Using Symantec GHOST™ with RDM

A White Paper

January 28, 2005

Notes:

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Preface

This White Paper explains how to use IBM® Remote Deployment Manager (RDM) 4.20 with the disk-imaging product, Symantec GHOST™, made by Symantec Corporation. Among other things, you can use this document to learn how to do the following:

- Modify an RDM *Windows Clone Install* task to use a different cloning engine.
- Create RDM custom tasks.
- Create custom RDM system environments and use them in an RDM task.
- Create RDM user parameters and use them in an RDM task.

This document provides 2 methods to create the tasks:

- Explicitly, using the step-by-step procedure in <u>Section 2</u> below.
- Importing the RDM Tasks and environment from an attached file, using the procedure in <u>Section 6</u> below. Importing the task, while considerably faster, is hardly understandable.

These methods are equivalent; importing is probably a little faster.

Who should read this White Paper

This White Paper is intended to help skilled RDM administrators to create deployment procedures and to understand the concepts involved. To effectively use this White Paper, you should already have an extensive knowledge of your Network environment, your RDM environment, and DOS batch files.

Further reference

In addition to this paper, there are various other sources of information that you can consult for RDM and for RDM Custom tasks.

Guides

The following product documentation is available for RDM:

- Remote Deployment Manager 4.20 Users Guide – The main reference manual for RDM
- Remote Deployment Manager 4.20 Installation Guide – Describes the complete installation process of RDM
- Remote Deployment Manager 4.20 Compatibility and Configuration Guide – Lists RDM-supported hardware and software

Check the IBM Web site at <u>IBM Web Support site</u>, <u>http://www-307.ibm.com/pc/support/site.wss/document.do?lndocid=MIGR-50575</u> to get the current versions of these documents.

White papers

The various RDM white papers are available on the IBM Web site at http://www-307.ibm.com/pc/support/site.wss/document.do?lndocid=MIGR-53487.

Online help

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

Links

The following links are available for further information:

- 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 4.20, 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.

1. Ghost™ and IBM Remote Deployment Manager

1.1 Caveats

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Beyond this document, IBM will provide no support for the procedures described here. This document is the entire support for using Ghost in the manner described.

1.2 Introduction

Ghost is a disk-imaging product trademarked by Symantec Corporation.

In normal use, Ghost requires the user to be at each target system that is to be imaged. After each target system has been imaged, some time will then be spent configuring each target system with any necessary unique parameters. This document shows how to use Ghost, together with RDM to deploy target systems using a RDM *Windows Clone Install* task, thereby removing any need to visit the target systems. If you follow the instructions in this document, the target system will also be customized for the known user of a machine.

This document shows how to image and customize a Windows 2000, Windows XP or Windows 2003 installation.

As Ghost can clone many kinds of partitions, these procedures can be used to deploy many kinds of operating systems, within the limits of those operating systems. Note that in the event that you try to use these procedures to clone any other operating system, it will be your responsibility to design procedures to customize your images. These procedures will only work correctly to customize images of the listed operating systems.

This procedure was designed, and tested, to run on RDM 4.20, running on IBM Director 4.20.2. While the procedure may work on other versions/combinations of RDM/Director, no other versions have been tested.

1.3 Windows Clone Installations with RDM 4.20 and Ghost

RDM 4.20 ships with a native cloning capability based on a limited version of Symantec's ImageCenter imaging engine. This paper will show a method to replace that engine with Ghost, for that particular task.

These procedures require the use of a licensed copy of Ghost version 7.5 (or later). Earlier versions of Ghost have various memory constraints or command-line limitations. Shareware and evaluation versions of Ghost do not allow the use of batch parameters; so will also not allow these procedures to work in unattended fashion.

As RDM 4.20 does not use NetBEUI, we have no choice but to use the GhostCast server. GhostCasting defaults to using a multicast operation. Fortunately, the GhostCast server can run in any of three modes, so if you object to using multicast, you can always use the GhostCast server in unicast mode, or even in broadcast mode. Please refer to the Ghost documentation for details. In these procedures, we shall use Ghost in multicast mode, as our objective is to deploy large numbers of computers in the most efficient manner.

These procedures require the creation of text files. They can be created in any text editor. Ensure that the files are saved in MS-DOS format, with the correct line termination characters. One way to test this is to open the file in Windows Notepad. If the file displays correctly there, the file likely has the correct format. Complete listings of the files are given in the "File Listings" section of the document. It may be desirable to create these files before continuing. The final location of these files will be specified in the documentation. While these locations may be varied, it is best to follow the documentation as outlined, as these procedures are very sensitive to the file locations.

The files required are:

1. GHSCRIPT.TXT. This file will be used to pass parameters to the Ghost executable. This allows greater flexibility than trying to pass these parameters on the command line.

2. MKDOSCG.BAT. This file will be used to compile the new boot diskette image for the DOS system environment that we shall use for Ghost operations with RDM.

Other files that ship with RDM will also need to be modified, albeit not in their original directories. Full listings of the modified files will be supplied in the text.

2. Procedures:

2.1   Summary

For those who need minimal guidance, here is a summary of what needs to be done:

1.   Prepare the system for cloning.

2.   Create a new DOS system environment for use with Ghost.

3.   Acquire the image onto the RDM D-server, using a Custom task written to use Ghost for capturing the donor.

4.   Create a task for imaging, and use it to deploy the target systems.

2.2   Detailed procedure

To use Ghost with RDM requires six steps, after having a working RDM setup:

1.   Install software on a donor system.

2.   Prepare the donor system for capture by RDM. This consists largely of installing any needed applications, and then running sysprep on the donor computer. Refer to the RDM documentation, and Microsoft's documentation on sysprep for more detail, if you require it.

3.   Create a new DOS system environment for use with Ghost

4.   Create the User parameters for use with our tasks

5.   Create a Ghost image of the system (in this case, for simplicity, we create this image on the RDM server, but the image can be anywhere where it is accessible to the GhostCast server. We shall also install the GhostCast server on the RDM server).

6.   Use RDM to deploy and customize systems. For the sake of simplicity, in these procedures, we shall use an RDM *Windows Clone Install* task. For greater freedom of operation, you may use a Custom task, but that does require many enhancements to the procedure described here.

Note: If you want to import the actual task used in the creation of this document, follow the procedure in below.

2.2.1 Install the software on the donor system

Install all the required software on the system. This can be very conveniently done using an RDM *Windows Native Install* task, to install both the operating system and just about any application that can be installed in unattended fashion.

2.2.2 Customize the donor system for image capture

Customizing the installation image requires running sysprep on the donor.

1.   Create a directory called sysprep in the root of the system drive, which would normally be C:.

2.   Copy the files sysprep.exe and setupcl.exe into this directory. These files may be downloaded from the Microsoft website. The version that ships on the Windows 2000 CD especially is extremely limited. Each version of Windows uses a specific version of sysprep; it is the only version that will run. Consult the sysprep documentation to determine which version of sysprep is compatible with your operating system.

3. Run sysprep as necessary. Most of the time sysprep should be run with the "reseal" parameter, which is what we do here. On Windows XP and Windows 2003, you will also specify the "mini-setup" option. The "mini-setup" option is preselected when you run sysprep on Windows 2003; the option cannot be unchecked. (Windows 2000 sysprep does not recognize these parameters, so they will not be needed, if you are imaging Windows 2000).

For more information on sysprep parameters, and what they do, please consult the Microsoft documentation.

You may also want to refer to Chapter 10 of the *IBM Remote Deployment Manager 4.20 User's Reference*, available from the IBM web support site, http://www.pc.ibm.com/support. This reference provides considerable detail on preparation of donor systems for Windows Clone Install tasks.

2.2.3 Create a new DOS system environment for use with Ghost

We shall create a new boot diskette image called DOS71CG. This image will be based on the existing DOS71C environment. In all these procedures, we shall refer to the directory in which RDM is installed as %RDMROOT%. You will need to substitute the correct directory for your particular installation. The default value for %RDMROOT% is "C:\Program Files\IBM\RDM".

Note: The file used for importing the actual task used in the creation of this document, as detailed in Section 6 below, also contains the source directory for the DOS71CG environment. Should you choose to use this method to obtain the DOS71CG environment, note the caveats regarding GHOST.EXE. These also are detailed in Section 6, step 6.

1. Install Ghost on the machine that you will use as the GhostCast server. This is usually, but does not need to be, the RDM D-server. We shall install Ghost on the RDM server for simplicity.

2. Copy %RDMROOT%\local\env\71c to create a new directory. Call the new directory, %RDMROOT%\local\env\71cg.

3. Create a directory called log under the %RDMROOT%\temp directory. Any log failures from failed *Windows Clone Install* tasks using Ghost, will be placed in this directory if it exists. If you do not create the directory correctly, log files will be placed in the RDM temp directory, which can get rather cluttered.

4. Copy the file DIS_PKT.DOS from the Ghost installation to %RDMROOT%\local\env\71cg\dos. This is an updated version of, and will replace, the file that ships with RDM, and **MUST be used, or Ghost will not bind correctly to the network stack**.

5. Copy SLEEP.EXE from %RDMROOT%\local\env\b\net to the %RDMROOT%\local\env\71cg directory.

6. Copy EMM386.EXE from %RDMROOT%\local\env\o\e\dos to %RDMROOT%\local\env\71cg\dos. This is necessary because there are machines that require emm386.exe for Ghost to run, and there are other machines that require that emm386.exe NOT be loaded. This part of the procedure assumes that we are dealing with a machine that requires that emm386 be loaded; or that the presence of emm386.exe is irrelevant. See Section 5, which deals with the case where we must not load emm386.

7. Create a file MKDOSCG.BAT (as listed in Section 3.1) in the %RDMROOT%\local\env directory, or if already created, copy it there. The "pause" at the end of the file is just to ensure that you can see that it compiled with no errors.

8. Create or copy the file GHSCRIPT.TXT (as listed in Section 3.2) to the %RDMROOT%\local\env\71cg\deploy directory.

9. In this particular case, as we shall be using a specific version of Ghost, we copy the GHOST.EXE file into our DOS system environment for compilation, rather than transfer it at run time. Therefore, copy GHOST.EXE from the Ghost installation to %RDMROOT%\local\env\71cg\deploy directory. Note that Demo and Shareware versions of Ghost cannot be successfully used with these procedures.

10. Create a file WATTCP.CFG in the %RDMROOT%\local\env\71cg directory. This file needs to contain at least one line: "RECEIVE_MODE=6". Consult the Symantec documentation for any other information about the wattcp.cfg file.

11. Modify the %RDMROOT%\local\env\71cg\CONFIG.SYS file to read as shown in the file listing in Section 3.3

12. Modify the %RDMROOT%\local\env\71cg\AUTOEXEC.BAT file to read as shown in the file listing in Section 3.4

13. Modify the %RDMROOT%\local\env\71cg\deploy\DEPLOY.BAT file to read as shown in the file listing in Section 3.5

14. Modify the %RDMROOT%\local\env\71cg\capture\CAPTURE.BAT file to read as shown in the file listing in Section 3.6

15. Modify the %RDMROOT%\local\env\71cg\custimg\CUSTIMG.BAT file to read as shown in the file listing in Section 3.7. The inserted line is shown in **bold** text.

16. From a command prompt session in the %RDMROOT%\local\env directory, run the mkdoscg.bat file. This will compile a new boot image called DOS71CG for us to use for Ghost operations.

To improve readability, all the file-listings are given separately in a different section (Section 3), of this paper. These files are fully commented to explain what they are doing.

2.2.4 Create the User parameters for use with our tasks

As an example, we shall show how to create one such user parameter. We then present a table of values to be used to create the other user parameters.

> **Note:** Importing the actual task used in the creation of this document, as detailed in Section 6 below, will create all the user variables as part of the import procedure. You may prefer to use this faster method, once you understand what these parameters are supposed to do.

We create the user parameter we shall call "ghsession".

At the Director Console,

1. Right click on the RDM **Windows Clone Install** template.

You should see the graphic shown below.
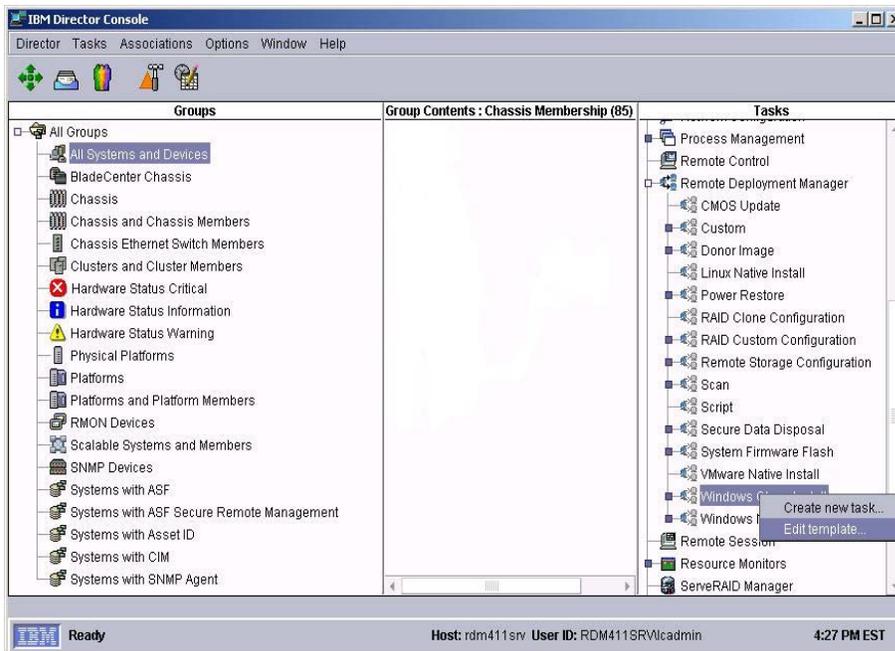
2. Click on **Edit Template.**

3. Click on the **Advanced** tab in the configuration notebook.

4. Click on **User parameters.**

You should see the graphic shown below.
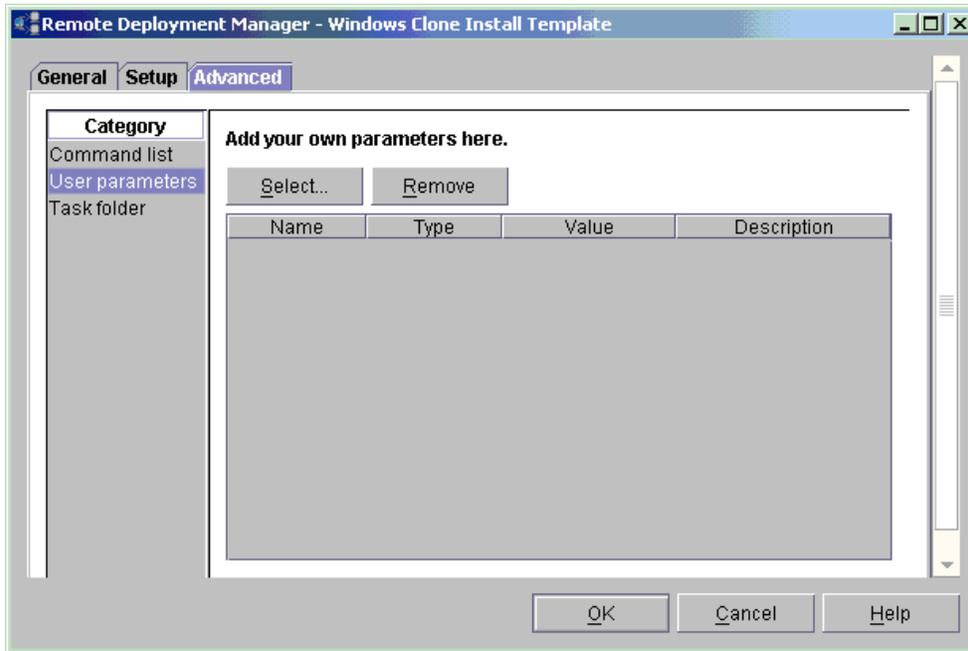
5. Click on the **Select** button.

You should see the graphic shown below.
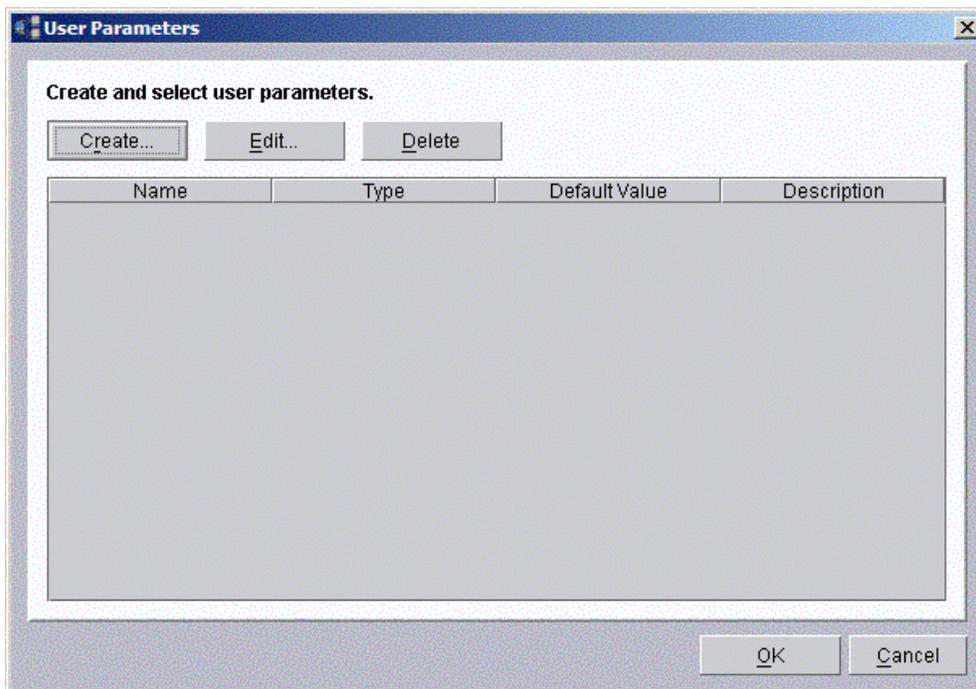
6. Click on the **Create** button.

You should see the graphic shown below.

Using the controls, fill out the values as shown in the picture below.
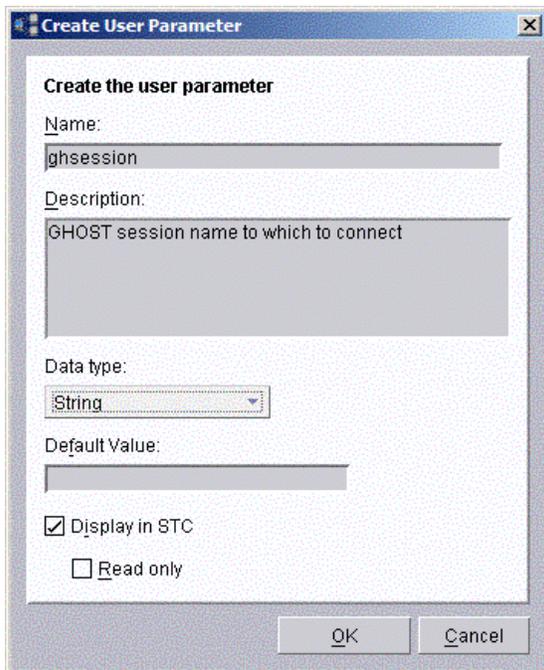
Following the same method, and using this table as a guide, create the rest of the parameters. The table lists all the parameters that need to be created; including the "ghsession" parameter that we just defined. All these user parameters will become environment variables in the environment for any task of which they are a part. We shall use our batch files to access these variables.

Parameter Name	Data Type	Default Value	Parameter Description
ghsession	String		Ghost session name to which to connect.
TTL	Non-negative Integer	10	Time to live for multicast packets. Set to 16 if left blank.
debug	Non-negative Integer		1=debug with pauses, 2=debug with no pauses. Logging files will be placed on server.
c1max	Non-negative Integer	5	# attempts to retry (each batch of) connection attempts (default=5, max=10)
c2max	Non-negative Integer	5	# connection attempts (i.e., multiples of c1max) (default=5, max=10)
waittime	Non-negative Integer	300	seconds to wait between batch of connection attempts
extra1	String		Any single extra command to be passed to Ghost. <Place your own description here>
extra2	String		Any single extra command to be passed to Ghost. . <Place your own description here>
extra3	String		Any single extra command to be passed to Ghost. . <Place your own description here>
extra4	String		Any single extra command to be passed to Ghost. . <Place your own description here>
extra5	String		Any single extra command to be passed to Ghost. . <Place your own description here>
extra6	String		Any single extra command to be passed to Ghost. . <Place your own description here>
extra7	String		Any single extra command to be passed to Ghost. . <Place your own description here>
extra8	String		Any single extra command to be passed to Ghost. . <Place your own description here>
gsip	String		IP address at which the GhostCast session is running. If blank, it defaults to the address of the RDM server.
size	String	-szeE	Specify any size parameters for Ghost
ghver	Non-negative Integer	8	Ghost major version. Default=8. Must be stated if Ghost version is earlier than version 8. Value is 8 for all Ghost 8.x versions; 9 for all Ghost 9.x versions. Value can be anything for any other versions.

Click on the **OK** buttons to exit the *User Parameters* and *Windows Clone Install Template* screens.

2.2.5 Create a Ghost image of the system

To do this we shall create a *Custom* task for the purpose.

Proceed as follows:

1. Using the *Custom* task template, and following the same procedure described in Section 2.2.4, where we created User parameters, create *Custom* task User parameters, *ghsession* and *ghver*, identical in definition to those that you created in Section 2.2.4

2. Create a Custom task User parameter, *debug*. Enter a description that specifies values of:

    1=enabled, disabled otherwise.

3. Right-click on **Custom Task**

4. Click on **Create new task**

5. Enter *Get Donor – using GHOST* for the **Task name**

6. Click on **Advanced**

7. Modify the Command list to read as follows:

```
;This is the command list for the GHOST clone capture task
;
;***************************************************************
; * Remote Deployment Manager
; * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
;***************************************************************
;
BOOTTYPE !LOADDOS /ENVIRONMENT/DOS71CG
WAKE
!!SETENV
TIMEOUT 240
!capture\capture.bat
!capture\CaptMsg.bat
!!SHUTDOWN
END
```

Notice the change of the DOS system environment to DOS71CG from DOS71C

8. Click on **User parameters**

9. Click on the **Select** button

10. Place check marks in the choices for

- ghsession

- debug

- ghver

11. Start the GhostCast server, and provide a name for the GhostCast session and the name of the file to be created as the Ghost image file. GHGET is a good suggestion for the session name. Refer to the Ghost documentation for any necessary information. This document assumes that you have an intimate working knowledge of Ghost: **IBM will not provide support on how to use Ghost.**

12. Drag and drop the donor system onto the task as is normally done to run any task.

13. Select **Configure systems** and ensure that all necessary values are correct. The value for ghsession MUST be the same as the name that you gave the Ghost session.

When the Ghost session is complete, there should be a Ghost image of the donor wherever you specified that the image be placed.

If anything goes wrong, set debug to 1 in the System Task Configuration and rerun the task. The task will pause at various points so you can break out or otherwise determine the problem.

Note that this procedure is not at all disruptive to existing Ghost deployment situations. You continue to use your current repository for Ghost files: you merely access them using the GhostCast server.

2.2.6 Use RDM to deploy the Ghost image and customize systems

To do this we shall create a *Windows Clone Install* task, and then modify it for the purpose.

Proceed as follows:

1. We need a *Windows Clone Install* image in order to create a *Windows Clone Install* task, so we shall first need to create a dummy Powerquest image file (PQI file) for use in creating the task. This method of using a dummy PQI file ensures that everything related to Ghost deployments is distinctly separate, and self-contained.

    Create a file called DUMMY.PQI in a known location. We put it in the root of C:. The contents of the file are immaterial.

2. Starting from the Director menu bar, click on **Tasks→Remote Deployment Manager→Image Management→Create and Modify Images…**

3. Click on the **Create…** button

4. Select **Windows Clone Install** from the drop-down list and click on the **OK** button.

5. In the resulting notebook dialog box, in the *Image name* panel, call the image, *Dummy image for GHOST tasks.* Add a description if you wish.

6. Click on the **Setup** tab of the notebook.

7. Select a workstation-class operating system.

8. Leave the **Sysprep Type** as *RESEAL*, unless you have very good reason to change it.

9. For machine type, enter the correct machine type, or any 4 characters.

10. Click on the **Browse** button and navigate to, and select the C:\DUMMY.PQI file that you created in step 1 above, and then click on the **OK** button. This will create the necessary image.

11. Click on the **OK** button after the image is successfully created.

12. Repeat steps 3 to 11, selecting a server-class (instead of a workstation-class) operating system, at step 7. In step 5, you will have to select a different name for the image, as you cannot have two images with the same name in RDM.

13. Click on the **OK** button to exit the *Image Management* screen.

14. Following a similar procedure to that in Section 2.2.5 above, create a new *Windows Clone Install* task. We called this "*Deploy GHOST Image to* <specify machine type here if you wish>"

15. You may elect to check the box which will "**Ignore failure in systems configuration**", especially if you intend to use this task on multiple machines that are not identical to the donor system.

16. Select all the previously defined User parameters as part of the definition of the task.

17. Edit the task **Command list** to use DOS71CG as its system environment.

18. The final Command list will look like this:

```
;This is the command list for the GHOST clone Full deployment
task
;
;***************************************************************
; * Remote Deployment Manager
; * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
;***************************************************************
;
BOOTTYPE !LOADDOS /ENVIRONMENT/DOS71CG
```

```
WAKE
!!SETENV
TIMEOUT 240
!deploy\deploy.bat
!!REBOOT
!custimg\setUser.bat
!!SETENV
!custimg\custimg.bat
BOOTTYPE !BOOTLOCAL
!!REBOOT
BOOTTYPE !LOADDOS /ENVIRONMENT/DOS71CG
!!REBOOT
UpdateAssetID
!!SHUTDOWN
END
```

Once again, notice the change of the DOS system environment to DOS71CG from DOS71C.

19. Start the GhostCast server and load the file that we are going to use for the session. Remember to set the TTL parameter to a reasonable value. Consult the Ghost documentation if necessary.

20. Name the session. This is the same name that you will assign to the task as "*ghsession*", so that the system can connect to the GhostCast server.

21. Drag and drop the target system onto the task as is normally done to run any task in RDM.

22. Elect to ignore **System Task Configuration** errors, if the dialog box comes up. This will be the case anytime this task is deployed to a system that is not identical to the system type that you specified in step 9 above.

23. Fill in the value for the "*ghsession*". This MUST be the same as the name that you gave the Ghost session.

24. Fill in or edit the values for any of the parameters that you will use. All parameters that have defaults MUST be used, but you can change their values to values more in line with your requirements.

Notes on deployment characteristics

The way DEPLOY.BAT is written causes the systems to stay in a timed multiple loop looking for the GhostCast session. If during task deployment, the Ghost session hangs, as it sometimes will if network hiccups occur, you just need to stop the GhostCast session and restart it. What will happen is that all the systems will fail out, and immediately go into seek mode looking for the GhostCast session. The systems will thus rejoin the session as soon as the GhostCast server comes back up.

This behavior is controlled by the $c1max$ and $c2max$ and *waittime* User parameters that we defined. Assuming a total failure, the total time to failure will be approximately $c2max$ multiplied by *waittime*. Hence, while debugging, you may want to use a small value for *waittime* and/or $c2max$. There is little to be gained from reducing $c1max$.

This feature also means that deployments of multiple systems can be automatically staggered if desired. You merely need to specify both an autostart and auto-timeout values for the GhostCast server, or otherwise start the GhostCast session when the desired number of clients connect. All other systems will go into the seek loop. If the GhostCast server is set to automatically restart, then another batch of systems will manage to connect as soon as the GhostCast server restarts, while the rest remain in the seek loop, and so on.

For example, if you launched the task against 100 systems, but specified an autostart value of 20 for the GhostCast server, then all 100 clients will be processed, in batches of 20 at a time. The maximum number of batches that you can run will be equal to the value assigned to the $c2max$ User parameter. Any batch that is less than the autostart value will start when the GhostCast session autostart timeout expires.

It is possible to launch the GhostCast server using a Windows shortcut (or from the command prompt), with the necessary parameters to create a new session ready for connection. Consult the Symantec documentation for details.

Note on troubleshooting

If anything goes wrong, set debug to 1or 2 in the System Task Configuration and rerun the task. If debug=1, the task will pause at various points so you can break out or otherwise determine the problem; if debug=2, the task will run without pausing, but place log files in the %RDMROOT%\temp\log directory or the %RDMROOT%\temp directory if the log directory does not exist.

You can also always press the **F8** function key at the "Starting PC-DOS" message on the client, and do an interactive step-through of the process. Note that a peculiarity of conditional DOS redirection will pipe an incorrect character into the ghscript.txt file, and thus cause a failure, unrelated to whatever you are debugging.

3. File Listings

In all these listings, some lines may have been wrapped for clarity.

3.1 MKDOSCG.BAT

```
@echo OFF
REM **********************************************************
REM * Remote Deployment Manager
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM **********************************************************
Rem * MKDOSCG.BAT
REM * This file builds the customer-created DOS images
REM * used during RDM processing with GHOST.
REM **********************************************************


echo . Building DOS disk images...
echo .
echo . Changing to %~p0
cd %~p0
echo . Making dos71cg image
copy baseimg dos71cg
bpdisk -d dos71cg -i b
bpdisk -d dos71cg -i 71s\dos
bpdisk -d dos71cg -i o\h
bpdisk -d dos71cg -i o\e
bpdisk -d dos71cg -i o\r
bpdisk -d dos71cg -i 71cg
move dos71cg ..\..\repository\environment\dos71cg


PAUSE
:end
```

3.2 GHSCRIPT.TXT

```
-clone,mode=%clmode%,src=@mc%gs%,dst=1
-js=%ttl%
-jaddr=%gsip%
-sure
-fx
-batch
```

3.3 CONFIG.SYS

```
REM **********************************************************
REM * Remote Deployment Manager 4.20
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM **********************************************************
REM * CONFIG.SYS file for the dos71cg DOS image.
REM * - It contains support for concurrently running IBM and
```

```
REM *   GHOST/PowerQuest IP stacks.
REM * - It is an IBM DOS 7.1 image used for these RDM tasks:
REM *    Windows Clone Install
REM *    Get Donor
REM ********************************************************

DOS=HIGH,UMB
SWITCHES = /I

rem ****** modified lines follow ********************
rem Files=25
rem Buffers=5
rem STACKS=0,0

Files=30
Buffers=20
STACKS=9,256

SHELL=A:\COMMAND.COM A:\ /E:1024 /P /H
DEVICE=A:\DOS\HIMEM.SYS /NUMHANDLES=128 /VERBOSE
device=a:\dos\emm386.exe /noems /verbose

DEVICEHIGH=A:\DOS\RAMDRIVE.SYS 6144 /E
LASTDRIVE=Z

rem LASTDRIVE=E
rem LASTDRIVE is changed to "Z" to take care of Citrix Metaframe clonng.
rem ******** end of modifications **************

DEVICE=A:\net\PXUTIL.SYS -a A:\NET\PROTOCOL.INI
DEVICE=A:\net\PROTMAN.DOS /I:A:\NET
DEVICEHIGH=A:\net\NDIS.DOS
DEVICE=A:\net\LCIPS.DOS
DEVICEHIGH=a:\dos\dis_pkt.dos
```

3.4 AUTOEXEC.BAT

```
@ECHO OFF
REM ********************************************************
REM * Remote Deployment Manager
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM ********************************************************
REM * AUTOEXEC.BAT file for the dos71cg image.
REM * - It contains support for concurrently running IBM and
REM *   GHOST/PowerQuest IP stacks.
REM * - It is an IBM DOS 7.1 image used for these RDM tasks:
REM *    Windows Clone Install
REM *    Get Donor
REM ********************************************************

SET BOOTDRI=A:
SET PATH=A:\NET;A:\DOS;%path%;
SET TEMP=A:\DOS
SET TCPHELP=A:\NET

A:\NET\netbind
```

```
REM Check for Raid adapter
raidchk.exe
IF ERRORLEVEL 1 goto RAID

SET HASRAID=FALSE
REM Try to Set write cache on for IDE drives
REM Uncomment next line to turn on IDE cache
REM IDEWC.EXE
GOTO CONTINUE

:RAID
SET HASRAID=TRUE

:CONTINUE
REM set common environment variables
RDAGENT /e
if exist _rdm.bat call _rdm.bat
echo CLIENT_IP is %CLIENT_IP%
echo SERVER_IP is %SERVER_IP%
echo UUID is %uuid%
echo BOOTMAC is %bootmac%

rem **** start of modifications ***
rem **** We need the ramdrive just in case we run out of space on the  ***
rem **** virtual floppy in the future ****

REM Detect the Ramdisk drive letter, RAMDSK is set in ramdrive.bat
ramdsk2.exe
call ramdrive.bat

rem **** end of insertion ****


REM Reset status
SET RDRASLEVEL=0
SET RDSTATUS=RDAGEN000I
SET RDRETPATH=%RAMDSK%
SET RDRETFILE=none

REM Continuously call server to request for work
:LOOP

REM Clean up from any prior command that was run
if exist _rdm.bat del _rdm.bat

:RUNAGENT

RDAGENT

REM Always delete any previous RDRETFILE
if exist %RDRETPATH%\%RDRETFILE% del %RDRETPATH%\%RDRETFILE%

REM Go handle an RDAGENT Error if it occurs.
if errorlevel 1 goto SETAGERR

REM assume good status before calling _rdm.bat
SET RDRASLEVEL=0
SET RDSTATUS=RDBATC000I
```

```
call _rdm.bat
goto LOOP

:SETAGERR
SET RDRASLEVEL=1
call rdagerr.bat
REM sleep 2 seconds to display the error
sleep 2
goto LOOP

:END
echo System will reboot in 10 seconds ...
sleep 10
treboot
```

3.5 DEPLOY.BAT

```
@ECHO OFF
REM ****************************************************************
REM * Remote Deployment Manager
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM ****************************************************************
REM * DEPLOY.BAT
REM * Deploying Ghost image from to client, by connecting
REM * to a GHOSTCAST session.
REM ****************************************************************

ECHO Running DEPLOY.BAT to use GHOST to deploy images to client.

REM Write heading of log file.
echo Log file for Ghost multicast Windows Clone Install task>>%systemname%.txt
echo.>>%systemname%.txt

rem  Setting processing variables

set xferfile=%systemname%-%TASKTOID%-%TASKTEMPLATEID%.txt
set scruberr=0

mtftp get %SERVER_IP% environment\dos\scrub3.exe A:\scrub3.exe

RDAGENT /L "Wiping hard disk 1"
A:\SCRUB3 /D=1 /L=1 /S=NO
IF NOT ERRORLEVEL 1 GOTO SCRUBOK
RDAGENT /L "Error running SCRUB3.EXE, attempting to continue.
set scruberr=1
echo
###############################################################>>%systemname%.txt
echo # Output from "A:\SCRUB3 /D=1 /L=1 /S=NO /DEBUG=YES"
follows.>>%systemname%.txt
echo
###############################################################>>%systemname%.txt
A:\SCRUB3 /D=1 /L=1 /S=NO /DEBUG=YES >>%systemname%.txt
:SCRUBOK

rem **** If GHOST.EXE does not exist, abort.
```

```
if exist deploy\ghost.exe goto GHCLIOK
RDAGENT /L "ERROR: Cannot find DEPLOY\GHOST.EXE program."
SET RDSTATUS=NOGHCLIENE
GOTO END

:GHCLIOK

rem If the GHOST session name is not defined, we abort.

if NOT %ghsession%.==. goto GHSEIOK

RDAGENT /L "ERROR: No Ghost session is defined."
SET RDSTATUS=NOGHSESSIE
GOTO END

:GHSEIOK

rem Otherwise we connect to the session.

RDAGENT /L "Entered GHOSTCASTING deploy procedure."
if %debug%.==1. RDAGENT /L "DEBUG flag set, mode=%debug% : processing will be
paused, and logged."
if %debug%.==2. RDAGENT /L "DEBUG flag set: mode=%debug% : processing will be logged
on server, but not paused."

rem **** We use a ramdisk if one is available, and create some space on the virtual floppy.

if exist %ramdsk%\nul goto RAMDOK
RDAGENT /L "ERROR: No ramdisk available. Aborting."
set RDSTATUS=NORAMDSK_E
goto END

:RAMDOK

RDAGENT /L "Ramdrive is %ramdsk% drive."
RDAGENT /L "Copying files to ramdrive.
"
copy deploy\ghost.exe %ramdsk%\ghost.exe >nul
if exist %ramdsk%\ghost.exe del deploy\ghost.exe
copy deploy\ghscript.txt %ramdsk%\ghscript.txt >nul
copy wattcp.cfg %ramdsk%\wattcp.cfg >nul

rem **** The next variables can be overridden by the task defining
rem **** variables of the same name

rem    c1max ..... Number of attempts to retry on (each batch of) connection attempt (default=5,
max=10)
rem    c2max ..... Number of connection attempts (i.e., multiples of c1max) (default=5, max=10)
rem    waittime .. Number of seconds to wait between batch of connection attempts
(default=300)

if %c1max%.==. goto setc2max
set ctemp=%c1max%
set c1try=%c1max%
set c1max=xxxxx
if %ctemp%.==10. set c1max=xxxxxxxxxx
if %ctemp%.==9. set c1max=xxxxxxxxx
if %ctemp%.==8. set c1max=xxxxxxxx
```

```
if %ctemp%.==7. set c1max=xxxxxxx
if %ctemp%.==6. set c1max=xxxxxx
if %ctemp%.==5. set c1max=xxxxx
if %ctemp%.==4. set c1max=xxxx
if %ctemp%.==3. set c1max=xxx
if %ctemp%.==2. set c1max=xx
if %ctemp%.==1. set c1max=x

:setc2max
if %c1max%.==. set c1max=xxxxx
if %c2max%.==. goto setwtime
set ctemp=%c2max%
set c2max=xxxxx
if %ctemp%.==10. set c2max=xxxxxxxxxx
if %ctemp%.==9. set c2max=xxxxxxxxx
if %ctemp%.==8. set c2max=xxxxxxxx
if %ctemp%.==7. set c2max=xxxxxxx
if %ctemp%.==6. set c2max=xxxxxx
if %ctemp%.==5. set c2max=xxxxx
if %ctemp%.==4. set c2max=xxxx
if %ctemp%.==3. set c2max=xxx
if %ctemp%.==2. set c2max=xx
if %ctemp%.==1. set c2max=x

:setwtime
if %c2max%.==. set c2max=xxxxx
if %waittime%.==. set waittime=300

rem **** Initiate counts for multicast processing attempts

set count1=
set count2=

rem **** set ghostcast server related environment variables
rem gs=sessionname on ghostcast server
rem gsip=ghostcast server IP address; defaults to RDM server address, if blank

set gs=%ghsession%
if %gsip%.==. set gsip=%server_ip%
::if %size%.==. set size=szee
if %ttl%.==. set ttl=16

rem **** set the correct parameters, depending on the GHOST version

RDAGENT /L "Set GHOST clone parameter, depending on GHOST version."

set clmode=load
if %ghver%.==8. set clmode=restore
if %ghver%.==9. set clmode=restore

RDAGENT /L "GHOST major version requested is %ghver%. GHOST dump parameter set to
'%clmode%'."

rem ***** We need to customize the GHOST control file, so we get lccustom.exe

mtftp get %SERVER_IP% environment\dos\lccustom.exe A:\lccustom.exe
if errorlevel 1 goto TFTPERR
```

```
rem **** Now we customize the file

RDAGENT /L "Customizing ghscript.txt file"

lccustom.exe deploy\ghscript.txt
if not %size%.==. echo %size%>>deploy\ghscript.txt
if not %extra1%.==. echo %extra1%>>deploy\ghscript.txt
if not %extra2%.==. echo %extra2%>>deploy\ghscript.txt
if not %extra3%.==. echo %extra3%>>deploy\ghscript.txt
if not %extra4%.==. echo %extra4%>>deploy\ghscript.txt
if not %extra5%.==. echo %extra5%>>deploy\ghscript.txt
if not %extra6%.==. echo %extra6%>>deploy\ghscript.txt
if not %extra7%.==. echo %extra7%>>deploy\ghscript.txt
if not %extra8%.==. echo %extra8%>>deploy\ghscript.txt

rem **** Copy the modified file to the ramdrive if one exists.

if exist %ramdsk%\nul copy deploy\ghscript.txt %ramdsk%\ghscript.txt >nul

if %debug%.==1. type deploy\ghscript.txt
if %debug%.==1. pause
if %debug%.==2. type deploy\ghscript.txt

:STARTGH

rem **** We remove the error semaphore, if it exists, so we can start clean

if exist ghosterr.txt del ghosterr.txt

rem **** then execute GHOST

RDAGENT /L "Running inner GHOST search loop. %count1%x"
RDAGENT /L "Connecting to GHOST session %ghsession% at IP address: %gsip%."

if exist %ramdsk%\ghost.exe RDAGENT /L "Command line is: %ramdsk%\ghost.exe
@%ramdsk%\ghscript.txt"
if exist %ramdsk%\ghost.exe %ramdsk%\ghost.exe @%ramdsk%\ghscript.txt

rem **** If there was an error, ghosterr.txt is created, so we check for it
rem **** and use it's absence as a semaphore for success, after checking the errorlevel.

if not errorlevel 1 goto SUCCESS
if not exist ghosterr.txt goto SUCCESS

rem **** else initiate an error count and retry c1max times

set count1=%count1%x
if not %count1%.==%c1max%. goto STARTGH

rem **** If we are here, we have made c1max tries (number of x's above)
rem **** so we pause for a period (sleep below), and try
rem **** again another c1max times

cls
echo.
echo.
echo.
echo.
```

```
echo        GHOST multicast did not complete after %c1try% tries
echo        Will try again in %waittime% seconds.
echo.
echo.

sleep %waittime%
set count1=
RDAGENT /L "Running outer GHOST search loop. %count2%x"
set count2=%count2%x
if not %count2%.==%c2max%. goto STARTGH

rem **** if we are here, we have made "c2max" attempts to connect
rem **** each attempt consisting of "c1max" tries, so we have an
rem **** access problem, and report an error

rem **** create the error file

echo.>>%systemname%.txt
echo Ghost Multicast failed to deploy image>>%systemname%.txt
echo.|date>>%systemname%.txt
echo.>>%systemname%.txt
echo.|time>>%systemname%.txt
echo.>>%systemname%.txt
echo #############################################>>%systemname%.txt
echo # Target system environment variables follow.>>%systemname%.txt
echo #############################################>>%systemname%.txt
set>>%systemname%.txt
echo.>>%systemname%.txt
echo.>>%systemname%.txt
if exist ghosterr.txt echo #######################################>>%systemname%.txt
if exist ghosterr.txt echo # Contents of GHOST error file follow.>>%systemname%.txt
if exist ghosterr.txt echo #######################################>>%systemname%.txt
echo.>>%systemname%.txt
if exist ghosterr.txt type ghosterr.txt>>%systemname%.txt
echo.>>%systemname%.txt
echo.>>%systemname%.txt


if %debug%.==1. type %systemname%.txt
if %debug%.==1. pause
if %debug%.==2. type %systemname%.txt

rem **** transfer the file to the server, set status and exit

RDAGENT /L "Ghost Multicast failed to deploy image. Sending logging file to server."

if %debug%.==1. echo Ghost Multicast failed to deploy image. Sending logging file to server.
if %debug%.==1. pause
if %debug%.==2. echo Ghost Multicast failed to deploy image. Sending logging file to server.

mtftp put %SERVER_IP% %systemname%.txt log\%xferfile% -v

rem **** If the log directory does not exist on the RDM server, then we put
rem **** the file in the rdm\temp directory

if errorlevel 1 mtftp put %SERVER_IP% %systemname%.txt %xferfile% -v
if exist MTFTPRC.BAT CALL MTFTPRC.BAT
```

```
if %debug%.==1. pause

RDAGENT /L "GHOST image deployment failed."
set RDSTATUS=GHMC_ERR_E
goto END

:SUCCESS
RDAGENT /L "GHOST image successfully deployed using GHOSTCAST session:
%ghsession%."
echo GHOST image successfully deployed using GHOSTCAST session:
%ghsession%.>>%systemname%.txt
set RDSTATUS=0GHCaptOKI
if not %debug%.==1. if not %debug%.==2. goto END
if %debug%.==1. echo Ghost Multicast successfully deployed image.
if %debug%.==1. pause
if %debug%.==2. echo Ghost Multicast successfully deployed image.

rem if debug flag is set we send log to server

echo.>>%systemname%.txt
echo Ghost Multicast deploy debug log>>%systemname%.txt
echo.|date>>%systemname%.txt
echo.>>%systemname%.txt
echo.|time>>%systemname%.txt
echo.>>%systemname%.txt
echo #############################################>>%systemname%.txt
echo # Target system environment variables follow.>>%systemname%.txt
echo #############################################>>%systemname%.txt
set>>%systemname%.txt
echo.>>%systemname%.txt
echo.>>%systemname%.txt
echo #############################################>>%systemname%.txt
echo # Contents of %ramdsk%\ghscript.txt file follow.>>%systemname%.txt
echo #############################################>>%systemname%.txt
echo.>>%systemname%.txt
if exist %ramdsk%\ghscript.txt type %ramdsk%\ghscript.txt>>%systemname%.txt
echo.>>%systemname%.txt
echo.>>%systemname%.txt
echo #############################################>>%systemname%.txt
echo # Contents of a:\deploy\ghscript.txt follow.>>%systemname%.txt
echo #############################################>>%systemname%.txt
echo.>>%systemname%.txt
type a:\deploy\ghscript.txt>>%systemname%.txt
echo.>>%systemname%.txt
echo.>>%systemname%.txt

if %debug%.==1. type %systemname%.txt
if %debug%.==1. pause
if %debug%.==2. type %systemname%.txt

rem **** transfer the file to the server, set status and exit

RDAGENT /L "DEBUG flag set. Sending logging file to server."

if %debug%.==1. echo DEBUG flag set. Sending logging file to server.
if %debug%.==1. pause
if %debug%.==2. echo DEBUG flag set. Sending logging file to server.
```

```
mtftp put %SERVER_IP% %systemname%.txt log\%xferfile% -v

rem **** If the log directory does not exist on the RDM server, then we put
rem **** the file in the rdm\temp directory

if errorlevel 1 mtftp put %SERVER_IP% %systemname%.txt %xferfile% -v
if exist MTFTPRC.BAT CALL MTFTPRC.BAT

goto END

:TFTPERR
CALL MTFTPRC.BAT
GOTO END

:END

rem if %scruberr%=1, then there was a scrub error,so we transfer the log file

if not %scruberr%.==1. goto FINISH
mtftp put %SERVER_IP% %systemname%.txt log\%xferfile% -v

rem **** If the log directory does not exist on the RDM server, then we put
rem **** the file in the rdm\temp directory

if errorlevel 1 mtftp put %SERVER_IP% %systemname%.txt %xferfile% -v
if exist MTFTPRC.BAT CALL MTFTPRC.BAT

:FINISH
RDAGENT /L "Exiting DEPLOY.BAT"
ECHO Exiting DEPLOY.BAT.
```

3.6 CAPTURE.BAT

```
@ECHO OFF
REM ****************************************************************
REM * Remote Deployment Manager
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM ****************************************************************
REM * CAPTURE.BAT
REM * This batch file runs the appropriate PowerQuest DeployCenter
REM * program to create an image of the system on the RDM D-Server.
REM * The output image file CLONE.PQI is created in the
REM * "Program Files\IBM\RDM\temp" directory on the D-Server.
rem
rem * Modified to use GHOST as the imaging engine, by connecting to a
rem * GHOSTCAST session. Image file location is determined by the
rem * GHOSTCAST session.
REM ****************************************************************

ECHO Running CAPTURE.BAT to create clone image from host at %CLIENT_IP%.

rem **** GHOST CAPTURE STUFF *****
rem
rem **** If GHOST.EXE does not exist, abort.

if exist deploy\ghost.exe goto GHCLIOK
RDAGENT /L "ERROR: Cannot find DEPLOY\GHOST.EXE program."
```

```
SET RDSTATUS=NOGHCLIENE
GOTO ORIGINAL

:GHCLIOK

rem If the GHOST session name is not defined, we assume we are not using GHOST
rem so we go to the original entry point

if %ghsession%.==. goto ORIGINAL

rem Otherwise we connect to the session

RDAGENT /L "Entered GHOSTCASTING capture procedure."
if %debug%.==1. RDAGENT /L "DEBUG flag set."

rem first clean up any detritus from former operations
if exist ghosterr.txt del ghosterr.txt

rem then call ghost

rem **** first set the correct parameters, depending on the GHOST version

RDAGENT /L "Set GHOST dump parameter, depending on GHOST version."

set clmode=dump
if %ghver%.==8. set clmode=create
if %ghver%.==9. set clmode=create

RDAGENT /L "GHOST major version requested is %ghver%. GHOST dump parameter set to
'%clmode%'."

rem **** then execute GHOST

RDAGENT /L "Connecting to GHOST session %ghsession%."
RDAGENT /L "Command line is: deploy\ghost.exe -
clone,mode=%clmode%,src=1,dst=@MC%ghsession% -sure -batch -z9"

deploy\ghost.exe -clone,mode=%clmode%,src=1,dst=@MC%ghsession% -sure -batch -z9

rem ghsession=name of GHOST session on the GHOSTCast Server

rem  if errorlevel is not zero, we set a status flag for branching

if errorlevel 1 set status=err

rem Just for surety, we check that a ghosterr.txt file has not been generated, as one
rem would mean that there was a GHOST error.

if exist ghosterr.txt set status=err

rem  else we set our good return message and go to exit point

if not %status%.==err. goto GOODCAPT

rem Proccess error

rem **** create the error file
```

```
echo.>>%systemname%.txt
echo GhostCast failed to capture image>>%systemname%.txt
echo.|date>>%systemname%.txt
echo.>>%systemname%.txt
echo.|time>>%systemname%.txt
echo.>>%systemname%.txt
set>>%systemname%.txt
echo.>>%systemname%.txt
echo.>>%systemname%.txt
if exist ghosterr.txt echo ####################################>>%systemname%.txt
if exist ghosterr.txt echo Contents of GHOST error file follow.>>%systemname%.txt
if exist ghosterr.txt echo ####################################>>%systemname%.txt
echo.>>%systemname%.txt
if exist ghosterr.txt type ghosterr.txt>>%systemname%.txt
echo.>>%systemname%.txt
echo.>>%systemname%.txt


if %debug%.==1. type %systemname%.txt
if %debug%.==1. pause


rem **** transfer the file to the server, set status and exit

RDAGENT /L "Ghost Multicast failed to capture image. Sending logging file to server."

if %debug%.==1. echo Ghost Multicast failed to capture image. Sending logging file to server.
if %debug%.==1. pause
mtftp put %SERVER_IP% %systemname%.txt log\%ghsession%.txt -v

rem **** If the log directory does not exist on the RDM server, then we put
rem **** the file in the rdm\temp directory

if errorlevel 1 mtftp put %SERVER_IP% %systemname%.txt %ghsession%.txt -v
if exist MTFTPRC.BAT CALL MTFTPRC.BAT
if %debug%.==1. pause


RDAGENT /L "GHOST image capture failed"
if %status%.=err. set RDSTATUS=GHCaptErrE
goto END

:GOODCAPT
RDAGENT /L "GHOST Image successfully captured using GHOSTCAST session:
%ghsession%."
set RDSTATUS=0GHCaptOKI
if not %debug%.==1. goto END
if %debug%.==1. pause
goto END

:ORIGINAL

rem *** end of additions ********


RDAGENT /L "Running makepqs.com to modify pqstore.scr"
makepqs.com
REN PQSTORE.SCR S.S
```

```
REM Delete PR_ERR.BAT, ERROR.TXT and E. files if they already exists (thought they
shouldn't)
IF EXIST PR_ERR.BAT DEL PR_ERR.BAT
IF EXIST ERROR.TXT DEL ERROR.TXT
IF EXIST E. DEL E.

IF EXIST PQIImgCtr.EXE GOTO FULL

RDAGENT /L "Downloading PQIDplyZ Files"
mtftp get %SERVER_IP% environment\dos\pqidplyz.exe A:\PQIDplyz.exe
if errorlevel 1 goto TFTPERR
mtftp get %SERVER_IP% environment\dos\pqidplyz.rtc A:\pqidplyz.rtc
if errorlevel 1 goto TFTPERR

RDAGENT /L "Start PQIDplyZ.exe to capture image"
PQIDplyZ /IMG=\\.\imgsrv\%SERVER_IP%\%INTENAME%\clone.pqi /LOG=E. /CMD=S.S
/IFC
GOTO RETURN

:FULL
copy capture\STORE.TXT A:\F.S
IF %HASRAID% == TRUE GOTO RAID
RDAGENT /L "Start PQIImgCtr.exe to capture image - IDE Optimization On"
PQIImgCtr /IMG=\\.\imgsrv\%SERVER_IP%\%INTENAME%\clone.pqi /LOG=E. /CMD=F.S
/NOCDR /IFC /NMD
GOTO RETURN

:RAID
RDAGENT /L "Start PQIImgCtr.exe to capture image - Raid Support Enabled"
PQIImgCtr /IMG=\\.\imgsrv\%SERVER_IP%\%INTENAME%\clone.pqi /LOG=E. /CMD=F.S
/IDE=OFF /NOCDR /IFC /NMD

:RETURN
REN E. ERROR.TXT
PRERR.COM S
IF EXIST PR_ERR.BAT CALL PR_ERR.BAT
GOTO END

:TFTPERR
CALL MTFTPRC.BAT
GOTO END

:END
RDAGENT /L "Exit Capture.bat"
ECHO Exiting Capture.bat.
```

3.7 CUSTIMG.BAT

```
@ECHO OFF
REM ***************************************************************
REM * Remote Deployment Manager
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM ***************************************************************
ECHO * CUSTIMG.BAT
REM * Perform client customizations to deployed image.
REM ***************************************************************
```

```
RDAGENT /L "Removing Deployment files"
REM Remove unnecessary files
if exist PQImgCtr.ovl del PQImgCtr.ovl
if exist PQImgCtr.exe del PQImgCtr.exe
if exist PQImgCtr.pqg del PQImgCtr.pqg
if exist PQIDplyZ.exe del PQIDplyZ.exe
if exist PQIDplyZ.rtc del PQIDplyZ.rtc
if exist deploy\ghost.exe del deploy\ghost.exe
if exist Scrub3.exe del Scrub3.exe

RDAGENT /L "Downloading WCI Customization files"
mtftp get %SERVER_IP% environment\dos\lccustom.exe A:\lccustom.exe
if errorlevel 1 goto TFTPERR
mtftp get %SERVER_IP% environment\dos\winagent.exe A:\winagent.exe
if errorlevel 1 goto TFTPERR
mtftp get %SERVER_IP% environment\win32\sleep.exe A:\sleep.exe
if errorlevel 1 goto TFTPERR
mtftp get %SERVER_IP% environment\dos\pqaccd.exe A:\pqaccd.exe
if errorlevel 1 goto TFTPERR
mtftp get %SERVER_IP% environment\dos\pqaccd.rtc A:\pqaccd.rtc
if errorlevel 1 goto TFTPERR
mtftp get %SERVER_IP% environment\win32\getdir.exe A:\getdir.exe
if errorlevel 1 goto TFTPERR
mtftp get %SERVER_IP% environment\win32\mtftp.exe A:\custimg\mtftp.exe
if errorlevel 1 goto TFTPERR

Mtftp get %server_ip% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\answer2.txt
sysprep.inf
if errorlevel 1 goto TFTPERR

REM Customizing answer file
lccustom A:\sysprep.inf

RDAGENT /L "Creating WCI Support files and Directory Structure"

REM Build client.ini file
ECHO [Environment]> A:\CLIENT.INI
ECHO RDM_USER_NAME=%UserName%>> A:\CLIENT.INI
ECHO RDM_ADMIN=%ADMIN%>> A:\CLIENT.INI
ECHO RDM_STARTUP_PATH=%STARTUP_PATH%>> A:\CLIENT.INI
ECHO SERVER_IP=%SERVER_IP%>> A:\CLIENT.INI
ECHO CLIENT_IP=%CLIENT_IP%>> A:\CLIENT.INI
ECHO UUID=%UUID%>> A:\CLIENT.INI
ECHO BOOTMAC=%BOOTMAC%>> A:\CLIENT.INI

REM Build client.bat file
ECHO REM Environment Variables> A:\CLIENT.BAT
ECHO set RDM_USER_NAME=%UserName%>> A:\CLIENT.BAT
ECHO set RDM_ADMIN=%ADMIN%>> A:\CLIENT.BAT
ECHO set RDM_STARTUP_PATH=%STARTUP_PATH%>> A:\CLIENT.BAT
ECHO set SERVER_IP=%SERVER_IP%>> A:\CLIENT.BAT

REM Create and copy files to Sysprep Directory
SET STATUS="Creating sysprep directory"
PQAccD /MKDIR 1:\sysprep
if errorlevel 1 goto FAIL2
```

```
SET STATUS="Creating i386 directory"
PQAccD /MKDIR 1:\sysprep\i386
if errorlevel 1 goto FAIL2

SET STATUS="Creating $OEM$ directory"
PQAccD /MKDIR 1:\sysprep\i386\$OEM$
if errorlevel 1 goto FAIL2

SET STATUS="Copying sysprep.inf"
PQAccD /copy A:\sysprep.inf 1:\sysprep\sysprep.inf
if errorlevel 1 goto FAIL2

IF NOT "%SysprepType%" == "2" GOTO NOWINBOM
RDAGENT /L "Downloading and customizing winbom.ini"
SET STATUS="downloading winbom.ini"
Mtftp get %server_ip% TEMPLATE\%TASKTEMPLATEID%\%TASKTOID%\winbom.ini
winbom.ini
if errorlevel 1 goto TFTPERR
SET STATUS="customizing winbom.ini"
lccustom A:\winbom.ini
SET STATUS="Copying winbom.ini"
PQAccD /copy A:\winbom.ini 1:\winbom.ini
if errorlevel 1 goto FAIL2

:NOWINBOM
RDAGENT /L "Customizing and Transferring WCI Post Install Files"
SET STATUS="Copying pqcmdln.txt to cmdlines.txt"
PQAccD /copy A:\custimg\pqcmdln.txt 1:\sysprep\i386\$OEM$\cmdlines.txt
if errorlevel 1 goto FAIL2

REM Copy and configure post install files
SET STATUS="Copying client.ini"
PQAccD /copy a:\CLIENT.INI 1:\CLIENT.INI
if errorlevel 1 goto FAIL2

SET STATUS="Copying client.bat"
PQAccD /copy a:\CLIENT.BAT 1:\CLIENT.BAT
if errorlevel 1 goto FAIL2

SET STATUS="Copying sleep.exe"
PQAccD /copy a:\sleep.exe 1:\sleep.EXE
if errorlevel 1 goto FAIL2

SET STATUS="Copying winagent to rdagent.exe"
PQAccD /copy a:\winagent.exe 1:\RDAGENT.EXE
if errorlevel 1 goto FAIL2

SET STATUS="Copying pqclean.bat"
PQAccD /copy a:\custimg\pqclean.bat 1:\pqclean.bat
if errorlevel 1 goto FAIL2

SET STATUS="Copying getdir.exe"
PQACCd /COPY a:\getdir.exe 1:\sysprep\getdir.exe
if errorlevel 1 goto FAIL2

SET STATUS="Copying mtftp.exe"
PQACCd /COPY a:\custimg\mtftp.exe 1:\mtftp.exe
if errorlevel 1 goto FAIL2
```

```
lccustom A:\custimg\pqagent.bat
SET STATUS="Copying pqagent.bat"
PQAccD /copy a:\custimg\pqagent.bat 1:\pqagent.bat
if errorlevel 1 goto FAIL2

SET STATUS="Copying autoBoot.bat"
PQAccD /copy a:\custimg\autoboot.bat 1:\autoBoot.bat
if errorlevel 1 goto FAIL2

lccustom A:\custimg\defuser.reg
SET STATUS="Copying defuser.reg"
PQAccD /copy A:\custimg\defuser.reg 1:\defuser.reg
if errorlevel 1 goto FAIL2

lccustom A:\custimg\dlocuser.reg
SET STATUS="Copying dlocuser.reg"
PQAccD /copy A:\custimg\dlocuser.reg 1:\dlocuser.reg
if errorlevel 1 goto FAIL2

REM Reset Boot.ini to boot from first partition
SET STATUS="Changing boot.ini attributes"
PQAccD /att=-RSH 1:\boot.ini

SET STATUS="Copying boot.ini to RAM"
PQAccD /copy 1:\boot.ini A:\

bootini.com
SET STATUS="Copying boot.ini"
PQAccD /copy A:\boot.ini 1:\boot.ini

SET STATUS="Changing boot.ini attributes"
PQAccD /att +RH 1:\boot.ini

IF NOT "%DomainName%" == "" GOTO PQEND
IF NOT "%WorkGroupName%" == "" GOTO PQEND
GOTO NOGROUP

:TFTPERR
CALL MTFTPRC.BAT
GOTO END

:NOGROUP
RDAGENT /L "Warning: No Domain or Workgroup Defined"
GOTO END

:FAIL2
SET RDRASLEVEL=1
SET RDSTATUS="RDMSWM234E Failure %STATUS%"
@ECHO Failure %STATUS%
PQAccD /INFO
GOTO END

:PQEND
RDAGENT /L "File Customization and Transfer Complete"
ECHO Customization Complete.
GOTO END
```

```
:END
RDAGENT /L "Exiting Custimg.bat"
ECHO Exiting CUSTIMG.BAT.
```

4. Troubleshooting

4.1 Pausing the task

- The *debug* User parameter is provided for troubleshooting.

- Set the parameter to 1 to pause the processing at various places already set.

- If you want to pause at any other parts of the task processing, edit the necessary file, as determined from the Command list, placing the statement, "if %debug%.==1. pause" wherever you want to create a temporary stop.

4.2 Error logging

If the deployment fails, the log and error files are placed in the RDM temp directory, unless you have created a LOG directory under the RDM temp directory, in which case they are placed there.

You can force creation of the log files by setting *debug* to *2* in System Task Configuration for the GHOST deployment task. This will create the log files but not otherwise affect the task processing.

- For the Ghost capture task, the files are named: %ghsession%.txt, where %ghsession% is the Ghost capture session name.

- For the Ghost deployment task, the files are named: %systemName%-%TASKTOID%-%TASKTEMPLATEID%.txt, where %systemName% is the system name that is assigned to the system in the Director console.

These files contain the entire list of environment variables that exist in the environment, and the contents of the Ghost error log file.

Typical contents of such a file are shown in the following actual example:

```
Ghost Multicast failed to deploy image
Current date is Fri 09-03-2004
Enter new date (mm-dd-yy):


Current time is  4:37:34.12p
Enter new time:


COMSPEC=A:\COMMAND.COM
BOOTDRI=A:
PATH=A:\NET;A:\DOS;A:\DOS;
TEMP=A:\DOS
TCPHELP=A:\NET
IDE=TRUE
CLIENT_IP=166.16.43.212
SERVER_IP=166.14.253.53
UUID=ccec2ef21c1eb211b889e49ea5dd743c
BOOTMAC=00096bb50894
```

```
RDRETFILE=none
TASKTEMPLATEID=13
TASKTOID=901
OSTYPE=5
SYSPREPTYPE=1
CLONEFOLDER=1093386968344
CLONEFILENAME=clone.pqi
LICENSECOUNT=5
IGNOREFAILURE=0
WORKGROUPNAME=WORKGROUP
SYSTEMNAME=SW1-B05
COMPUTERNAME=SW1-B05
LOCALELANGUAGEGROUP=1
LOCALELANGUAGE=00000409
TIMEZONE=4
USERNAME=ibm
COMPANYNAME=ibm
GHVER=8
SIZE=szeE
GSIP=166.14.253.53
GHSESSIONNAME=GHCSFB
WAITTIME=1
DEBUG=1
TTL=10
SESSIONNAME=bob
RDRASLEVEL=0
RDSTATUS=RDBATC000I
RAMDSK=void
C1TRY=1
C1MAX=x
CTEMP=1
C2MAX=x
GS=GHCSFB
CLMODE=restore
COUNT2=x


######################################
Contents of GHOST error file follow.
######################################

Date   : Fri Sep  3 16:37:33 2004
Error Number: (40011)
Message: Destination drive too small
Version: 8.0.0.984 (Oct  3 2003, Build=984)
OS Version: DOS v7.10
Command line arguments: -clone,mode=restore,src=@mcGHCSFB,dst=1 -js=10 -
jaddr=166.14.253.53 -szeE -sure -fx -batch
Active Switches :
     AutoName
```

This particular one shows that the task specified that the image was NOT to be resized to fit the drive (-szeE on the Ghost command line), but the target drive was smaller than the donor; hence the statements:

"Error Number: (40011)
 Message: Destination drive too small"

5. Cases where emm386 must not be loaded

We follow the same general procedures as in <u>Section 2.2.3</u>. The differences are as follows:

1. Give your copy of the %RDMROOT%\local\env\71c a different name: e.g., %RDMROOT%\local\env\71cn.

2. Ignore step 6: do not copy emm386.exe into the directory structure.

3. Do not edit AUTOEXEC.BAT.

4. Edit CONFIG.SYS to read as shown in Section 5.1 below.

5. Create a new compiler batch file, MKDOSCN.BAT with content, to read as shown in Section 5.2 below. Place this file in the %RDMROOT%\local\env.

6. From a command prompt session in the %RDMROOT%\local\env directory, run the mkdoscn.bat file. This will compile a new boot image called DOS71CN for us to use for Ghost operations.

7. Specify your boot image as DOS71CN in your tasks

5.1 CONFIG.SYS

```
REM ********************************************************
REM * Remote Deployment Manager
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM ********************************************************
REM * CONFIG.SYS file for the dos71CN DOS image.
REM * - It contains support for concurrently running IBM and
REM *   GHOST IP stacks.
REM * - It is an IBM DOS 7.1 image used for these RDM tasks:
REM *     Windows Clone Install
REM *     Get Donor
REM ********************************************************

DOS=HIGH,UMB
SWITCHES = /I

rem  ****** modified lines follow ********************
rem Files=25
rem Buffers=5
rem STACKS=0,0

Files=30
Buffers=20
STACKS=9,256

SHELL=A:\COMMAND.COM A:\ /E:1024 /P /H
DEVICE=A:\DOS\HIMEM.SYS /NUMHANDLES=128 /VERBOSE
LASTDRIVE=Z

rem LASTDRIVE=E

rem  ******** end of modifications *************

DEVICE=A:\net\PXUTIL.SYS -a A:\NET\PROTOCOL.INI
DEVICE=A:\net\PROTMAN.DOS /I:A:\NET
```

```
DEVICEHIGH=A:\net\NDIS.DOS
DEVICE=A:\net\LCIPS.DOS
DEVICEHIGH=a:\dos\dis_pkt.dos
```

5.2 MKDOSCN.BAT

```
@echo OFF
REM *********************************************************
REM * Remote Deployment Manager
REM * (C) Copyright IBM Corp. 1996, 2005 All rights reserved.
REM *********************************************************
Rem * MKDOSCN.BAT
REM * This file builds the customer-created DOS images
REM * used during RDM processing with GHOST.
REM *********************************************************


echo . Building DOS disk images...
echo .
echo . Changing to %~p0
cd %~p0
echo . Making dos71cn image
copy baseimg dos71cn
bpdisk -d dos71cn -i b
bpdisk -d dos71cn -i 71s\dos
bpdisk -d dos71cn -i o\h
bpdisk -d dos71cn -i o\e
bpdisk -d dos71cn -i o\r
bpdisk -d dos71cn -i 71cn
move dos71cn ..\..\repository\environment\dos71cn


PAUSE
:end
```

6. Using the exported RDM tasks

RDM 4.20 (or later) has the ability to import a task. You can use the attached file (which contains exported copies of the tasks, and a copy of the custom DOS71CG environment, created in Section 2 above) to create your tasks. The DOS71CG environment does not contain the Ghost.exe file; you have to supply the file, and then follow the procedure to compile the new DOS71CG boot diskette image, as shown in step 9 and step 16 of Section 2.2.3.

6.1 Unzip the file

1. Extract the attached self-extracting ZIP file, *rdm42gh.exe*, by right clicking on the paperclip icon and saving the file to disk.

   Note: You may need Adobe Acrobat Reader 6.0.1 or later to be able to extract the file.

2. Run *rdm42gh.exe*

3. Click the **Unzip** button.

4. Click on the **OK** button when the unzip is complete.

5. Click on the **Close** button to exit WinZip.

6.2 Build the DOS71CG environment

1. Run the C:\RDM_GHOST_FILES\env\env.exe file.

2. The files extract to the correct path if RDM was installed to the default path. Correct the path to show the correct %RDMROOT%, and extract the files directly to the correct place, or extract the files and then copy them to the correct locations. See Section 2.2.3.

3. Click the **Unzip** button.

4. Click on the **OK** button when the unzip is complete.

5. Click on the **Close** button to exit WinZip.

6. Both the DOS71CG and the DOS71CN environments will not have GHOST.EXE in them. Follow the instructions in step 9 in Section 2.2.3, (and refer to Section 5) to place GHOST.EXE in the right place.

7. Follow the instructions in step 16 in Section 2.2.3, to compile the boot diskette image for the DOS71CG boot environment.

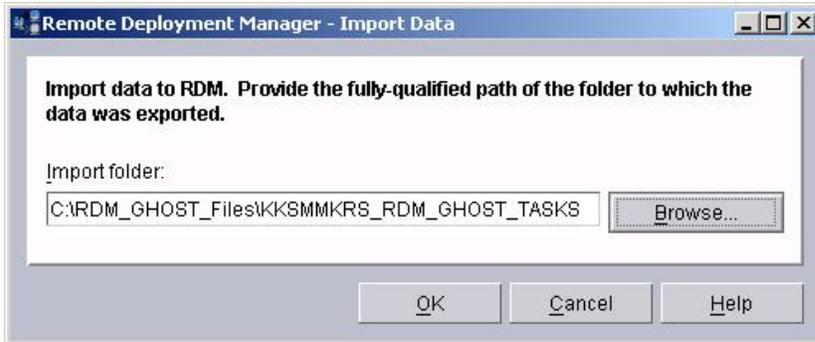## 6.3 Import the Ghost RDM tasks

1. From the Director console menu, select **Tasks → Remote Deployment Manager → Import/Export → Import RDM Data...**
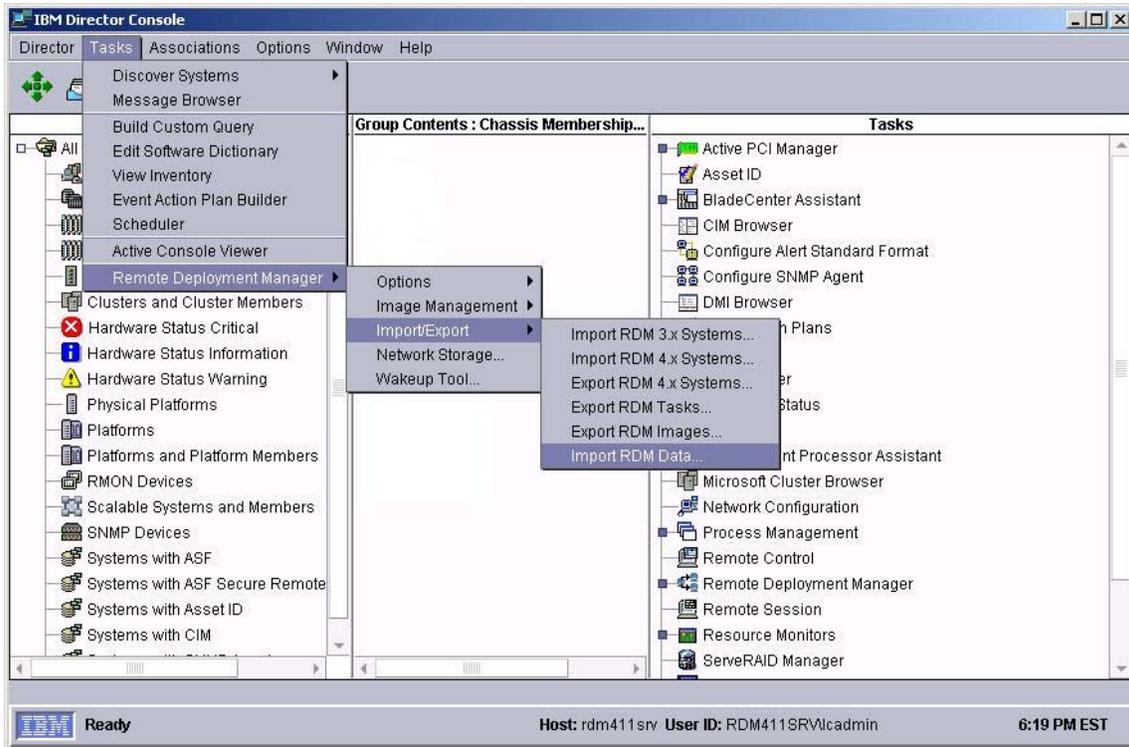
2. Make sure that you are not running any other RDM tasks, then click on **OK** on the warning message.
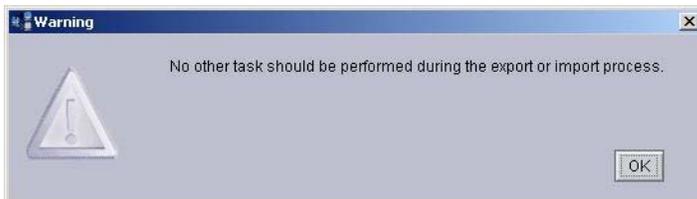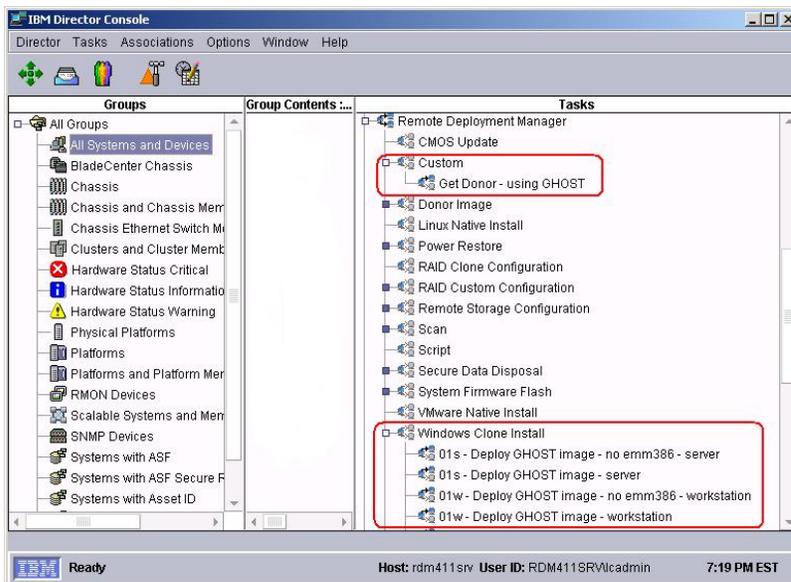
3. Select the **Browse** button on the *Import Data* window.

4. Navigate to the *C:\RDM_GHOST_Files\KKSMMKRS_RDM_GHOST_TASKS* folder, and select the **OK** button.

5. Select the **OK** button on the *Import Data* window.

6. Select the **OK** button on the Progress Indicator message window

7. Expand the RDM templates to validate that the new tasks are there

8. Edit and use tasks as necessary. Refer to Section 2.2.5 and Section 2.2.6.

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