Image Management window.
   c. On the General page, enter a name, for example “Token Ring cs118r files”, and (optionally) a description.
   d. On the Setup page, select the **File** radio button (for the output image to be a zip file). Then select the **Directory…** button, and then navigate to the C:\TRFLASH directory.
   e. Select **OK** on both dialogs and on the “Image successfully created” message window. Your custom image that contains all the files that are needed on the target system is now created. Note the numeric Internal Name of the image, for use below.
3. Create the custom task:
   a. Right click on the **Custom** template, and select **Create new task…**
   b. Enter a name, say “Token Ring cs118r Firmware Flash”, and (optional) a description on the **General** page.
   c. Select the **Advanced** page, and enter the following lines in the command list editor. Use the image-file numeric name that you recorded above.

```
; Flash Token Ring adapter firmware
BOOTTYPE !LOADDOS /ENVIRONMENT/DOS71F
WAKE
!!SETENV
!mtftp get %%SERVER_IP%% image\0391131642556 %%RAMDSK%%\FILES.ZIP
!mtftprc.bat
!mtftp get %%SERVER_IP%% environment\dos\unzip.exe %%RAMDSK%%\unzip.exe
!mtftprc.bat
!%%RAMDSK%%
!UNZIP FILES.ZIP
!TRFLASH\TRFLASH.BAT
!!SHUTDOWN
END
```

d. Click **OK** to complete the task creation. Your new task will appear under Custom in the Tasks pane of the Director console.

4. Debug the task logic. The best way to do this is to run the task on a single system. After the "Starting PC DOS" message appears, quickly press the F8 key. This allows you to step through all the batch files one statement at a time. You can easily find your errors, this way.

This example illustrates several important custom-task concepts.

- There is no single correct way to design a custom task. In this example, the task of downloading files was put in the command list, but those steps could also have been included in the batch file.
- In this case, the batch file was required because flashing the network adapter firmware breaks the network connection. In order to complete the processing, you had to reboot the system in the batch file, since the RDAGENT program could no longer contact the RDM server.
- There are several useful environment variables. RAMDSK (which translates to "D:") is the drive on which you store the images. SERVER_IP is the IP address of the RDM D-Server. Notice that you surround these variables with "%%" in the command list and with "%" in the batch file.
- The task uses the MTFTPRC program to do error handling for each MTFTP command. This program will cause the task to fail whenever the preceding MTFTP command returns an error.
- The task contains no other error handling. For a production-level custom task, you would want to add error handling for each command that might fail (for example, IBMFLASH.EXE and UNZIP.EXE) by setting the RDSTATUS environment variable to an appropriate string. Your objective is to have the task go to "failed" (rather than "complete") state whenever the task does not work properly.

Note: As long as you use a 10-character variable For RDSTATUS ending in E, RDM will fail the task. For example:

```
SET RDSTATUS=RDCUST001E Bad return code from RSA's FLASH2.EXE program.
```

RDSTATUS uses a 6/3/1 format for the syntax: six-character identifier, three-digit id, and E for error, I for Information or W for Warning.

Refreshing hardware inventory data

Drag and drop a group from the Groups pane, or a system from the Group Contents pane, onto a **Scan** task in the Tasks pane. The **Scan** task will refresh the system database with the latest hardware, Asset ID, and optionally end user input.

If the default **Scan** task for new system discovery includes user prompts, you might wish to create a separate task for hardware inventory refresh.

Deploying Windows 2000 on an NT 4.0 workstation

The purpose of this scenario is to deploy Windows 2000 on a customer Windows NT 4.0 workstation, giving the option to regress the workstation back to Windows NT 4.0 if the user later determines that Windows 2000 is unsatisfactory. The workstation contains a single hard disk drive with the following partitions:

- Partition 1 is the C: drive, which contains Windows NT 4.0 Workstation plus all of the user application programs.
- Partition 2 is the D: drive, which contains all of the user data files.
- Partition 3 is a hidden RDM 3.x Power Restore partition that contains a backup of partition 1 (called *Image A*).

It is assumed that there is enough space on the hidden Power Restore partition to store two compressed RDM backups of partition 1.

Create and run a Script Task that has the following characteristics:

- Flashes the system BIOS code to the latest level using a built-in System Firmware Flash Task.
- Deploys Windows 2000 Professional using a Windows Native Install Task.
- Deploys the customer applications as part of the Windows Native Install Task.
- Keeps existing hard-disk partitioning (the user must modify the Windows Native Install Task).
- Creates an *Image B* Power Restore backup of partition 1 using a Power Restore Task.

The workstation hard disk drive now looks like this:

- Partition 1 is the C: drive, which contains Windows 2000 Professional plus all of the user application programs.
- Partition 2 is the D: drive, which contains all of the user data files. This partition was not changed in any way by this scenario.
- Partition 3 is a hidden Power Restore partition that contains 2 backups of partition 1:
  - *Image A* backup containing Windows NT 4.0 Workstation.
  - *Image B* backup containing Windows 2000 Professional.

Viewing and editing system properties with System/Task Configuration

The purpose of this scenario is to import a file containing system property information into the Master Repository, and then view the information using the System/Task Configuration window. The file to be imported contains information needed for installing the operating systems and applications on the systems (for example, IP addresses, computer names, or time zones of the systems.) The file follows these rules:

- The file contains comma-delimited field names. These names are the same names that RDM uses for the same fields.
- The rest of the rows contain values for the fields, in the same order as the first row.

- The file contains a UUID for each computer.
- The file type is *.txt*.

1. Select a System (or Systems) from the Groups Contents pane in the main console. To select more than one system, press Ctrl while making your selections.
2. Right-click the blank area of the Group Contents pane, and then select *Open system configurations...*
3. The System/Task Configuration screen asks if you have a file of system information to import. To import a file, select *Yes, import system information from a file* and type the path to the file and the filename in the space provided or click **Browse** to find your file. Click **OK** to continue.
4. The system information is imported and then displayed in a grid so that you can view and modify the information for all of the systems at the same time. The information displayed is based on the file that was imported. To enter or modify system parameters:
   a. Highlight the computer or computers for which you want to modify the parameters.
   b. Right-click the cell of the parameter you want to modify and select from the commands. The commands will vary depending on whether you have selected one or multiple computers, and which parameter you are modifying. Some parameters (for example, Time zone) will have a scrollable list to choose a value from.
   c. Click **OK** to save any changes you have made and close the System/Task Configuration, or click **Cancel** to close without saving changes.

Configuring a task

1. Right-click a task. Context menu displays.
2. Select "Configure systems". The System Task/Configuration (STC) panel displays with all configured systems filled in.
3. Make changes as needed.
   - Update parameters.
   - Delete rows (that is, the configuration of a system for this task) by selecting the rows and using a "delete" button.
4. Select **Save**. The STC closes.

Chapter 6. Customizing RDM

This chapter describes creating DOS boot images and automating Sysprep.

Creating RDM DOS boot images

Note: When loading a DOS environment, the RDM bootstrap will return an error if there is less than 16 MB of system memory. The bootstrap by itself requires 2.88 MB of RAM to save the DOS image before transferring control to it.

Create unique DOS folder

1. Navigate to the \rdm\local\env directory where x is the drive RDM is installed.
2. Create a folder called myDos.dir.

   You can name this folder whatever you want.
3. Copy your custom Autoexec.bat, Config.sys, DOS drivers, and any other supporting files to the myDos.dir directory.

Edit mkimages.bat file

1. Navigate to the \rdm\local\env directory.
2. Right-click the mkimages.bat file and select **Edit**.
3. Add the following lines of code to the mkimages.bat file:

```
Copy baseimg myDos
Bpdisk -d myDos  -i myDos.dir
Move myDos ..\...\repository\environment\myDos
```

Build DOS image

1. Navigate to the \rdm\local\env directory.
2. Run the mkimages.bat file.
3. Make sure there is a file named myDos in the \rdm\repository\environment directory.

Use DOS image

1. Create a new Custom task or edit an existing task.
2. Right-click the task and select **Edit** task.
3. Click the **Advanced** tab and add the following line to the beginning of the Command list:

```
BOOTTYPE !LOADDOS /ENVIRONMENT/MYDOS
```

This tells the RDM server to load your DOS image to the client assigned to this task on the next client boot.

Note: You will most likely want to replace the existing BOOTTYPE command that is already in the Command list with this one.

Note: When booting the client multiple times in the same Command List, you must set the BOOTTYPE before you call the !!REBOOT command. If you do not, the client will load the previous BOOTTYPE command.

Advanced mkimages.bat usage

If you want to use the RDM DOS RDAGENT in your Command List or Autoexec.exe file, you will need to add the following code to your section of the mkimages.bat file. Example:

```
Copy baseimg myDos
Bpdisk -d myDos -i base.dir
Bpdisk -d myDos -i myDos.dir
Move myDos ..\...\repository\environment\myDos
```

If you want to use the RDM Extended Memory Manager in your DOS image add the following code to your section of the mkimages.bat file:

```
Bpdisk -d myDos -i others.dir\emm386
```

If you want to use the RDM RAM Drive in your DOS image add the following code to your section of the mkimages.bat file:

```
Bpdisk -d myDos -i others.dir\ramdrive
```

If you want to use the RDM High Memory support in your DOS image add the following code to your section of the mkimages.bat file:

```
Bpdisk -d myDos -i others.dir\himem
```

If you want to use the RDM Disk Formatting support in your DOS image add the following code to your section of the mkimages.bat file:

```
Bpdisk -d myDos -i others.dir\frmtutils
```

If you want to use the RDM Windows Install Utilities in your DOS image add the following code to your section of the mkimages.bat file:

```
Bpdisk -d myDos -i others.dir\instutils
```

Note: Make sure that you re-run the mkimages.bat batch file after every change you make.

Automating Sysprep

You prepare a donor computer to be the basis of the clone by running the Microsoft System Preparation tool, Sysprep (sysprep.exe), to remove the unique system information, such as its Security Identifier (SID). The following example automates the process of running Sysprep with the Windows Native Install task:

1. Copy necessary Sysprep files:

   Extract sysprep.exe and setupcl.exe from the \support\tools\deploy.cab file located on the Windows XP/2K CD into the x:\rdm\repository directory on the Master D-Server.

2. Create a batch file called SysCopy.bat as follows:

```
Echo on
REM Start SysCopy.bat
mkdir c:\sysprep
mtftp get %SERVER_IP% sysprep.exe c:\sysprep\sysprep.exe
mtftp get %SERVER_IP% setupcl.exe c:\sysprepsetupcl.exe
REM Finished SysCopy.bat
```

   Copy the SysCopy.bat file to the \rdm\repository directory on the Master D-Server.

3. Create a new Windows Native Install task:

   a. Type valid name and click **Next**.

   b. Click **Select**, select an operating system image, and then click **Next**.

   c. Make sure the operating system is compatible with the version of Sysprep in the folder.

   d. Click **Next** and continue with the wizard.

4. Click **Finish** to complete the wizard.

5. Edit the Windows Native Install task:

   a. Right-click the Windows Native Install task you just created and click the **Advanced** tab.

   b. Modify the Command List as follows:

```
BOOTTYPE !LOADDOS ENVIRONMENT/DOS71X
WAKE
!!SETENV
!PRE_INST.BAT
!!REBOOT
!!SETENV
!INSTALL.BAT
!!REBOOT
!mtftp get %%SERVER_IP%% SysCopy.bat A:\SysCopy.bat
!SysCopy.bat
BOOTTYPE !BOOTLOCAL
!!REBOOT
BOOTTYPE !LOADDOS ENVIRONMENT/DOS71X
!C:\sysprep\sysprep.exe –quiet –reboot
!!SHUTDOWN
END
```

You can drag a client (with a Windows 2000 or Windows XP operating system) onto this new Windows Native Install task. The task runs Sysprep after a complete Windows

installation. After running Sysprep, the system reboots and then shuts down. You can now run a Get Donor task on the client.

Note: The *-reboot* parameter was used with Sysprep because Sysprep was not shutting down systems properly (while using Sysprep version 1.0 in the test). Sysprep version 1.1 for Windows 2000 and Sysprep for XP has a -forceshutdown parameter that might solve this issue. The command list might change to look like this:

```
BOOTTYPE !BOOTLOCAL
!!REBOOT
!C:\sysprep\sysprep.exe –quiet –forceshutdown
END
```

Note: In order to complete a Windows Clone Install task on an image that has a Windows XP operating system, you must run Sysprep and add in the "-mini" tag to the sysprep command line in the RDM commandlist, for example:

```
sysprep –mini -quiet –reboot
```

This is not necessary with Windows 2000 Professional, Windows 2000 Server, or Windows 2003 Server.

Chapter 7. Utilities

This chapter describes the DOS and RDM utilities. The utilities are listed alphabetically.

DOS utilities

DYNALOAD.COM

This program uses the DYNALOAD utility to load a device driver dynamically after the boot process has completed.

DYNALOAD is part of PC-DOS 7 and is used in batch files to load a device driver dynamically after the boot process has completed. RDM automatically uses DYNALOAD to load ServeRAID drivers (when needed) to download the RAID configuration to your ServeRAID adapter. To use DYNALOAD to load another device driver within your batch files, refer your PC-DOS 7 documentation.

FAT32.EXE

This program accesses FAT32 disk partitions from PC-DOS. This is a "terminate and stay resident" (TSR) program.

The syntax of the command is:

```
FAT32 [/S]
```

`/S` Display the current status of FAT32 support.

If a hard disk has been partitioned using FDISK32.EXE (so that partitions greater than 2047 MB can be supported) it is necessary to load the FAT32 TSR so that these partitions can be accessed. However, the FORMAT32.COM command can use FAT32 partitions without the FAT32 TSR. See FORMAT32.COM and FAT32.EXE for an example of the use of FORMAT32.COM and FAT32.EXE.

FDISK.COM

The FDISK command is used to partition a hard disk and prepare it for a format operation. When using FDISK, start from a known disk configuration by deleting all partitions. The utility LCBTRDEL.EXE resets the hard disk to a known state by deleting the master boot record.

Note: RDM is currently restricted to managing systems with a maximum of two DOS drives. You can create more partitions, but no more than two can be primary or logical DOS drives.

The version of FDISK that is provided with RDM can be used with command-line arguments or a response file. Using command-line arguments provides more flexibility and can provide standardized partition sizes regardless of the hard disk capacity.

Typically, within RDM the required keyboard input to the FDISK.COM command is provided by a redirected file:

```
%LCCMPATH%\FDISK < %TMPPATH%\LCFDISK.DAT
```

The LCFDISK.DAT file is prepared using the LCFDISK2.EXE utility.

FDISK command-line arguments

You can use DOS FDISK command-line arguments in RDM batch files as an alternative to creating binary response files.

The syntax for the DOS FDISK command is:

```
[d:][path]FDISK d [/PRI:m] | [/EXT:n ] | [/LOG:o]
```

`d:`	The drive on which the FDISK program is located.
`path`	The path to the directory of specified drive where the FDISK program is located.
`d`	The drive (1 or 2) on which the FDISK operation is to be performed.
`/PRI:m`	The size of the primary DOS partition to create (in MB).
`/EXT:n`	The size of the extended DOS partition to create (in MB).
`/LOG:o`	The size of the logical drive to create (in MB) in the extended partition.

PC DOS can handle a maximum of two partitions: one primary and one extended. The maximum primary partition size recognized by PC DOS is 2048 MB. The maximum extended partition size is 8064 MB. The largest logical drive that can be contained within the extended partition is 2048 MB, but you can have multiple logical drives. If you specify a partition size that is larger than the amount of available disk space, the FDISK command will create a smaller partition to use whatever amount of disk space is available. Therefore, you can create a single preload image batch file specifying the /EXT:8064 parameter and use it on any system regardless of the hard disk capacity.

Note: Be aware that the LCBTRDEL utility program provided with the RDM program numbers the first physical hard disk drive as 0 and the second physical drive as 1. The DOS FDISK command numbers the first physical hard disk as 1 and the second physical drive as 2.

Example 1: You have a single 5 GB hard disk and you want to partition it as follows:

2 GB primary partition

2 GB extended partition

1 GB unused

Your preload image batch file (*.LCP* file) would look like the following:

```
%LCCMPATH%\LCBTRDEL 0 /S
%LCCMPATH%\FDISK 1 /PRI:2048 /EXT:2048 /LOG:2048
```

If you use this same preload image batch file on a system with a 3 GB hard disk, the result would be a 2 GB primary partition and a 1 GB Extended partition.

Example 2: You have a single 5 GB hard disk and want to partition it to have a 2 GB primary partition and a 3 GB extended partition containing two logical drives (2 GB and 1 GB, respectively).

Your preload image batch file (*.LCP* file) would look like the following:

```
%LCCMPATH%\LCBTRDEL 0 /S
%LCCMPATH%\FDISK 1 /PRI:2048 /EXT:3076 /LOG:2048
%LCCMPATH%\FDISK 1 /LOG:1024
```

Response Files for the FDISK Command

Two response files are provided by RDM to run the FDISK command unattended.

LC5050FD.DAT contains the responses for FDISK to process a disk with no partitions defined and to create one primary and one secondary partition, each taking 50% of the disk space.

Note: If the size of the system hard disk is 4 GB or greater, you cannot use LC5050FD.DAT. LC5050FD.DAT creates a primary DOS partition that is 50% of the hard disk space, and this partition cannot exceed 2 GB.

LCFDISK.DAT contains the responses for FDISK to process a disk with no partitions defined and to create a single partition, 100% of available disk space.

The following shows the sequence of responses found in the LC5050FD.DAT file:

`ENTER`	Create DOS partition.
`ENTER`	Create primary DOS partition.
`N ENTER`	Do not use all disk space.
`50% ENTER`	Use 50% of disk space.
`ESC`	Return to FDISK Options.
`ENTER`	Create DOS partition.
`2 ENTER`	Create extended DOS partition.
`ENTER`	Use maximum available space.
`ESC`	Go to create logical DOS drives.
`ENTER`	Use all available space.
`ESC`	Return to FDISK options.
`2 ENTER`	Set active partition.
`1 ENTER`	Partition 1.

ESC	Return to FDISK options.
ENTER	Reboot.

The most likely variation would be to create one or more partitions of fixed size. To do this, change the text **50%** to the size of the partition required.

You can easily modify one of the existing response files as follows:

1. Copy the LC5050FD.DAT file provided with RDM under a new name. Make sure you keep the *.DAT* extension.
2. Open the newly created response file using WordPad or NotePad. Not all of the characters will be readable.
3. Locate the 50%.
4. Change the 50 to any value from 1 to 100. Do not change any other characters. The value you choose will determine the percentage of the hard disk that will be used for the primary partition.
5. Save and close the file.

If you want to create your own response file you must first go through the FDISK procedure to partition the hard disk and write down every keystroke you use. Be sure to include the final keystroke to restart the computer. Next, use an editor to prepare a binary file with the ASCII codes for the keystroke characters. (ENTER is 13 decimal, 0D hex. ESC is 27 decimal, 1B hex.)

A preload image batch file (*.LCP* file) using the LC5050FD.DAT response file looks similar to the following:

```
ctty con
%LCCMPATH%\LCBTRDEL 0 /S
%LCCMPATH%\INTER.EXE FDISK < %LCCMPATH%\LC5050FD.DAT
```

FDISK32.EXE

This program allows hard disk drive partitions larger than 2047 MB to be created.

The syntax of this command is exactly the same as FDISK.COM.

Example: The following command line will create a primary partition of size 4096Mb.

```
FDISK32 1 /PRI:4096
```

As with FDISK.EXE, the system must be re-booted after changes have been made to the partition table before it can be used. After a re-boot, the following command line can be used to prepare the partition for use:

```
FORMAT32 C:
```

Finally, before using any other PC-DOS commands the FAT32 TSR must be loaded thus:

```
FAT32
```

Typically, within RDM the required keyboard input to the FDISK32.EXE command is provided by a redirected file:

```
%LCCMPATH%\FDISK32 < %TMPPATH%\LCFDISK.DAT
```

The LCFDISK.DAT file is prepared using the LCFDISK2.EXE utility.

FORMAT.COM

This program prepares a disk partition for use with PC-DOS.

The syntax for this command is:

```
FORMAT drive: [/V[:label]] [/Q] [/U] [/F:size] [/B | /S] [/C]
FORMAT drive: [/V[:label]] [/Q] [/U] [/T:tracks /N:sectors] [/B |
/S] [/C]
FORMAT drive: [/V[:label]] [/Q] [/U] [/1] [/4] [/B | /S] [/C]
FORMAT drive: [/Q] [/U] [/1] [/4] [/8] [/B | /S] [/C]
```

`drive`	Specifies the drive to format.
`/V[:label]`	Specifies the volume label.
`/Q`	Performs a quick format.
`/U`	Performs an unconditional format.
`/F:size`	Specifies the size of the diskette to format (such as 160, 180, 320, 360, 720, 1.2, 1.44, 2.88).
`/B`	Allocates space on the formatted disk for system files.
`/S`	Copies system files to the formatted disk.
`/T:tracks`	Specifies the number of tracks per disk side.
`/N:sectors`	Specifies the number of sectors per track.
`/1`	Formats a single side of a diskette.
`/4`	Formats a 5.25-inch 360K diskette in a high-density drive.
`/8`	Formats eight sectors per track.
`/C`	Revert to less conservative handling of bad blocks.

Example: The following command line prepares the primary partition on a drive:

```
FORMAT C:
```

Note: This is the standard PC-DOS FORMAT.COM command.

Typically, within RDM the required keyboard input to the FORMAT.COM command is provided by a redirected file:

```
%LCCMPATH%\FORMAT %TARGET% < %LCCMPATH%\FORMAT.DAT
```

FORMAT32.COM

This program prepares a FAT32 disk partition for use with PC-DOS.

The syntax for this command is:

```
FORMAT32 drive: [/V[:label]] [/Q] [/AUTOTEST]
```

`drive`	Specifies the drive to format.
`/V[:label]`	Specifies the volume label.
`/Q`	Performs a quick format.
`/AUTOTEST`	Run FORMAT without prompts.

Example: The following command line prepares the primary partition on a drive:

```
FORMAT32 C:
```

Note: FORMAT32.COM should only be used to format FAT32 partitions, that is, partitions that were created by FDISK32.EXE.

Typically, within RDM the required keyboard input to the FORMAT32.COM command is provided by a redirected file:

```
%LCCMPATH%\FORMAT32 %TARGET% < %LCCMPATH%\FORMAT.DAT
```

Response file for the FORMAT command

The FORMAT command can be used to define areas of the hard disk that can receive and store data. A response file is provided with RDM to run the FORMAT command unattended.

FORMAT.DAT contains the responses for FORMAT to create DOS FAT16-based tracks and sectors within the specified partition.

IMPORTANT: The FORMAT command prompts the user to define a volume label as a part of its process. RDM will not create a startable partition if a volume label is named.

Example: The following sequence of responses is found in the FORMAT.DAT file:

`y ENTER` Format existing partition

ENTER	No volume label assigned

Do not create variations of this response file.

RDM utilities

AIAREAD.EXE

Use the AIAREAD.EXE utility to read the contents of the Asset Information Area (AIA) of the Radio Frequency Identification (RFID) chip. This chip is battery-maintained and contains asset data specific to each system. This program runs under DOS only.

The syntax of the command is:

```
AIAREAD group [field] [/f=file] [/a] [/s]] [/x] [/p=prefix],
```

group	The name of the device group.
field	The name of the field to read (default is all fields).
file	The name of the file to sent output results to (default is stdout).
/a	Append the file (default is overwrite file).
/s	Format output as SET statements. For example, "SET name=value" (default is "name=value").
/x	Exclude fields that are null strings or zero values.
/p	Prepend "prefix" to the name of each field.

Example 1: You want to display one of the AIA fields at the system.

At the system, execute the following command line:

```
AIAREAD ownerdata
```

The system displays:

```
OWNERNAME=jim smith
DEPARTMENT=219
LOCATION=Room 315
PHONE_NUMBER=3765
OWNERPOSITION=Manager
```

Example 2: You want to create a .BAT file that will SET variables in RAM on a system.

At the system, execute the following command line:

```
AIAREAD /s ownerdata > OWNER.BAT
```

The created OWNER.BAT file would contain these lines:

```
SET OWNERNAME=jim smith
SET DEPARTMENT=219
SET LOCATION=Room 315
SET PHONE_NUMBER=3765
SET OWNERPOSITION=Manager
```

AIAWRITE.EXE

Use this program to input contents to the Asset Information Area (AIA) of the Radio Frequency Identification (RFID) chip. This chip is battery maintained and contains asset data specific to each system. This program runs under DOS only.

The syntax of the command is:

```
AIAWRITE group {field1=[value1]...[fieldn=[valuen]]|/f=file}
```

`group`	The name of the device group.
`fieldn`	The name of the field to write.
`valuen`	The value to assign to `fieldn`. For the USERDEVICE group, a blank value means delete this field, if the field already exists, or create a field with a NULL value if the field does not exist. For all others it means assign a zero or null value.
`file`	The name of the file from which to get field/value pairs. Each line in this file contains one field/value pair, separated by "=".

Example:

```
AIAWRITE USERDEVICE AREA=SOUTH
```

IPSSENDL.EXE

The ipssendl command is a light version of the ServeRAID ipssend command-line configuration utility. As such, it supports a subset of the ipssend command set, restricted to the following options:

GETCONFIG
SETCONFIG
BACKUP
RESTORE
SETSTATE
CREATE LOGICALDRIVE
SET LDCACHE
STRIPESIZE

To configure an IBM ServeRAID Adapter directly at the client or remotely using the RAID clone task, use a DOS batch file comprised of appropriate ipssendl commands, comments, and error-handling for the tasks. These tasks include viewing the current configuration, rebuilding a dead drive, initializing and synchronizing logical drives, plus many more. This functionality is described in more detail here.

To create arrays and logical drives for ServeRaid Controllers, you use the `CREATE` option. You must enter the channel and SCSI ID of the physical drives to define an array. You must type the logical drive size and the RAID level for the logical drive. When you type MAX as the size on the command line, the maximum size of the logical drive is calculated automatically. If there is free space in an existing array, you can create additional logical drives for that array.

The syntax of the command with the `CREATE` option is:

```
IPSSENDL CREATE <Controller> LOGICALDRIVE <Options> <Size>
<RAIDLevel> <Channel> <SCSI ID> [<Channel> <SCSI ID>] NOPROMPT
```

`<Controller>`	Indicates the ServeRAID controller number (1 to 12).
`LOGICALDRIVE`	Indicates you are creating a logical drive.
`<Options>`	Enter one of the following:
	The keyword `NEWARRAY` indicating that you are creating a new array and a new logical drive.
	A valid array ID (A - H) of an existing array.
`<Size>`	Enter one of the following:
	The keyword `MAX` to create the maximum size for the array.
	The size in megabytes (MB) of the logical drive.
`<RAIDLevel>`	The RAID level for the logical drive (0, 1, 1E, 5, 5E)
`<Channel>`	Enter the channel number for the device (1 to 4). You must provide `<Channel>` and `<SCSCI ID>` at least once. However, you can repeat these parameters in a single command up to 16 times.
`<SCSI ID>`	Enter the SCSI ID of the device (0 to 15). You must provide `<Channel>` and `<SCSCI ID>` at least once. However, you can repeat these parameters in a single command up to 16 times.
`NOPROMPT`	Overrides the user prompt. The parameter is optional.

Note: You cannot create RAID level-x0 logical drives with the `IPSSENDL CREATE` function.

After the logical drive is created, a quick initialization is done. The quick initialization process initializes (writes zeroes on) the first 1024 sectors (0.5 MB) of the logical drive. If you assign RAID level-5 or RAID level-5E to the logical the logical drive automatically synchronizes in the background.

Refer to the documentation on the ServeRAID CD for syntax and detailed explanations of these commands.

LCBTRDEL.EXE

Use the LCBTRDEL.EXE utility to delete the master boot record of a physical disk drive. This action destroys all partitions on the disk and, for normal purposes; all data saved on it. Use this utility only if you want to partition the disk using FDISK or FDISK32.

The syntax of the command is:

```
LCBTRDEL n /S
```

where `n` is the disk drive number (0 is the first hard disk drive, 1 is the second hard disk drive, and so on) and `/S` is a safety flag to prevent accidental use.

After using LCBTRDEL.EXE, you would normally call FDISK or FDISK32.

LCCUSTOM.EXE

The LCCUSTOM.EXE utility substitutes DOS environment variables with values within batch files. In most cases, the LCCUSTOM utility can be used to replace the older DEDITD.EXE utility. LCCUSTOM is more powerful than DEDITD, in that it cannot only substitute the environment variables of a batch file based on parameters supplied from RDM System and Profile parameter pages, but it can also substitute environment variables from parameters stored in a text file (which DEDITD cannot do).

Variables within files must be enclosed within % characters (as they are in RDM batch files). If a string enclosed within % characters is the name of an environment variable, the string, including the % characters, will be replaced by the actual value of the environment variable.

The syntax for the command is:

```
LCCUSTOM infile [=outfile] [variable_file] [/v]
```

`infile`	The name of the file to be modified.
`outfile`	Optional. The name of the modified copy of the file. If omitted or set to "=", the infile is modified.
`variable_file`	Optional. A file containing variables to be modified. If used, outfile must be specified as "=".
`/v`	Optional. Verbose output for debugging.

When using LCCUSTOM.EXE, note the following:

- A value set in `variable_file` takes precedence over a value for the same variable set in the DOS command line environment.
- Environment variables within the output file can be given a blank value.
- LCCUSTOM can replace DEDITD for the most common purposes, replacing all occurrences of a parameter with its value throughout a file. DEDITD might still be required for more specialized file modifications.
- LCCUSTOM does not use the current directory for work files, so it can be run from a read-only directory.
- LCCUSTOM modifies one line at a time. The maximum line length is 8 KB. Lines that are longer than 8 KB might not be fully converted.

LCCM.1 and BSTRAP.0

1. The following informational messages can be displayed on the system monitor:

```
IBM Bootstrap Loader"
2.1
(C) Copyright IBM Corp. 1999,2002 All Rights Reserved."
Copyright (C) 1997,1999 Intel Corporation."
This version of RDM 4.1 is licensed to run only on IBM computers.
Please\r\n"
contact your IBM representative to purchase the RDM version that
is licensed\r\n"
to run on non-IBM computers.\r\n"
Contacting RDM D-Server"
Booting RDM System Environment"
from RAM disk ..."
Performing local boot ..."
Loading second bootstrap"
Receive Reboot command ..."
Receive Shutdown command ..."
Reboot in 3 seconds ..."
```

2. The following error or warning messages can be displayed on the system monitor:

```
RDBOOT000I Bootstrap starts up successfully"
RDBOOT001W No D server IP found. Default to DHCP server."
RDBOOT002W No udp ports defined. Default to "
RDBOOT003E !PXE structure is invalid "
RDBOOT004E PXENV+ structure is invalid "
RDBOOT005E Get cached packet failed"
RDBOOT006E Could not get pointer to original packet storage"
RDBOOT007E No response from server."
RDBOOT008E Received invalid message type (Sig/Dtype/Opcode)"
RDBOOT009E Message XID not match"
RDBOOT010E Unknown work type received"
RDBOOT011E Unknown work option received"
RDBOOT012E Not support floppy image larger than 2880KB"
RDBOOT013E Not enough extended memory"
RDBOOT014E Could not download boot image"
RDBOOT015E ENV RAMdisk image corrupted"
RDBOOT016E Cannot update 40:13"
RDBOOT017E Cannot remove undi code"
RDBOOT018E Could not open UDP connection"
RDBOOT019E UDP write failed."
```

```
RDBOOT020E PXE-E79: NBP is too big to fit in free base memory."
RDBOOT021E Failed to send DHCP Release"
RDBOOT022E PXE-E81: Invalid DHCP option format."
RDBOOT023E Transfering control to RAMdisk image failed."
RDBOOT024E Restart to new bootstrap failed."
RDBOOT025E Failed to read hard disk boot sector"
```

3. The following messages are displayed by BSTRAP.0 only.

```
Invalid DHCP option format"
Bad or missing discovery server list.  #1"
Bad or missing multicast discover address #1"
Bad or missing discovery server list #2"
Bad or missing multicast discover address #2"
Bad or missing PXE menu and/or prompt information.  #1"
Bad or missing PXE menu and/or prompt information.  #2"
No MAN_INFO or OS_INFO options found"
Press <Space> for Configuration Services or <Esc> or <Ctrl-C> to
cancel"
Press <Esc> to cancel network boot"
No services selected"
Network boot canceled by keystroke"
Network Boot Menu"
Key Description"
 Esc   Cancel network boot"
Press key to select desired network boot (1"
, 2"
, Space"
, ESC) "
Network boot canceled by keystroke"
```

LCIPS.DOS

This is the DOS IP stack used on the to-be-deployed systems.

```
RDIPST001E The protocol manager could not be opened."
RDIPST002E The protocol manager would not accept a request."
RDIPST003E The protocol manager would not supply a configration
image."
RDIPST004E The protocol manager would not accept module
registration."
RDIPST005E No MAC driver bindings were specified in PROTOCOL.INI"
RDIPST006E System Resources are nto available to hold the current
paramter configuration in PROTOCOL.INI.
RDIPST007I Driver will not fit in UMB, loading low."
RDIPST008I Chaining multiple LAN drivers."
RDIPST009E Address error correcting 386 processor."
RDIPST010E Too many MAC driver binds specified in PROTOCOL.INI"
RDIPST011E An unrecognized keyword was found in PROTOCOL.INI:"
RDIPST012E A value is required for keyword in PROTOCOL.INI."
RDIPST013E The value specified for a keyword is not valid."
RDIPST014E The value specified for a keyword is not within the
allowed range."
RDIPST015E A duplicate keyword was found in PROTOCOL.INI."
RDIPST016E Section for this Driver missing in PROTOCOL.INI."
RDIPST017E Error loading - Press F1 to continue."
```

MERGEINI.EXE

This program merges two (.INI) or (.INF) files together.

The syntax of the command is:

```
MERGEINI file1 file2
```

The contents of file1 are merged with the contents of file2 and the results written to file2.

MTFTP.EXE

This program is the MTFTP client. The Linux version and the DOS version are the same except that the DOS version omits the –I option.

```
MTFTP  {GET | PUT}  ipaddr[,port]  sourcefile  destfile
[-Aackfrequency]  [-Bblocksize]  [-M]  [-Llisten_to]
[-Ttransmission_to]  [-V]  [-D]  [-R]  -Iinterface


GET|PUT            GET to read file from server.
                   PUT to write file to server.  PUT is only
                   supported for unicast.
ipaddr             IP address of MTFTP service in format w.x.y.z
port               Listen port of MTFTP service.  Default port is
                   1759 for multicast, 69 for unicast.
sourcefile         Name of file to read from.
                   For GET, the source file resides on the
                   server. For PUT, the source file resides on
                   the client.
destfile           Name of file to write to.
                   For GET, the destination file resides on the
                   client. For PUT, the destination file resides
                   on the server.
-Aackfrequency     Acknowledge every nth packet, where
                   n=ackfrequency.
                   Should be a power of 2. Default is 1.
-Bblocksize        Blocksize of data packet - should be multiple
                   of 512. Default is 512.  Maximum value is
                   8192.
-M                 Use multicast TFTP, listening on mip:mport
                   assigned by server. No input required for mip
                   or mport. Default mport mip is 1758.
-Llisten_to        Time, in seconds, a client listens before
                   deciding to open the multicast session
                   himself.  Must be >= 0.  Defaults to 2
                   seconds.
-Ttransmission_to  Baseline time, in seconds, a non-acking client
                   waits before deciding to reopen the multicast
                   session himself.  The actual time waited is
                   adjusted based on the data already received.
                   Must be >= 0. Defaults to 2 seconds.
-V                 Display progress of transfer.
-D                 Display extensive details of transfer
                   appropriate for program debugging.  Debug
                   information displayed will include verbose
```

```
                    output regardless of specification of -V
                    option.
-R                  Replicate file from master dserver to remote
                    dserver without actually transferring file to
                    client.
-Iinterface         IP address of client network interface to
                    communicate on in format w.x.y.z
```

- The following are messages displayed when invalid parameter values are entered.

```
RDMMC002E Invalid option: %s\n
RDMMC003E Invalid server IP address %s\n
Server IP address must be in format w.x.y.z where w, x, y, and z
are all numeric and <= 255\n
RDMMC004E Invalid server port - %s.  Port number must be numeric
and less than 65535.\n
RDMMC005E Invalid ackfrequency -A%s\n
Ackfrequency must be numeric and in decimal\n
RDMMC006E Invalid ackfrequency -A%s\n
Ackfrequency must be greater than 0\n
RDMMC007E Invalid blocksize -B%s\n
Blocksize must be numeric and in decimal\n
RDMMC008E Invalid blocksize -B%s\n
Blocksize must be between 512 and 8192.\n
RDMMC009E Invalid multicast IP address -M%s\n
Multicast IP address must be in format w.x.y.z where w, x, y, and
z are all numeric and <= 255\n
#define RDMMC010InvalMcastPort RDMMC010E Invalid multicast port -
%s.  Port number must be numeric and less than 65535.\n
RDMMC011E Invalid listen timeout value -L%s\n
Listen timeout must be numeric and in decimal\n
RDMMC012E Error opening destination file %s\n
RDMMC013E Invalid transmission timeout value -T%s\n
Transmission timeout must be numeric and in decimal\n
RDMMC014E Error getting UNDI information\n
RDMMC015E Server returned a zero ack frequency in OACK response\n
RDMMC016E The ack frequency returned by the server, %d, was not
the same as the ack frequency, %d, requested.\n
RDMMC017E Multicast put not supported. Remove -M option.\n
RDMMC019E Error opening source file %s\n
RDMMC020E Error getting cached packet of type %d - retval = %d\n
RDMMC021E Error getting cached packet of type %d - gbi.Status =
%d\n
RDMMC022E Failed to bind with the IP stack, RC=%04xh\n
RDMMC023E Error setting unicast filter, RC: %04x\n
RDMMC024E Error joining multicast group, RC: %04x\n
RDMMC025E Error setting multicast filter, RC: %04x\n
RDMMC026E Error removing filter, RC: %04x\n
RDMMC027E Error leaving multicast group, RC: %04x\n
RDMMC028E Error unbinding service RC: %04x\n
RDMMC029E Error seeking to location %ld in destination file -
RDMMC030E Error writing %d bytes to location %ld in destination
file -
RDMMC031E Error seeking to location %ld in source file -
RDMMC032E Error reading %d bytes from location %ld in source file
-
RDMMC033E Max seek location exceeded for blocksize %d\n
RDMMC034E Invalid multicast IP address -M%s\n
Multicast IP address must be between 224.0.0.0 and 255.255.255.0\n
RDMMC035E Invalid ackfrequency -A%s\n
Ackfrequency should be less than 5 characters\n
RDMMC036E -A option specified without a value\n
```

```
RDMMC037E Invalid blocksize -B%s\n
Blocksize should be less than 5 characters\n
RDMMC038E -B option specified without a value\n
RDMMC039E Invalid listen timeout -L%s\n
Listen timeout must be > 0\n
RDMMC040E Invalid transmission timeout -T%s\n
Transmission timeout must be > 0\n
RDMMC041E Error seeking to end of source file -
RDMMC042E Error seeking to start of source file -
RDMMC043E Error getting file position using ftell -
RDMMC044E Invalid option: %s - no leading hyphen\n
RDMMC045E -L option specified without a value\n
RDMMC046E Invalid listen timeout -L%s\n
Listen timeout should be less than 4 characters\n
RDMMC047E -T option specified without a value\n
RDMMC048E Invalid transmission timeout -T%s\n
Transmission timeout should be less than 4 characters\n
RDMMC049E Invalid client network interface address -M%s\n
Client network interface must be an IP address in format w.x.y.z
where w, x, y, and z are all numeric and <= 255\n
RDMMC050E No client network interface specified with -I\n
```

- The following are messages displayed when there is a problem with the MTFTP transfer.

```
RDMMC100E ProxyDHCP service did not reply to request on port
4011\n
RDMMC101E Client could not locate a secure server\n
RDMMC102E Missing MTFTP server IP address\n
RDMMC103E BIS bad entry structure checksum\n
RDMMC104E BIS get signature information failed\n
RDMMC105E BIS free memory failed\n
RDMMC106E BIS get boot object authorization check flag failed\n
RDMMC107E BIS shutdown failed\n
RDMMC108E BIS initialization failed\n
RDMMC109E BIS image/credential validation failed\n
RDMMC110E BIS integrity check failed\n
RDMMC111E Transfer canceled by keystroke\n
RDMMC112E ARP timeout\n
RDMMC113E TFTP open timeout\n
RDMMC114E TFTP Error - File Not found\n
RDMMC115E TFTP Error - Access Violation\n
RDMMC116E Error received from TFTP server\n
RDMMC117E TFTP unknown opcode\n
RDMMC118E TFTP read timeout\n
RDMMC119E TFTP cannot open connection\n
RDMMC120E TFTP cannot read from connection\n
RDMMC121E No DHCP or proxyDHCP offers were received.\n
RDMMC122E proxyDHCP offers were received.  No DHCP offers were
received.\n
RDMMC123E No boot filename received\n
RDMMC124E Invalid UNDI API function number\n
RDMMC125E MTFTP cannot initialize NIC for multicast\n
RDMMC126E Error while initializing the NIC\n
RDMMC127E Error while initializing the PHY\n
RDMMC128E Error while reading the configuration Data\n
RDMMC129E Error while reading the initialization data\n
RDMMC130E Invalid MAC address\n
RDMMC131E Invalid EEPROM checksum\n
RDMMC132E Error while setting interrupt\n
RDMMC133E TFTP too many packages\n
RDMMC134E TFTP packet size is invalid\n
RDMMC135E Media test failure, check cable\n
```

```
RDMMC136E NBP is too big to fit in free base memory\n
RDMMC137E Bad or missing discovery server list\n
RDMMC138E Bad or missing multicast discovery address\n
RDMMC139E Bad or missing PXE menu and/or prompt information\n
RDMMC140E Could not locate boot server\n
RDMMC141E Invalid state returned from UNDI\n
RDMMC142E Mtftp Unexpected Error\n
RDMMC143E Tftp error %d received from server: %s\n
RDMMC144E Blocksize %d returned from server is too large. Max size
is %d\n
RDMMC145E A TFTP_DAT message was received when operating in large
block num mode\n
RDMMC146E A TFTP_LDAT message was received when operating in
standard block num mode\n
RDMMC147E A TFTP_ACK message was received when operating in large
block num mode\n
RDMMC148E A TFTP_LACK message was received when operating in
standard block num mode\n
RDMMC149E Invalid blknumsize\n
RDMMC150E Blocksize %d returned is not a multiple of sector size
512\n
RDMMC151E File too large for transfer to server with 2-byte packet
number.\n
RDMMC152E Unexpected NACK received - not supported by server.\n
RDMMC153E Unexpected error in receive buffer management.\n
```

- The following are messages displayed when there is a problem locating or initializing the PXE interface

```
RDMMC201E INT 1A could not find PXE structure.\n
RDMMC202E PXE-E81 PXENV+ structure is invalid. (#%1d)\n
RDMMC203E PXE-E81 !PXE structure is invalid. (#%1d)\n
RDMMC204E Error calling PXENV_UNDI_GET_INFORMATION - status = %d\n
RDMMC205E Hardware MTU is 0\n
```

- The following are messages displayed in the linux version when performing socket operations:

```
RDMMC301E Error creating unicast socket -
RDMMC302E Error setting unicast socket options -
RDMMC303E Error binding to unicast socket -
RDMMC304E Error creating multicast socket -
RDMMC305E Error setting multicast socket options -
RDMMC306E Error binding to multicast socket -
RDMMC307E Error setting owner via fcntl on unicast socket -
RDMMC308E Error setting owner via fcntl on multicast socket -
RDMMC309E Error joining multicast group -
RDMMC310E Error leaving multicast group -
```

RAVE.EXE

This program, the older Rapid Restore program from LCCM 3.0 and earlier versions, comes with RDM 4.1 (unchanged from LCCM 3.0). It is used only as part of Power Restore, when it converts the hidden partition from the older format to the new format.

RDAGENT.EXE

This program is used on the to-be-deployed system for communication with the D-Server. It is not intended to be run by the customer.

rdagent [**/r**] [**/d**]

rdagent /s=<filename> [**/d**]

rdagent /g=<filename> [**/d**]

- The following informational messages can be displayed on the system monitor:

```
RDAGENT Contacting server ... (%d)
RDAGENT Notifying server ... (%d)
RDAGENT Received shutdown command.
RDAGENT Received reboot command.
RDAGENT Received command file.
RDAGENT Received set env command.
RDAGENT Received ack
RDAGENT Received nack
```

- The following error or warning messages can be displayed on the system monitor:

```
RDAGEN001E Error parsing arguments
RDAGEN002E File not found: %s
RDAGEN003E Sending invalid opcode (%04xh)
RDAGEN004E Failed to open file to write: %s
RDAGEN005E PXE interrupt 1A failed or bad PXE struct
RDAGEN006E Failed to get communication info
RDAGEN007E Failed to get DHCP packet\n
RDAGEN008E Failed to bind with IP stack, RC=%04xh
RDAGEN009E Error setting filter, RC: %04xh
RDAGEN010E Transmit Error, RC=%04xh
RDAGEN011E No buffers available
RDAGEN012E Failed to unbind from IP stack, RC=%04xh
RDAGEN013E Receive invalid message type
RDAGEN014E Receive invalid work type
RDAGEN015W Receive invalid work option
RDAGEN016E No response from server.
RDAGEN017E SETENV data has wrong format
RDAGEN020E Socket open error
RDAGEN021E Socket bind error
RDAGEN022E Socket connect error
RDAGEN023E Socket select error
RDAGEN024E Socket send error
RDAGEN025E Socket recv error
RDAGEN026E Socket setsockopt error
```

REBOOT.COM

This program causes a system to reboot.

The syntax for this command is:

```
REBOOT
```

There are no command line parameters.

This command will cause a system running the DOS environment to reboot immediately.

SCAN.EXE

This program collects hardware information about the to-be-deployed system. It runs in DOS.

Text output

```
This version of RDM 4.1 is licensed to run only on IBM computers.  Please
contact your IBM representative to purchase the RDM version that is
licensed to run on non-IBM computers. Thank you.
```

Messages

```
RDSCAN000I Scan succeeded.
RDSCAN001E Failed to set locale.
RDSCAN002E Memory allocation failed
RDSCAN003E Failed to open file for output
RDSCAN004E Non-IBM system detected
RDSCAN005I Default scan running
RDSCAN006E Invalid input data file format
RDSCAN007E Failed to retrieve system info
RDSCAN008E Failed to retrieve Bios info
RDSCAN009E Failed to retrieve ECU info
RDSCAN010E Failed to retrieve processor info
RDSCAN011E Failed to retrieve memory info
RDSCAN012E Failed to retrieve hard disk info
RDSCAN013E Failed to retrieve PCI info
RDSCAN014E Failed to retrieve nic info
RDSCAN015E Failed to retrieve Raid info
RDSCAN020E Failed to update AID (input mightbe too large).
RDSCAN021E General scan error
RDSCAN022I Detected same BIOS version
RDSCAN023I Detected different BIOS version
```

SCRUB3.EXE

The SCRUB3 utility is part of the RDM Secure Data Disposal tool. This program runs as a system command under the DOS operating system. It permanently erases all data on one or more hard disk drives that are installed on the system. Therefore, it is a potentially dangerous utility. **It is strongly recommend that you do not use this utility manually**. Instead, use the built-in profiles to run this program.

The syntax of this command is:

```
SCRUB3 [/?] |
[[/Q=NO][/S=NO]{/D=<drive>|/D=ALL}{/L=<level>|/W=<writes>} ]
```

/Q=NO	This parameter causes the program to display a maximal number of messages on STDOUT. It is intended for “in the field” debugging only, and a customer should normally not use this parameter. If present, this parameter should be the first (that is, leftmost) parameter.
/S=NO	This parameter causes the program not to write the scrub signature to the

disk(s) that will be erased.

`/D=<drive>` Use this form of the /D parameter if you want to erase only one hard disk drive that is installed on the system computer. The value <drive> is the hard disk drive number of the drive that you want to erase. 1 is the first hard disk drive, 2 is the second hard disk drive, and so on. There is no default value for this parameter. The /D parameter is required.

`/D=ALL` Use this form of the /D parameter if you want to erase all hard disk drives that are installed on the system computer. There is no default value for this parameter. The /D parameter is required.

`/L=<level>` The value <level> is the security level of the disposal operation. It must be one of the following values:

/L=1 Limited security. The first 63 sectors on the drive (includes Master Boot Record) the last 2 sectors on the drive, and the first 100 sectors on each partition are overwritten with a 0x0000 pattern (that is, each pair of bytes on the sector is overwritten with this pattern). This operation is very fast. The hard disk drive will not be usable through standard I/O methods. However, this is not a secure operation in an absolute sense. It leaves most of the partitions on the hard disk drive unchanged.

/L=2 Medium security. All sectors on the drive are overwritten 1 time with a 0x0000 pattern (that is, each pair of bytes on the sector is overwritten with this pattern). This operation is relatively slow and involves many write operations. Actual speed depends on the size and speed of the target hard disk drives.

/L=3 High security. All sectors on the drive are overwritten 4 times with the following patterns (in this order): a random pattern, the bit-wise complement of that random pattern, a different random pattern, and a 0x0000 pattern (that is, each pair of bytes on the sector is overwritten with these patterns). This operation is quite slow, and it takes 4 times as long as a /L=2 operation.

/L=4 DOD-compliant security. All sectors on the drive are overwritten 7 times with the following patterns (in this order): a random pattern, the bit-wise complement of that random pattern (3 times, each with a different random pattern), and a 0x0000 pattern (that is, each pair of bytes on the sector is overwritten with these patterns). This operation is quite slow, and it takes 7 times as long as a /L=2 operation.

There is no default value for this parameter. The /L parameter is required.

`/W=<writes>` The value <writes> is the number of times each sector is overwritten (done <writes> - 1 times with a random pattern, before a final write with a 0x0000 pattern). <writes> is an integer greater than 1 and less than 100. There is no default value for this parameter. Exactly one of the /L parameter or the /W parameter is required.

`/?` This parameter causes the program to display a concise description of its execution syntax on STDOUT and then to terminate execution. If you run SCRUB3.EXE with no parameters, it will display this same output. The /? parameter causes all other parameters to be ignored.

Examples:

```
SCRUB3 /L=1 /D=ALL
```

Overwrites the Master Boot Record, the first 100 sectors of each partition, and the last 2 sectors on every hard disk drive installed on the system. The pattern used for the write

operation is 0x0000. None of the data on any of the drives can be accessed with standard methods. However, most of the data on these drives can be read successfully by a program that uses low-level BIOS read functions.

```
SCRUB3 /Q=NO /D=2 /L=2
```

Overwrites every sector on hard disk drive number 2 with a pattern of 0x0000. None of the other hard disk drives installed on the system is changed. Debug messages are displayed in the command window (that is, on STDOUT), along with all the standard messages that this program produces.

```
SCRUB3 /D=ALL /L=3
```

Overwrites every byte on every sector of every hard disk drive installed on the system 4 times. None of the data on any of the drives is recoverable. This is not the normal way to run SCRUB3.EXE. It takes an extremely long time to run. However, overwriting 4 times provides good protection from attempts to recover data with specialized sensitive electronic equipment.

```
SCRUB3 /D=ALL /L=2
```

Overwrites every byte on every sector of every hard disk drive installed on the system with 0x00. None of the data on any of the drives is recoverable. This is the normal way to run SCRUB3.EXE.

During execution of the last example, SCRUB3 displays the following output on the computer monitor:

```
Secure Data Disposal Utility v2.0 (LCCM vx.x)

Licensed Materials - Property of IBM
(C) Copyright IBM Corp. 1999, 2000  All Rights Reserved.

LCCMCM001I Null return code from setlocale function call.
  LC_ALL .......... 0
  LCCMLANG ........ english-us
LCCMDD002I Locale used by this program: C

Processing drive 2:

                   Writing sectors for Secure Data Disposal
0%                                  50%
100%
```

```
Total program execution time (minutes): 4.95

Secure Data Disposal Utility
Return code ..... 0
Execution Complete.
```

The hard disk drives are modified based on what parameters the user specified on the command line. A record of the SCRUB3 processing is written on the master boot record of each scrubbed hard disk drive. If the computer is then booted to its hard disk drive, that signature is displayed on the computer monitor. The following is an example of the SCRUB3 signature:

```
IBM Secure Data Disposal Utility 2.0
IBM Remote Deployment Manager 4.1
Date and time of execution ... 08/16/02 17:49:39
Command executed ............. A:\SCRUB3.EXE /d=all /l=2
Return code .................. 0
```

SLEEP.EXE

This program causes processing to halt for a specified number of seconds.

The syntax of the command is:

```
SLEEP seconds
```

Power Restore utilities

There are several custom programs used in the installation and running of Power Restore and IBM Boot Manager. Brief descriptions of them are provided next.

ChkPart.com

This utility can, based on the command-line parameter given, perform various tests on the primary drive and return error codes to indicate if the tested-for condition has been found. The syntax is:

```
CHKPART { /R | | /A | /3 | /H | /F | /I | /Pxxxx | /B } { /V }
```

- The /R parameter causes ChkPart to test if a Rapid Restore/Rave-style partition is defined
- The /A parameter causes ChkPart to test if an active (or “startable”) partition is defined
- The /3 parameter causes ChkPart to test if partition number 3 is defined
- The /H parameter causes ChkPart to test if partition number 3 is a hidden FAT32 partition
- The /F parameter causes ChkPart to test if partition number 3 is a FAT32 partition
- The /I parameter causes ChkPart to test if there is a drive defined with the volume name IBM_SERVICE
- The /P parameter causes ChkPart to test if a version of IBM Power Restore equal to or higher than the specified version has already been installed, with the specified version being in the format:

  (Major Version * 1000) + (Minor Version * 100) + (Sub Minor Version)

  where /P2100 would indicate a test for version 2.1.00 or greater
- The /B parameter causes ChkPart to test if IBM Boot Manager for Power Restore has been installed
- The /V parameter causes ChkPart to be run in verbose (debug) mode

ChkPart returns an error level of 1 if the test passes or 0 if it fails (except for /I tests). For the /I test, it returns 1 through 24 (drives C: through drive Z:) if the test passes or 0 if it fails.

GetBSize.com

This program checks the size of the boot partition on the primary drive and creates a batch file (FDISK.BAT) to run the IBM FDISK32.COM utility to create a Power Restore partition of the same size. If there is not enough space left on the primary drive to create the Power Restore partition, the FDISK.BAT file will contain a line to call SETERROR.COM to return an error level of 1. The syntax is:

```
GETBSIZE
```

GetRamD.com

This utility searches the available drives and returns a number indicating which, if any, is the RAM drive. It returns 1 through 24 if a RAM drive is found, with 1 corresponding to the “C:” drive, 2 corresponding to the “D:” drive, and so on. If no RAM drive is identified, it returns 0. The utility has the following syntax:

```
GETRAMD
```

HidePart.com

This utility marks the specified partition(s) as hidden or un-hidden. The syntax is:

```
HIDEPART {/F | /L | /A | /n1} {/H | /U} [/n2] [/V]
```

- The /F parameter causes HidePart to act on the first defined partition on the primary drive
- The /L parameter causes HidePart to act on the last defined partition on the primary drive
- The /A parameter causes HidePart to act on all partitions on the primary drive
- The /*n1* parameter, with *n1* being 0 through 3, causes HidePart to act only on the specific partition table entry on the primary drive
- The /H parameter causes HidePart to mark the specified partition(s) as hidden
- The /U parameter causes HidePart to mark the specified partition(s) as un-hidden
- The optional /*n2* parameter, with n2 being 0 through 9, causes HidePart to act on a specific drive (if not specified, drive 0 [the “boot” drive] is assumed)
- The optional /V parameter causes HidePart to be run in verbose (debug) mode

PR.exe

The Power Restore program (PR) is a front-end for the PowerQuest ImageCenter program which is run by a combination of command-line arguments and a script file. When run as part of an RDM task, PR runs with no visible user interface and translates commands defined in the RDM interface to a batch file and an ImageCenter script file that are used to run ImageCenter to perform tasks. When run as a “local” task, PR runs with an interactive user interface, and then creates the batch file and an ImageCenter

script file that run ImageCenter to perform the desired tasks. Whether run as part of an RDM task or as a local task, PR also performs the backing up or restoring of the Master Boot Record. When run as a local task, PR can also be used to display information about the Partition Table. The syntax is:

```
PR {/I | /P | /V | {/S | /R}{/Y | /N}{/Y | /N}{/A | /B | /O | /N}}
```

- Using /I as the first parameter causes PR to be run in interactive mode, displaying a user interface (no additional parameters needed)
- Using /P as the first parameter causes PR to be run in interactive mode, displaying a user interface, but preventing the user from being able to save to the “A” image file (no additional parameters needed)
- Using /V as the first parameter causes PR to display partition table information in the window (no additional parameters needed)
- Using /S as the first parameter causes PR to run in noninteractive mode with a Save operation specified
- Using /R as the first parameter causes PR to run in noninteractive mode with a Restore operation specified
- Using /Y as the second parameter causes PR to act on (save or restore) the Master Boot Record
- Using /N as the second parameter causes PR to *not* act on (save or restore) the Master Boot Record
- Using /Y as the third parameter causes PR to act on (save or restore) the Boot Partition
- Using /N as the third parameter causes PR to *not* act on (save or restore) the Boot Partition (if this option is chosen, the fourth parameter is ignored)
- Using /A as the fourth parameter causes PR to save to or restore from the “A” image file (only if the third parameter has been set to /Y)
- Using /B as the fourth parameter causes PR to save to or restore from the “B” image file (only if the third parameter has been set to /Y)
- Using /O as the fourth parameter causes PR to save to or restore from the older of the “A” or “B” image files (only if the third parameter has been set to /Y)
- Using /N as the fourth parameter causes PR to save to or restore from the newer of the “A” or “B” image files (only if the third parameter has been set to /Y)

PR2.com

This utility is run from the batch file generated by PR.exe and is used to update the information sector on the first track of the boot drive. The information sector holds the Power Restore version number, a flag indicating whether or not IBM Boot Manager for Power Restore has been installed, flags indicating the existence (or lack thereof) of the “A” and “B” Power Restore image files, the creation dates of the image files and comments associated with the image files. The syntax is:

```
PR2 { /1 | /2 | /B | /D | /F | /U} { "comments" }
```

- The /1 parameter causes PR2 to set the “A image file exists” flag to True, to store the date of the “A” image file and to store the optional comments for the “A” image file

- The /2 parameter causes PR2 to set the “B image file exists” flag to True, to store the date of the “B” image file and to store the optional comments for the “B” image file
- The /B parameter causes PR2 to set the “IBM Boot Manager for Power Restore Installed” flag to True
- The /U parameter causes PR2 to set the “IBM Boot Manager for Power Restore Installed” flag to False
- The /D parameter causes PR2 to display the information stored in the Information Sector
- The /F parameter “flushes” (zeros out) the information sector
- The optional comments, which must be enclosed in double quotation marks, are stored if the first parameter has been set to /1 or /2

PRLast.com

This program copies details of the partition table to a sector on the drive. It can also restore the details of the partition table from the copy plus search the partition table of the primary drive in last-to-first order for a hidden FAT32 partition. If it finds one and it is not the last partition table entry, the entry is swapped with the last partition table entry. The syntax is:

```
PRLAST { /S | /R | /U} { /V }
```

- The /S parameter causes PRLast to save details of the partition table to a sector on the drive
- The /R parameter causes PRLast to restore details of the partition table from the copy
- The /U parameter causes PRLast to restore details of the partition table from the copy plus moves the Power Restore partition to be the last entry in the table
- The /V parameter causes PRLast to be run in verbose (debug) mode

SetAct.com

This program marks the specified partition on the primary drive as the “active” or “boot” partition. The Syntax is:

```
SETACT /n
```

The /n parameter must be a positive integer value from 0 to 3

SetError.com

This program sets the error level to the value set in the numeric command-line parameter. The syntax is:

```
SETERROR /n
```

The /n parameter must be a positive integer value from 0 to 32767

D-Server configuration program

The D-Server configuration program, DSCONFIG.EXE, runs under Windows on a D-Server to start the RDM D-Server Service and to configure the D-Server parameters.

The program runs automatically at the end of a D-Server installation, whether it is part of a RDM Server installation (which includes both Console and D-Server components) or the D-Server component by itself. The program can be run at any time in a command window using the Windows Start → Run command.

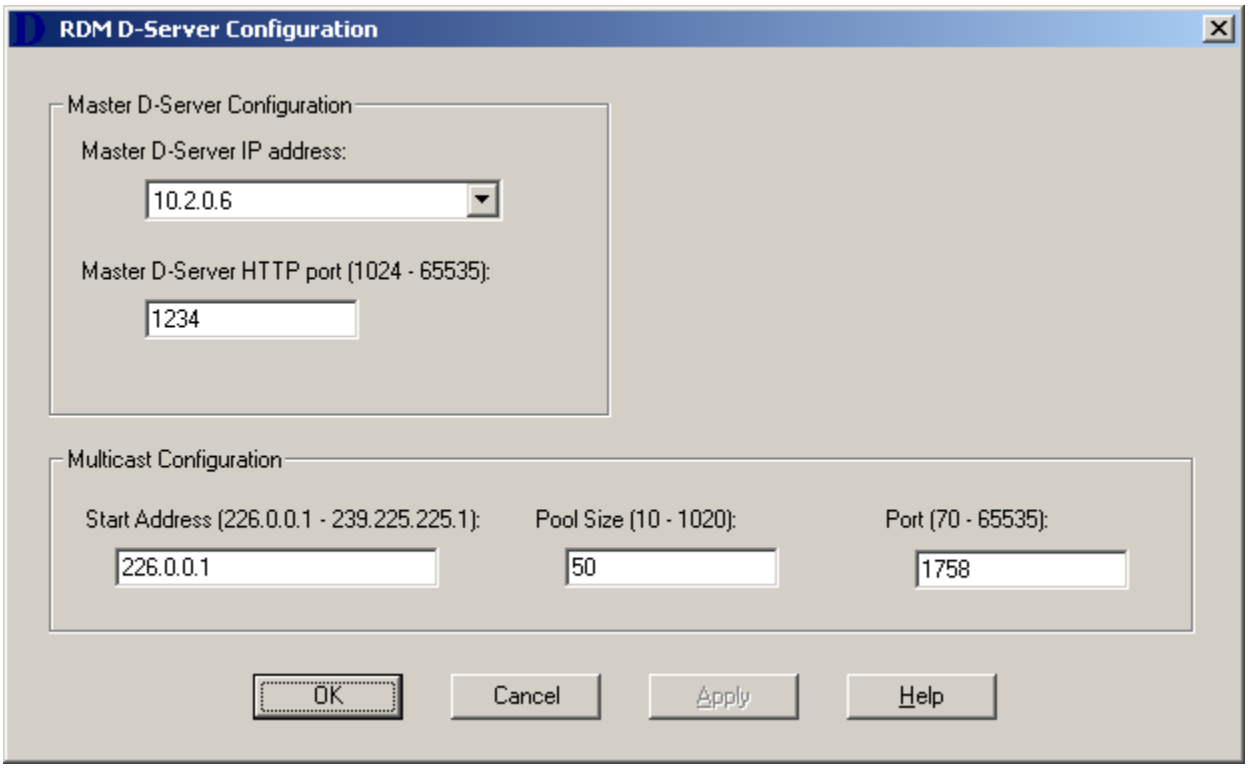
The syntax of this command is:

```
DSCONFIG [/Q]
```

/Q This parameter causes the program to run without displaying the dialog.

Master D-Server

Running DSCONFIG.EXE with no command-line options displays the following window. This window also displays when installing RDM Server.



The fields on this window are defined as follows:

Master D-Server IP address – This is the IP address by which the Master D-Server is known to RDM. If the Server contains multiple network adapters (with multiple IP addresses), you must select one of them in this field.

Master D-Server HTTP port – This is the port number for communication between the Master D-Server and Remote D-Servers; it is the port on which the Master D-Server receives HTTP messages. The default is 1234. The minimum of 1024 is an IBM Director requirement. The port must not already be in use by any application.

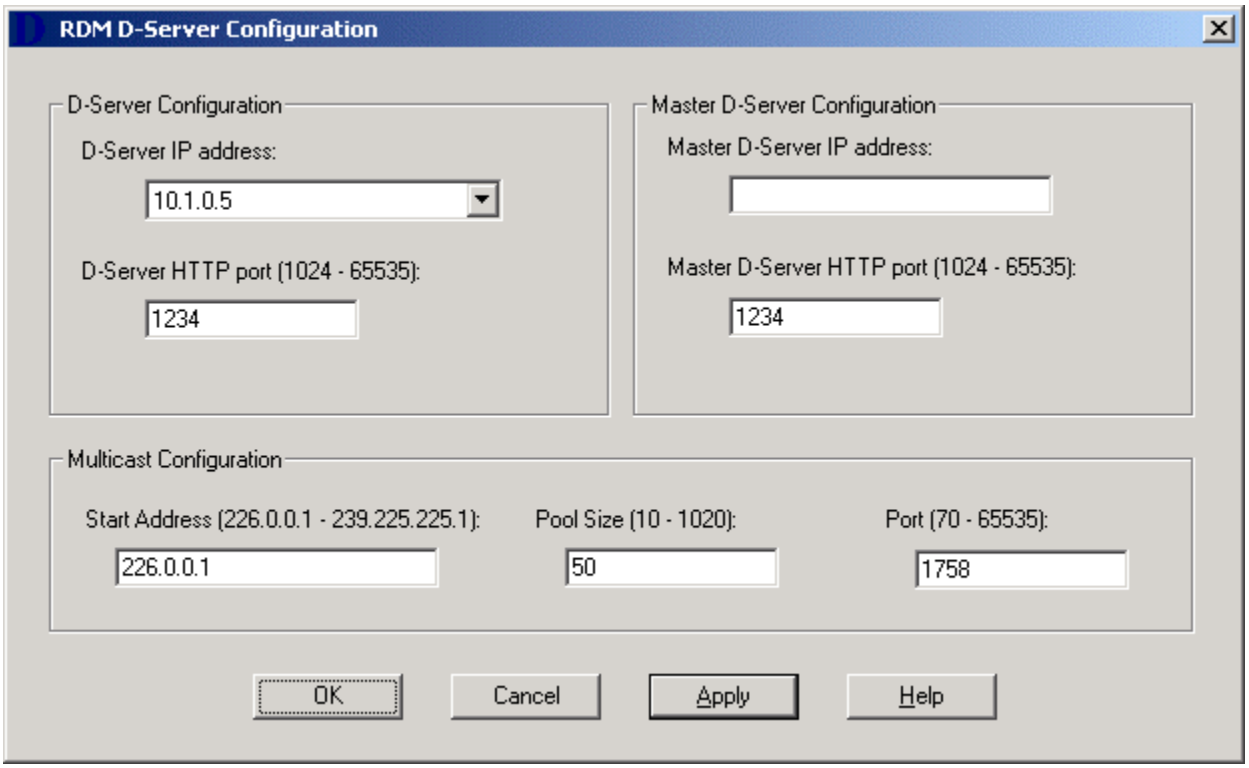
Start Address – This is the first class-D (multicast) IP address in a range of addresses that is assigned to this D-Server. The default value, 226.0.0.1, is the smallest class-D address that RDM allows. Class-D addresses in the range 224.0.0.0 through 226.0.0.0 are often used for other specific non-RDM purposes.

Pool Size – This is the number of contiguous class-D addresses reserved by RDM for use by this D-Server.

Port – This is the port number used by the IBM RDM MTFTP Service that is installed on this D-Server. The default is 1758.

Remote D-Server

Running DSCONFIG.EXE, with no command-line options, on a system with only the RDM D-Server component (that is, no Server component) installed displays the following window. This window also displays when installing just the RDM D-Server component.



The fields on this window are defined as follows:

D-Server IP address – This is the IP address by which is D-Server is known to RDM. If the Server contains multiple network adapters (with multiple IP addresses), you must select one of them in this field.

D-Server HTTP port – This is the port number for communication between this D-Server and the master D-Servers. The default is 1234. The port must not already be in use by any application.

Master D-Server IP address – This is the IP address by which the Master D-Server is known to RDM. It must be the same address that you used when installing the RDM Server.

Master D-Server HTTP port – This is the port number for communication between the Master D-Server and the Remote D-Server; it is the port on which the Master D-Server receives HTTP messages (and therefore, to which this D-Server sends HTTP messages). It must be the same port that you used when installing the RDM Server.

Start Address – This is the first class-D (multicast) IP address in a range of addresses that is assigned to this D-Server. The default value, 226.0.0.1, is the smallest class-D address that RDM allows. Class-D addresses in the range 224.0.0.0 through 226.0.0.0 are often used for other specific non-RDM purposes. Ensure that a D-Server range of addresses does not overlap with another D-Server range (or with addresses used by another application).

Pool Size – This is the number of contiguous class-D addresses reserved by RDM for use by this D-Server.

Port – This is the port number used by the IBM RDM MTFTP Service that is installed on this D-Server. The default is 1758.

Chapter 8. Troubleshooting

This chapter contains a compilation of answers to Frequently Asked Questions about RDM, as well as workarounds to known networking problems in an RDM environment.

RDM Server

I get a qualification error saying data is not available

If an error in qualification says data is not available in a Native Managed Object (NMO), it may be because the database is not yet populated. This can occur in the following kind of scenario:

1. Do a Director discovery (this will create new NMOs).
2. Drag one of the NMOs to an RDM task, and select "Run systems...".

Because the Director database update is still in progress (in the background), the error occurs. You should generally wait short time (for example, 30 to 60 seconds) before using a new NMO for an RDM task.

I get various inexplicable errors involving disk reading or writing

Sometimes hard-disk or RAID-adapter manufacturers provide firmware updates to correct reported problems. You should check the Web sites of your system, RAID adapter, and disk manufacturers to see if an update is available.

In some cases, you can create an RDM Custom task to deploy the firmware update, depending on the particular update program capabilities and memory-usage constraints.

When I scan for my systems, why RDM will not wake them up?

Before or during the scan process, you must turn on the system manually and force a network boot (either by keystrokes or by setting the primary boot sequence to be *network)*.

RDM wakes a system by sending a wake-up packet to the system media access control (MAC) address. At the time a scan process is initiated, RDM has no knowledge of the MAC address; RDM discovers the MAC address during the scan process. Therefore, the Wake on LAN feature is not part of the scan function.

RDM can wake up a system manually before scan if you enter the computer MAC address into the Wake Systems window of RDM. This window is accessed through the Tools selection on the main menu bar. But it is usually easier just to turn on the system manually.

System management

I cannot change my RAID configuration.

If you try to change your RAID configuration with any RAID Clone or RAID Custom task and receive the message, “You cannot change the configuration. A rebuild, logical drive migration, RAID compression/decompression or RAID-5EE compaction/expansion is in progress.”, the following workarounds are available:

1. If you have physical access to the system, type Ctrl+I to restore the factory defaults.
2. If you have physical access to the system, pull another one of the drives in the array being compressed, rebuilt, or migrated.
3. Use ipssendl to set one of the drives in the array as dead, either by running ipssendl at the system or creating an RDM custom task and running it remotely.
4. Wait until the compression, migration, or rebuild has completed, and then rerun the Express task.

How can I make a system boot from the local operating system instead of booting off the network?

The only way to do what you want is to change the primary startup sequence in the CMOS to the way you want the system to act. You can do it as part of the system deployment (on most IBM computers) by using the CMOS update facility to change the CMOS as needed. (You could also do this as a separate Maintenance procedure). There is NO way to remotely do it without modifying the boot sequences.

While it is possible to do this on many network adapters by changing a setting in the network adapter configuration, you have to be at the system to do so. Of course, if the adapter has a DOS-based configuration utility that is not too resource-hungry, you might be able to do this as an RDM Custom task. This is not possible on any of the currently officially supported network adapters.

How can I make a system reboot, instead of powering down, at the end of a deployment?

This is done by modifying the command list instead to end with a !REBOOT instead of a !SHUTDOWN.

The installation of IBM Boot Manager was interrupted and left the system in a non-startable state.

If the installation of IBM Boot Manager on a local system is interrupted, it might leave the computer in a non-startable state. Follow these steps to repair the computer:

1. Start the PC with a DOS boot diskette.
2. Replace the DOS boot diskette with the IBM Boot Manager Installation diskette.
3. From the DOS prompt, run the following commands:

```
HIDEPART A U

HIDEPART L H
```

4. Remove the IBM Boot Manager Installation diskette and reboot the PC.

The installation of Power Restore was interrupted and left the system in a non-startable state.

If the installation of Power Restore on a local system is interrupted, it might leave the computer in a non-startable state. Follow these steps to repair the computer:

1. Start the PC with a DOS boot diskette.
2. Replace the DOS boot diskette with the Power Restore Installation diskette.
3. From the DOS prompt, run the following commands:

   ```
   HIDEPART A U

   HIDEPART L H
   ```

4. Remove the Power Restore Installation diskette and reboot the PC.

How can I use RDM with third-party imaging products?

With RDM, a light version of PowerQuest DeployCenter is included in RDM. You can use this capability without installing any other imaging product. You can also upgrade this capability to use the full-function version of the PowerQuest tool.

RDM Databases

When I try to export the systems or profiles database, I get an error message

If you export a systems or profiles database, and use spaces in the filename or pathname, you will get an error message. RDM does not allow the use of spaces here. Try again without spaces.

How do I reset the database tables?

The twgreset command deletes all persistent data and resets the database tables. This is run if you want to go back to a pristine installation without actually having to reinstall everything, or if there has been corruption of persistent data.

Attention: Use the twgreset command only when instructed by the IBM Director program or documentation.

Appendix A. Command list commands

Conventions

!! == RdAgent command . commands interpreted by RDAgent code

! == Client command . commands passed to client DOS session

== Server Side Command . command performed by D-Server code

Parameter replacement

Double Percents . client DOS session parameter replacement - %%var1%%

Single Percents . D-Server (server side) parameter replacement - %var1%

Server commands

BOOTTYPE: Specifies the type of DOS or Linux Profile Image to be loaded into a clients RAM

Usage: BOOTTYPE [!LOADDOS | !LOADBOOTSTRAP] <boot image file>

Example: BOOTTYPE !LOADDOS /ENVIRONMENT/DOS71C

Example: BOOTTYPE !LOADBOOTSTRAP bstrap.0

Example: BOOTTYPE !BOOTLOCAL

END: Ends the command list, usually the last command in a given task

Usage: END

Example: END

Used with: All command lists

SUBTASK: Appends and runs the specified task for the current task

Usage: SUBTASK .<name of the task>.

Example: SUBTASK .Intellistation MPro Bios downloaded 2002/07/15.

Used with: any task (Example Script Task)

TIMEOUT: Changes the timeout value that the server will wait for the client to send its next request for work

Usage: TIMEOUT <time in minutes>

Example: TIMEOUT 8

Used with: All command lists

WAKE: Wakes client system. Task usually starts with a wake.

Usage: WAKE

Example: WAKE

Used with: Should be the first or second command in all command lists

Client commands

!BOOTLOCAL

Example: BOOTTYPE BOOTLOCAL

Used with: boottype server command (Linux)

Not called directly used internally with boottype server command

!LOADBOOTSTRAP

Example: !LOADBOOTSTRAP ENVIRONMENT\bstrap.0

Used with: boottype commandlist command (Linux)

Not called directly used internally with boottype server command

!LOADDOS

Example: !LOADDOS ENVIRONMENT\DOS71S

Used with: Boottype commandlist command (Scan)

Not called directly - used internally with boottype server command

!MTFTP: performs MTFTP commands

Useage: !MTFTP [get | put] %%server_ip%% <source path> <destination path>

!SLEEP: sleep for given time in seconds

Useage: !SLEEP <time in seconds>

Example: !SLEEP 10

!UNZIP: unzips files to current directory

Useage: !UNZIP <zip filename>

Example: !UNZIP filename.zip

!*.*: any IBM PC-DOS command available on client system can be used with the .!. as a client command will be stripped of .!. and run as normal DOS command

Example: !myBatchFile.bat

Used with: any locally present DOS command or executable

RdAgent commands

!!REBOOT

Example: !!Reboot

Usage: command list to reboot client

!!SETENV: Sets all environment variables for client DOS session

Usage: !!SETENV

Example: !!SETENV

Used with: operating system installs to pass Task parameters

RDAGENT command that is called directly from server task list

!!Shutdown

Example: !!Shutdown

Usage: Command list to shutdown client

Appendix B. Client environment overrides

All RDM tasks involve running a DOS or Linux System Environment (for example, a Preboot Environment) on the system. Many tasks involve several system reboots, and they use a System Environment for some of those reboots.

A System Environment can be related to several things, such as any data that is related to the task or system. These might typically include things like:

- Task template id
- Task id
- Computer model
- Machine type
- Network-adapter model

If you need a System Environment (for example, a DOS or Linux image) that is not included in RDM, you must create a new system environment or modify an existing system environment manually to override what is defined by a task. When the images are ready, insert them into the Master Repository with the Image Management (IM).

When you want to change the boot environment from the default, modify the file *bootenv.sub*. This file comes with the RDM product, located in the repository, *...\rdm\local\env\bootenv.sub*. An example of when you might need to change the boot environment is when the NIC in one or several of your systems require a special memory allocation during bootup that the RDM default boot image does not provide. In this case, create a new boot image that addresses the problem. Put that new image in an applicable location as defined in (creating bootimage section). To make the substitution take place, you have to know which environment your special systems needs to boot up instead of the default boot image. You identify the condition (criteria) based on the system hardware configuration, such as boot the new image based on the machine model, the PCI ID of the system, or on both the model and the PCI ID. With that information, you can modify and save *bootenv.sub* in RDM. The next time you initiate a task, the data from *bootenv.sub* is updated, and remains until you make another change and start a new task.

Note: The boot image is universally used, and if you define the condition, for example, of just the model type, then, every system with that model type and the specified boot environment will be executed with the new image. The more you can refine the condition, the more you can target specific systems.

Note: Each condition (that is, the left side of the =) must be unique. For the case where the condition is the same, but the boot environment is different, put the second set of changes on the same line, separate by a semi colon.

A sample System Environment is provided here:

```
#System Environment substitution
#
#Format:
```

```
#model::PCIid=DefaultBootEnvironment::NewBootEnvironment ;
DefaultBootEnvironment::ToNewBootEnvironment
#
#Example, if you have the following:
#machine model type 4696, pciID none, when boot image is DOS7.1S,
and you want to replace with boot DOS7.1J
#machine model type 4696, pciID none, when boot image is DOS7.0,
and you want to replace with DOS7.1J
#machine model type 4696, pciID 8086122980860040, when boot image
is DOS7.0, and you want to replace with DOS7.1J
#machine model type none, pciID none, when boot image is DOS7.0,
and you want to replace with DOS7.1J
#
#the entries should look like this:
#4696::0=DOS7.1S::DOS7.1J ; DOS7.0::DOS7.1J
#4696::8086122980860040=DOS7.1S::DOS7.1J
#0::0=DOS7.0::DOS7.1J

#each line should uniquely identify the condition of the model
type and PCIID.
#your changes will be updated the next time a task is enabled.
#

##############################################
##
##        The data lines begin here
##
##############################################

8550::0=DOS7S::DOS71S;DOS7S1test::DOS71S2test
8560::78934900093498=DOS7Ss::DOS71S
#data extrapolated from real machine.lst for testing purpose only
4694::0=dos71c.dir::dos71s.dir
4800::0=dos71c.dir::dos71s.dir
6881::80862449101401CE=dos71s.dir::dos71x.dir
8660::0=dos71s.dir::dos71x.dir
```

Appendix C. RDM 4.1 data

RDM 4.1 data is stored in various places on the LAN or WAN. The RDM 4.1 data is used for most of its operations, storing information about tasks, systems, and schedules. While conceptually, this data could be considered to be a single entity, the actual implementation consists of two different kinds of data stores.

In implementation, it is mechanized as a traditional database for data that fits a row/column model, and a repository (part of the host file system) used for general file storage. Entries in the database are used for all searching and filtering operations, and in turn reference files in the repository when required.

Directory structure

RDM 4.1 files are stored in 2 places:

- \Program Files\IBM\Director – The RDM 4.1 executables and database.
- \Program Files\IBM\RDM – The RDM 4.1 repository and miscellaneous other files. This is the root directory for RDM 4.1. It is the only name configurable by the user (while installing RDM 4.1).

Repository

The entire Repository (either the Master Repository or any of the Distributed Repositories) exists as a single directory tree, beneath the RDM 4.1 root directory. This single directory is referred to as the Repository Root. The name of the Repository Root is saved locally for each Repository. All accesses to the Repository are done using D-Server API calls or through services exposed by the D-Server itself (for example, TFTP, MTFTP, or PXE).

Note: It is defined as being illegitimate for any RDM 4.1 code or code outside RDM to access the Repository (that is, the files under the Repository Root directory) directly. Accesses to the Repository from outside RDM 4.1 may cause unpredictable operation.

The RDM 4.1-provided accesses to Repository files always expect file names to be relative to the Repository Root. No RDM 4.1-supplied Repository-access code will allow access to any other areas of the D-Server file system, as doing so would be a potential security exposure.

Beneath the Repository Root are a number of standard directories for use by RDM 4.1, where each one might have directories underneath in turn, managed by various portions of RDM 4.1 code. Any file within the Repository might be replicated automatically (also known as “reactively”), depending on the D-Server Preferences set by the user. The general structure is outlined next.

- \bin – This directory contains RDM 4.1 server-side executable modules that are not installed in \Program Files\IBM\Director directories. RDM also installs a separate Java Runtime Environment here, which is only used for the Remote D-Server.
- \local – This is the directory for files used to build things that go into the RDM 4.1 Master Repository.

- \local\env – This is the directory for creating RDM 4.1 system environments. . It contains programs (such as, BPDISK.EXE and MKIMAGES.BAT) that are used to build the DOS images.
- \local\http – This directory is used internally by RDM 4.1 for D-Server-to-Master D-Server communication using HTTP protocol.
- \local\w32drivers – This is the directory for Windows 2000, Windows XP, and Windows Server 2003 device drivers. Under this directory is an identical structure to what will be copied to the system during a Windows Native Install task.
- \local\wnihives - This directory contains files to modify the hivesft files furnished by Microsoft.
- \log – This is the directory for various RDM log files.
- \repository – This is the directory for the RDM 4.1 Master Repository (on the Server) or for the repository (on a D-Server). This is the controlled access path for the MTFTP Service.
- \repository\environment – This is the directory for RDM 4.1 system (preboot) environments used to implement the many tasks comprising RDM 4.1. They are generally created during the installation of RDM 4.1 itself, though subsequent installation of Templates could also add environments. The user can create and add environments, too. Each DOS image is a single file that is created by the MKIMAGES.BAT file during RDM 4.1 install. Each Linux image is a single file.
- \repository\image – This is the directory for the RDM 4.1 images that are managed by the Task Image Management. Most are supplied by the user, and added to the Master Repository using the IM GUI. Files are described using meta-data stored in the RDM 4.1 database, and names are not intended to be user-significant. In general these files are large compressed collections of other files, and change very infrequently. It is also legitimate for an “image” to actually be a subdirectory, which might contain any number of other files or directories. Only the first level (that is, files and directories immediately beneath the Images directory) is controlled; directories below this first level are preserved and replicated, but their content is unknown to the RDM 4.1 infrastructure code.
- \repository\template – This is the directory for the RDM 4.1 templates.
- \repository\template\<n> – This is the directory for a specific RDM 4.1 template. The subdirectory name is a number. Within this directory, there is a subdirectory for each task created. RDM 4.1 does not expose a user mechanism for preemptively replicating these files. They are, in practice, always replicated reactively (that is, as needed by the system). There might be other directories or files here, as well, for tasks that require it; for example, the Windows Native Install task will contain its zipped driver file.
- \repository\template\<n>\<m> – This is the directory for a specific RDM 4.1 task. It contains all the files that the particular task needs. The subdirectory name is a number.
- \temp – This directory is used internally by the RDM 4.1 Scan task. Each system stores its SCAN.OUT file here, and the RDM 4.1 System Engine uses this file to create or update the system Platform Managed Object. It might also be used for other items, particularly those that transmit data back to the RDM Server (the Get Donor task, for instance).

Appendix D. Linux directories

When configuring the Linux Native Install task, you must specify the mount point for where Linux will be installed. On the Setup page in the Partition category, there is a Mount Point column entry field for a valid Linux pathname. There must be a partition whose mount point is “/”. There are rules about which disk the “/” mount point, or the “/boot” mount point (if you define one) must go. It must be one of the first two SCSI Disks or one of the first two IDE Disks. There also needs to be a partition defined that is both big enough (approximately 2 GB) to hold the installation files that are downloaded and whose mount point is not a normal Linux directory.

The following is a list of Linux directories to avoid as a mount point:

/
/bin
/boot
/boot/grub
/boot/lost+found
/dev
/dev/ataraid
/dev/cciss
/dev/compaq
/dev/cpu
/dev/cpu/0
/dev/cpu/1
/dev/cpu/10
/dev/cpu/11
/dev/cpu/12
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Appendix E. Notices

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Glossary

Asset ID. If you are using IBM computers that incorporate the IBM Asset ID chip and an Asset Information Area (AIA), you can use this stored AIA data with RDM. The Asset ID chip is battery-maintained and contains asset data specific to each system.

Asset Information Area (AIA). On AIA-enabled computers, data can be read and written to an onboard Electrically Erasable Programmable Read Only Memory (EEPROM), and used with RDM.

BAT file. A file that contains a batch program (that is, a set of commands).

bind. Associating one or more systems to a task. This causes all information to be verified (by one of the STC modules) and a resulting job to be scheduled to run.

console, or RDM Console. The group of programs that make up the user interface to RDM. RDM is client/server in nature so that the Console might run on any computer and not necessarily be running on the same computer as the RDM server or other RDM components. The RDM Console is actually an IBM Director Console on which the RDM Console component is installed.

dynamic group. A group whose membership is determined during RDM (or IBM Director) operation using a database query. Membership in the group is determined strictly by the attributes of each system. RDM provides no dynamic groups, but IBM Director provides the ability to define new ones.

Dynamic Host Configuration Protocol (DHCP). DHCP allows you to manage your network centrally and automate the assignment of Internet Protocol (IP) addresses to the system at boot time. The DHCP client and server are socket applications that are used to provide automatic configurations of various TCP/IP protocol components. The server is configured with scopes that are the ranges of IP addresses to be assigned to systems along with additional configuration information.

DHCP uses the concept of a “lease” or amount of time that a IP address will be valid for a computer. The lease time can vary depending on how long a user is likely to require the Internet at a particular location. Using very short leases, DHCP can dynamically reconfigure networks in which there are more computers than there are available IP addresses.

DHCP, based on TCP/IP, is a routable protocol and can therefore be used in the WAN environment. The DHCP protocol assigns TCP/IP parameters automatically and therefore, simplify network administration.

group (or system group). A collection of systems. A system can belong to many different groups at the same time. Grouping gives users a convenient view of the systems.

image. An image is the software stored on a deployment server that is downloaded to a

system during an operation. Images vary in size and in the type of software they provide to the system. The purpose and content of each image depends on the task to be accomplished, as well as the method used to download the image from the deployment server to the system. A *native* image is built off a product installation CD. A *clone* image is copied from a donor system.

job. An object managed by the scheduler and created by STC. A job is a binding of one task and one or more systems. A job can be scheduled to run once or to recur. Sometimes a job is called by a different name (Scheduled Task, Running Task), to emphasize some aspect of the job.

magic packet. A bit sequence that is sent to a particular computer to wake it up (that is, power it on). It starts with 12 *F* characters followed by the MAC address of the system repeated eight times. When you initiate RDM processing, the RDM server sends magic packets to wake up the systems for which it has work scheduled.

managed system. The IBM Director term for its system. Mentioned here only for clarity; the term *system* is preferred when referring to an RDM system.

MNS file. Maintenance batch file. It contains a set of DOS commands that are run on a system to perform a user-defined task.

PQI file. PowerQuest image file created by Deploy Center.

preboot DOS agent. The preboot DOS agent is a DOS operating system with a communications stack that is booted from the network by the bootstrap agent. The preboot DOS agent performs actions on a system as directed by the RDM server.

Preboot Execution Environment (PXE). PXE is an industry standard client/server interface that allows networked computers that are not yet loaded with an operating system to be configured and booted remotely. PXE is based on Dynamic Host Configuration Protocol (DHCP). Using the PXE protocol, clients can request configuration parameter values and startable images from the server.

The PXE process consists of the system initiating the protocol by broadcasting a DHCPREQUEST containing an extension that identifies the request as coming from a client that uses PXE. The server sends the client a list of boot servers that contain the operating systems available. The client then selects and discovers a boot server and receives the name of the executable file on the chosen boot server. The client downloads the file using Trivial File Transfer Protocol (TFTP) and executes it, which loads the operating system.

Redundant Array of Independent Disks (RAID). RAID is way of storing the same data in different places (thus, redundantly) on multiple hard disks. By placing data on multiple disks, I/O operations can overlap in a balanced way, improving performance. Multiple disks increase the mean time between failure (MTBF) and storing data redundantly increases fault-tolerance.

static group. A group that contains only systems that have been explicitly added to the

group. The significance of “static” in this context is that membership in the group is not dependent on particular attributes of each system; thus, the content of the group do not change without user action.

system. An individual, target system being deployed or managed by RDM. In IBM Director terminology, an RDM system is always a platform managed object. These can represent any of the supported-by-RDM systems. They cannot represent an IBM Director object that RDM does not process, such as a chassis or an SNMP object.

task. An already defined and configured unit of work that is available to be applied to a system or a group (of systems). You create a task by clicking on the applicable task template from the RDM main console. RDM is installed with predefined tasks, such as data disposal and scan.

task template. A prototype of a specific kind of RDM task. This is a term used to describe the different kinds of tasks shown on the task pane in the main window of the RDM console. Each task template has its own characteristics and attributes. RDM comes with a set of task templates.

Transmission Control Protocol/Internet Protocol (TCP/IP). TCP/IP is the suite of communications protocols developed for internetworking that encompasses both network layer and transport layer protocols. While TCP and IP specify two protocols at specific protocol layers, TCP/IP is often used to refer to the entire protocol suite based upon these, including Telnet, File Transfer Protocol (FTP), and User Datagram Protocol (UDP).

Trivial File Transfer Protocol (TFTP).TFTP is a simple form of the File Transfer Protocol (FTP). TFTP uses the User Datagram Protocol and provides no security features. It is often used by servers to boot diskless workstations, X-terminals, and routers.

Wake on LAN. Technology developed by IBM that allows LAN administrators to remotely power up systems. The following components are essential for the Wake on LAN setup:

- Wake on LAN-enabled network interface card (NIC).
- Power supply that is Wake on LAN-enabled.
- Cable which connects NIC and power supply.
- Software that can send a magic packet to the system.

If the system has the first three of the previous components, the system is called a Wake on LAN-enabled system. Even though a system might be powered off, the NIC keeps receiving power from the system power supply to keep it alive. A network administrator sends a magic packet to the system through some software, for example, RDM or Netfinity IBM Director. The NIC on the system detects the magic packet and sends a signal to the power supply to turn it on. This process is also called *waking up the system*. Using RDM, this process can be scheduled for individual systems. The Wake on LAN feature and RDM together make it very easy for you to deploy software on individual systems on a scheduled basis.

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Printed in U.S.A.