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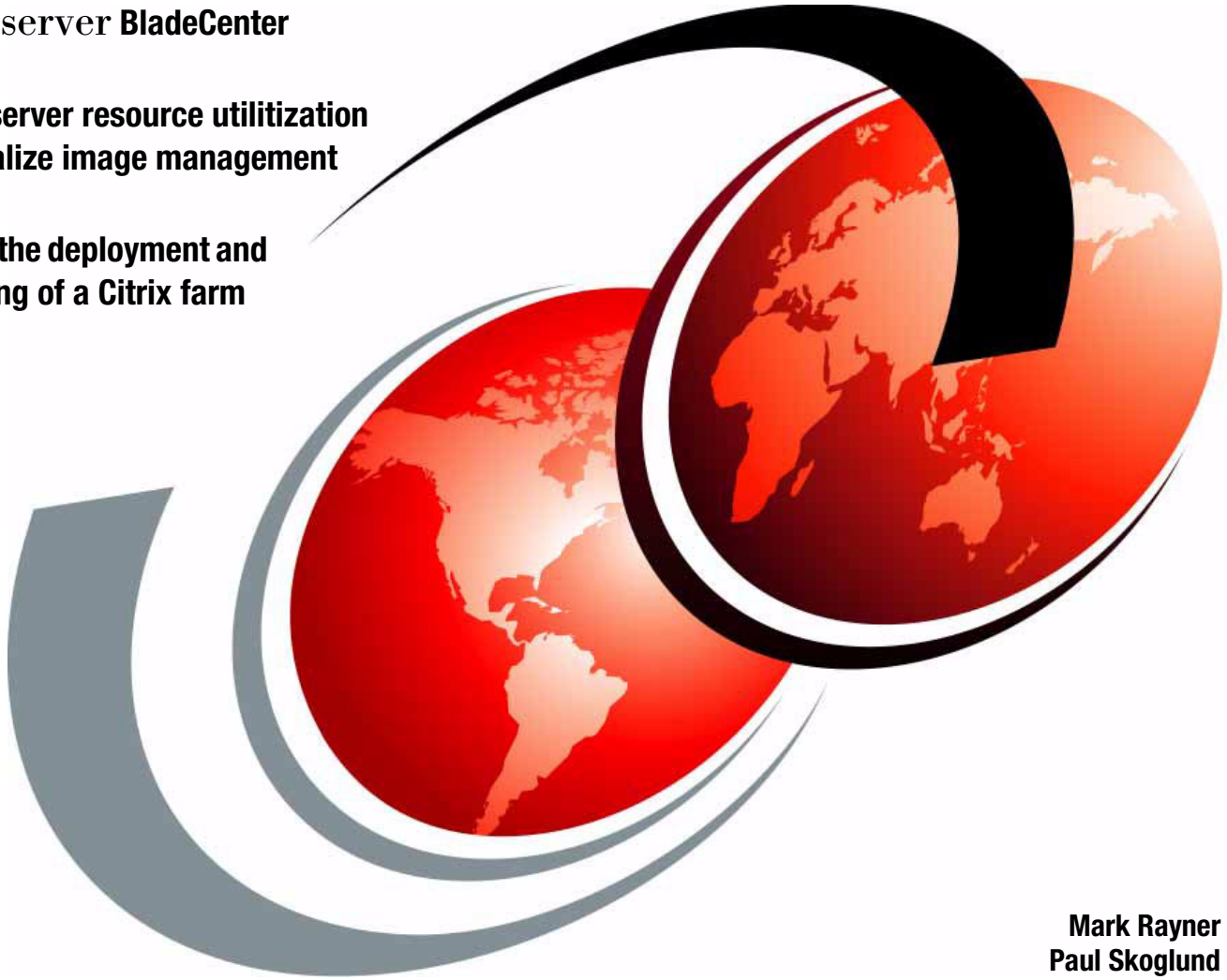
Automating the Deployment and Image Management of a Citrix Hosted Client Environment

- Migrate from PCs to a hosted environment on IBM @server BladeCenter
- Optimize server resource utilitization and centralize image management
- Automate the deployment and provisioning of a Citrix farm



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Redpaper

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International Technical Support Organization

Automating the Deployment and Image Management of a Citrix Hosted Client Environment

May 2005

Note: Before using this information and the product it supports, read the information in “Notices” on page v.

First Edition (May 2005)

This edition applies to the following products:

- Microsoft Windows Server 2003, Standard Edition
- Microsoft Windows CE Version 7.0.2
- Citrix MetaFrame Presentation Server Version 3.0
- Java Runtime Environment Version 1.4.1_02
- Aurema ARMTech for Citrix MetaFrame Version 2.10
- Softricity SoftGrid Client Version 3.1
- Cygwin Version 1.5.11
- AutoIt Version 3.0
- IBM Director Version 4.2
- Remote Deployment Manager Version 4.2
- IBM Tivoli Provisioning Manager Version 2.1

Contents

Notices v
Trademarks vi

Preface vii
The team that wrote this Redpaper vii
Become a published author viii
Comments welcome. viii

Chapter 1. Introduction. 1

Chapter 2. Preparing for deployment 5
2.1 Overview 6
2.2 Citrix MetaFrame Presentation Server 3.0 7
2.2.1 Creating the Citrix MetaFrame answer file 7
2.2.2 DSN file creation for Citrix using SQL Server 9
2.2.3 Citrix MetaFrame batch file creation 10
2.3 ARMTech for Citrix 11
2.4 Cygwin and AutoIt 3.0 11
2.4.1 Cygwin installation and configuration steps 11
2.4.2 Step 1. Downloading Cygwin components 12
2.4.3 Step 2. Creating and compiling the AutoIt script 13
2.4.4 Step 3. Obtain TPM server public key files 14
2.4.5 Step 4. Create bash script to set up and configure SSH. 14
2.4.6 Step 5. Creating AutoIt.bat 16
2.4.7 Step 6. Copy files to IBM Director/RDM server source directory 17
2.5 Active Directory on Windows Server™ 2003 17
2.5.1 Enabling roaming user profiles 17
2.5.2 Managing roaming user profiles via group policy 18
2.5.3 Enabling folder redirection and exclusion under group policy. 20
2.6 Tivoli Provisioning Manager 2.1 21
2.6.1 Data Center Model overview. 21
2.6.2 TC driver updates 24
2.6.3 Director command line 25

Chapter 3. Deployment 29
3.1 Image Deployment with RDM 30
3.1.1 WNI image for Windows Server 2003. 30
3.1.2 WNI Image for JRE 1.4.1_02 32
3.1.3 WNI image to create a Citrix MetaFrame Presentation Server farm. 35
3.1.4 WNI image to join a Citrix MetaFrame Presentation Server farm 36
3.1.5 WNI image of ARMTech for Citrix. 38
3.1.6 WNI image for Softricity SoftGrid client 40
3.1.7 WNI image for Cygwin Shell 42
3.1.8 Creating the WNI tasks 44
3.1.9 Enabling Terminal Services 54
3.1.10 Creating script tasks 55
3.2 Deployment with RDM and TPM. 58
3.2.1 Remote Deployment Manager 59
3.2.2 Copying Cygwin to the donor machine 59

3.2.3 Edit Autoit.bat on the donor machine 59
3.2.4 ARMTech for Citrix licensing. 60
3.2.5 Prepare for the donor image 60
3.2.6 Creating the clone image 61
3.2.7 Edit the advanced tab in the WCI task to call c:\cygwin2\Autoit.bat 62
3.2.8 Tivoli Provisioning Manager 62

Chapter 4. After deployment 65
4.1 Publishing the desktop with Presentation Server 66
4.2 Creating an ICA connection in Neoware 70
4.3 ezUpdate on Neoware Windows CE devices 74
4.3.1 ezUpdate server address 75
4.3.2 ezUpdate server setup 76
4.3.3 Disabling ezUpdate for Neoware Windows CE. 77
4.3.4 ezUpdate setup on Neoware Windows CE 8.0 77
4.3.5 Troubleshooting your ezUpdate setup for Neoware CE 79

Appendix A. Answer file UnattendedTemplate.txt 81

Appendix B. Additional material 91
Locating the Web material 91
Using the Web material 91

Related publications 95
IBM Redbooks 95
Other publications 95
Online resources 95
How to get IBM Redbooks 97
Help from IBM 97

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Preface

In today's enterprise computing environments, IT organizations are facing an increasing need to gain more centralized control over their servers and applications. The expense of full-featured desktop systems combined with the high cost of administering physically dispersed systems has driven corporate IT departments to seek alternative means of delivering desktop computer functionality. Many are making the move from a distributed desktop environment to a more centralized, hosted computing environment.

In a terminal-session solution such as that based on Citrix MetaFrame Presentation Server, simple, stateless, thin-client devices communicate with back-end servers that run the desktop applications. In this hosted-client environment, all user data and configuration information is stored in a centrally managed location that is easier to back up, secure, maintain, and administer.

This Redpaper describes how to use IBM® Director and Remote Deployment Manager to construct rapid deployment images for provisioning a Citrix-based hosted client infrastructure including Aurema ARMTech for Citrix, Softricity SoftGrid client, and the Cygwin shell.

This paper includes detailed steps to configure Microsoft®'s roaming user profiles and folder redirection to manage user data, how to use Citrix MetaFrame Presentation server to publish a desktop and how to create an ICA connection from a Neoware thin client to a Citrix MetaFrame publication. In addition, methods for enhancing the management of this solution architecture via leveraging the capabilities of IBM Tivoli® Provisioning Manager are explored.

The intended audience includes technical sales support and IT personnel. This document assumes that the reader has some skills in the setup and configuration of the components described above.

The team that wrote this Redpaper

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1

Introduction

In a hosted client environment, the desktop operating system and all applications run on servers in a remote data center. End-user storage is also remote from the user's desktop and is hosted in the data center using robust security features. End users interact with one of a variety of client devices, depending on a user's location or the nature of the task that user is performing.

The hosted client solution based on Citrix MetaFrame technology provides the infrastructure required for hosting desktop sessions on remote server hardware (see Figure 1-1).

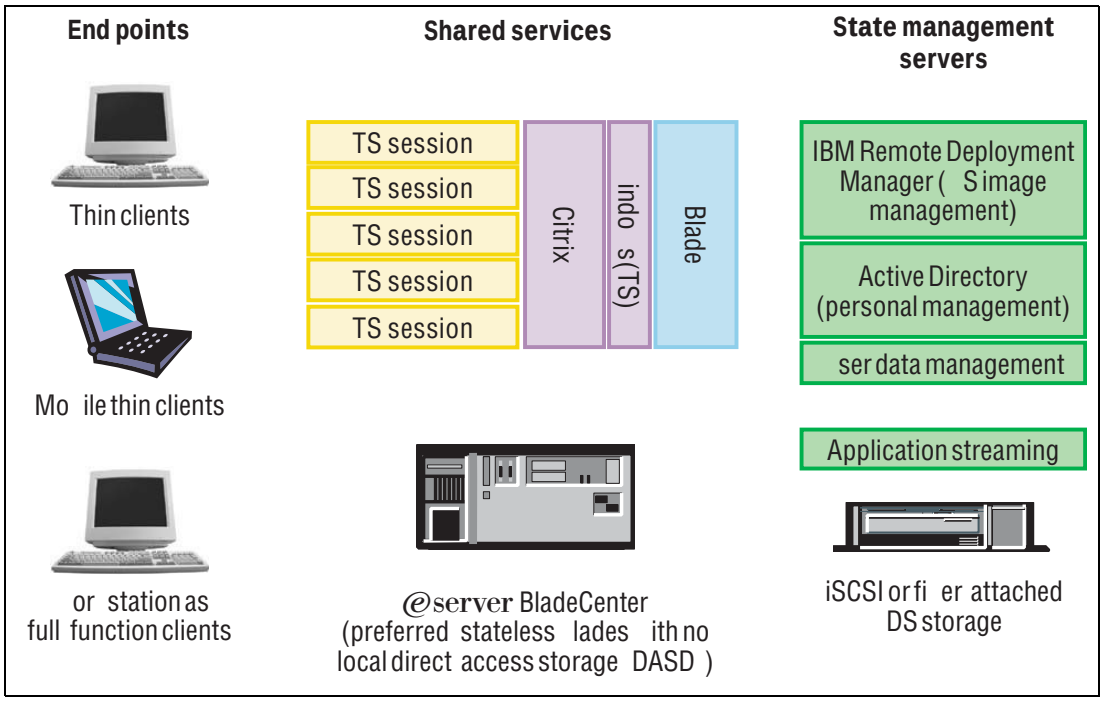

Figure 1-1 Hosted clients solution infrastructure based on Citrix MetaFrame Presentation Server

The hosted client architecture is composed of a three-tiered infrastructure:

- The desktop tier that the end user interacts with
- The compute-engine tier that hosts the desktop operating system and applications
- The state-management tier that manages all states associated with an end-user's desktop experience

To enable broad client-side support, the IBM-hosted client solution supports desktop appliances with embedded operating systems, locked-down thin-PC operating systems, and full-function clients running local operating systems and local applications. A thin client can take the form of a terminal, such as a Neoware client, or it can be a modified desktop with a locked-down operating system. A full-function client refers to a PC desktop, running a local operating system with local applications, which connects to remote hosted sessions, such as a Citrix-hosted application. The client device provides keyboard, mouse, and video for the remote session. Depending on the environment, the client device can also provide connections to local printers, I/O devices (USB memory key, diskette drive, CD-ROM, or DVD-ROM.

The hosted client compute engine is constructed using Citrix MetaFrame terminal sessions, which leverage the Citrix ICA protocol for remote desktop operation. In the terminal-session solution, each user is connected to a terminal session, and the applications run within this session. Multiple concurrent sessions are supported on a single operating system instance.

The primary components of this terminal session-based hosted client solution are:

- IBM @server BladeCenter with HS20 blade servers
- Citrix MetaFrame Presentation Server
- Microsoft Active Directory® and roaming user profiles
- Aurema ARMTech for Citrix MetaFrame
- Softricity SoftGrid Virtual Application Platform
- Cygwin
- IBM Director and Remote Deployment Manager
- Neoware thin client devices or mobile/desktop systems
- IBM Tivoli Provisioning Manager

An in-depth description of each of these components included in this Redpaper can be found in the white paper *IBM @server BladeCenter Hosted Clients: Citrix Terminal Session-based solution for Desktop Infrastructure Simplification*, available from:

`http://www.ibm.com/servers/eserver/bladecenter/alliance/solutiondetail_citrix.html`

Each hosting BladeCenter server is provisioned with a common software stack that includes Citrix MetaFrame Presentation Server, Aurema ARMTech for Citrix, the Softricity SoftGrid client, and Cygwin. By leveraging IBM Director and RDM to deploy the software stack, this solution can be rapidly and reliably scaled by adding blades to the BladeCenter chassis.

Figure 1-2 on page 3 illustrates the core components of this hosted client solution. This paper describes the role that each of these components plays in the overall solution, how the key components are configured, and how to implement provisioning and deployment tools for the installation of the complete solution. While the solution scenario described in this paper focuses on Neoware thin client devices, the solution logically extends to include support for repurposed desktop systems, workstations, or mobile desktop systems.

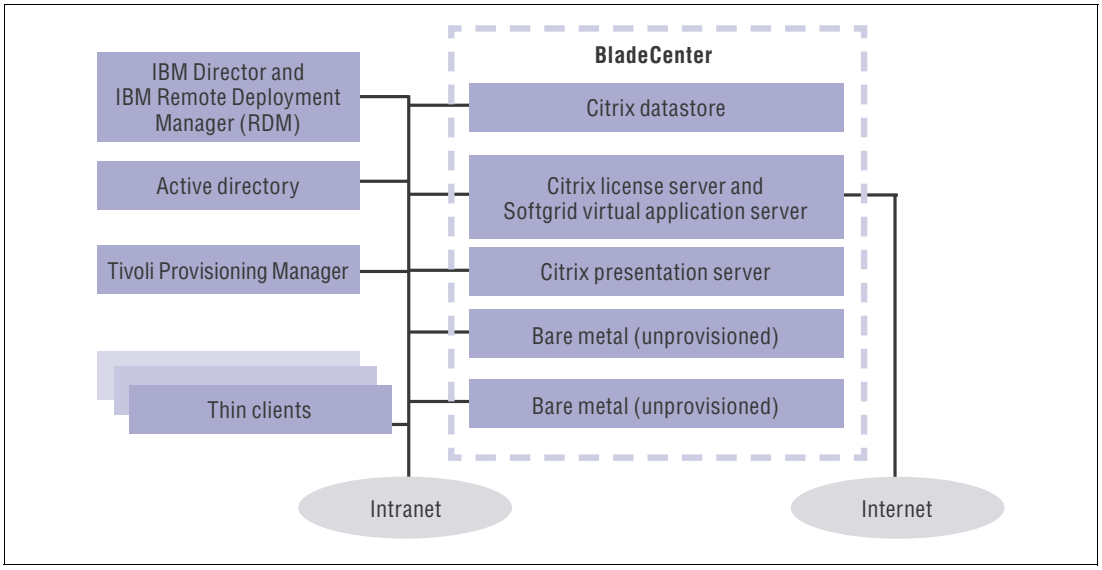

Figure 1-2 Hosted clients key components

2

Preparing for deployment

This solution focuses on the scalable deployment of Citrix MetaFrame Presentation Server and the Softricity SoftGrid client only. It is assumed that a reasonable understanding and familiarity with all of the components described in this document is established. Prior to the deployment of this solution, the user/administrator must have set up and configured the following components: IBM Director Server with RDM, an active Citrix License Server, an SQL datastore, a Softricity SoftGrid application server, and IBM Tivoli Provisioning Manager (optional).

Topics in this chapter are:

- 2.1, “Overview ” on page 6
- 2.2, “Citrix MetaFrame Presentation Server 3.0” on page 7
- 2.3, “ARMTech for Citrix” on page 11
- 2.4, “Cygwin and AutoIt 3.0” on page 11
- 2.5, “Active Directory on Windows Server™ 2003” on page 17
- 2.6, “Tivoli Provisioning Manager 2.1” on page 21

2.1 Overview

There are several steps that must be completed *prior* to the deployment of this Hosted Clients solution. Once the primary steps are completed and the WNI images are built, they will then be grouped into WNI tasks. These WNI tasks will be combined with RDM's Basic Scan task to enable the bare metal provisioning and deployment of each blade via IBM Director/RDM. The following list outlines the primary steps that must be completed *prior* to the deployment of this solution.

1. Citrix MetaFrame answer file creation

   The user/administrator must create two separate answer files to tell the unattended installation of the MetaFrame Presentation Server to either create a new server farm or join an existing server farm. This is discussed in 2.2.1, "Creating the Citrix MetaFrame answer file" on page 7.

2. DSN file creation for Citrix using SQL Server

   In this example the unattended installation of the Citrix MetaFrame Presentation Server will connect to an existing SQL database (in our example, CitrixDB1). To accomplish this task, a DSN file must be created and copied to the Citrix source directory on the IBM Director/RDM server prior to creating this WNI image. This is discussed in 2.2.2, "DSN file creation for Citrix using SQL Server " on page 9.

3. Citrix MetaFrame batch file creation

   The unattended installation of Citrix MetaFrame Presentation Server will be driven by RDM through the use of two batch files (CreateFarm.bat and JoinFarm.bat). These batch files will be called in the WNI image creation steps for this application. This is discussed in 2.2.3, "Citrix MetaFrame batch file creation" on page 10.

4. ARMTech for Citrix armtech_setup.iss file Creation

   The user/administrator must create an armtech_setup.iss file to enable the unattended installation of ARMTech for Citrix. This is discussed in 2.3, "ARMTech for Citrix" on page 11.

5. Cygwin and AutoIt 3.0

   There are many steps involved in the preparation of the Cygwin shell for deployment. These steps are discussed in 2.4, "Cygwin and AutoIt 3.0" on page 11.

   Note: The inclusion of this application is intended for those users running TPM in their environment only.

6. WNI image creation

   It will be necessary to build software images for every component of this solution that is to be deployed via IBM Director/RDM to each blade server. These software images include the following:

   - Windows 2003 Server with Terminal Services enabled
   - Java™ Runtime Environment V 1.4.1_02
   - Citrix MetaFrame Presentation Server
   - ARMTech for Citrix
   - Softricity SoftGrid client
   - Cygwin shell (optional)

   This is discussed in 3.1, "Image Deployment with RDM" on page 30.

7. WNI task creation

The user/administrator will use the RDM interface to create two separate WNI tasks to either create a new server farm or join an existing one. This is discussed in 3.1.8, “Creating the WNI tasks” on page 44.

8. WNI Task Modification to enable Terminal Services for the Windows 2003 Server Operating system

   Once the creation of each WNI task is complete it will be necessary to modify each answer2.txt file to enable the Terminal Services windows component upon install. This is discussed in 3.1.9, “Enabling Terminal Services” on page 54.

9. Script task creation

   Once the WNI tasks are built, the user/administrator will create two *Script* tasks that will include RDM’s *Basic Scan* feature at the beginning of each client’s deployment. This is discussed in 3.1.10, “Creating script tasks” on page 55.

10. Active Directory on Windows server 2003

    The setup and configuration of Active Directories roaming user profiles and folder redirection will be necessary to achieve a true “state free” computing environment. This is discussed in 2.5, “Active Directory on Windows Server™ 2003” on page 17.

Note: While Active Directories roaming user profiles and folder redirection is not a requirement for deployment, it is recommended that it is configured prior to the deployment of this solution.

2.2 Citrix MetaFrame Presentation Server 3.0

Through the use of an answer file, the administrator is able to provide answers to the questions asked when setup is run in unattended installation mode. The sample answer file is located on the MetaFrame Presentation Server CD in the Support\Install directory and has been included in this redpaper in Appendix A, “Answer file UnattendedTemplate.txt” on page 81. Instructions are provided in that file describing the various setup options. It will be necessary to copy the sample answer file to another location and modify it accordingly.

2.2.1 Creating the Citrix MetaFrame answer file

It is through the use of these answer files that the users are able to choose what type of datastore they wish to use and whether the install will create a new server farm or join an existing one. This section includes two sample answer files that will accomplish these tasks:

- createfarm.txt: See Example 2-1.
- joinfarm.txt: See Example 2-2 on page 8.

Note: These two answer files are copied to C:\Citrix\Support\Install on the IBM Director/RDM server *prior* to building the images for deployment via RDM.

For more information on the creation of Citrix MetaFrame answer files, refer to:

http://www.citrix.com

Example 2-1 Sample answer file 1: CreateFarm.txt

```
[MetaFrame License Agreement]
AcceptLicense=Yes

[Data Store Configuration]
```

```
CreateFarm=Yes
DirectConnect=Yes
; Leave this blank to use the default zone name
ZoneName=

[Farm Settings]
FarmName=TestFarm
FarmAdministratorUsername=Administrator
FarmAdministratorDomain=DomainName

[Direct Connect Settings]
DSNFilePath=c:\citrixtemp\support\install\HostedClients.dsn
UserName=DomainName\Administrator
Password=PassWord

[Shadowing Restrictions]
AllowShadowing=Yes
ProhibitRemoteControl=No
ProhibitNotificationOff=No
ProhibitLoggingOff=No

[Citrix XML Service]
ExtendIIS=No
; This setting applies only if ExtendIIS is No
DedicatedPortNumber=80
; This setting applies only if ExtendIIS is Yes
EnableVirtualScripts=Yes

[Update ICA Clients]
UpdateClients=No
ClientPath=

[Options]
RebootOnFinish=No
LogLevel=*v
LogFile=c:\msi.log
UILevel= BASIC_UI_NO_MODAL
IgnoreMCM=No
RemoveWITurnkey=No

[MetaframeServer]
ServerType=Metaframe Enterprise Server

[MFLicenseServer]
LicenseServerChoice="Point"
LicenseServerName="licenseserver"

[MFRDP]
DisableRDPPromptForPassword="Yes"
```

Example 2-2 Sample answer file 2: JoinFarm.txt

```
[MetaFrame License Agreement]
AcceptLicense=Yes
```

```
[Data Store Configuration]
CreateFarm=No
DirectConnect=Yes
; Leave this blank to use the default zone name
ZoneName=

[Direct Connect Settings]
DSNFilePath=c:\citrixtemp\support\install\HostedClients.dsn
UserName=DomainName\Administrator
Password=PassWord

[Shadowing Restrictions]
AllowShadowing=Yes
ProhibitRemoteControl=No
ProhibitNotificationOff=No
ProhibitLoggingOff=No

[Citrix XML Service]
ExtendIIS=No
; This setting applies only if ExtendIIS is No
DedicatedPortNumber=80
; This setting applies only if ExtendIIS is Yes
EnableVirtualScripts=Yes

[Update ICA Clients]
UpdateClients=No
ClientPath=

[Options]
RebootOnFinish=No
LogLevel=*v
LogFile=c:\msi.log
UILevel= BASIC_UI_NO_MODAL
IgnoreMCM=No
RemoveWITurnkey=No

[MetaframeServer]
ServerType=Metaframe Enterprise Server

[MFLicenseServer]
LicenseServerChoice="Point"
LicenseServerName="licenseserver"

[MFRDP]
DisableRDPPromptForPassword="Yes"
```

2.2.2 DSN file creation for Citrix using SQL Server

In this example the unattended installation of that Citrix MetaFrame Presentation Server will connect to an existing SQL Server database (that is, CitrixDB1).

To accomplish this task, create a DSN file and copy it to C:\citrix\support\install on the IBM Director/RDM server *prior* to building the WNI image for this application.

Note: The sample DSN file name must match the file name given in the DSNFilePath= section of the answer files CreateFarm.txt (Example 2-1 on page 7) and JoinFarm.txt (Example 2-2 on page 8).

In this example, the file name given is HostedClients.dsn.

Example 2-3 Sample HostedClients.dsn file

```
[ODBC]
DRIVER=SQL Server
UID=Administrator
Trusted_Connection=Yes
Network=DBMSSOCN
DATABASE=CitrixDB1
APP=Citrix IMA
SERVER=CITRIXSQL
```

2.2.3 Citrix MetaFrame batch file creation

The unattended installation of the Citrix MetaFrame Presentation Server will be driven by RDM through the use of two BAT files:

- CreateFarm.bat: See Example 2-4.
- JoinFarm.bat: See Example 2-5.

These BAT files will be called in the WNI image creation steps for this application. Below are two sample BAT files that can be used to accomplish these tasks.

Note: Both of these files must be copied to the IBM Director/RDM server and placed in the root of the source directory for this WNI application image *prior* to building. In this example these files have been copied to C:\citrix on the IBM Director/RDM server.

Example 2-4 Sample CreateFarm.bat file

```
mkdir c:\citrixtemp
xcopy /E *.* c:\citrixtemp
cd c:\citrixtemp\Support\Install
start /W UnattendedInstall.exe "c:\citrixtemp\MetaFrame Presentation
Server\mps.msi" "c:\citrixtemp\Support\install\CreateFarm.txt"
cd\
rmdir/S /Q c:\citrixtemp
exit
```

Example 2-5 Sample JoinFarm.bat file

```
mkdir c:\citrixtemp
xcopy /E *.* c:\citrixtemp
cd c:\citrixtemp\Support\Install
start /W UnattendedInstall.exe "c:\citrixtemp\MetaFrame Presentation
Server\mps.msi" "c:\citrixtemp\Support\install\JoinFarm.txt"
cd\
rmdir/S /Q c:\citrixtemp
exit
```

2.3 ARMTech for Citrix

ARMTech can be configured for automated installation via IBM Director with RDM. This will enable the rapid and simplified deployment of ARMTech across Citrix MetaFrame server farms.

This section describes how to create an armtech_setup.iss file that will be used for the automated installation of ARMTech via IBM Director/RDM.

Note: It is required that the creation of an ARMTECH_SETUP.ISS file be run on a machine with the same operating system as the production servers that you wish to deploy to. Once the ARMTECH_SETUP.ISS file is created it will then be copied to the same directory that the WNI image for ARMTech will be built from in RDM. In this example that directory is C:\Aurema on the IBM Director/RDM server.

Only after the file copy is complete will the user/administrator be ready to follow the detailed steps outlined in “WNI image of ARMTech for Citrix” on page 38.

The steps to create the ARMTECH_SETUP.ISS file are as follows:

1. On a machine with the same operating system version as your production servers, create the file armtech_setup.iss (for installation) by typing at the command prompt:

   ```
   armtech_setup.exe /r /f1"<path>\armtech_setup.iss"
   ```

   Tip: The parameter above is /F1 and not /FL.

2. Complete the installation interactively.
3. Once the installation is complete, copy the armtech_setup.iss file back to the IBM Director/RDM server and place it in the C:\Aurema directory.
4. The user/administrator is now ready to follow the detailed steps outlined in “WNI image of ARMTech for Citrix” on page 38.

2.4 Cygwin and AutoIt 3.0

The following sections describe the necessary steps that must be completed *prior* to the creation of this WNI image for Cygwin deployment.

Note: The inclusion of this application is intended for those users running TPM in their environment only.

2.4.1 Cygwin installation and configuration steps

Ultimately Cygwin is installed and configured to run ssh (sshd) to allow authorized ssh clients access without passwords. TPM makes extensive use of ssh to connect to and then control servers under its management. Depending on what type of public key cryptography is used on the TPM server, the corresponding public keys from the TPM server need to be added to the authorization list on each newly deployed server.

The steps are summarized below and detailed in the following sections. Depending on the TPM server configuration, some slight modifications may be required.

1. Download Cygwin by running Cygwin's setup.exe manually and selecting the desired components for inclusion in the Cygwin WNI image. See "Step 1. Downloading Cygwin components" on page 12.
2. Create and compile an AutoIt script file in order to run the installation of Cygwin in unattended mode (cygwin.au3 in this example). See "Step 2. Creating and compiling the AutoIt script " on page 13.
3. Obtain the DSA and/or RSA public key file(s) from the TPM server. See "Step 3. Obtain TPM server public key files" on page 14.
4. Create a bash script to set up and configure ssh. See "Step 4. Create bash script to set up and configure SSH" on page 14.
5. Create a batch file (AutoIt.bat in this example) that will copy all of the contents created in the above steps to a specific local directory on the newly deployed server, and then launch cygwin.exe. See "Step 5. Creating AutoIt.bat " on page 16.
6. Copy the files from the above steps to the source directory on the IBM Director/RDM server used to create the WNI image (c:\cygwin in this example). See "Step 6. Copy files to IBM Director/RDM server source directory" on page 17.

The details of these steps are described below.

2.4.2 Step 1. Downloading Cygwin components

In the first installation step for Cygwin (which must be completed prior to the building of the WNI image), the users are required to locate and download all the components of the Cygwin application that they wish to include in their installation. By launching Cygwin's setup.exe file, the users will be guided through a series of windows to obtain any and all components that they wish to include in their install.

Table 2-1 is the recommended list of components to include in the image. In this example, all of the following components have been downloaded and copied to C:\Cygwin on the IBM Director/RDM server.

Table 2-1 Recommended packages to add to the Cygwin installation

Category	Package
Admin	cron, cygrunsrv, shutdown
Archive	sharutils, unzip, zip
Base	All packages
DataBase	Accept default packages.
Devel	cvs
Doc	cygwin-doc
Editors	ed, vim
Games	Accept default packages.
Interpreters	Expect, gawk
Libs	Accept default packages.
Mail	Accept default packages.

Category	Package
Math	Accept default packages.
Misc	Accept default packages.
Net	inetutils, openssh, openssl, whois
Publishing	Accept default packages.
Shells	Accept default packages (ensure ash, bash and sh-utils are selected).
System	Accept default packages.
Text	more
Utils	clear, cygutils, time, file
Web	Accept default packages.
+Xfree86	Accept default packages.
+_PostInstallLast	Accept default packages.

2.4.3 Step 2. Creating and compiling the AutoIt script

In the second step of this installation the user is required to create an AutoIt script file that will point to the components captured in the previous section and install them in an unattended fashion. There are two sub-steps involved in the creation of this file. AutoIt Version 3.0 was used in the following example, available from:

http://www.autoitscript.com/autoit3/

1. Create an AutoIt script file (that is, Cygwin.au3).
2. Compile the script file into an executable (that is, Cygwin.exe).

Tip: The tools needed to compile the .au3 file in step 1 are included with the AutoIt 3.0 application.

Example 2-6 is a sample .au3 file that can be used to install Cygwin in unattended mode. In this example the following script has been compiled into an executable named cygwin.exe. (cygwin.exe must be copied to the source directory for this RDM image on the IBM Director/RDM server, c:\cygwin in this example.)

Tip: With AutoIt 3.0 installed, compile by right-clicking the script file above and click **Compile Script**.

Example 2-6 Sample .au3 file to install Cygwin in unattended mode

```
AutoIt Script for Cygwin:

Run ( 'C:\cygwininst\setup.exe' )

WinWait ( 'Cygwin Setup', 'This wizard will guide you' )
Send ( '!n' )

WinWait ( 'Cygwin Setup - Choose Installation Type' )
; Choose "Install from Local Directory"
Send ( '!l!n' )
```

```
WinWait ( 'Cygwin Setup - Choose Installation Directory' )
Send ( '!n' )

WinWait ( 'Cygwin Setup - Select Local Package Directory', 'Select Local Package
Directory' )
; Use proper package directory
Send ( 'c:\cygwininst!n' )

WinWait ( 'Cygwin Setup - Select Packages' )
; Make sure the Window is active, then click in the right place to
; select "install all"
Send ( '!n' )

; Wait ten seconds to ensure selection is noticed
Sleep ( 10000 )
Send ( '!n' )

WinWait ( 'Cygwin Setup - Create Icons' )
Send ( '{ENTER}' )

WinWait ( 'Cygwin Setup', 'Installation Complete' )
WinActivate ( 'Cygwin Setup', 'Installation Complete' )
Send ( '{ENTER}' )

WinWaitClose ( 'Cygwin Setup', 'Installation Complete' )
```

2.4.4 Step 3. Obtain TPM server public key files

On the TPM server, the public key files are typically located in the $HOME/.ssh folder for the tioadmin account. The public key file names are typically id_dsa.pub and/or id_rsa.pub, but when the keys are generated on the TPM server, non-default files names may have been specified.

In this example, the id_dsa.pub file on the TPM server was copied to the IBM Director/RDM server, renamed to tpmdsakey.pub, and placed in the c:\cygwin folder.

2.4.5 Step 4. Create bash script to set up and configure SSH

Create a script like that shown in Example 2-7. This script is used to configure the ssh daemon or host after the initial cygwin installation completes. The complete installation will enable the TPM server, using an ssh client, to access the newly deployed server without a password.

In this example the script is named sshdconfigfortpm.sh, and is placed in the c:\cygwin folder on the IBM Director/RDM server.

Example 2-7 bash script file sshdconfigfortpm.sh

```
#!/bin/bash

progname=$0
TPMServerkeyfile=""
TPMServerkeyfullpath=""
password=""
```

```
usage()
{
    echo "usage: ${progname} Arguments..."
    echo
    echo "Script to setup and configure OpenSSH for passwordless access by TPM
server."
    echo
    echo "Arguments:"
    echo "  --keyfile -k <file>    File with TPM Server public rsa or"
    echo "                         dsa public key"
    echo "  --pwd     -w <passwd>  Use pwd as password for"
    echo "                         user 'sshd_server'. "
    echo
}

# Check options
while :
do
  option=$1
  shift

  case "${option}" in
  -k | --keyfile )
    TPMServerkeyfile="$1"
    shift
    ;;

  -w | --pwd )
    password="$1"
    shift
    ;;

  *)
    usage
    exit 1
    ;;

  esac

  case $# in
  0)
    break
    ;;
  esac

done

TPMServerkeyfullpath="/bin/""${TPMServerkeyfile}"

echo "current Directory " `pwd`
echo "TPMServerkeyfullpath " ${TPMServerkeyfullpath}

if ([ ! -n "${TPMServerkeyfile}" ] || [ ! -n "${password}" ])
then
```

```
  echo "Required arguments missing."
  echo
  usage
  exit 2
fi

if [ ! -e "${TPMServerkeyfullpath}" ]
then
  echo "File not found" ${TPMServerkeyfullpath}
  echo "File with public key of TPM Server required."
  echo
  usage
  exit 3
fi

# argument parsing ends, take action

cd /bin
echo "configuring ssh host..."
ssh-host-config -y -c ntsec -w ${password}
export CYWIN=ntsec

echo "generating ssh keys..."
ssh-keygen -t dsa -N "" -f "$HOME"/.ssh/id_dsa

echo "appending local keys to authorized keys list..."
cat "$HOME"/.ssh/id_dsa.pub >> "$HOME"/.ssh/authorized_keys
cat "$HOME"/.ssh/id_dsa.pub >> "$HOME"/.ssh/authorized_keys2

echo "appending TPM Server key to authorized keys list..."
cat ${TPMServerkeyfullpath} >> "$HOME"/.ssh/authorized_keys
cat ${TPMServerkeyfullpath} >> "$HOME"/.ssh/authorized_keys2

echo "turn off StrictHostKeyChecking..."
echo "StrictHostKeyChecking no" >> "$HOME"/.ssh/config

echo "starting sshd service..."
cygrunsrv -S sshd

echo "done"
```

2.4.6 Step 5. Creating AutoIt.bat

This step involves the creation of a batch file, AutoIt.bat, that is used later in “WNI image for Cygwin Shell” on page 42. It will be used by RDM to copy the entire Cygwin installation package to a specific local directory on the newly deployed server and then launch the unattended installation of Cygwin via AutoIt from there (c:\cygininst in this example).

The batch file in Example 2-8 on page 17 references both the TPM server public key, tpmdsakey.pub (see “Step 4. Create bash script to set up and configure SSH” on page 14), and the SSH setup and configuration script, sshdconfigfortpm.sh (see “Step 3. Obtain TPM server public key files” on page 14).

Tip: The batch file in Example 2-8 uses the password *password* for a new account that is created to run the ssh daemon. A more secure password is recommended.

Example 2-8 batch file AutoIt.bat

```
mkdir c:\cygwininst
xcopy /E ".\*.*" "c:\cygwininst"
cd c:\cygwininst
start /wait cygwin.exe
rem sshdconfigfortpm.sh is described in Step 4
xcopy sshdconfigfortpm.sh "c:\cygwin\bin\."
rem tpmdsakey.pub is described in Step 3
xcopy tpmdsakey.pub "c:\cygwin\bin\."
cd C:\cygwin\bin
bash --debug --login sshdconfigfortpm.sh -k tpmdsakey.pub -w password
rmdir /S /Q c:\cygwininst
exit
```

2.4.7 Step 6. Copy files to IBM Director/RDM server source directory

All of the files created in steps 1–5 must be copied to the IBM Director/RDM server's source directory for this WNI image. In this example all of the contents in each of these steps were placed in c:\cygwin on the IBM Director/RDM server prior to building this image.

In other words, Cygwin's setup.exe and the folder tree downloaded in "Step 1. Downloading Cygwin components" on page 12, and cygwin.exe, tpmdsakey.pub, sshdconfigfortpm.sh, and autoit.bat all get copied to c:\cygwin on the IBM Director/RDM server.

2.5 Active Directory on Windows Server™ 2003

Through the use of roaming user profiles, folder redirection, and folder exclusion, an end user "state free" computing environment can be efficiently managed and maintained. The setup and configuration of these components is discussed in this section.

2.5.1 Enabling roaming user profiles

While the enabling of Microsoft's roaming user profiles is not required during the initial deployment of this solution, it is required in order to achieve a "state free" computing environment once deployment is completed.

The steps necessary to configure roaming user profiles are as follows:

1. Launch **Active Directory Users and Computers**.
2. Select all the users to be given roaming user rights.
3. Right-click one of them and click **Properties**. Click the **Profile** tab.

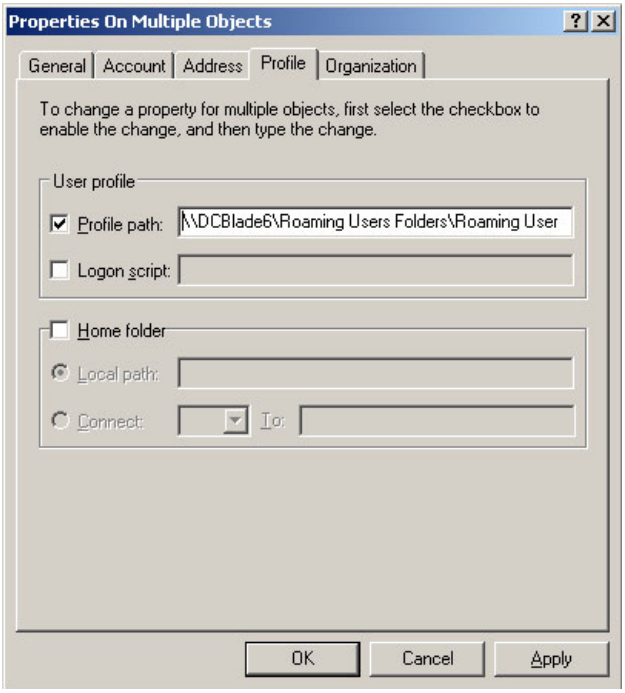

Figure 2-1 Properties on Multiple Objects, Profile tab

4. Check the Profile path check box.
5. Enter in a UNC path to the remote location for the roaming user profiles to be stored. A username variable can be used at the end of the profile path when editing this path for multiple users at the same time. This will append each user's profile path with an additional directory under that user's name. To achieve this, add `%username%` to the end of the profile path.

2.5.2 Managing roaming user profiles via group policy

The following steps describe how to create a new organizational unit (OU), assign new users to that organizational unit, and create a new group policy to manage it.

1. Launch **Active Directory Users and Computers**.
2. Right-click the domain name that the users will have roaming access to and click **New** → **Organizational Unit**.

   Organizational units are Active Directory containers into which users, groups, computers, and other organizational units are placed.

   Tip: By right-clicking the domain as described in step 2, Active Directory will automatically link this new OU to that domain. For clarity, the organizational unit in this example is referred to as *roaming users*.

3. Double-click the **Roaming Users** OU and create the individual user accounts.

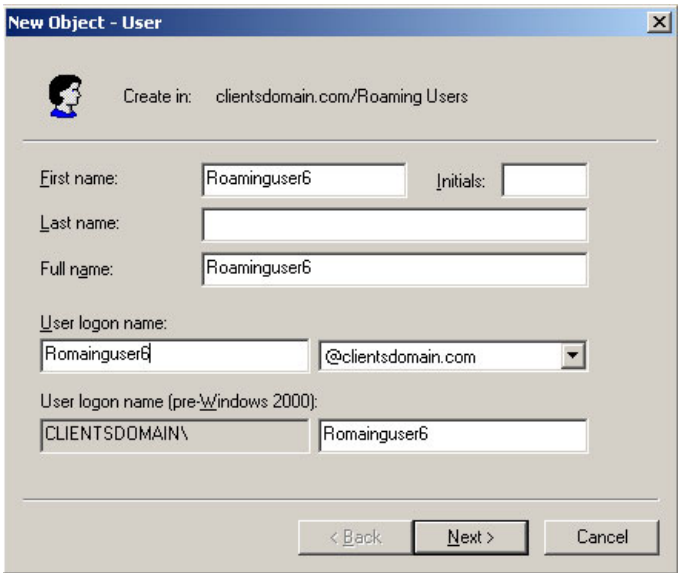

Figure 2-2 New user object

4. Once the user accounts have been created, right-click **Roaming User OU** and click **Properties**.
5. Click the **Group Policy** tab and click **New**.
6. Enter the name for the new group policy. In this example, we entered `Roaming Users Group Policy`.

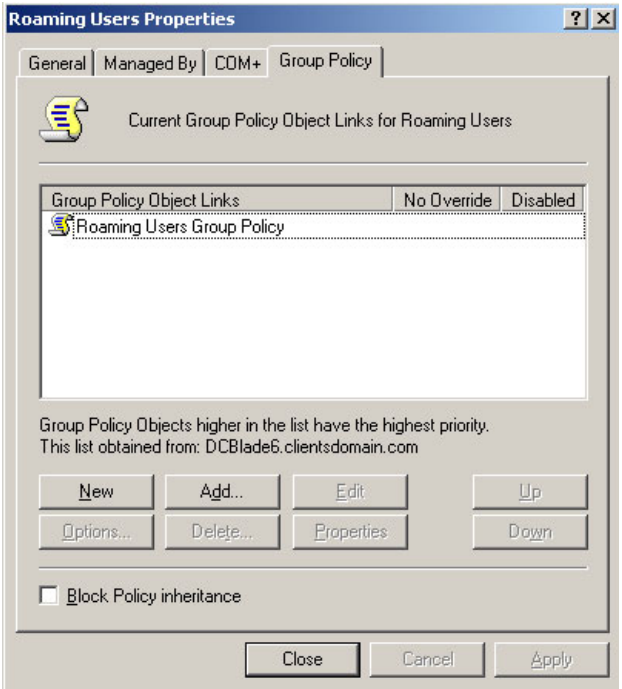

Figure 2-3 Group policy object links

Now that the OU, the users, and the group policy have been created, the next step is to enable folder redirection and exclusion as described in the next section.

Note: For more information on setting up roaming user profiles on Windows Server 2003, refer to the Microsoft online help:

http://support.microsoft.com/default.aspx?scid=kb;en-us;324749

2.5.3 Enabling folder redirection and exclusion under group policy

Folder redirection can be enabled for the Application Data, Desktop, My Documents and Start menu folders for all users assigned to a group policy. The following steps describe how to enable folder redirection and folder exclusion for group policy.

Follow these steps to enable folder redirection:

1. Double-click the **Roaming Users Group Policy** object link in Figure 2-3 on page 19 to display and edit its contents.
2. Select **User Configuration**, then **Folder Redirection**, then right-click the specific folder name you wish to redirect (for example, Application Data, Desktop, My Documents, Start menu).
3. Click the **Target** tab.

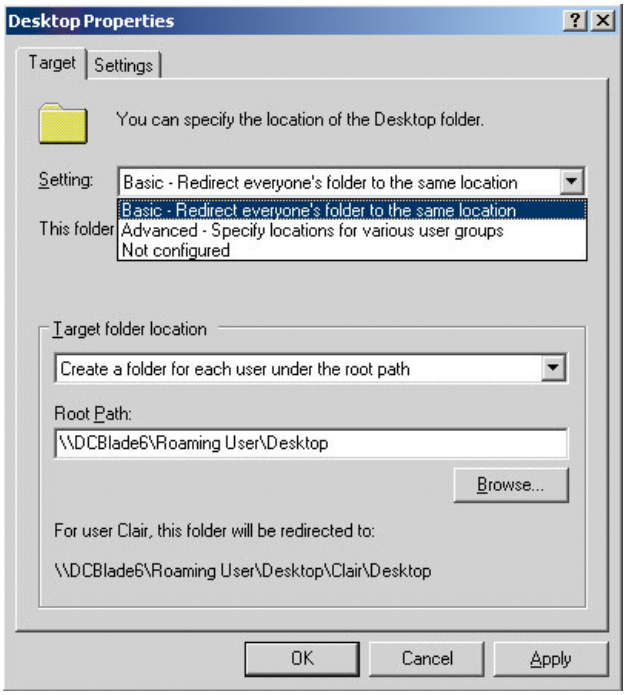

Figure 2-4 Desktop Properties for folder redirection

4. On the Target tab, specify the remote location and type of redirection of each folder. A UNC path is required if the folder is to be redirected to a network share.

Folder exclusion from the login copy process of the roaming profile can be enabled for the Application Data folder. This ensures that login times are kept to a minimum. It is desirable to include the Temporary Internet Files folder in this policy as well.

The following steps describe how to exclude the Application Data folder form the login copy process.

1. Double-click the **Roaming Users Group Policy** object link in Figure 2-3 on page 19 to display and edit its contents.
2. Click **User Configuration** → **Administrative Templates** → **System** → **User Profiles**, then click the **Exclude Directories in Roaming User Profile** option on the right.
3. Specify the Application Data folder and any additional folder names separated with a semi-colon (for example, Application Data, Temporary Internet Files, etc.)

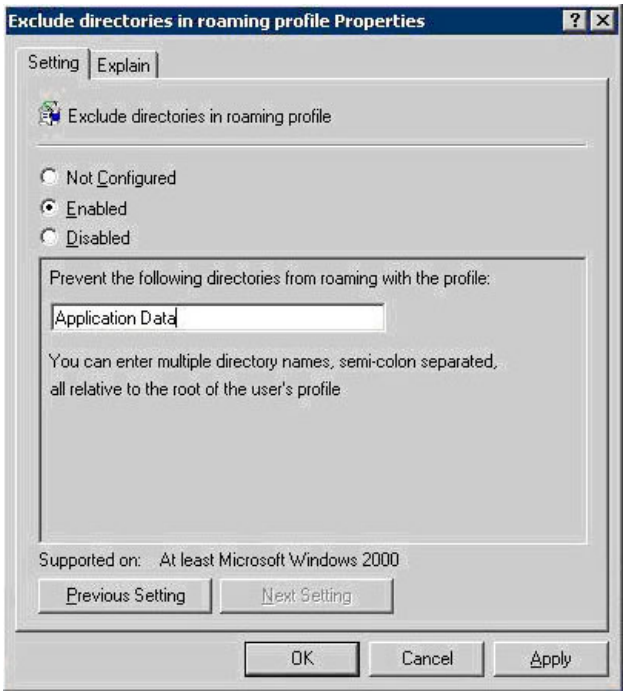

Figure 2-5 Roaming profile exclusion properties

2.6 Tivoli Provisioning Manager 2.1

The following sections introduce the Tivoli Provisioning Manager Data Center Model (TPM DCM) and how a Citrix-based hosted client solution can be modeled. TPM drivers, or workflow collections, of interest for the Citrix-based hosted client solution are referenced, and an IBM Director tool to help construct the TPM DCM is introduced.

2.6.1 Data Center Model overview

Users of Tivoli Provisioning Manager (TPM) can optionally leverage some of the Remote Deployment Manager (RDM) tasks described in this redpaper to aid in provisioning servers to support a Citrix Farm. In the TPM Data Center Model (DCM), the Cluster object provides a good abstraction of a Citrix Farm. Different Citrix Farms would be represented as different clusters in the TPM model. Each Citrix Farm represented as a cluster in TPM is associated with a software stack. The software stack might contain software products.

Figure 2-6 on page 22 provides a high-level representation of some of these components and some of the relationships between these pieces and other TPM objects.

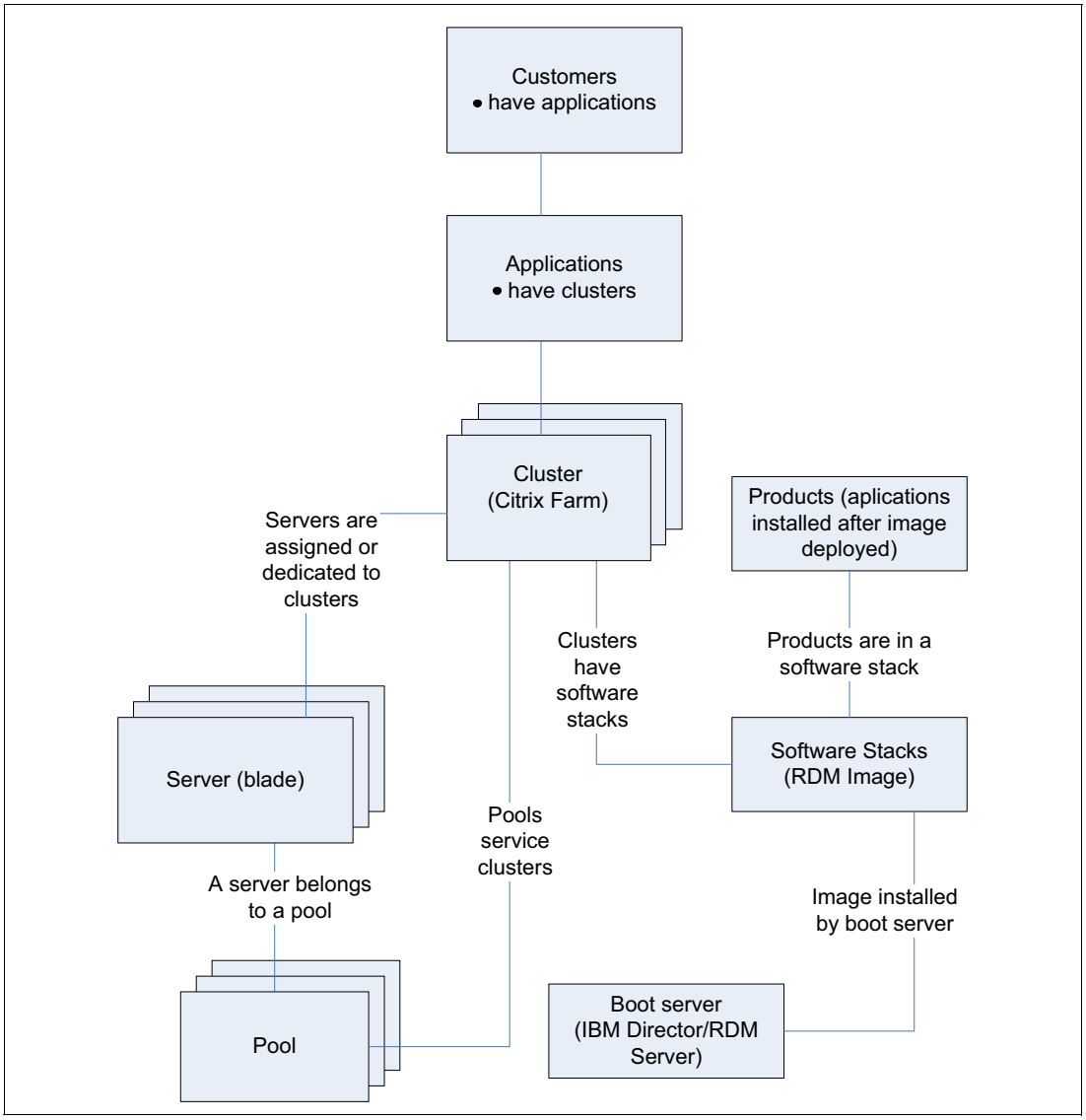

Figure 2-6 Citrix and RDM in the TPM DCM

The white paper *On Demand with IBM Tivoli Intelligent Orchestrator and Citrix MetaFrame*, by Dan Herold, provides a starting point for parties interested in using TPM and Citrix. It is available from:

`http://www.ibm.com/developerworks/tivoli/library/t-tiocitrix`

This redpaper describes the necessary steps to construct different types of RDM tasks for a Citrix-hosted client solution. RDM tasks to create or join a Citrix Farm using RDM's Windows Native Install are covered in detail. RDM tasks using Windows Clone Install in preparation for installation of a Citrix Presentation Server are also covered. TPM users can use this information to help automate their data center.

We cover two deployment options here:

- The first deployment option just uses RDM and is different from the approach covered in the Herold whitepaper. The Image Deployment with RDM option in this redpaper constructs two all encompassing RDM WNI tasks that include the operating system, Citrix Presentation Server, and other software products all deployed in a single image to either

create or join a Citrix Farm. This is discussed in 3.1, “Image Deployment with RDM” on page 30

- The second option uses both RDM and TPM for deployment and is more closely aligned with the strategy presented in the prior whitepaper. These approaches are modeled slightly differently in the TPM DCM. The second approach installs the Citrix MetaFrame Presentation Server separately from the RDM image that includes the operating system. TPM installs additional software products (Citrix Presentation Server) after the RDM image deployment is complete. This is discussed in 3.2, “Deployment with RDM and TPM” on page 58.

The following two figures show the slight differences between the two different RDM approaches described in this redpaper, and how those options are abstracted differently in the TPM DCM.

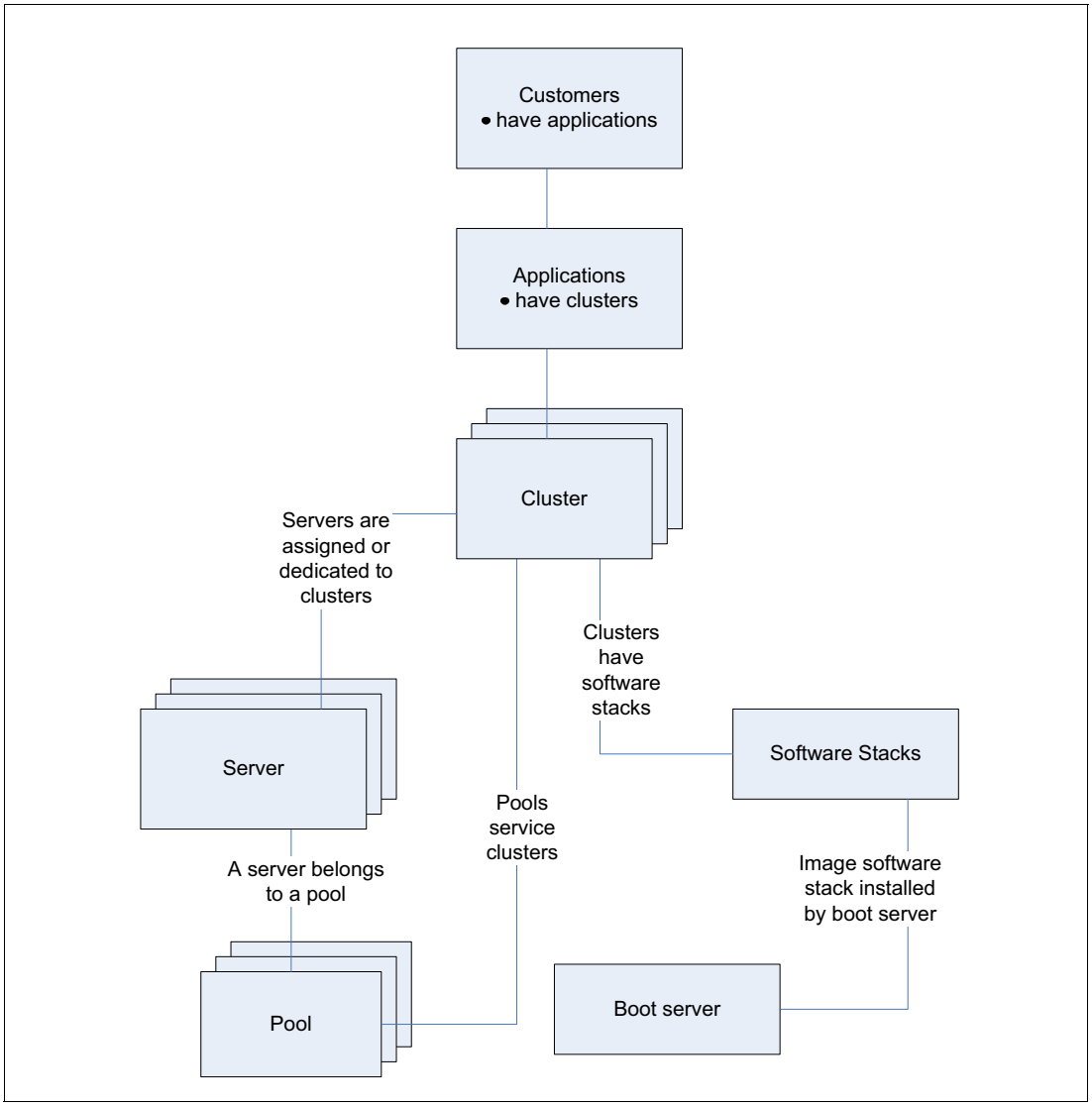

Figure 2-7 Single all-encompassing image

In Figure 2-7, the entire software stack is encompassed in a single image that is installed by the boot server. A dedicated server can be assigned to the cluster (Citrix Farm) and then additional servers can be provisioned to service the Citrix Farm.

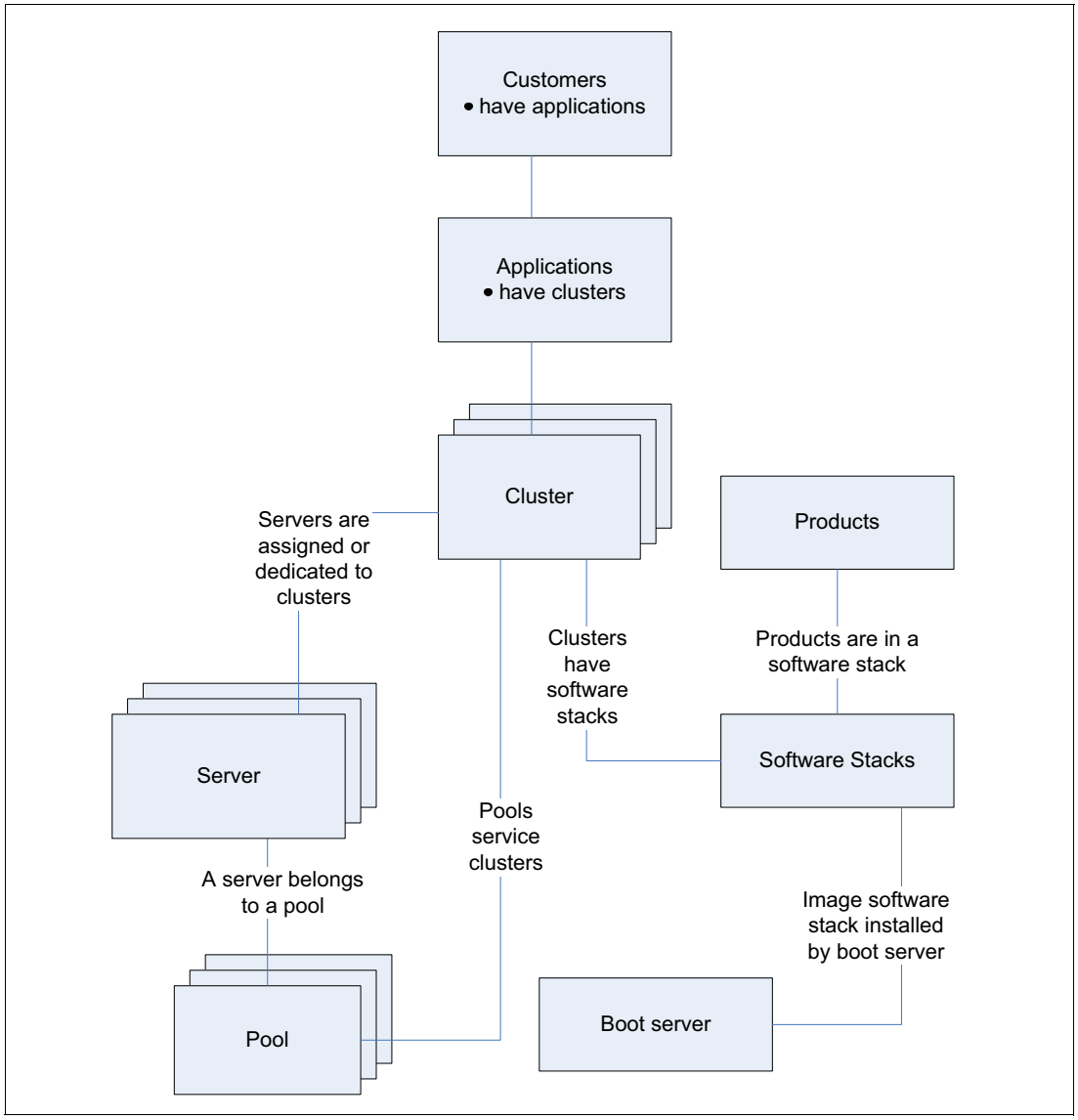

Figure 2-8 Image with flow-on product installations

In Figure 2-8, part of the software stack is installed by the boot server, and then additional software product installations are driven by TPM after the initial image deployment by the boot server.

TPM 2.1 includes workflows to support installation of the Citrix MetaFrame Presentation Server 3.0 separately from the operating system. This is the approach taken in the white paper *On Demand with IBM Tivoli Intelligent Orchestrator and Citrix MetaFrame* referred to above. The second deployment option described in this redpaper is best suited for users following that approach.

2.6.2 TC driver updates

TPM 2.1 “out of the box” includes two drivers of particular interest. These drivers and their shipped versions are shown in Table 2-2 on page 25.

Table 2-2 TPM drivers of interest

TC driver name	Shipped version	Update
IBM-RDM	2.1.1	2.1.2
Citrix	2.1.0	

Users of IBM RDM 4.20 will want to update to the IBM-RDM 2.1.2 TC driver. The updated IBM-RDM driver can be downloaded from the On Demand Automation Catalog at (search for RDM):

http://www-18.lotus.com/wps/portal/automation

The documentation included with the IBM-RDM TC driver describes the necessary configuration changes. A quick summary follows:

Note: While the order here is important, this is not a comprehensive list of steps. These are simply highlights of a detailed set of setup steps that the user can refer to in the documentation that comes with the TC Driver.

1. Install the additional Director extension files and Director library files that are packaged in the IBM-RDM TC driver on the IBM Director/RDM server. The IBM-RDM tc driver includes files that must be installed on the IBM Director/RDM server. This is a commonly overlooked step, but it is covered in the IBM-RDM TC driver documentation.
2. Software stack objects that represent the RDM image to be deployed need to define RDMTaskName, TimeOut, and SetIP variables. The RDMTaskName variable will reference the tasks that are described and built later in this redpaper.
3. Servers (blades) that are in the resource pool that service the cluster need to define the variable UUID. This variable is used so RDM can identify what servers are the target of a deployment.
4. The Boot Server object representing IBM Director with RDM server needs to define the IBMDirectorScriptsPath.
5. The Server object representing the TPM server needs to include Service Access Point with additional credentials to utilize the IBM Director command line interface. A Service Access Point with credentials to ssh to the IBM Director/RDM server is also required.
6. The Boot Server object representing IBM Director with RDM server needs to be set up to allow ssh clients to connect, and needs to include Service Access Point with additional credentials to utilize the IBM Director command-line interface.

The complete list of requirements to use the IBM-RDM tc driver is covered in the documentation for the TC driver (see the above URL).

2.6.3 Director command line

The updated IBM-RDM TC driver includes an IBM Director extension that enhances the IBM Director command-line interface (CLI). With the additions to the tioexport bundle in the Director CLI, data can be output in a TPM-friendly format. The output of the Director CLI can later be imported into the TPM DCM using scripts included with TPM.

The primary command in the tioexport bundle is **`ExportDCMTopology`**. The **`ExportDCMTopology`** command supports options to export information about servers (-s option) or information about RDM task names that can be represented as image software stacks (-i option).

Assuming a Director server name of *servername*, a user account *administrator* with Director CLI privileges, and an account password of *adminpassword*, the syntax to list the commands available in the tioexport bundle would be:

```
dircmd.bat -s servername -u administrator -p adminpassword tioexport List
```

The syntax of the command to output information about Director objects as TPM server objects and save that information to myoutputfile.xml is:

```
dircmd.bat -s servername -u administrator -p adminpassword tioexport
ExportDCMTopology -o myoutputfile.xml –s
```

Example 2-9 shows the contents of myoutputfile.xml from the this command.

Example 2-9 Contents of the file myoutputfile.xml

```
<?xml version='1.0' encoding='UTF-8'?>

<!DOCTYPE datacenter PUBLIC
    "-//Think Dynamics//DTD XML Import//EN"
    "http://www.thinkdynamics.com/dtd/xmlimport.dtd"
>

<datacenter>

  <new-devices>

    <!-- insert a new subnetwork -->
    <subnetwork ipaddress="100.100.100.0" netmask="255.255.255.0"/>

    <!-- Server structure -->
    <server name="265224U-970076K">
       <network-interface name="eth0" ipaddress="100.100.100.101"
        netmask="255.255.255.0" managed="false"/>
       <property name="Serial Number" value="970076K" component="KANAHA"/>
       <property name="Machine Type" value="265224U" component="KANAHA"/>
       <property name="UUID" value="80B09E01449711CBBA23DD41CBDA7F89"
        component="KANAHA"/>
    </server>
    <server name="BLADE1">
       <property name="Serial Number" value="2345678" component="KANAHA"/>
       <property name="Machine Type" value="883221Z" component="KANAHA"/>
       <property name="UUID" value="388E4F0F16B44A12A5B820BCF4050806"
        component="KANAHA"/>
    </server>
    <server name="BLADE2">
       <network-interface name="eth1" ipaddress="100.100.100.102"
        netmask="255.255.255.0" managed="false"/>
       <property name="Serial Number" value="23K5116" component="KANAHA"/>
       <property name="Machine Type" value="B83221Z" component="KANAHA"/>
       <property name="UUID" value="0A9A2C67D31DB211919420BC74C5E876"
        component="KANAHA"/>
    </server>
    <server name="BLADE3">
       <network-interface name="eth2" ipaddress="100.100.100.109"
        netmask="255.255.255.0" managed="false"/>
       <property name="Serial Number" value="23K5287" component="KANAHA"/>
```

```
      <property name="Machine Type" value="883231Z" component="KANAHA"/>
      <property name="UUID" value="78CFAD8150B44A12A91CD898221C130C"
       component="KANAHA"/>
   </server>
   <server name="BLADE4">
      <network-interface name="eth3" ipaddress="100.100.100.109"
       netmask="255.255.255.0" managed="false"/>
      <property name="Serial Number" value="23K5307" component="KANAHA"/>
      <property name="Machine Type" value="883231Z" component="KANAHA"/>
      <property name="UUID" value="404B801551B44A12992834C6B967B9DF"
       component="KANAHA"/>
   </server>
   <server name="865431Y-23B5005">
      <network-interface name="eth4" ipaddress="100.100.100.101"
       netmask="255.255.255.0" managed="false"/>
      <property name="Serial Number" value="23B5005" component="KANAHA"/>
      <property name="Machine Type" value="865431Y" component="KANAHA"/>
      <property name="UUID" value="3430ECE405B44A1299C42B9687E1BF87"
       component="KANAHA"/>
   </server>

  </new-devices>

</datacenter>
```

Using the Director CLI can save time and reduce the likelihood of a errors. Getting the UUID property value into the DCM for each of the servers that may be targeted for a RDM image installation is critical.

3

Deployment

Two options are detailed for the deployment of this hosted clients solution:

- The first option depends solely on the RDM Windows Native Install (WNI) process. Through this process, an administrator is able to manually create operating system and application images that can be deployed in one RDM task. These WNI tasks then can be readily deployed as demand dictates. The completed RDM tasks in this option include the entire software stack, operating system, and all applications.

  This option is described in 3.1, “Image Deployment with RDM” on page 30.

- The second option uses RDM and IBM Tivoli Provisioning Manager. In this option, the installation of the operating system and various applications are deployed using RDM WCI tasks, while the Citrix MetaFrame installation is handled by TPM.

  This option is described in 3.2, “Deployment with RDM and TPM” on page 58.

3.1 Image Deployment with RDM

Each Windows Native Install (WNI) task in this hosted client's solution includes several images that will ultimately be deployed to each blade as the user's scalability needs dictate. There are many ways to create images in the IBM Director/RDM console. For ease of use, we outline the necessary steps for image creation using the RDM Image Management console.

Note: When deploying a WNI task that contains more than one application, RDM will install these applications in *alphabetical order* based on the user-specified image name.

In the case of deploying the Citrix MetaFrame Presentation Server, for example, this is important because there are a few prerequisites that must be installed prior to installing the MetaFrame Presentation Server itself.

To avoid complications during install, a simple naming convention will be used where a few alpha characters are added to the beginning of each application's image name during its creation. For example, the Java Runtime Environment V1.4.1_02 will be named AAAJRE1412 in the RDM Image Creation Wizard, thus ensuring that it is installed first.

The following sections will outline the necessary steps to create each WNI image for this solution. These images will ultimately be associated with one or both of the WNI tasks described in "Creating the WNI tasks" on page 44.

3.1.1 WNI image for Windows Server 2003

The steps to create a WNI image for the Windows 2003 Server are as follows:

1. In the IBM Director Console, click **Tasks** → **Remote Deployment Manager** → **Image Management** → **Create and Modify Images**.
2. In the Image Management window, click **Create**. Figure 3-1 appears.

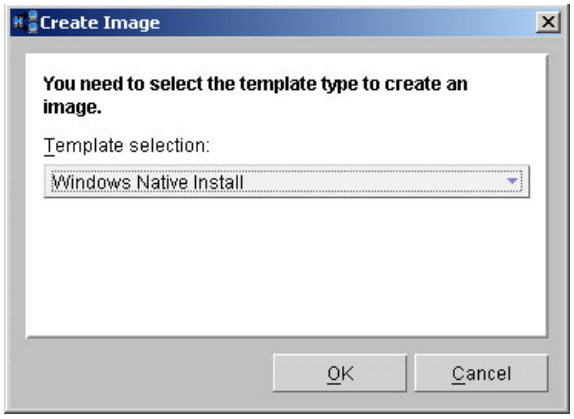

Figure 3-1 Create Image dialog

3. Select **Windows Native Install** from the Template selection pull-down and click **OK**.

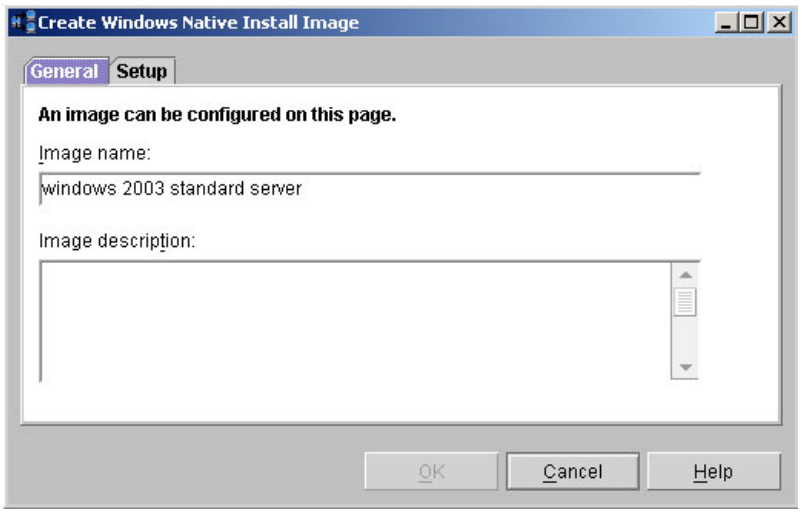

Figure 3-2 Creating a WNI image: General tab

4. In the General tab, type in the operating system image name. In this example we entered `Windows 2003 Standard Server`.

   The Image description field is an optional field that can be used to describe any details to be included with each RDM image. This may be useful for organizational purposes.

5. In the Setup tab, in the Select Image Type field, select **Operating System** from the pull-down.

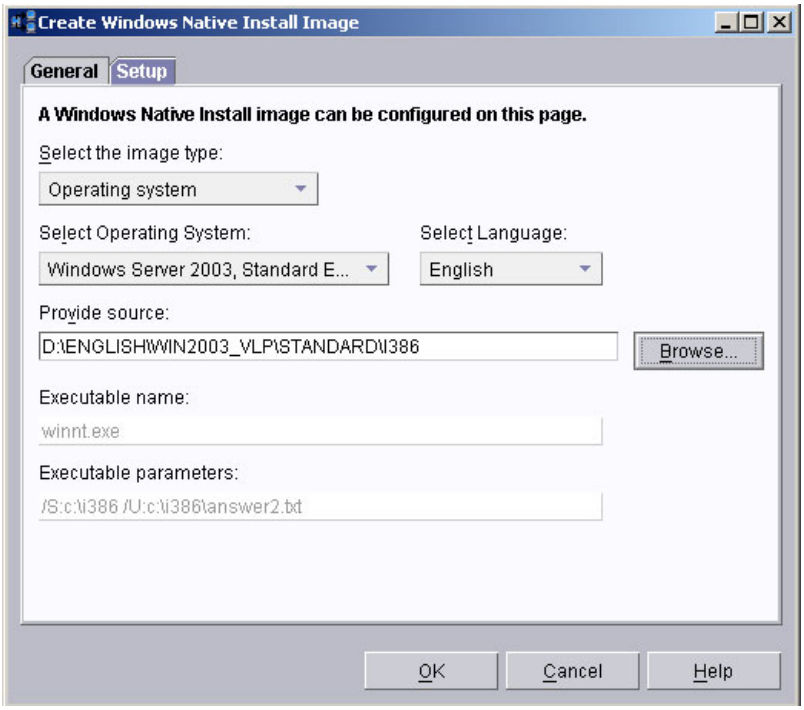

Figure 3-3 Creating a WNI image: Setup tab

6. Under Select Operating System, select **Windows Server 2003 Standard Edition OS**.
7. Click the **Browse** button and navigate to the WINNT.EXE file. In this example we are building this OS image from CD-ROM using the path D:\ENGLISH\WIN2003_VLP\STANDARD\i386.

8. Click **OK** and the RDM image Creation Progress indicator will appear and run as the OS image builds.

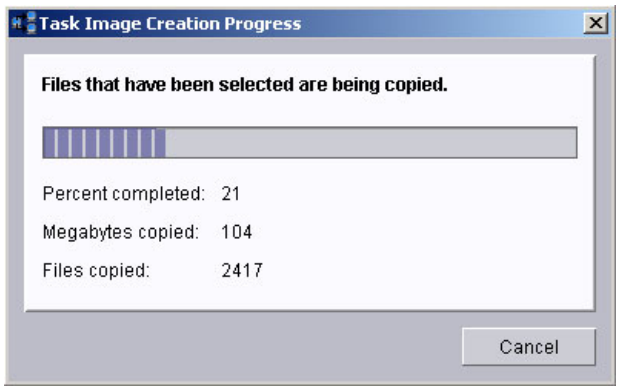

Figure 3-4 Task Image Creation Progress

9. Once the image has completed being built click **OK** and the WNI task name will be displayed in the Image Management window.

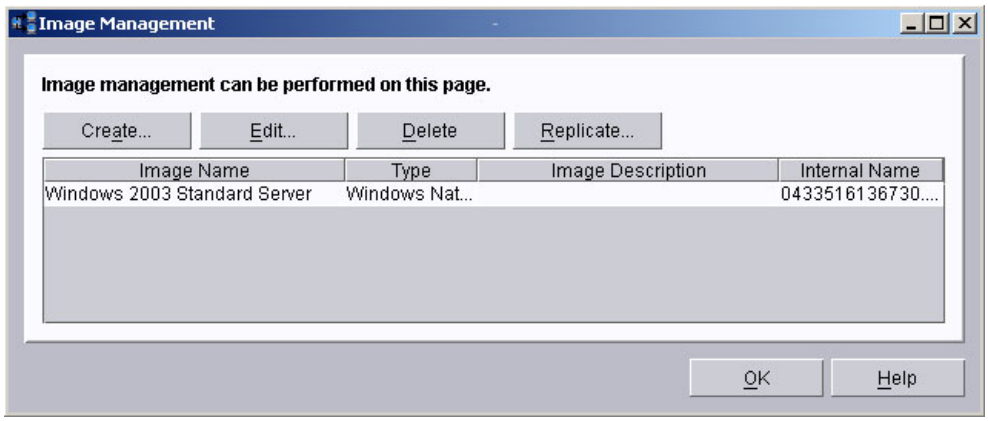

Figure 3-5 WNI image now created

At this point, the Windows 2003 Standard Server image has been successfully created. However, this image has not yet been assigned to a WNI task, and thus cannot be modified to enable Terminal Services or be deployed. See “Creating the WNI tasks” on page 44 and “Enabling Terminal Services” on page 54 for more details.

3.1.2 WNI Image for JRE 1.4.1_02

There are two primary prerequisites that must be installed prior to running the MetaFrame Presentation Server 3.0 installation. They are:

- Terminal Services (must be enabled and running in application mode).
- Java Runtime Environment 1.4.1_02

This section outlines the detailed steps involved to create a WNI image for JRE 1.4.1_02. For more information on enabling Terminal Services for Windows 2003, see “Enabling Terminal Services” on page 54.

Note: In this example the entire contents of the MetaFrame Presentation Server for Windows 2003 CD has been copied to C:\Citrix on the IBM Director/RDM server. While it is possible to build this WNI image from CD or other locations, this path was used for ease of explanation in this solution and to provide a writable location for creating and editing the Citrix answer files.

1. In the Image Management window (Figure 3-5 on page 32), click **Create**.

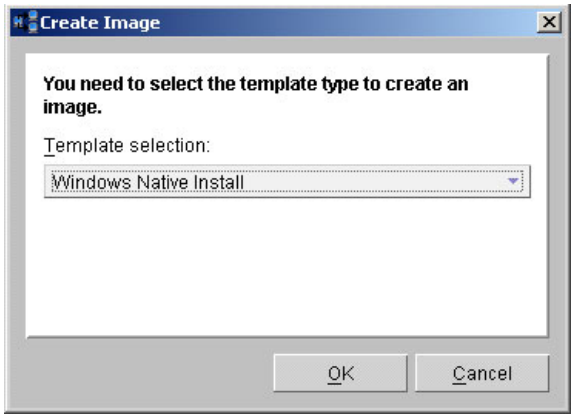

Figure 3-6 Create Image dialog

2. Select **Windows Native Install** from the pull-down menu and click **OK**. Figure 3-7 appears.

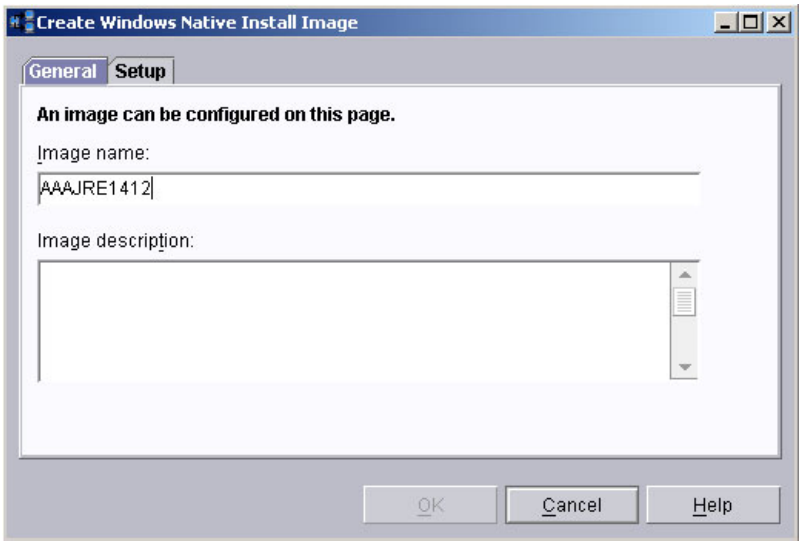

Figure 3-7 Creating a WNI image: General tab

3. In the General tab type in the image name for this application. In this example we used AAAJRE1412.

Note: As described on page 30, the addition of AAA at the beginning of this image name will ensure that this application is installed first. By design, RDM will install applications in alphabetical order based on image name.

4. Click the **Setup** tab.

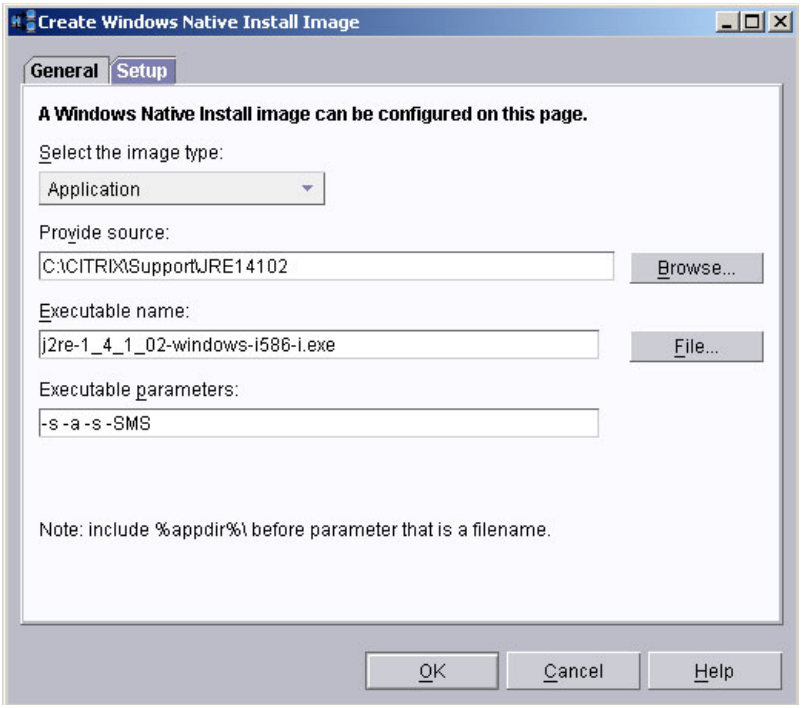

Figure 3-8 Creating a WNI Image: Setup tab

5. On the Setup tab, under Select the image type, use the pull-down menu to select **Application**.
6. Click **Browse** to select the location of the JRE14102 source directory, located at C:\CITRIX\Support\JRE14102 in this example.
7. Click **File** to locate the j2re-1_4_1_02-windows-i586-i.exe file.
8. Enter in the following parameters in the Executable Parameters field to enable the silent installation of this application:

   ```
   -s -a -s -SMS
   ```

   Note the case of each parameter.
9. Click **OK** to begin building this application image. A dialog box indicates the progress.

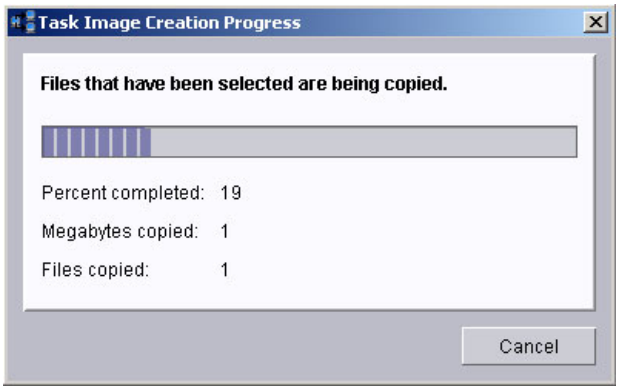

Figure 3-9 Task Image Creation Progress

10. When the image creation completes, click **OK** to return to the Image Management window.

3.1.3 WNI image to create a Citrix MetaFrame Presentation Server farm

This section describes the steps involved to build a WNI image for the MetaFrame Presentation Server that will create a new server farm.

In this example the entire contents of the MetaFrame Presentation Server for Windows 2003 CD has been copied to C:\CITRIX on the IBM Director/RDM server.

Note: All of the steps outlined in 2.2, “Citrix MetaFrame Presentation Server 3.0” on page 7, must be completed prior to building this image.

1. In the Image Management window click **Create**.

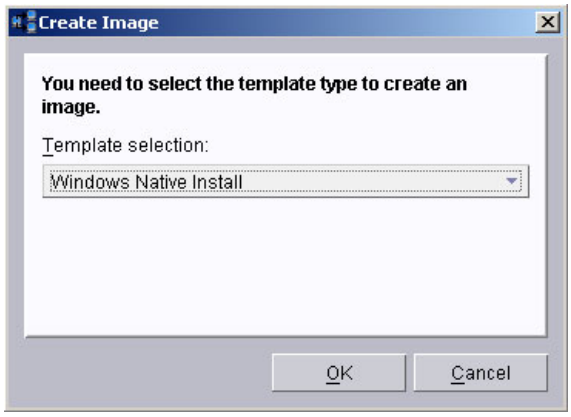

Figure 3-10 Create Image dialog

2. Select **Windows Native Install** and click **OK**.

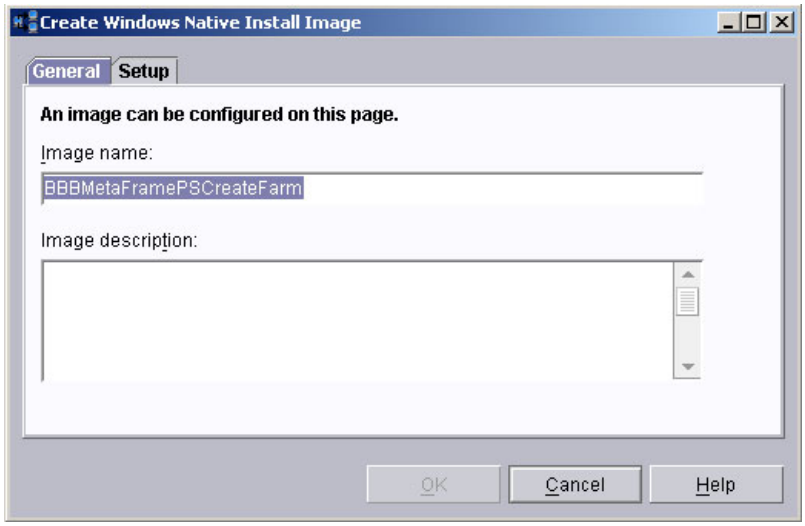

Figure 3-11 Creating a WNI image: General tab

3. In the General tab type in the image name for this application. In our example we used BBBMetaFramePSCreateFarm.

   As described on page 30, the addition of BBB at the beginning of this image name will ensure that this application will be installed after the AAAJRE1412 image is installed, thus satisfying one of MetaFrame's prerequisites.

4. Click the **Setup** tab.

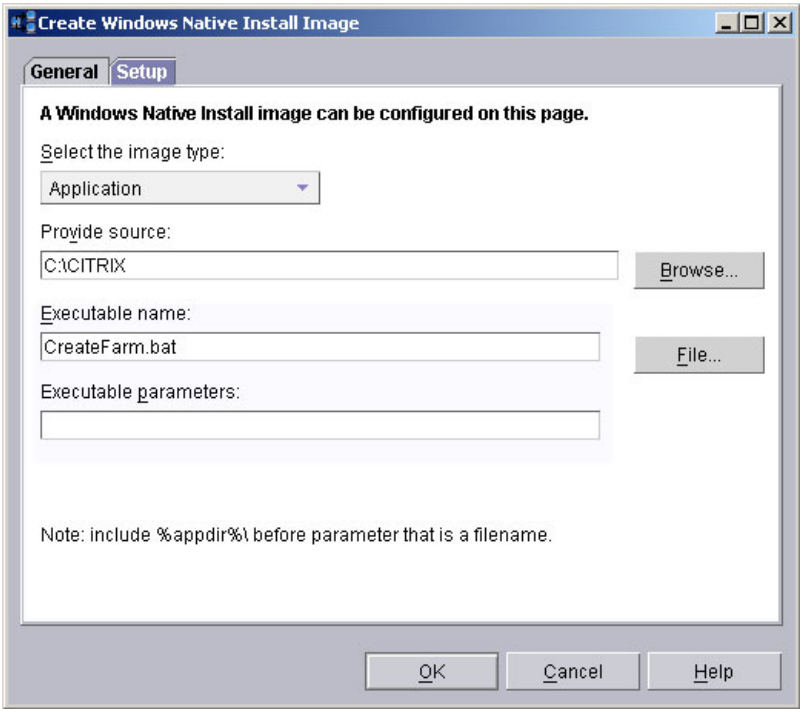

Figure 3-12 Creating a WNI image: Setup tab

5. Under Select Image Type, select **Application**.
6. Click **Browse** to select the location of the MetaFrame Presentation Server for Windows 2003 source directory, located at C:\CITRIX in this example.
7. Click **File** to locate the CreateFarm.bat file. We created this bat file in 2.2.3, "Citrix MetaFrame batch file creation" on page 10.
8. Click **OK** to build the image.
9. Once the image has been successfully created, click **OK** to return to the Image Management window.

3.1.4 WNI image to join a Citrix MetaFrame Presentation Server farm

This section describes the steps involved to build a WNI image for a MetaFrame Presentation Server to join an existing server farm.

As before, the entire contents of the MetaFrame Presentation Server for Windows 2003 CD have been copied to C:\CITRIX on the IBM Director/RDM server.

Note: All of the steps outlined in 2.2, "Citrix MetaFrame Presentation Server 3.0" on page 7, must be completed prior to building this image.

1. In the Image Management window click **Create**.

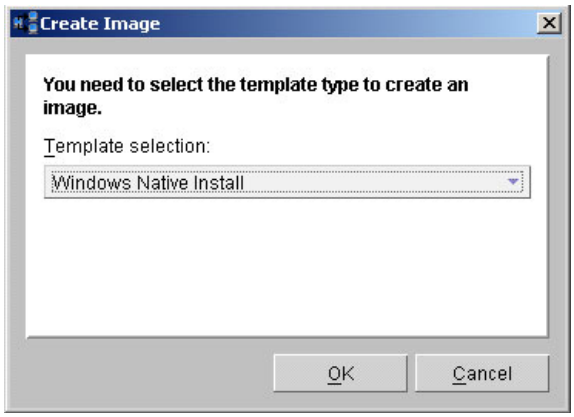

Figure 3-13 Create Image dialog

2. Select **Windows Native Install** and click **OK**.

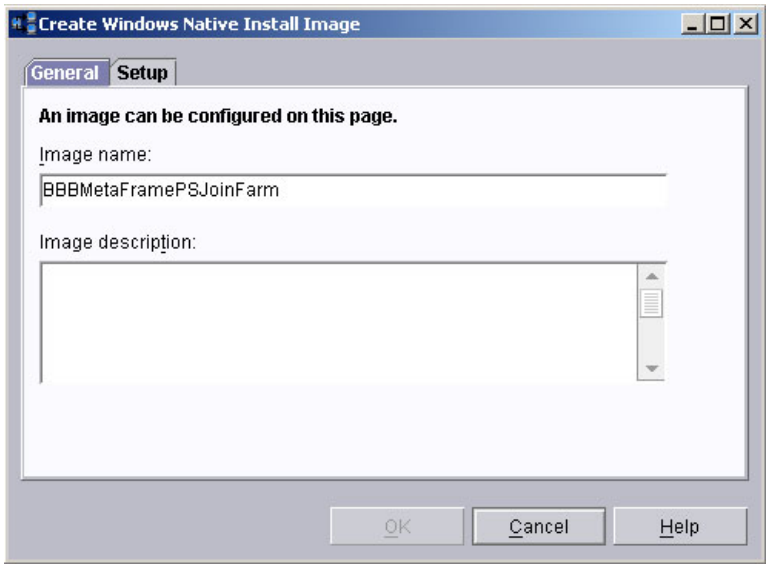

Figure 3-14 Creating a WNI image: General tab

3. In the General tab type in the image name for this application. In our example we used BBBMetaFramePSJoinFarm.

   As described on page 30, the addition of BBB at the beginning of this image name will ensure that this application will be installed after the AAAJRE1412 image is installed, thus satisfying one of MetaFrame's prerequisites.

4. Click the **Setup** tab.

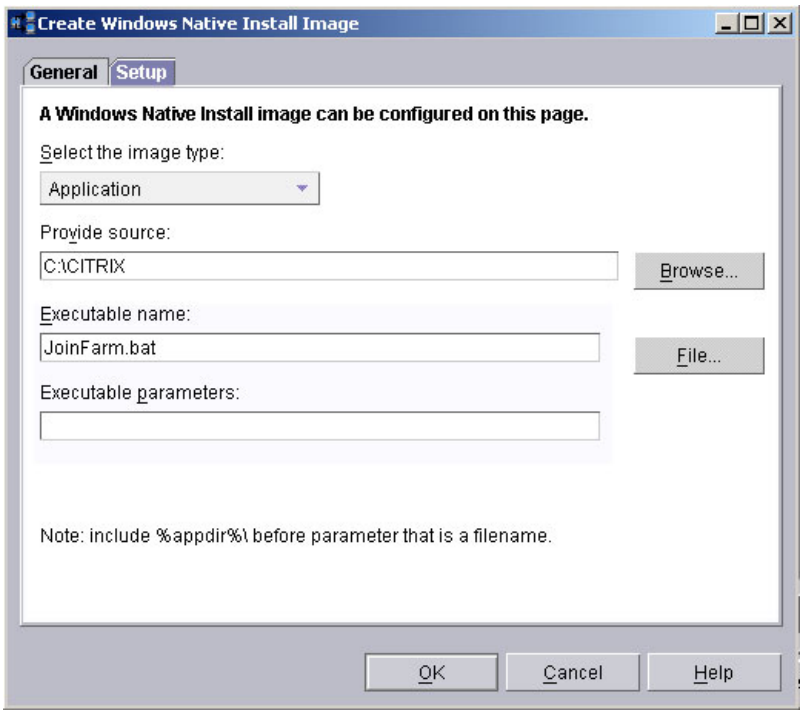

Figure 3-15 Creating a WNI image: Setup tab

5. Under Select Image Type, select **Application**.
6. Click **Browse** to select the location of the MetaFrame Presentation Server for Windows 2003 source directory, located at C:\CITRIX in this example.
7. Click **File** to locate the JoinFarm.bat file. We created this bat file in 2.2.3, “Citrix MetaFrame batch file creation” on page 10.
8. Click **OK** to build the image.
9. Once the image has been successfully created, click **OK** to return to the Image Management window.

3.1.5 WNI image of ARMTech for Citrix

This section describes the steps to build an ARMTech for Citrix application image for deployment.

In this example the entire contents of the ARMTech for Citrix v2.10 installation package (including armtech_setup.exe) have been copied to C:\Aurema on the IBM Director/RDM server. For more information on how to obtain ARMTech for Citrix v2.10, see the contact information in 2.3, “ARMTech for Citrix” on page 11.

Note: An ARMTECH_SETUP.ISS file must be created prior to building this image. For more information on how to create an ARMTECH_SETUP.ISS file, refer to 2.3, “ARMTech for Citrix” on page 11.

1. In the Image Management window click **Create**.

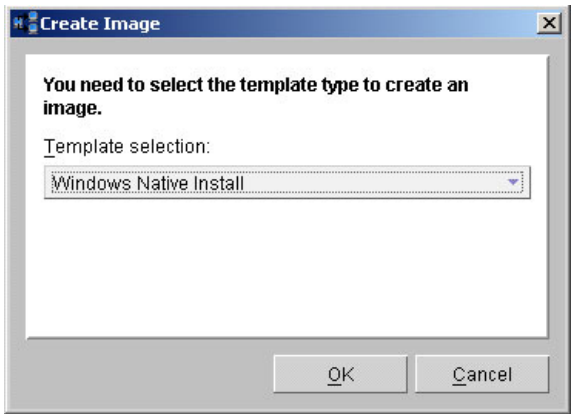

Figure 3-16 Create Image dialog

2. Select **Windows Native Install** and click **OK**.

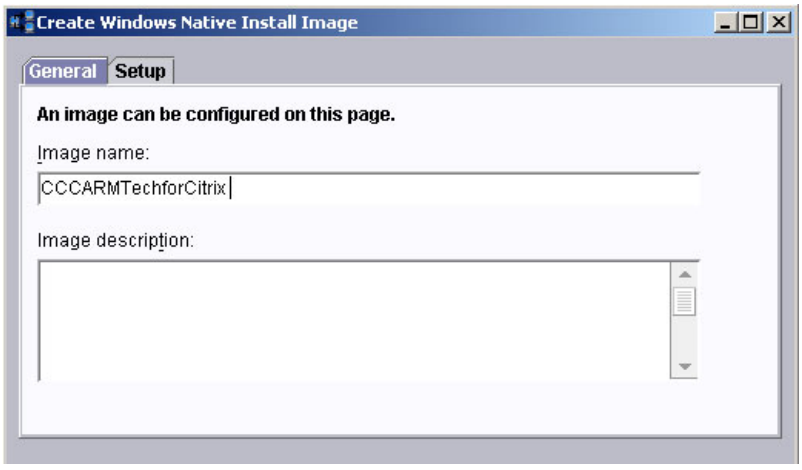

Figure 3-17 Creating a WNI image: General tab

3. In the General tab type in the image name for this application. In our example we used CCCARMTechForCitrix.

   As described on page 30, the addition of CCC at the beginning of this image name will ensure that this application is installed after the installation of both the JRE and the Citrix MetaFrame Presentation Server.

4. Click the **Setup** tab.

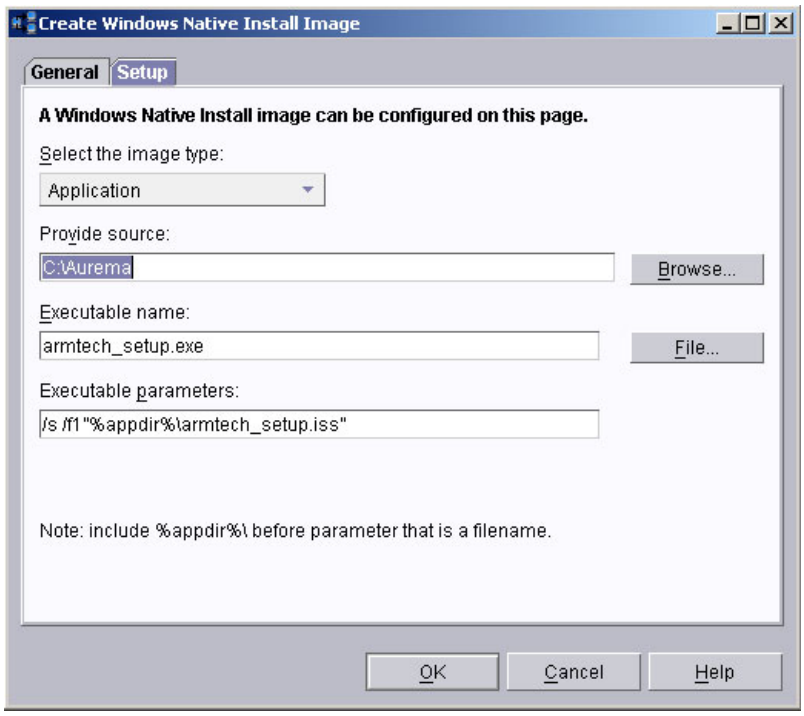

Figure 3-18 Creating a WNI image: Setup tab

5. Under Select Image Type, select **Application**.
6. Click **Browse** to select the location of the ARMTech for Citrix v2.10 source directory, located at C:\Aurema in this example.
7. Click **File** and select the **armtech_setup.exe** file. It is also in C:\Aurema.
8. Enter in the following parameters in the Executable Parameters field to enable the silent installation of this application:

   ```
   /s /f1"%appdir%\armtech_setup.iss"
   ```

   The second parameter is a lowercase f followed by the number 1, with no space before the quotation mark.
9. Click **OK** to build the image.
10. Once the image has been successfully created, click **OK** to be returned to the RDM Image Management window.

3.1.6 WNI image for Softricity SoftGrid client

This section describes the steps to create a WNI image for the Softricity SoftGrid Client.

In this example the entire Softricity package including the softgrid-ts-setup.msi package has been copied to C:\Softricity on the IBM Director/RDM server.

1. In the Image Management window click **Create**.

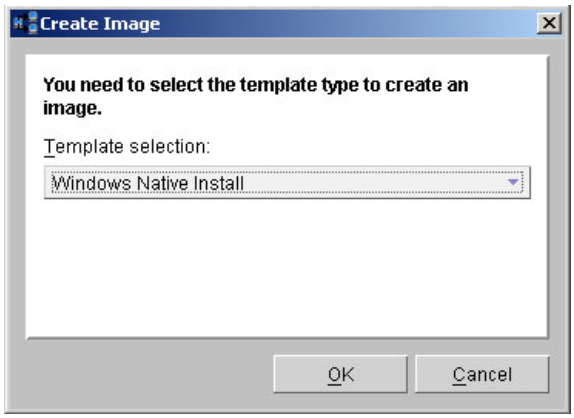

Figure 3-19 Create Image dialog

2. Select **Windows Native Install** and click **OK**.

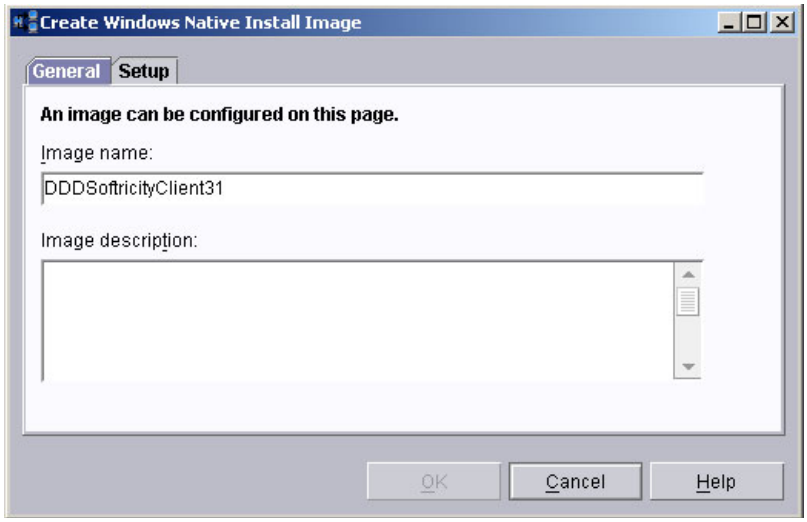

Figure 3-20 Creating a WNI image: General tab

3. In the General tab type in the image name for this application. In our example we used DDDSoftricityClient31.
4. Click the **Setup** tab.

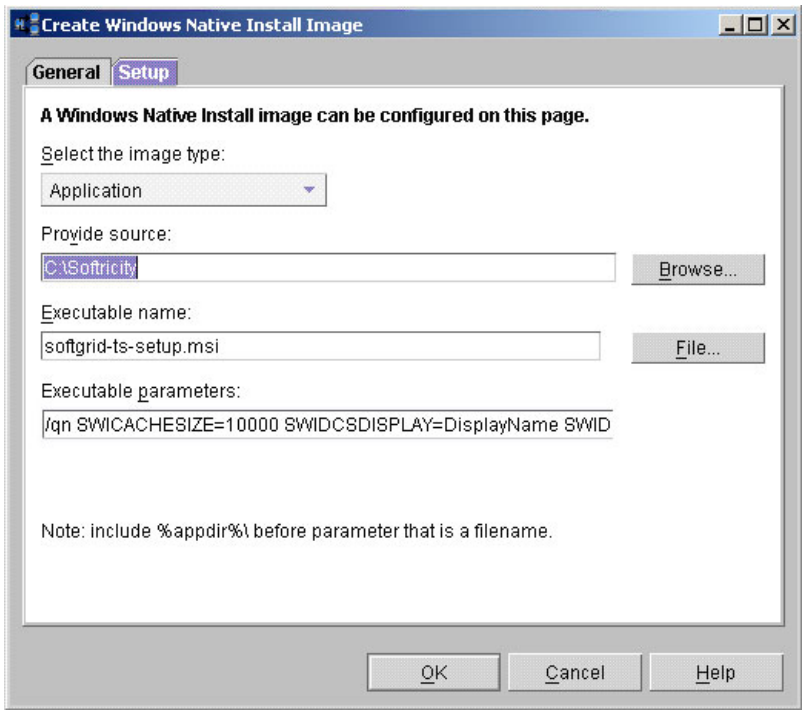

Figure 3-21 Creating a WNI image: Setup tab

5. Under Select Image Type, select **Application**.
6. Click **Browse** to select the location of the Softricity source directory, located at C:\Softricity in this example.
7. Click **File** to locate the softgrid-ts-setup.msi file. In our example, it is in C:\Softricity.
8. Enter in the following parameters in the Executable Parameters field to enable the silent installation of this application. It will be necessary to change the values for SWIDCSDISPLAY and SWIDCSHOST to match your existing SoftGrid environment.

   ```
   /qn SWICACHESIZE=10000 SWIDCSDISPLAY=DisplayName SWIDCSHOST=HostName
   SWIDCSTYPE=SoftGrid
   ```

   Note: There are many parameters that can be passed to the softgrid-ts-setup.msi installation package. For more information on the unattended installation options of this application, refer to the SoftGrid_v31_AdminGuide_TerminalServers.pdf file that came with your SoftGrid installation package.

9. Click **OK** to build the image.
10. Once the image has been successfully created, click **OK** to be returned to the RDM Image Management window.

3.1.7 WNI image for Cygwin Shell

This section describes the steps to create a WNI image for the Cygwin Shell.

Note: All the steps described in 2.4, “Cygwin and AutoIt 3.0” on page 11, must have been completed prior to the building this WNI image.

1. In the Image Management window click **Create**.

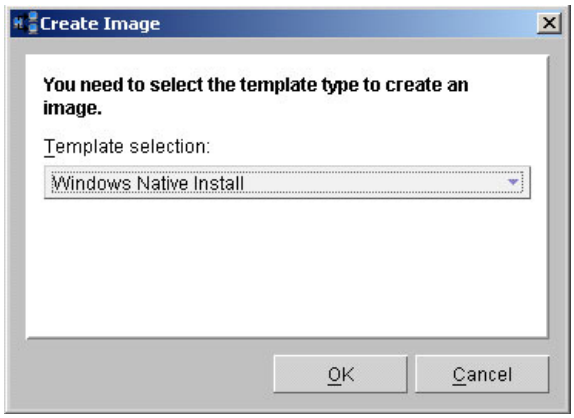

Figure 3-22 Create Image dialog

2. Select **Windows Native Install** and click **OK**.

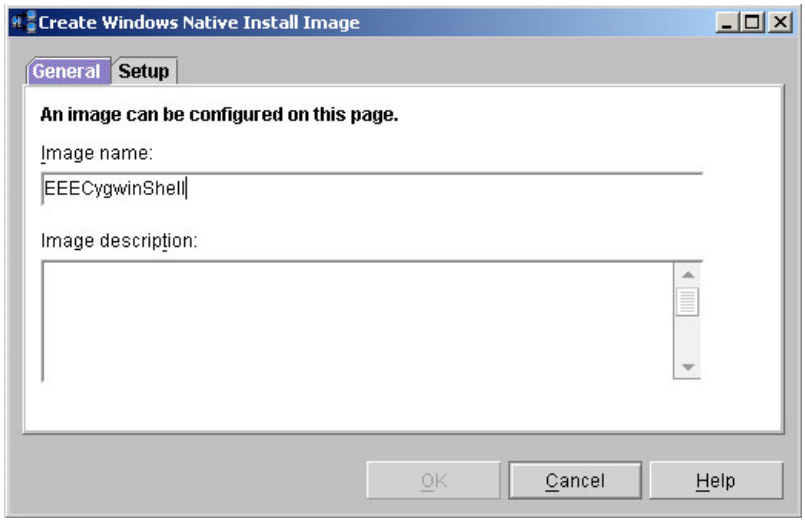

Figure 3-23 Creating a WNI image: General tab

3. In the General tab type in the image name for this application. In our example we used EEECygwinShell.
4. Click the **Setup** tab.

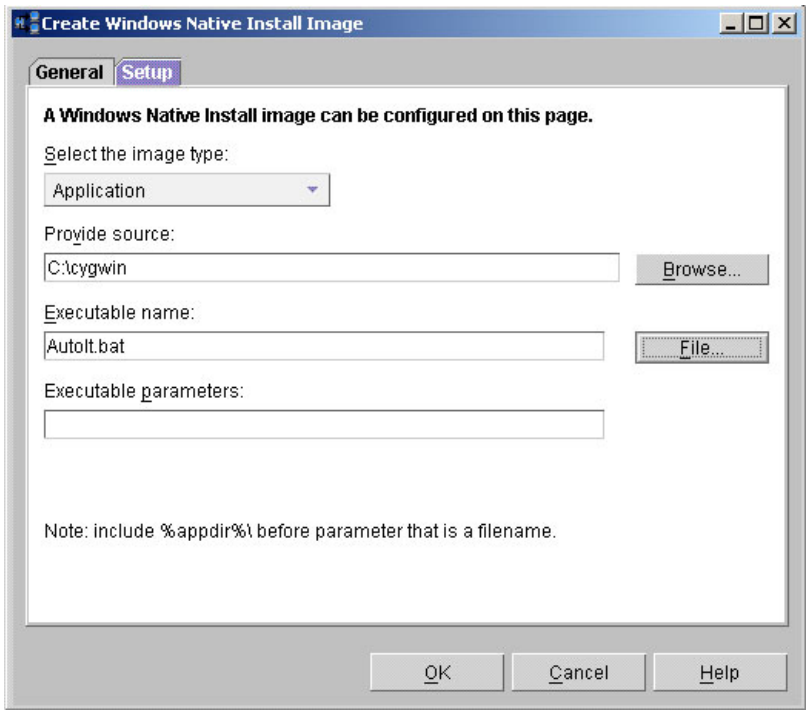

Figure 3-24 Creating a WNI image: Setup tab

5. Under Select Image Type, select **Application**.
6. Click **Browse** to select the location of the Cygwin source directory, located at C:\cygwin in this example.
7. Click **File** to locate the AutoIt.bat file. This was created in 2.4.6, “Step 5. Creating AutoIt.bat ” on page 16.
8. Click **OK** to build the image.
9. Once the image has been successfully created, click **OK** to return to the RDM Image Management window.

3.1.8 Creating the WNI tasks

Now that all the WNI images have been created, the next step is to create tasks that use those images. This section describes the steps for creating two Windows Native Install (WNI) tasks.

- Create a Citrix server farm. This is discussed in “WNI task to create a Presentation Server farm” on page 45.
- Add or join additional servers to that farm as scaling needs dictate. This is discussed in “WNI task to join a Presentation Server farm” on page 53.

These tasks will be deployed via Director/RDM, will install the following products on a bare-metal blade server, and will be used to either create or join a Citrix MetaFrame Presentation Server farm:

- Windows 2003 Server with Terminal Services enabled
- Java Runtime Environment v 1.4.1_02
- MetaFrame Presentation Server
- ARMTech for Citrix
- Softricity SoftGrid Client

- Cygwin Shell

While the above list of applications is the same for both WNI tasks, it will be necessary to create two separate tasks that will define the type of MetaFrame Presentation Server install to be deployed.

WNI task to create a Presentation Server farm

Follow these steps to create the task that will create a Citrix server farm.

1. In the Tasks pane of the IBM Director Console, expand the **Remote Deployment Manager** task.
2. Right-click **Windows Native Install Task** and click **Create new task**.

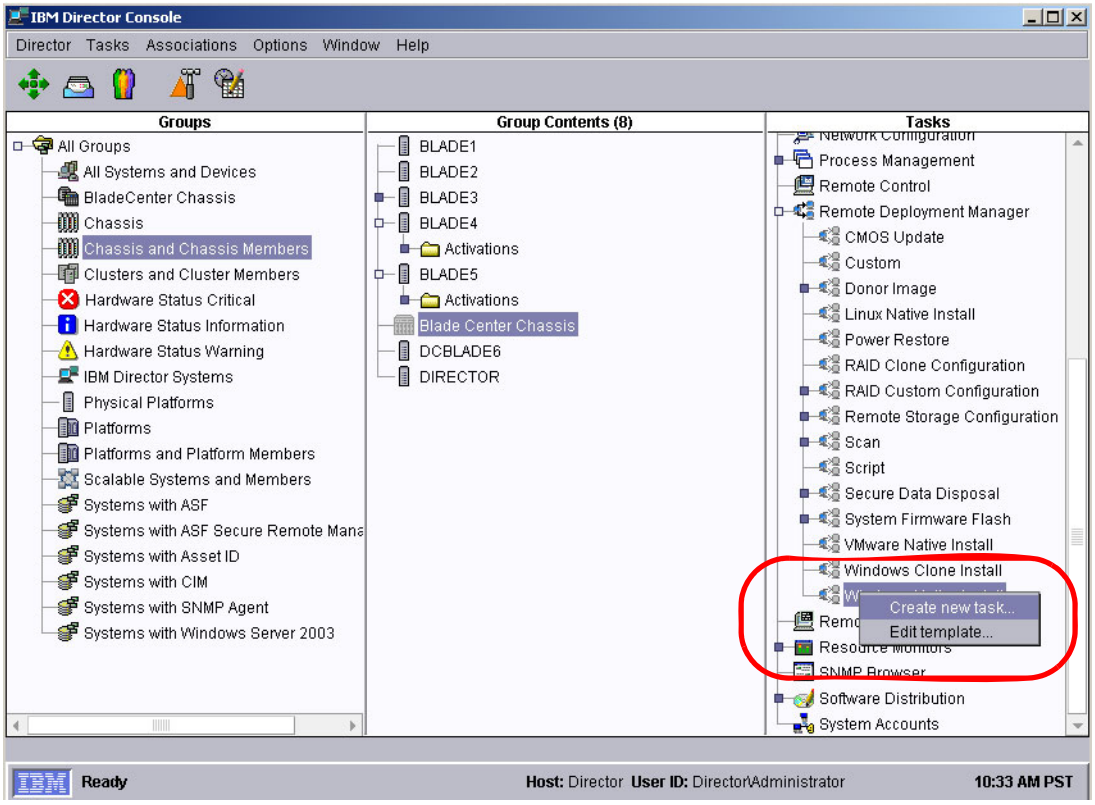

Figure 3-25 IBM Director Console

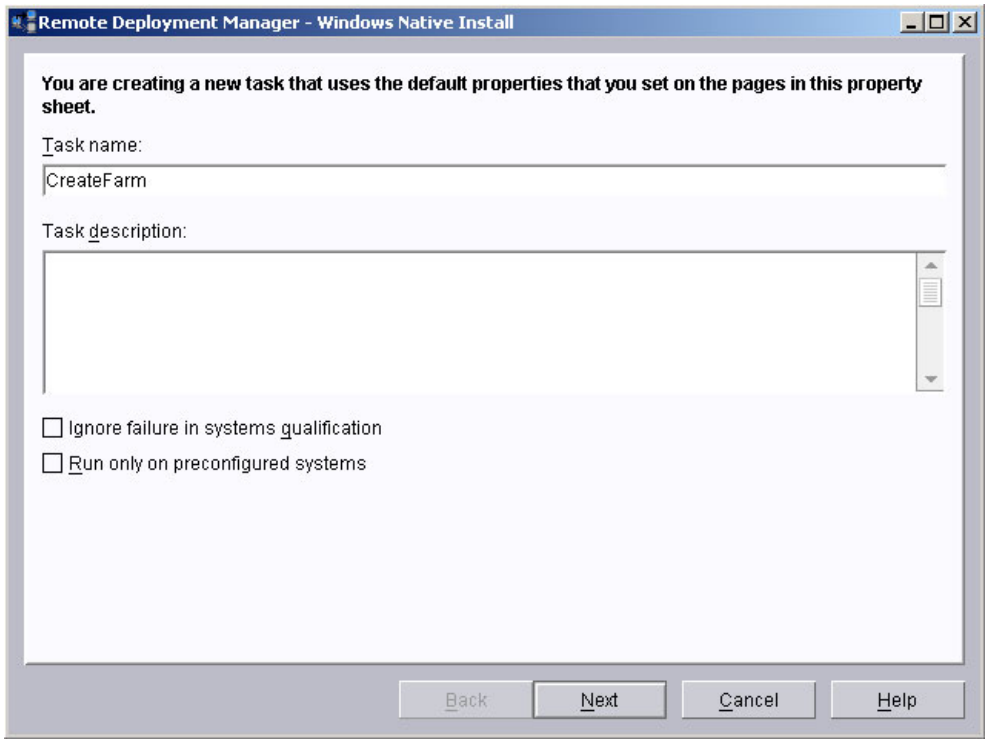

Figure 3-26 WNI Task name

3. Enter a task name that describes the type of native install to be created. In our example we used CreateFarm as a task name, as shown in Figure 3-26. Click **Next**.

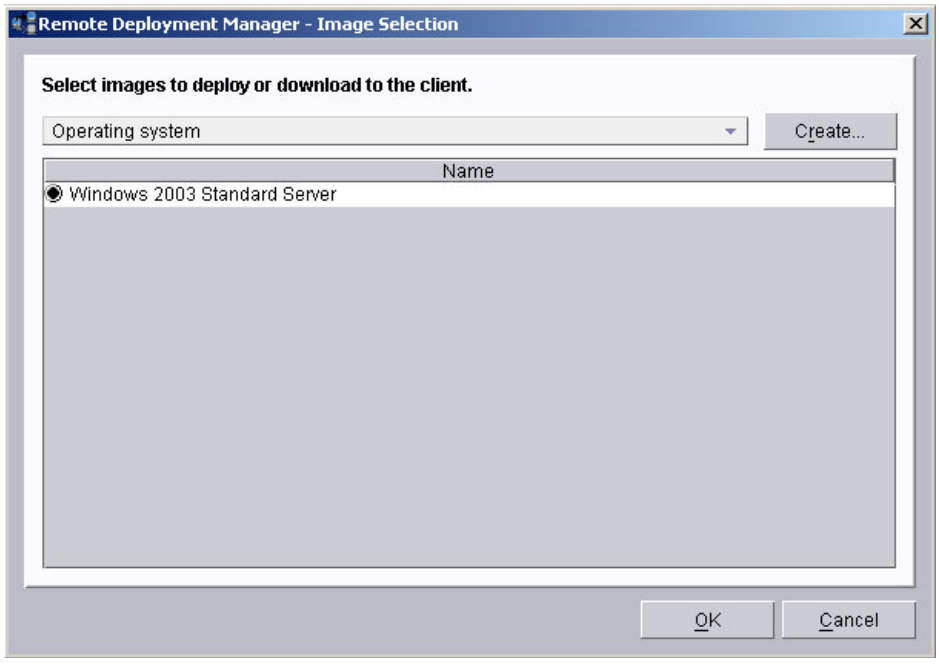

Figure 3-27 Selecting the Windows Server 2003 image

4. Select the operating system image that was created. In our example in 3.1.1, “WNI image for Windows Server 2003” on page 30, we selected **Windows 2003 Standard Server**. Click **OK**.

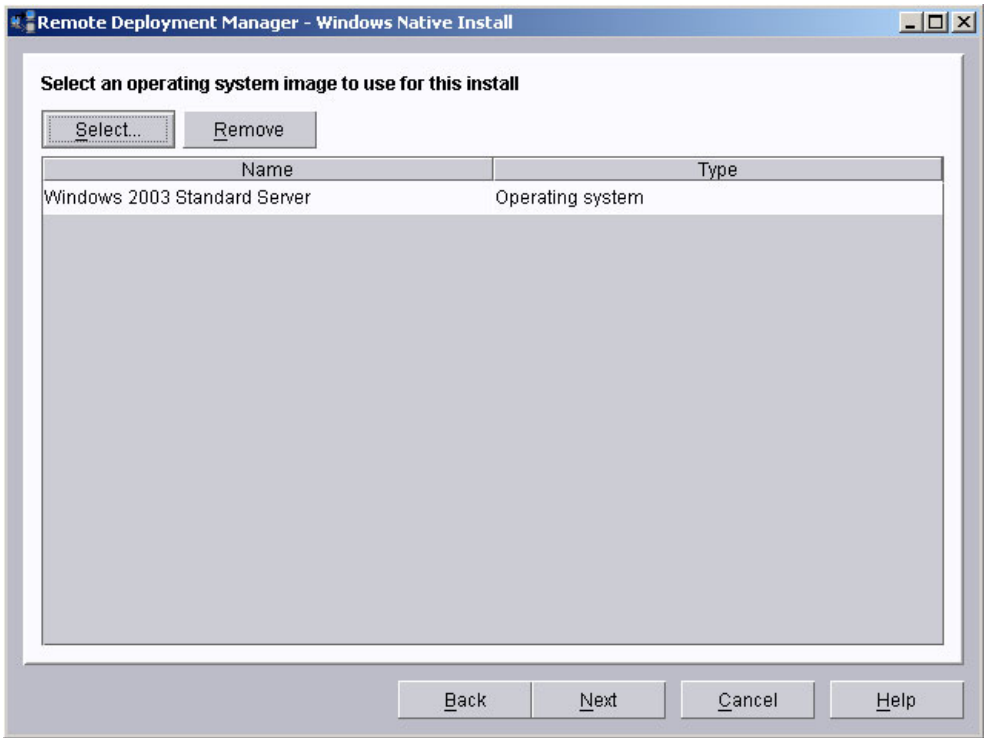

Figure 3-28 Selecting additional images to be included in this WNI task

5. Click **Select** to select the other images that will be deployed with this task.
6. Select **Application** from the pull-down list, as shown in Figure 3-29.

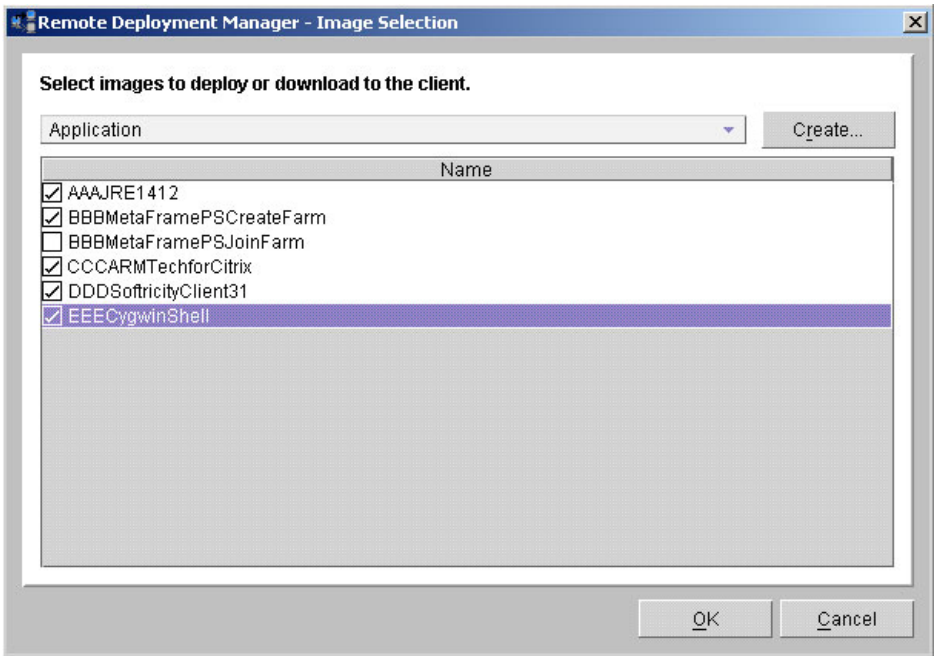

Figure 3-29 Select the application images to be included in this WNI task

7. The list of images that were created previously now appear. Place checkmarks next to the following applications to be included in this task and click **OK**.
   - AAAJRE1412

– BBBMetaFramePSCreateFarm
– CCCARMTechforCitrix
– DDDSoftricityClient31
– EEECygwinShell

The only one not selected is BBBMetaFramePSJoinFarm, as shown in Figure 3-29 on page 47.

8. Click **Next** to display the Partition Configuration window. By default RDM will create one partition using all available drive space.

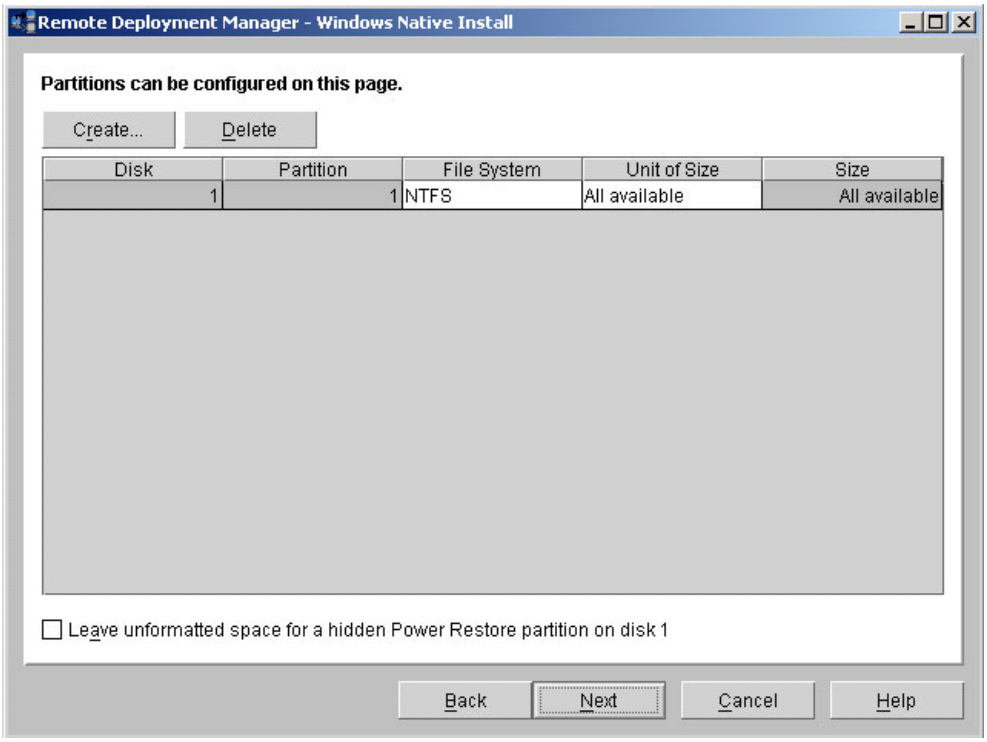

Figure 3-30 Partitions window

9. Click **Next**. Figure 3-31 on page 49 appears.

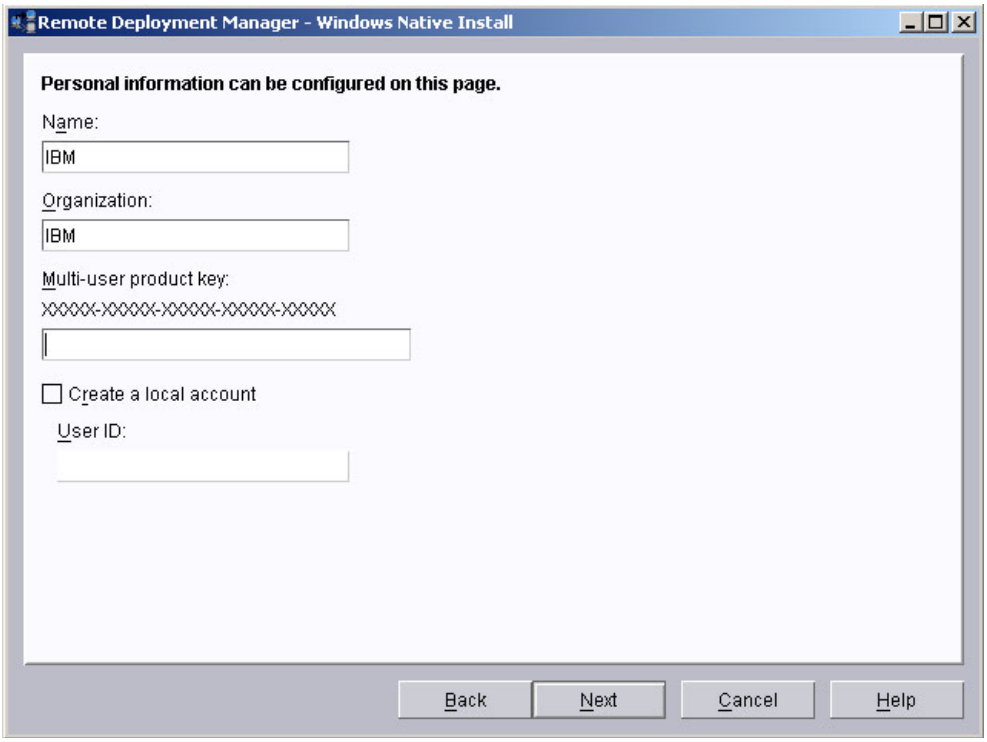

Figure 3-31 Account and product key information

10. Enter the appropriate name, organization, and product key information, and click **Next**. Figure 3-32 appears.

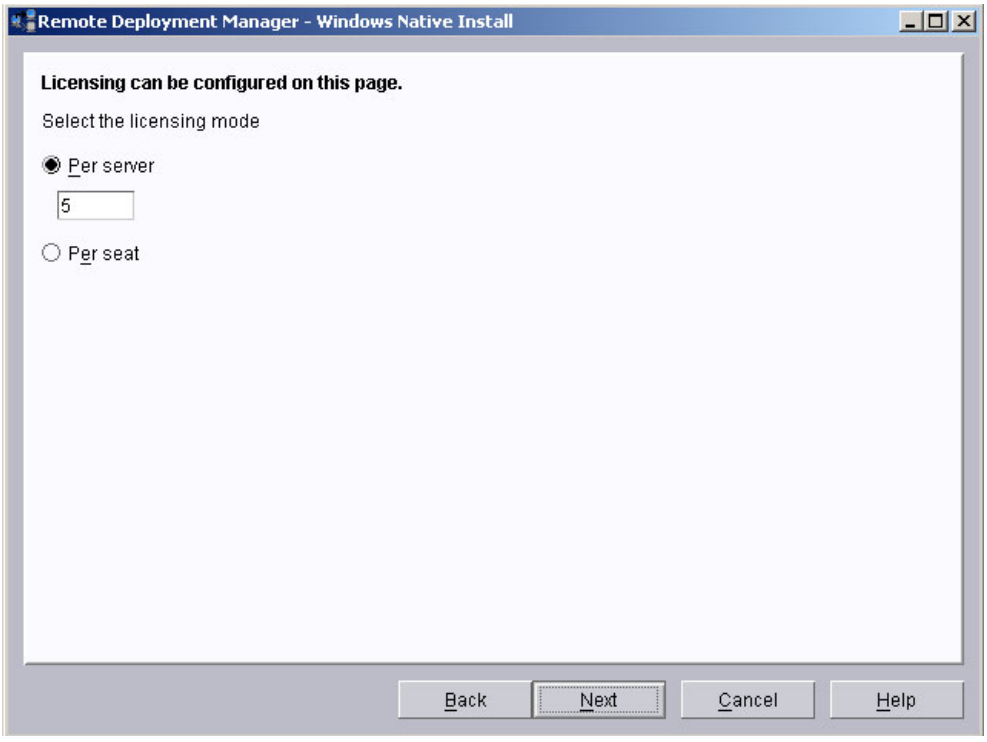

Figure 3-32 Licensing

11. Enter the licensing information and click **Next**. Figure 3-33 on page 50 appears.

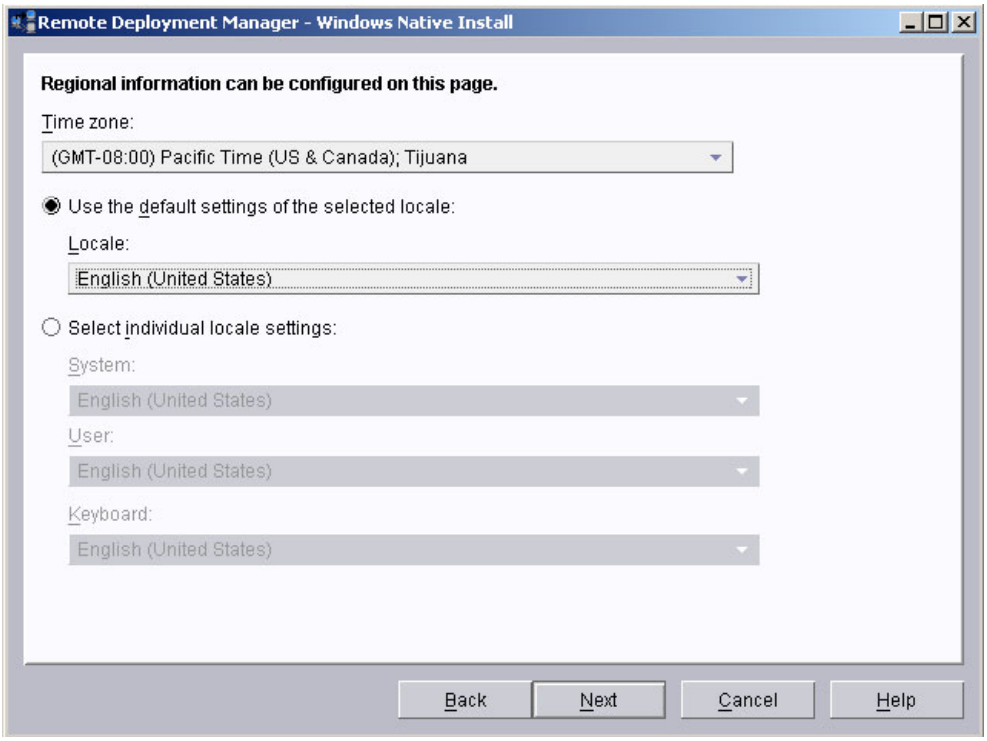

Figure 3-33 Regional information

12. Enter any regional information to be configured and click **Next**.

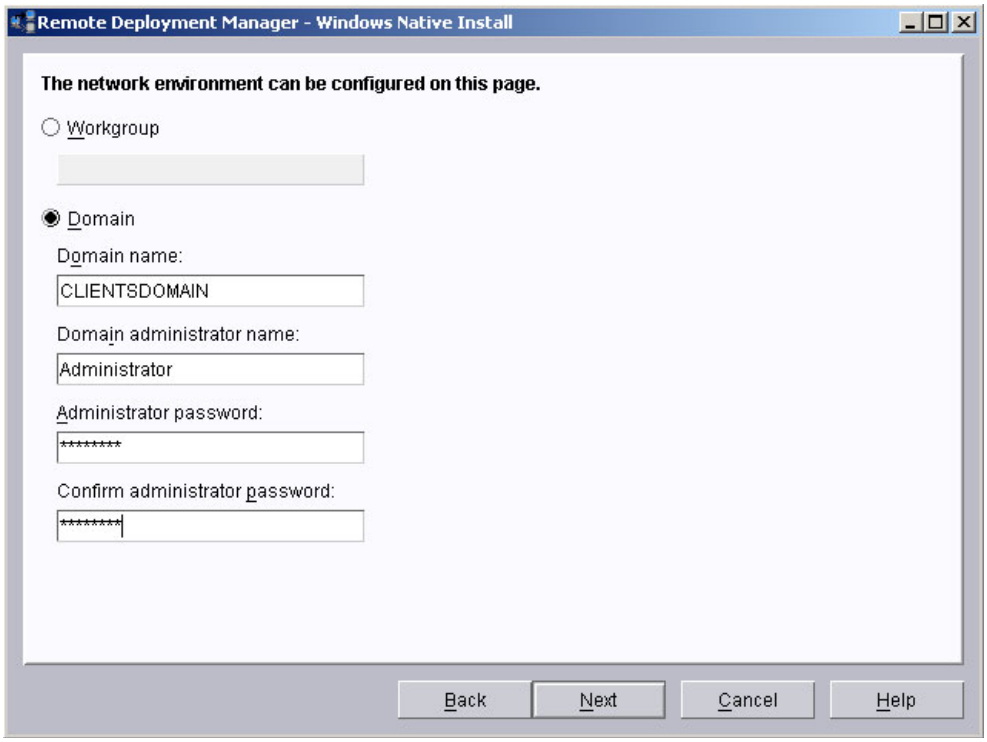

Figure 3-34 Network configuration

13. Enter the appropriate domain name and administrator credentials and click **Next**.

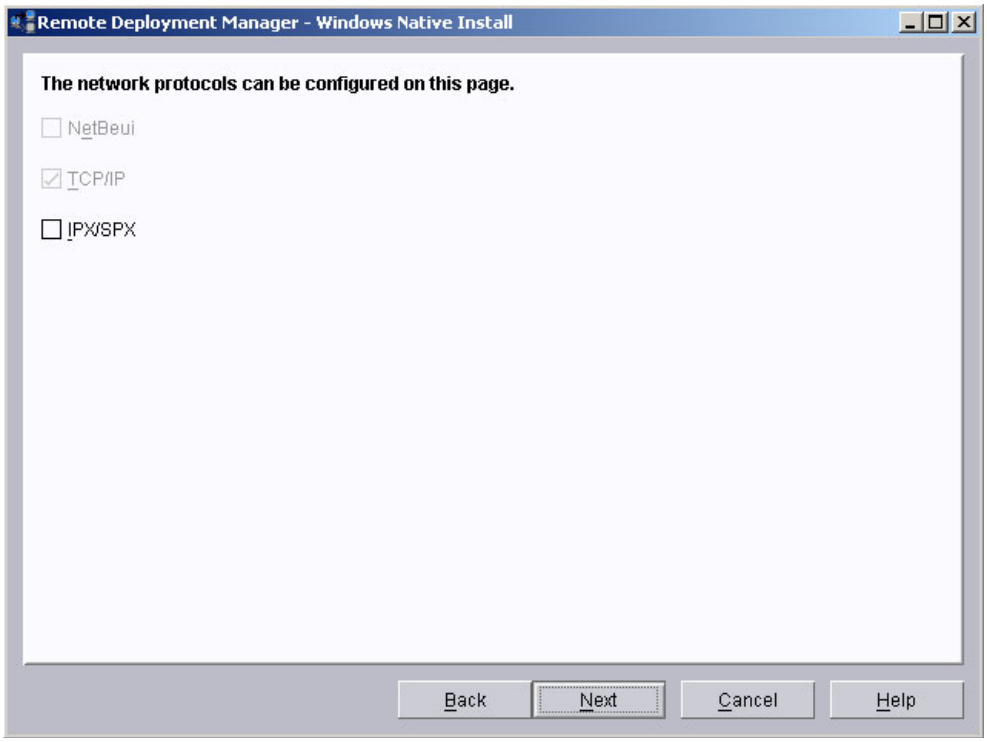

Figure 3-35 Network protocols

14. Click **Next** at the Networking Protocols window.

    By default, the RDM interface will set the TCP/IP to DHCP. In the case where the solution will include the IBM Tivoli Provisioning Manager, it will be necessary to click **Edit** in the window in Figure 3-36 on page 52 to set the IP address to manual. Enter a Static IP range and subnet mask and click **OK** to close the window. The specifics of the IP range and subnet mask entered will then be overwritten by TPM during install.

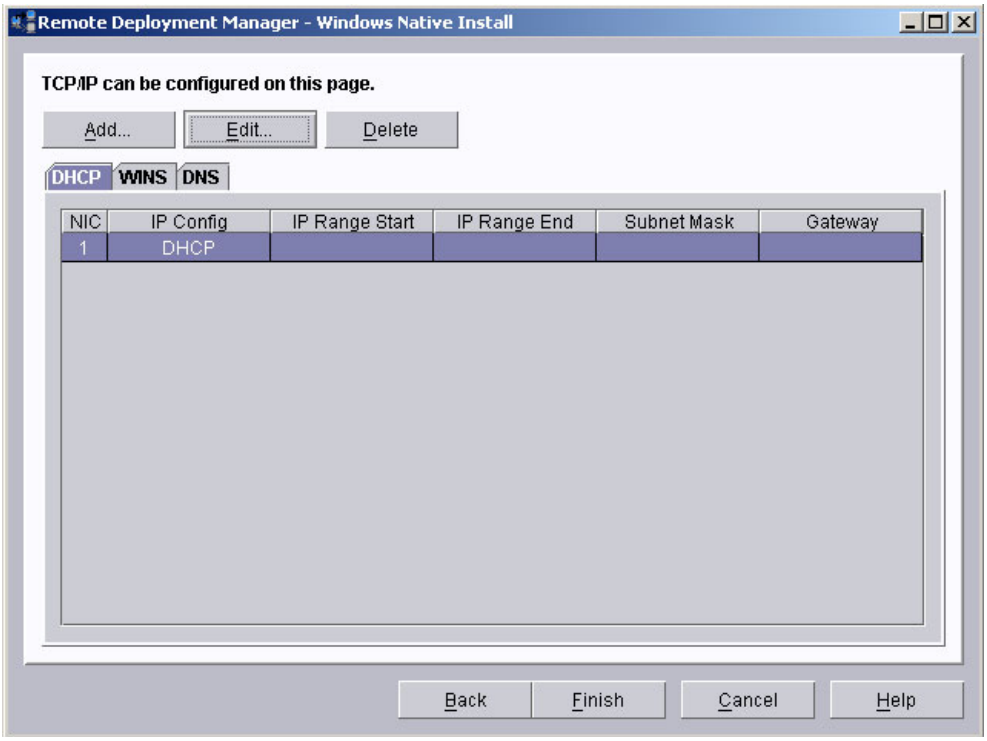

Figure 3-36 TCP/IP configuration

15. Configure the TCP/IP settings and click **Finish**. You are now returned to the IBM Director Console with the CreateFarm task added.

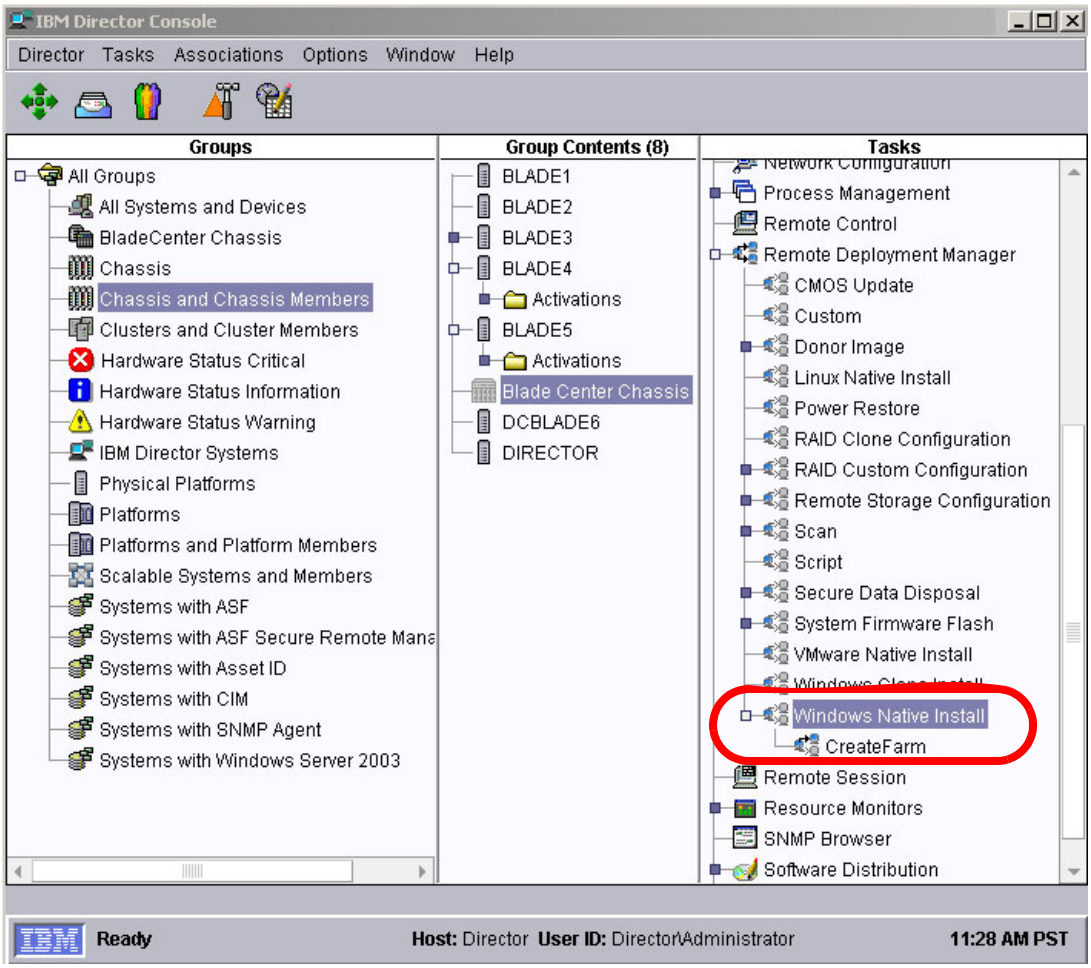

Figure 3-37 CreateFarm task now created

Even though the WNI CreateFarm task is complete, the answer2.txt file must still be edited to enable Terminal Services for the application deployment of MetaFrame Presentation Server to run correctly. See 3.1.9, “Enabling Terminal Services” on page 54.

WNI task to join a Presentation Server farm

The necessary steps involved to create a WNI task to join a farm are identical to the steps in “WNI task to create a Presentation Server farm” on page 45, with two small differences:

- In Figure 3-26 on page 46, the task name is JoinFarm.
- In the application image selection window (Figure 3-29 on page 47), the applications selected should include BBBMetaFramePSJoinFarm and not BBBMetaFrameCreateFarm. The selection windows for the join task should look similar to Figure 3-38 on page 54.

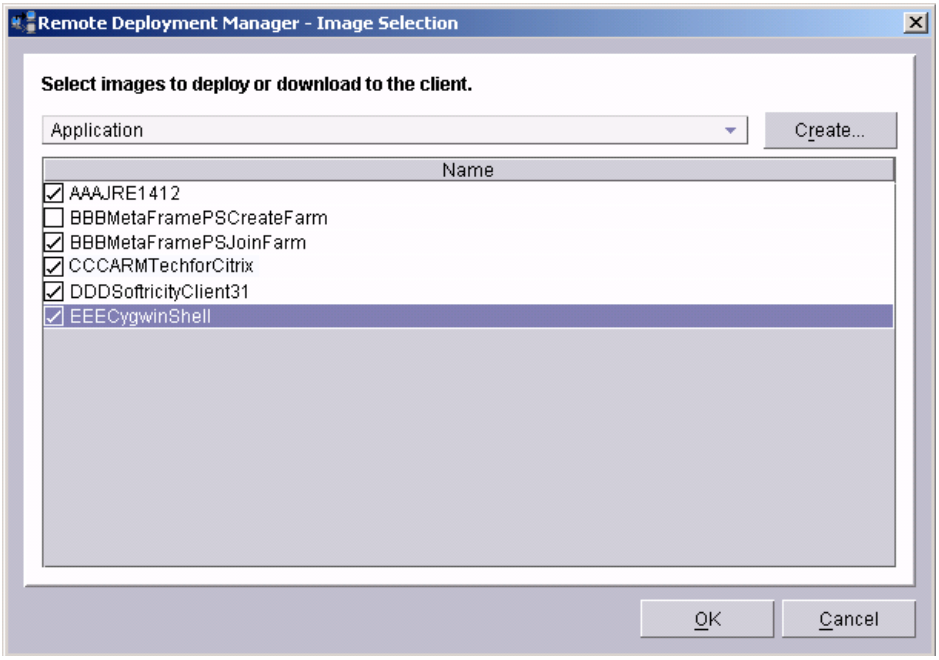

Figure 3-38 Selecting the application images to be included in this WNI task

Once the WNI JoinFarm task is complete, the answer2.txt file must be edited to enable Terminal Services for the application deployment of MetaFrame Presentation Server to run correctly. See 3.1.9, “Enabling Terminal Services” on page 54, to accomplish this task.

3.1.9 Enabling Terminal Services

As previously stated, there are two primary prerequisites that must be installed prior to running the MetaFrame Presentation Server installation:

- Terminal Services must be enabled and running in application mode.
- Java Runtime Environment 1.4.1_02.

This section shows the necessary steps to locate and modify the answer files for both WNI tasks described in 3.1.8, “Creating the WNI tasks” on page 44, to enable the Terminal Services windows component upon install. For more information regarding the installation of the Java Runtime Environment 1.4.1_02, see 3.1.2, “WNI Image for JRE 1.4.1_02” on page 32.

Tip: Once Terminal Services is enabled on Windows Server 2003 it will automatically be running in application mode.

Before you can modify the answer files to enable Terminal Services, you will first need to determine the folder where the answer file is stored. This is done as follows:

1. Locate the answer2.txt file that is associated with each task.

   Each time you create a new WNI task, RDM will create a new answer2.txt file for that task. For this reason you must repeat this step to enable Terminal Services for each task you create.

2. In IBM Director Console in the Task pane, select the **CreateFarm** task (under Remote Deployment Manager and Windows Native Install), right-click it, and click **Edit Task**.
3. Click the **Advanced** tab.

4. Select **Task folder** under Category. Figure 3-39 appears.

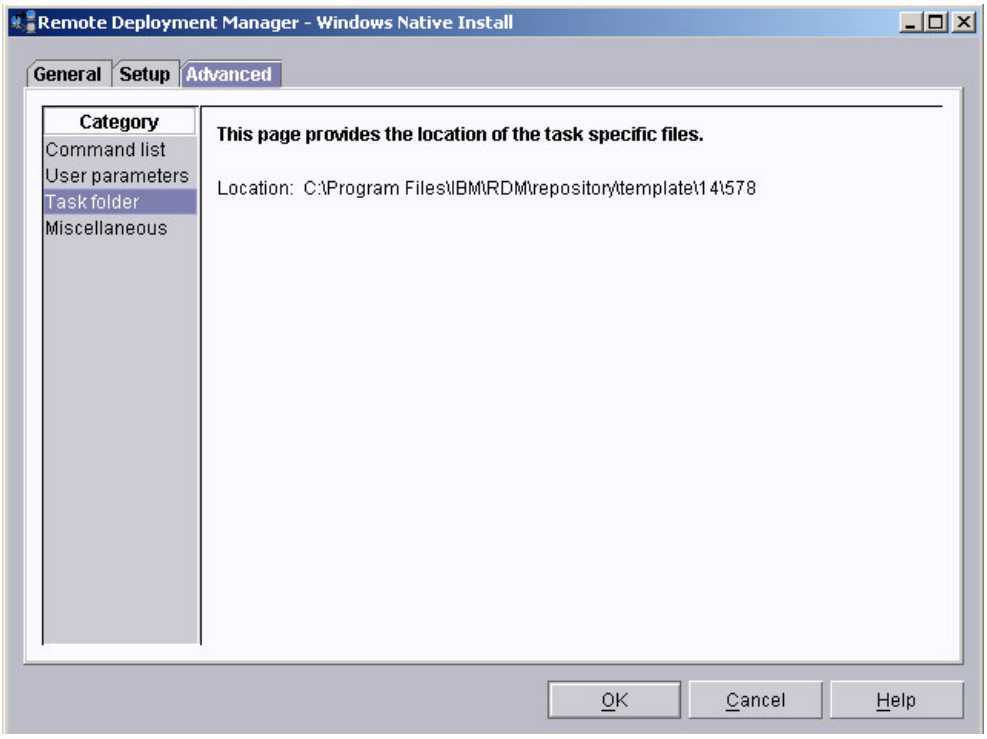

Figure 3-39 Advanced tab

The path that is displayed on the right-hand side of the window is the location of the Task folder that includes the answer2.txt file for this WNI task.

Using Notepad or a similar text editor, open the answer2.txt file in the folder displayed in Figure 3-39, and add the following two lines to the file (Example 3-1).

Example 3-1 Lines to add to the answer2.txt file to enable Terminal Services

```
[Components]
TerminalServer=ON
```

You will now need to repeat this entire process for the JoinFarm task.

3.1.10 Creating script tasks

Before you can deploy new machines via an RDM WNI task, each machine must have a Basic Scan task run against it to populate its hardware specifications in RDM. This section describes the steps to create two script tasks that will include a basic hardware scan at the beginning of each WNI task deployment. The two scripts are:

- Combining a basic scan with the CreateFarm WNI task
- Combining a basic scan with the JoinFarm WNI task

Script task to combine a basic scan with the CreateFarm WNI task

The steps to create this task are as follows:

1. In the Task pane of IBM Director Console, expand the Remote Deployment Manager task.
2. Right-click **Script** and click **Create new task**.

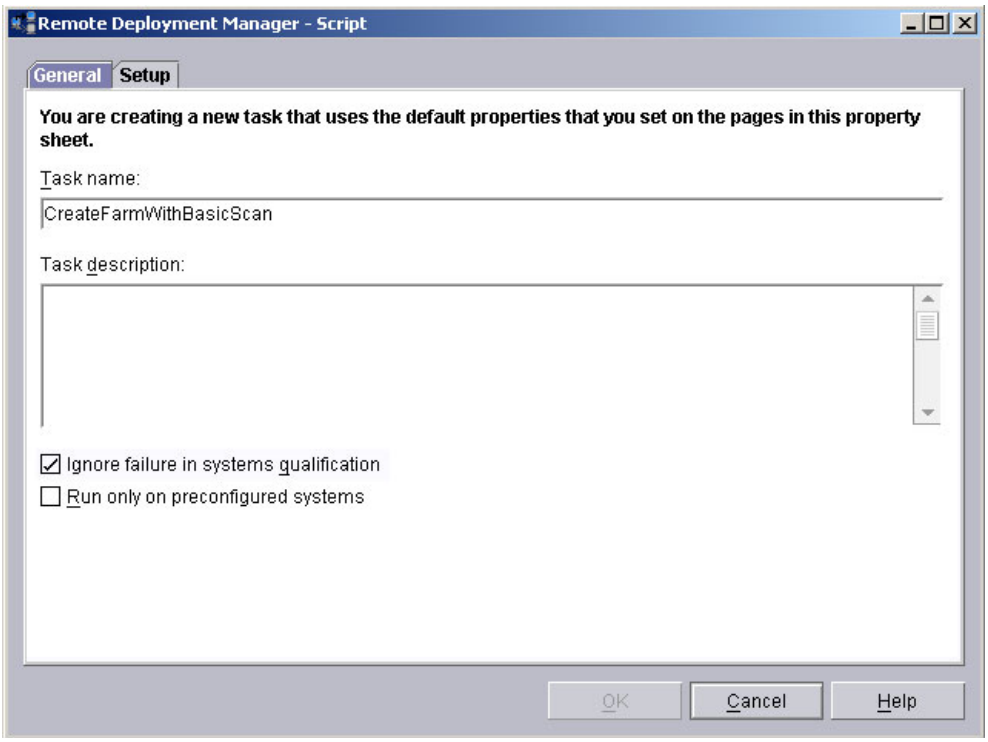

Figure 3-40 New script task: General tab

3. Enter a task name that describes the type of script task to be created. In our example we entered CreateFarmWithBasicScan.
4. Check the **Ignore failure in system qualification** check box.
5. Click the **Setup** tab.
6. Expand the **Scan** option in the Available Tasks tree, click **Basic Scan**, and click **Add** to add it to the Selected Tasks list.
7. Expand **Window Native Install** in the Available Tasks tree, click **CreateFarm**, and click **Add** to add it to the Selected Tasks as well. The window should look like Figure 3-41 on page 57.

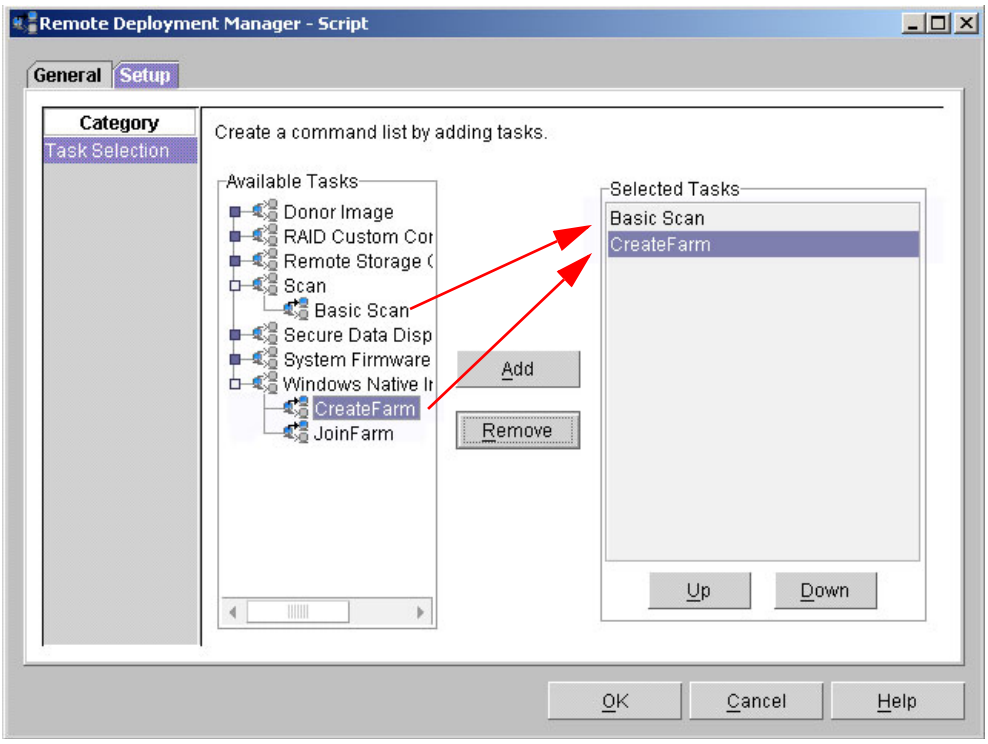

Figure 3-41 Creating a script task comprised of the basic scan and CreateFarm tasks

8. Click **OK** to be returned to the IBM Director Console. The task has now been created and appears under Scripts in the Remote Deployment Manager tasks.

Script task to combine a basic scan with the JoinFarm WNI task

The necessary steps involved to create a script that performs a basic scan and the JoinFarm task are identical to the steps in “Script task to combine a basic scan with the CreateFarm WNI task” on page 55, with two small differences:

- In Figure 3-40 on page 56, the task name is JoinFarmWithBasicScan.
- In the available tasks selection in Figure 3-41, the tasks selected should be Basic Scan and JoinFarm. The selection window for the join script should look similar to Figure 3-42 on page 58.

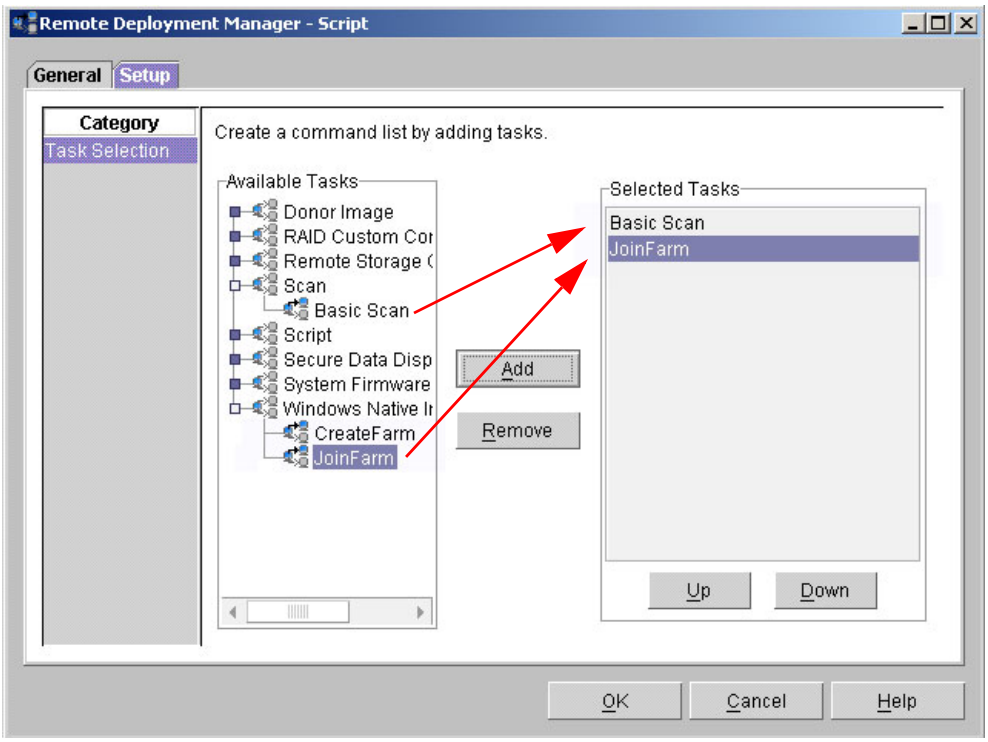

Figure 3-42 Creating a script task comprised of the basic scan and JoinFarm tasks

3.2 Deployment with RDM and TPM

This option uses the Remote Deployment Manager (RDM) Windows Clone Install (WCI) process to install the bulk of the software stack and applications, but leaves the Citrix MetaFrame Presentation Server to be installed using other means (Tivoli Provisioning Manager in our example). In this process, an administrator captures a pre-existing donor image containing an operating system, applications, and the Cygwin pre-installation directory (we use cygwin2 in our example).

Note: The native installation of Cygwin will be driven by the WCI Task at the end of deployment. The entire Cygwin installation package will be copied to the donor machine prior to cloning. See 3.2.2, “Copying Cygwin to the donor machine” on page 59, for more information on this step.

It is recommend that all of the applications described in the first deployment option be installed on the donor machine using RDM WNI, with the exception of Citrix MetaFrame Presentation Server and Cygwin.

Ultimately, the components deployed in this option are as follows:

- Deployed by Remote Deployment Manager (RDM):
  - Windows 2003 Server with Terminal Services enabled
  - Java Runtime Environment v 1.4.1_02
  - ARMTech for Citrix
  - Softricity SoftGrid Client
  - Cygwin Shell

- Deployed by Tivoli Provisioning Manager (TPM):
  - Citrix MetaFrame Presentation Server 3.0

After the RDM WCI image is deployed, the Citrix MetaFrame Presentation Server can be installed using the IBM Tivoli Provisioning Manager. TPM can be used to drive this entire series of steps.

3.2.1 Remote Deployment Manager

The WCI task in this hosted clients solution will include several images that will ultimately be deployed to each blade as the users'/administrators' scalability needs dictate. This section describes the steps involved to create a WCI donor image for deployment.

The steps to create a donor image for deployment are:

1. Install a clean Windows Server 2003 OS with Terminal Services enabled.
2. Install each application on the donor system, except for Citrix MetaFrame Presentation Sever and Cygwin.

   Note: These steps can be completed manually or by using RDM/IBM Director's WNI deployment. However, the ARMTech for Citrix application will require the implementation of a "non-node locked" license key prior to cloning this image. See 3.2.4, "ARMTech for Citrix licensing" on page 60, for more information on completing this step.

3. Copy the contents of the source directory for the Cygwin WNI image to the donor machine in folder c:\cygwin2. See 3.2.2, "Copying Cygwin to the donor machine" on page 59.
4. Edit Autoit.bat on the donor machine (located in c:\cygwin2). See 3.2.3, "Edit Autoit.bat on the donor machine" on page 59.
5. Run sysrep.exe on the donor machine. See 3.2.5, "Prepare for the donor image " on page 60.
6. Capture the donor image. See 3.2.6, "Creating the clone image" on page 61.
7. Assign the donor image to a WCI task.
8. Edit the Advanced tab in the WCI task to call c:\cygwin2\Autoit.bat.
9. Deploy the cloned image to new blades as needed.

3.2.2 Copying Cygwin to the donor machine

It will be necessary to move the entire contents of the source directory for the WNI image for Cygwin to the donor machine and place it in c:\cygwin2.

This folder includes the complete installation package for Cygwin described in 2.4, "Cygwin and AutoIt 3.0" on page 11. The WCI task will ultimately run the edited Autoit.bat described in 3.2.3, "Edit Autoit.bat on the donor machine" on page 59, to drive the installation.

3.2.3 Edit Autoit.bat on the donor machine

The Autoit.bat file will need to be modified as shown in Example 3-2 on page 60. The changes are underlined. This file should be stored in the c:\cygwin2 folder on the donor machine.

Example 3-2 Updates to Autoit.bat

```
cd c:\cygwin2
mkdir c:\cygwininst
xcopy /E ".\*.*" "c:\cygwininst"
cd c:\cygwininst
start /wait cygwin.exe
xcopy sshdconfigfortpm.sh "c:\cygwin\bin\."
xcopy tpmdsakey.pub "c:\cygwin\bin\."
cd c:\cygwin\bin
bash --debug --login sshdconfigfortpm.sh -k tpmdsakey.pub -w password
rmdir /S /Q c:\cygwininst
rmdir /S /Q c:\cygwin2
exit
```

3.2.4 ARMTech for Citrix licensing

Prior to cloning the ARMTech for Citrix application, it will be necessary to implement the use of a *non-node locked* license key, which will enable the ARMTech for Citrix application to run on any server with any MAC address. To do this, first you need to request a *non-node locked license key* from ARMTech Support. E-mail your request to support@aurema.com along with the Proof of Entitlement certificate you received when you purchased your ARMTech software licenses. They will respond with a license file in the following format (Example 3-3).

Example 3-3 License file

```
armtech-nnll.lic
V2:
2 1 4 2 0 34 13059,15,1 any 4702 "Your Customer Name" 1841adaecab7e0d6b5d43d4361f30cc1
```

Once the users have obtained a non-node locked license file and completed their initial installation of ARMTech for Citrix (either manually or via RDM's WNI deployment), the license file can be installed by either of two methods:

- Using the ARMTech GUI

  a. Click **Start** → **Programs** → **ARMTech** → **ARMTech Licensing**.
  b. Click the **Install an ARMTech License** tab.
  c. Paste in the license string (the entire third line) from the license file (Example 3-3).
  d. Click **Install License Now**.

- Command line:

  Issue the following command from the command prompt, where *armtech-nnll.lic* is the name of the file you have received from ARMTech support.

  ```
  c:\Program Files\Aurema\ARMTech\armtlic -i armtech-nnll.lic
  ```

3.2.5 Prepare for the donor image

There are multiple steps required to prepare a donor image:

1. Ensure that the donor system is set as a member of a workgroup, not as a member of a domain.
2. Ensure that the built-in administrator password is blank, and log on as the local administrator.
3. Complete the installation of any application to be captured in the donor image.

4. Obtain a copy of sysprep.exe and copy it to a local directory on your donor machine.

   Sysprep.exe is available on the installation CDs for Windows 2000, Windows Server 2003, and Windows XP, in the support\deployment\deploy.cab directory. You can also download an updated version from http://www.microsoft.com.

5. Close all windows on the donor system.
6. Run sysprep.exe and choose the **reseal** option.
7. Continue running sysprep until it completes. The donor system should then shut down.

3.2.6 Creating the clone image

Once the donor machine has been built, syspreped, and shut down, you are ready to capture the donor image via IBM Director/RDM. The following steps describe how to configure the donor system and capture the donor image using IBM Director/RDM.

1. In the Tasks pane of the IBM Director Console, expand tasks **Remote Deployment Manager** → **Donor Image** → **Get Donor**.
2. In the Group Contents pane, choose the donor system and drag it to the Get Donor Image task. If the donor system does not appear in the Group Contents pane, run the Scan task.

   Notes: Do not run more than a few Get Donor tasks concurrently due to system resource limitations.

   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 should make sure there is enough disk space to perform the task. Clone image size is dependent on the data you are cloning, and there is no way to predict how large a cloned image will be.

3. Click **Configure Systems**.
4. On the General tab, enter the donor operating system, image name, and image description.
5. Under Sysprep Type, click **Reseal**.
6. Click **OK** to complete the system configuration and return to the IBM Director Console.

   Note: When running the Get Donor task on a client attached to a Remote D-Server, the client may suspend while 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 the Get Donor task is canceled while the task is running, the user 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.

7. In the Group Contents pane, drag the donor system again and drop it on the Get Donor Image task.
8. Click **Run Systems**.
9. Click **Execute Now** to run the task now.

RDM will then wake the donor system, capture the cloned image, and then power it off once complete. This new WCI image can now be readily deployed as needed.

3.2.7 Edit the advanced tab in the WCI task to call c:\cygwin2\Autoit.bat

Once the donor image has been captured and assigned to a WCI task, edit the Command list on the Advanced tab to invoke the installation Cygwin via Autoit.bat.

The command **!c:\cygwin2\autoit.bat** is added, as shown in Figure 3-43. Note the exact placement of this command in the command list.

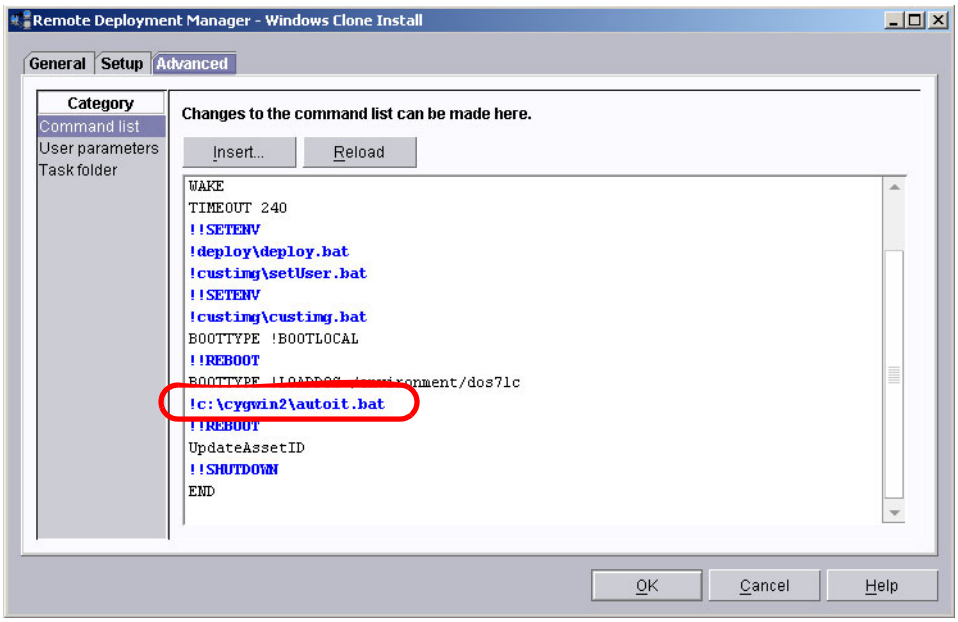

Figure 3-43 Adding the Autoit.bat line to command list

3.2.8 Tivoli Provisioning Manager

TPM installs the Citrix MetaFrame Presentation Server using some of the workflows included in the Citrix device driver that is included with TPM 2.1.

TPM performs the install and uninstall of the Citrix MetaFrame Presentation Server using the workflows in Table 3-1.

Table 3-1 TPM workflows for the installation and uninstallation of Presentation Server

Workflow name	Logical device operation
Citrix_Metaframe_XP_FR3_Install	Software.Install
Citrix_Metaframe_XP_FR3_Uninstall	Software.Uninstall

When TPM is used to drive the RDM installation of the WCI image, the workflows in Table 3-2 are also used. The workflows below in turn also call the corresponding workflow in Table 3-1 to complete the provisioning step.

Table 3-2 TPM workflows for installing the WCI image

Workflow name	Logical device operation
CitrixFarm.AddMemberServer	Cluster.AddServer
CitrixFarm.RemoveMemberServer	Cluster.RemoveServer

TPM using the CitrixFarm.AddMemberServer and Citrix_Metaframe_XP_FR3_Install workflows can provision an additional server to service the Citrix Farm.

4

After deployment

As described in the previous chapter, this solution focuses on the deployment and scalability of Citrix MetaFrame Presentation Server and the SoftGrid client only. Once deployment is complete and the Active Directory roaming user profiles are created, users/administrators are now ready to configure each component as they see fit in order to host their end users' working environment.

The Citrix MetaFrame Presentation Server provides the ability to publish an entire desktop to which an end user can connect from a thin client via an ICA connection. This chapter describes three procedures:

- How to use MetaFrame Presentation Server to publish a desktop
- How to create an ICA connection from a Neoware thin client running Windows CE to a Citrix publication, as described in 4.2, "Creating an ICA connection in Neoware" on page 70
- How to use Neoware's ezUpdate utility, as described in 4.3, "ezUpdate on Neoware Windows CE devices" on page 74

4.1 Publishing the desktop with Presentation Server

In this section, we discuss the publishing of desktops via the Citrix MetaFrame Presentation Server. The steps to publish a desktop are as follows:

1. From the Citrix MetaFrame Presentation Server Console, right-click **Applications** and click **Publish Application**.

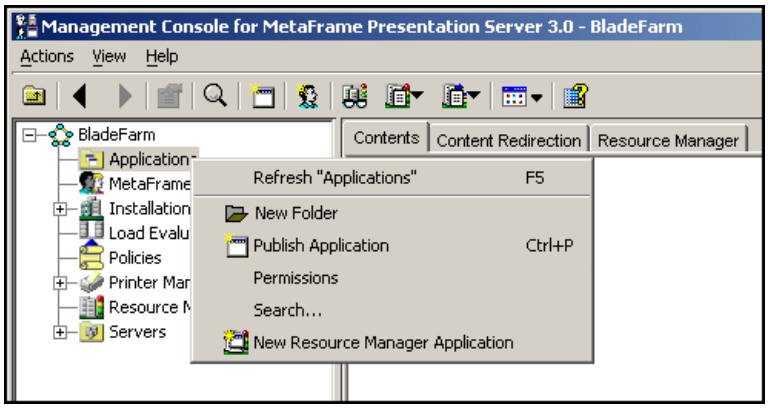

Figure 4-1 Launching the Applications Publishing Wizard

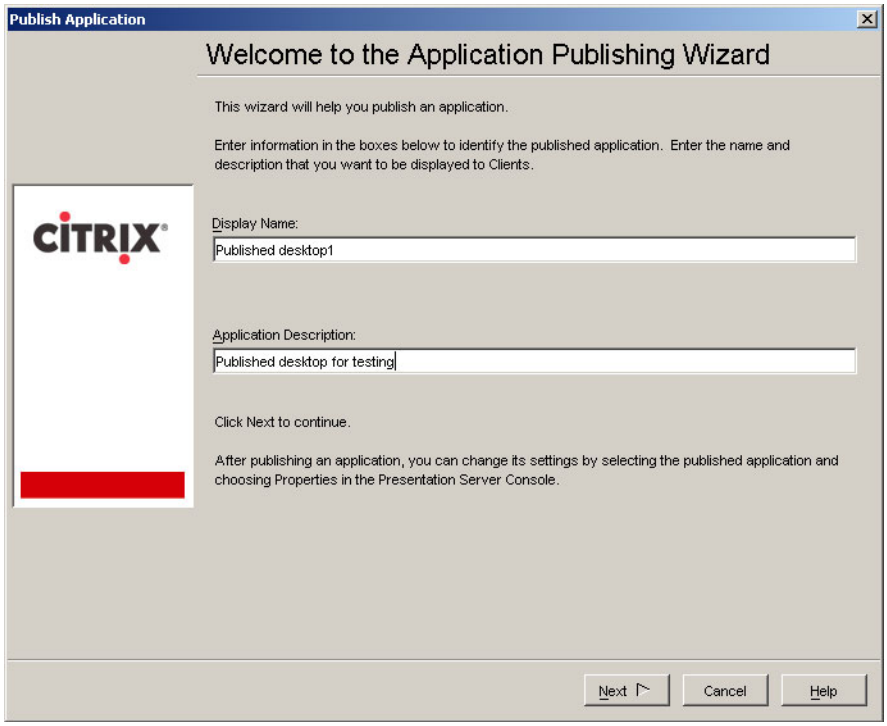

Figure 4-2 Enter the name and description

2. Enter the name of the desktop to be published and its description. The values we entered are shown in Figure 4-2. Click **Next**.

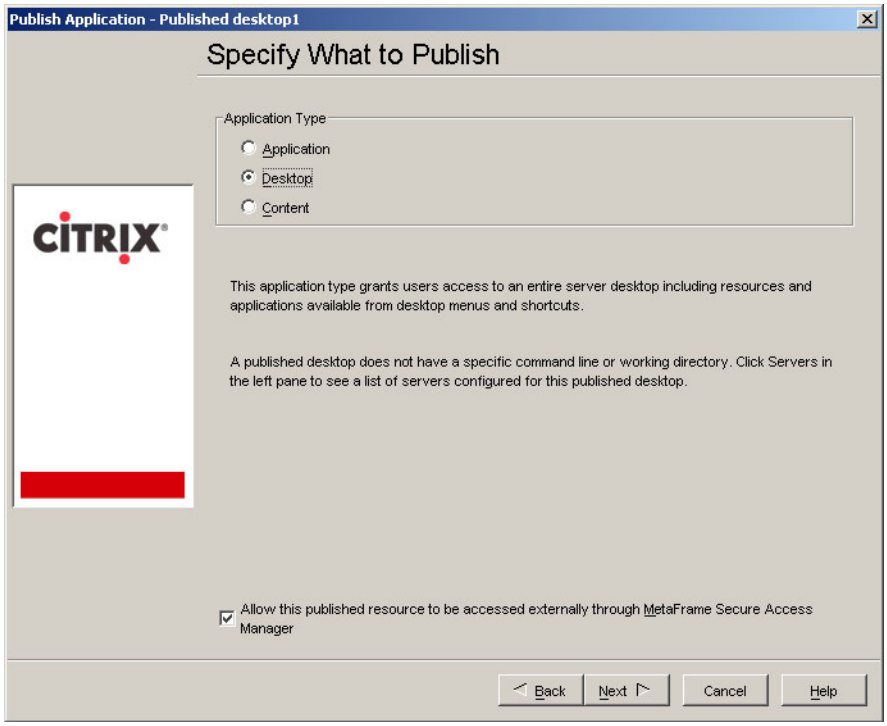

Figure 4-3 Selecting the application type

3. Select **Desktop** under Application Type. Accept the default to allow this published resource to be accessed externally through Secure Access Manager. Click **Next**.

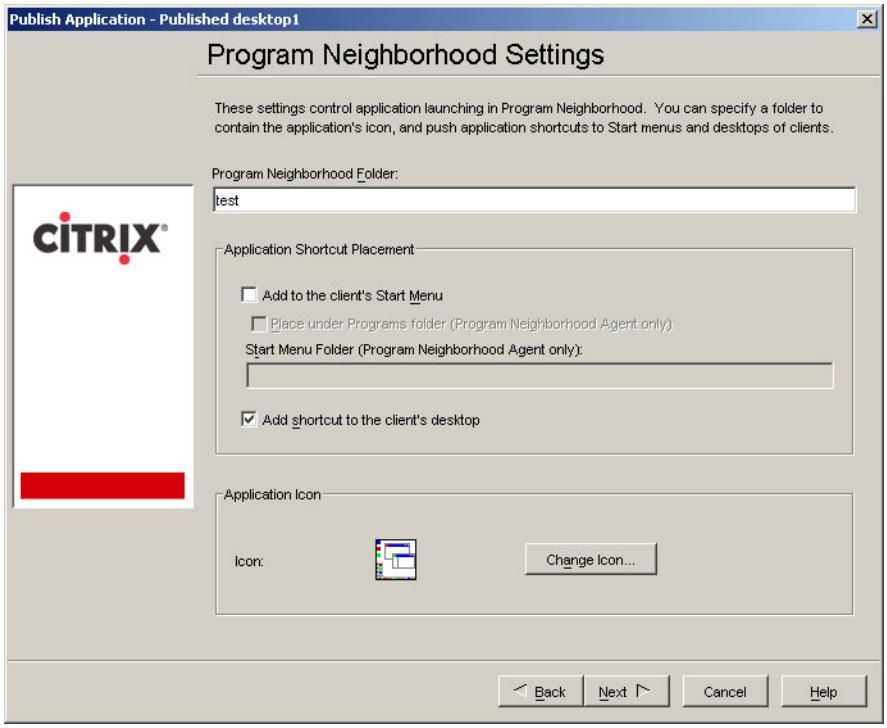

Figure 4-4 Neighborhood settings

4. Specify how you want the applications to appear to the user. In our example, we have selected the test folder and checked **Add shortcut to the client's desktop**. This setting will enable a seamless desktop environment on the thin client device. Click **Next**.

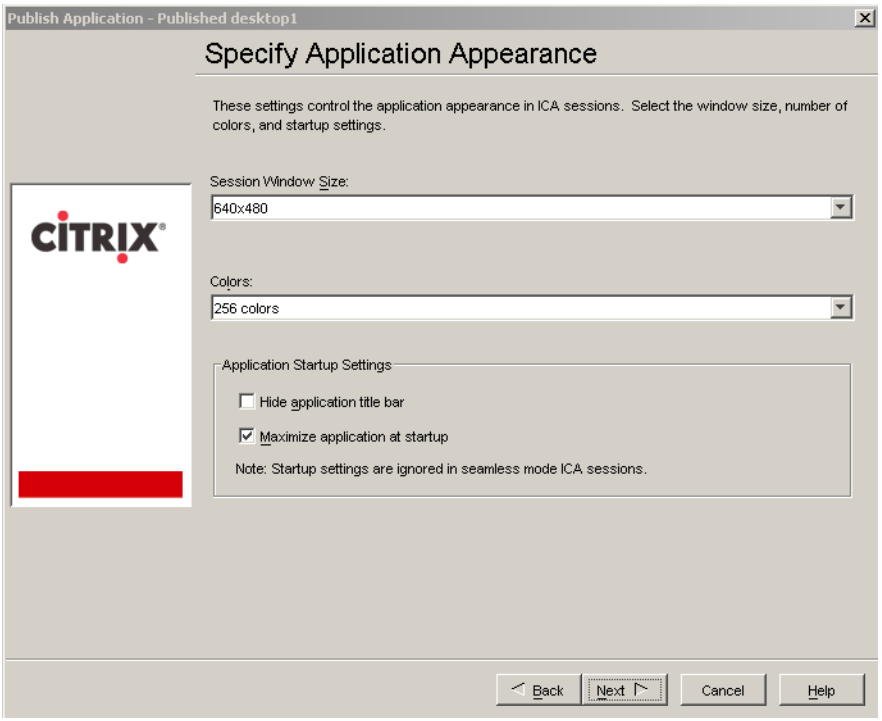

Figure 4-5 Resolution and colors

5. Set the session window size and the colors values, then click **Next**.

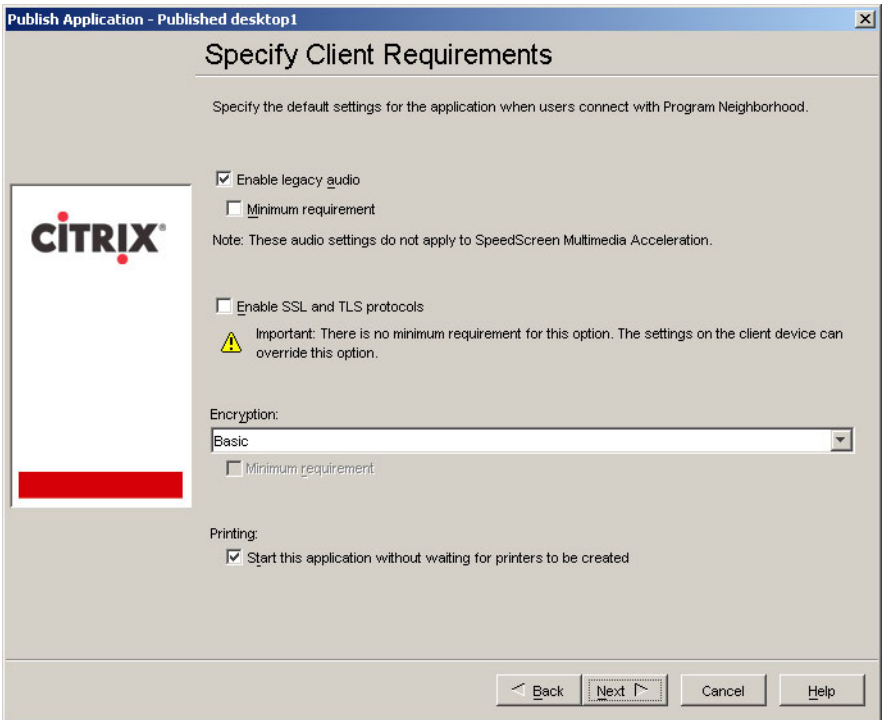

Figure 4-6 Client requirements

6. Specify the ICA Client requirements. In our example, we accepted the defaults. Click **Next**.

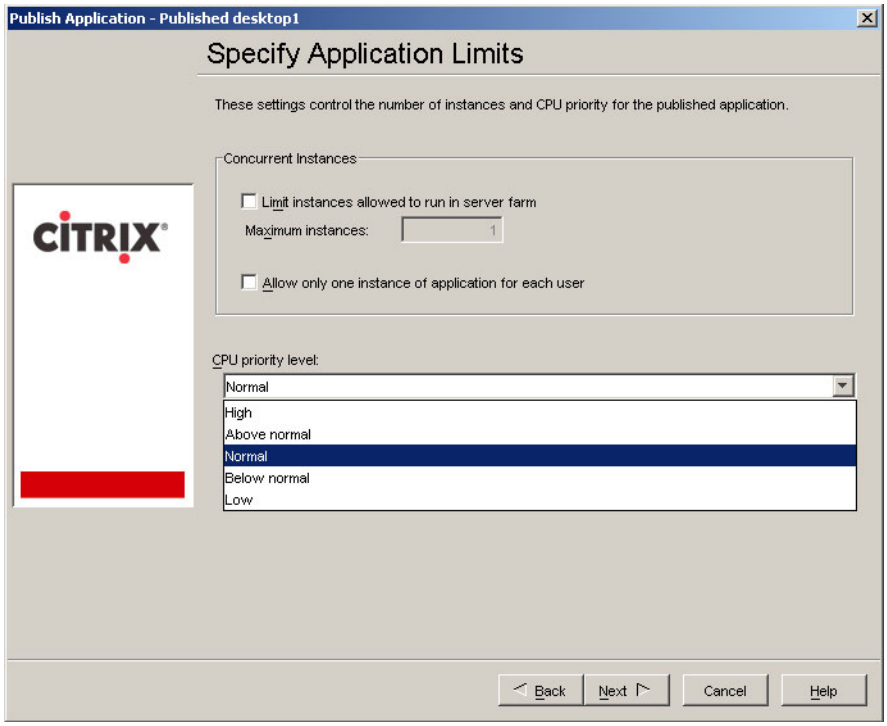

Figure 4-7 Concurrent application instances and CPU priority

7. Specify the concurrent instances and the CPU level priority. In our example, we have selected the defaults. Click **Next**.

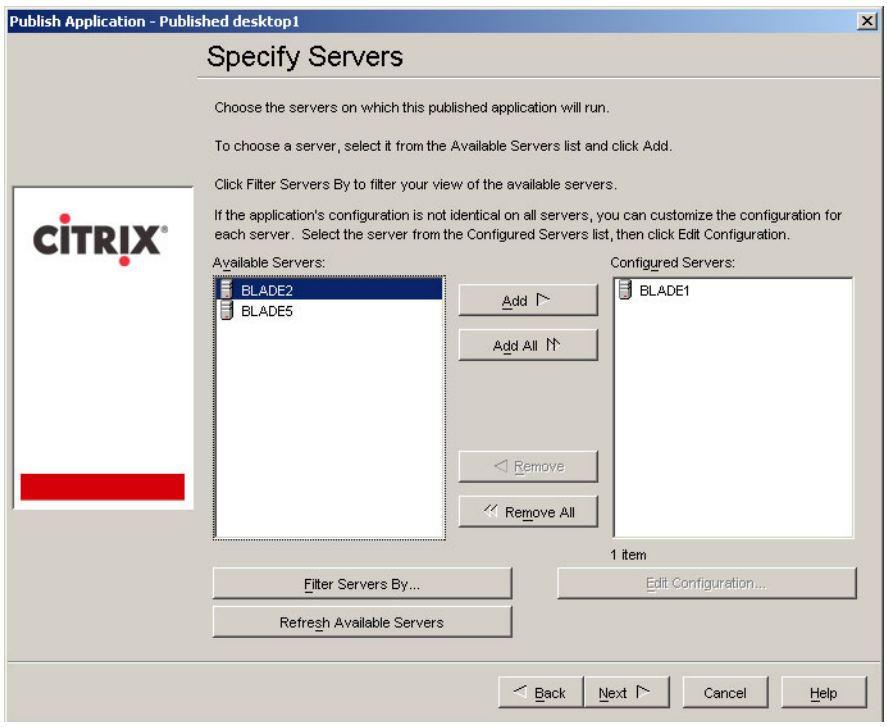

Figure 4-8 Select the servers to publish the desktop

8. Select each server that will publish the application and click **Add** to add them to the Configured Servers list. Click **Next**.

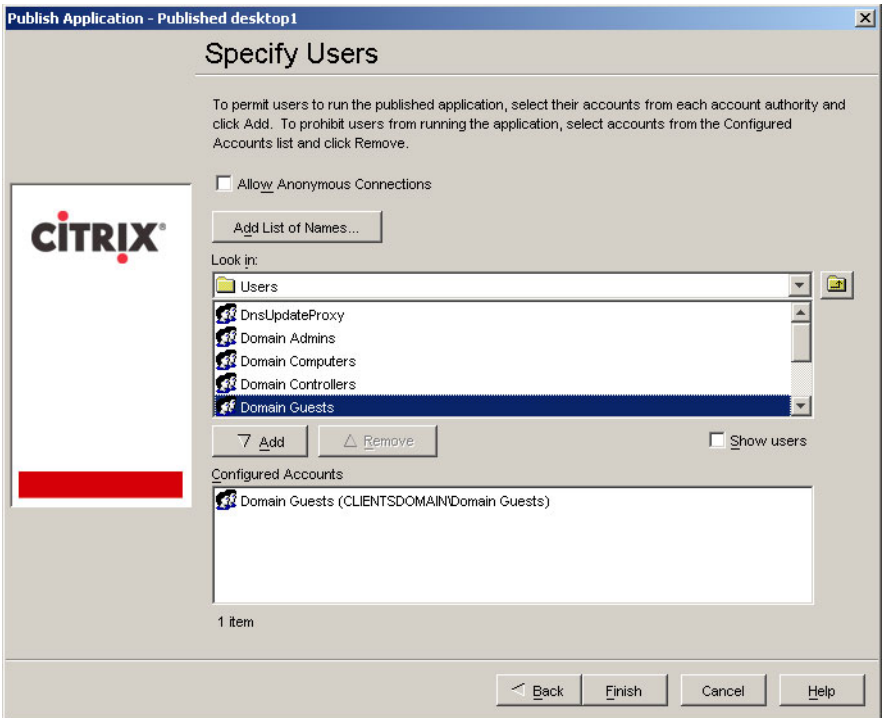

Figure 4-9 Selecting the authorized users

9. Specify the users and/or group that will have access to the published desktop. In our example, we have granted Domain Guests the authority to this published desktop.
10. Click **Finish**.

Once completed, the user is now ready to create an ICA connection to this newly published desktop. This is discussed in the next section.

4.2 Creating an ICA connection in Neoware

ICA is a network protocol used by Windows-based servers running Citrix MetaFrame XP Presentation Server, MetaFrame, or Win-Frame. ICA connections also allow the creation of dial-in and null-modem serial port connections.

To create an ICT connection follow these steps:

1. In the Neoware Connection Manager click the **Configure** tab and then click **Add**.

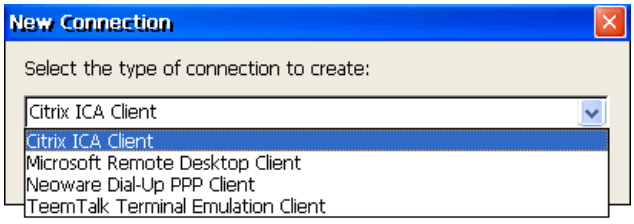

Figure 4-10 New connection

2. Select **Citrix ICA Client** from the drop-down list, and click **OK**.

3. Select a connection type:
   - When using an Ethernet network, select **Network Connection**.
   - When using a serial port connection, select **Dial-in Connection**.

   Click **Next**.

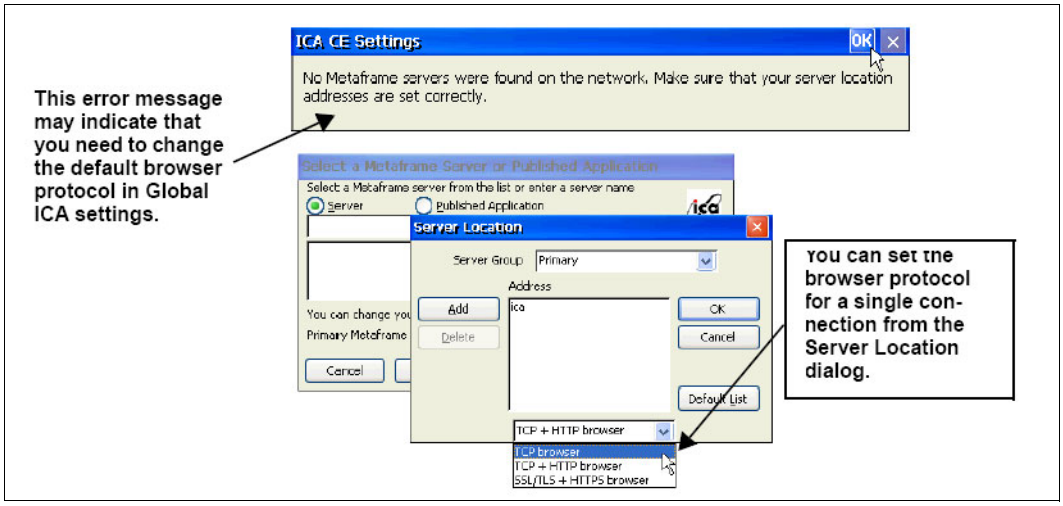

Figure 4-11 Network connections

4. If a network connection is chosen, click **Server** to select a Citrix server or click **Published Application**.

   Note: When using a version of Citrix MetaFrame prior to XP, a list of servers or applications may not display in this dialog because ICA 7.0 and later clients default to a broadcast protocol of TCP + HTTP browser. Earlier server farms typically use TCP browser broadcasts.

5. To change the broadcast protocol for a single connection, or to connect to a server that is not on the local network, click **Server Location**.
6. Click **Next**.

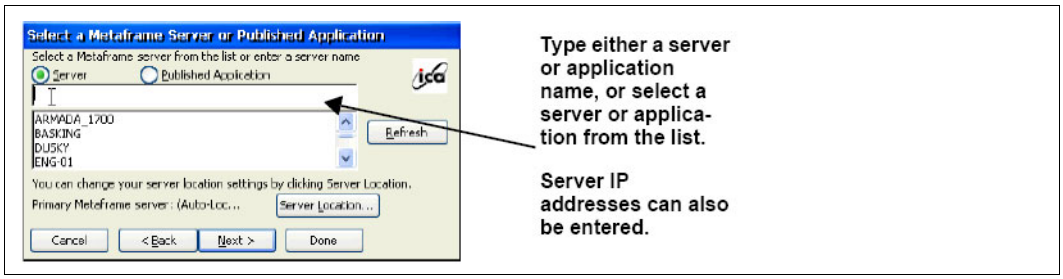

Figure 4-12 Select the server

7. When choosing an ICA dial-in connection, select a dial-in device and serial communication (COM) port and other settings.

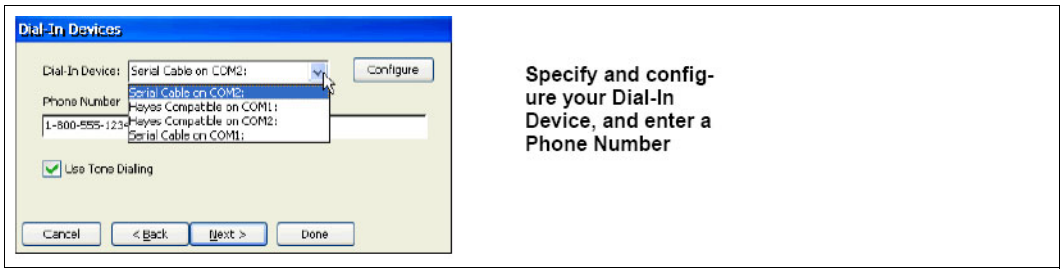

Figure 4-13 Configure dial-in

To configure a modem connection:

a. Select a Hayes-compatible device.
b. Type in a phone number.
c. Click **Configure** to select the port settings and call options.
d. Set the connection preferences to match the modem settings.
e. Click **OK**.

To configure a null-modem connection:

a. Select a serial cable device.
b. Click **Configure** to select the serial port settings.
c. Click **OK**.

When finished, click **Next**.

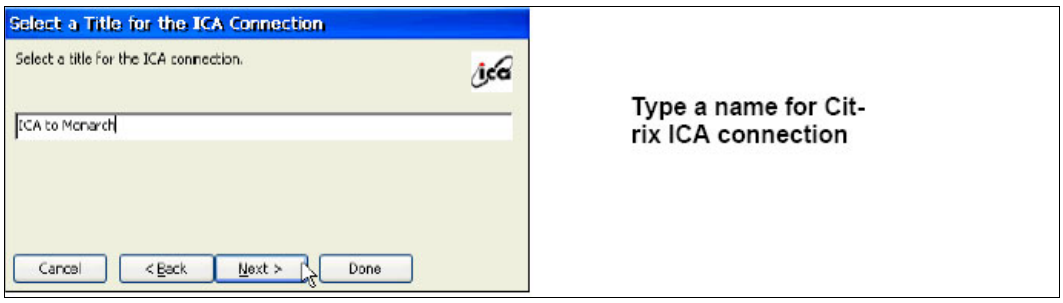

Figure 4-14 Naming the ICA connection

8. Enter a title for the ICA connection, then click **Next**.

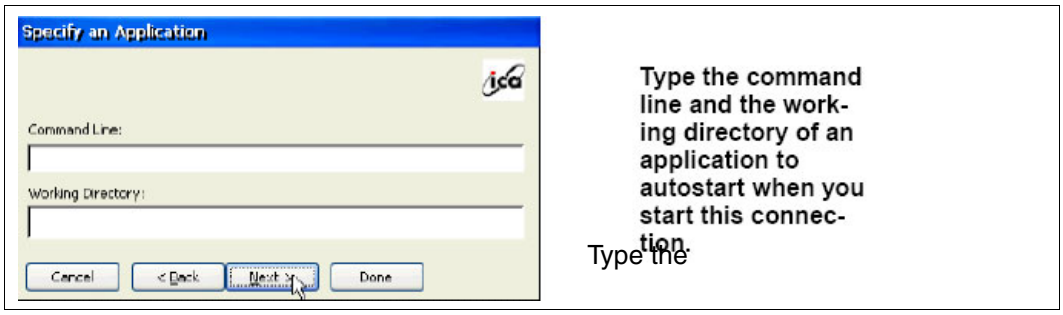

Figure 4-15 Specify an application to start automatically once the connection is made

9. Optionally, specify a Windows application to start with the connection.

   In the Command Line field, type in the path and application name. For example, if Notepad was located in the C:\WTSRV directory, type `C:\WTSRV\Notepad.exe`. In the Working Directory box, enter the drive and path of the application's working directory. For example, C:\My Documents.

When finished, click **Next**.

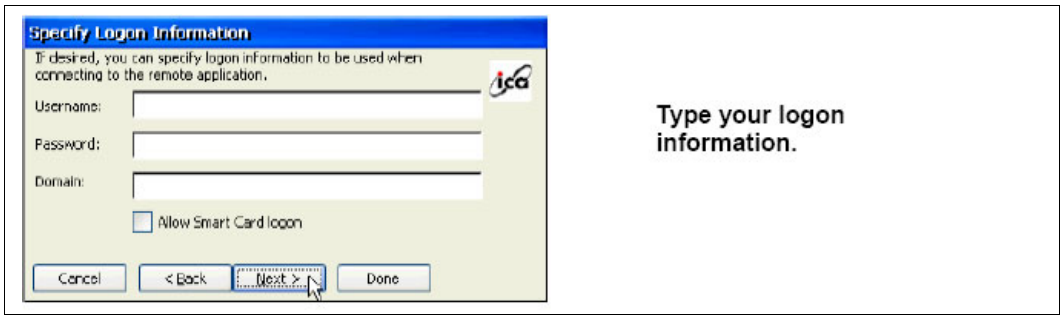

Figure 4-16 Login information

10. Enter your logon information if necessary, and then click **Next**.

    If the logon information is not entered now, it will be requested when the connection starts. When finished, click **Next**.

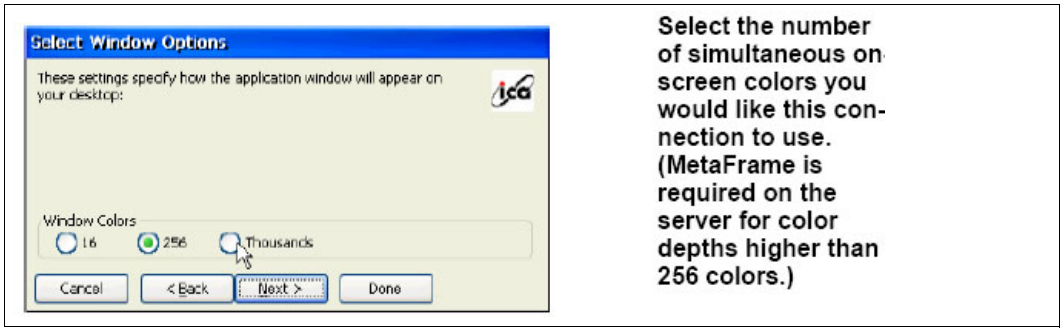

Figure 4-17 Color depth

11. Select a color depth, and then click **Next**.

    The option to use thousands or millions of colors is only available when the appliance's desktop area and refresh frequency are set to a resolution that supports high color or true color, such as 1024x768 @ 85 Hz and High Color (16-bit) or True Color (32-bit).

Figure 4-18 Compression and encryption

12. If needed, select data compression, sound, speedscreen, and encryption settings. These options are as follows:

   – Compress Data Streams: When using a dial-in connection, wide-area network, or other bandwidth-limiting connection type, the user can select **Compress Data Stream** to improve performance by reducing the amount of transmitted information.

   – Enable Sound: If the Neoware appliance and network support ICA audio, select **Enable Sound**, and then select a sound quality. High is recommended only for high-speed connections, medium for most connections, and low for dial-in connections.

   – SpeedScreen: When using MetaFrame 1.8 Feature Release 1 or later, the user may enable SpeedScreen3. SpeedScreen3 is designed to enhance the performance of low-bandwidth or high-latency connections. For slower server connections, set the SpeedScreen option to On. If uncertain of the connection speed, set the SpeedScreen option to auto.

   – Encryption Level: If MetaFrame server includes Citrix SecureICA Services (standard in MetaFrame XP and later, optional in earlier versions), the user can choose different encryption levels for the connection (up to 128-bit RC5 encryption). If SecureICA has not been installed on the MetaFrame server, choose **Basic** encryption.

   When finished, click **Next**.

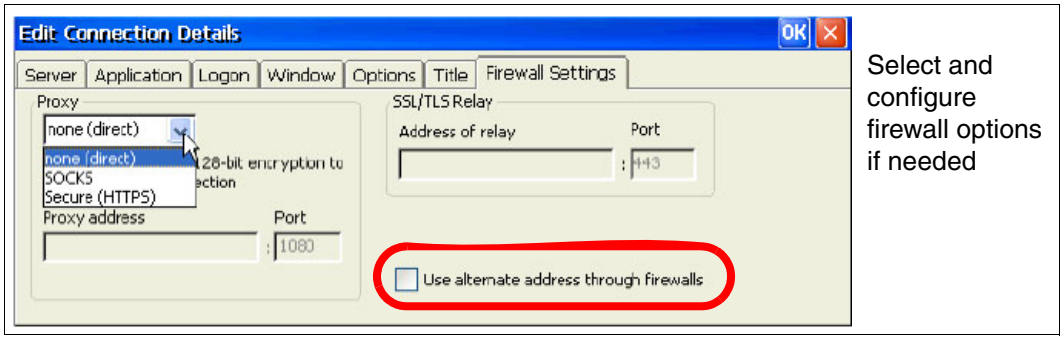

Figure 4-19 Firewall options

13. Click the check box **Use an alternate address through firewalls**. When using a proxy server, select between SOCKS and Secure (HTTPS) proxy servers and specify the address and port for the proxy to use. When using SSL/TSL + HTTPS for browsing to MetaFrame XP Presentation Servers, you can also set the address and port of a relay on this tab. When this step is completed, click **Finish**.

The ICA connection now appears in Connection Manager.

4.3 ezUpdate on Neoware Windows CE devices

This section describes setting up an ezUpdate environment for a Neoware system running Windows CE.

Tip: ezUpdate is supported on all Neoware models except the Eon e500.

There are important aspects to understand before proceeding:

- If you plan to run ezUpdate on multiple Neoware devices, they must all be running at least Version 7.0.2 of Windows CE.

- ezUpdate does not support multiple software client versions on the same hardware. For example, ezUpdate cannot support an environment with some devices running 6.0.3 with ICA, RDP, and TeemTalk clients, while other 6.0.3 devices have those clients plus Internet Explorer. Only one of the two configurations can be used.
- ezUpdate does not perform any space checking on target devices. During setup, make sure that the software image to be installed on the target devices is not larger than the device flash. For example, attempting to place an 18 MB software image on Neoware Thin Clients with 16 MB DiskOnModules will either render the device unusable or remove some desired functionality by omitting some necessary client files.
- Before deployment of an ezUpdate server, make sure to run test updates on at least one thin client in order to verify that the update occurs correctly. See 4.3.5, “Troubleshooting your ezUpdate setup for Neoware CE” on page 79.
- Downgrading between major versions of Neoware Windows CE is not recommended. For example, going from 5.3.2 to 5.3, 6.0.3 to 6.0.1, or 7.0.2 to 7.0 is supported; however, going from 6.0.3 to 5.3 or 7.0 to 6.0 is not supported. Any downgrade with ezUpdate will require a reset to factory defaults.
- Upgrading between Neoware Windows CE 5.3.x and subsequent versions through ezUpdate is not supported because a revision of the device file system is required. Special Neoware ezRemote Manager upgrade packages that handle the file system revision are required.
- ezUpdate does support configuring several different major versions on the same network in certain circumstances.

  The following combinations may coexist because they use separate software configuration files:

  – Versions 5.3, 5.3.1, and 5.3.2 with 6.0.3 and later
  – Versions 6.0, 6.0.1, and 6.0.2 with 6.0.3 and later
  – Version 6.0.4 with 7.0.2 and later
  – Version 7.0.1 with 7.0.2 and later

  The following combinations may not coexist because they use the same configuration files and would have software and settings conflicts:

  – Versions 5.3, 5.3.1, and 5.3.2 with 6.0, 6.0.1, and 6.0.2
  – Versions 6.0.3 and 6.0.4 with 7.0 and 7.0.1
- ezUpdate for Neoware Windows CE was not originally designed to handle case-sensitive FTP servers, such as those in UNIX®. As a result, setting up a UNIX server for Neoware CE ezUpdate requires careful attention to capitalization.
- ezUpdate does not support Neoware software snapins at this time, only full software updates.
- The instructions in this document detail ezUpdate configuration according to the ezUpdate version you are updating *from*, not the version you are updating *to*.

4.3.1 ezUpdate server address

The preferred method for setting the ezUpdate server location on Neoware CE thin clients is through DHCP tag 137 on the network FTP server. The value should be:

```
ftp://<ezUpdate_server_IP_address>/neoware/
```

Note that the trailing forward slash (/) is required. The ezUpdate folder name is neoware by convention, but any name may be used. For example, if your ezUpdate server has IP address 10.30.3.6 and you are using a folder named production, your DHCP tag 137 would be:

```
ftp://10.30.3.6/production/
```

In customer environments that use static IP addresses for each device, or for testing ezUpdate on individual devices, the location of the ezUpdate server can be configured through an ezRemote Manager snapin. In the included install.2do file, modify the two CMD lines and substitute the correct ezUpdate server IP address (and folder, if not neoware).

4.3.2 ezUpdate server setup

ezUpdate requires an FTP server to host the software update and configuration files. If the chosen FTP server is case sensitive, all folder and file names must be lower case except where special exceptions are noted.

The FTP server must be configured to allow guest/anonymous access, and all of the files in the ezUpdate folders must allow read permissions for anonymous users.

Configuration file

The configuration file for ezUpdate is config.txt in Versions 5.3 through 7.0.1 and ezupdate.cfg in Version 7.0.2 and later.

Notes about the configuration file:

1. Each line of the ezUpdate configuration file has one of the following formats:

   ```
   FEATURE "version" LOAD_AND_RUN /REBOOT program program_inputs
   FEATURE "version" UPDATE_REGISTRY /REBOOT registry_file.rgy
   ```

2. Except for full system software updates (described in step 4 below), the IDENTIFER and "version" can be any value of the user's choice. The ezUpdate client does not look for newer or older version strings, but instead looks for an exact match between the "version" and the values saved in the registry from previous ezUpdate configuration. In other words, changing the version from "2.0" to "1.0" will still force an update of that feature, despite the fact that version "2.0" is newer.

   For example, assume that the ezUpdate server must run a program called brwt.exe with an input parameter -wx on each device and push out a registry file named prnt.rgy to each device. The following is valid:

   ```
   RUN_BRWT "version 1.3" LOAD_AND_RUN /REBOOT brwt.exe -wx
   PRINT_RGY "May 7 2004" UPDATE_REGISTRY /REBOOT prnt.rgy
   ```

   As is:

   ```
   ITEM_1 "2.0" LOAD_AND_RUN /REBOOT brwt.exe –wx
   ITEM_2 "2.0" UPDATE_REGISTRY /REBOOT prnt.rgy
   ```

3. The /REBOOT flag indicates that the device will reboot before the ezUpdate client processes the next line. It may be omitted in some cases, but a reboot is required after most full device software updates and after the last registry file has been applied.

4. The SYSTEM line of an ezUpdate configuration file is a special case. If no software update is required, it may be omitted. A typical SYSTEM line is as follows:

   ```
   SYSTEM "6.0.3 (Built on June 10 2003 at 15:15:03)" LOAD_AND_RUN /REBOOT
   install.exe 3000
   ```

   The quoted version section (in the example, "`6.0.3 (Built on June 10 2003 at 15:15:03)`") must contain the exact contents of the system.rev file in the software upgrade

directory. Any other value will be interpreted by the ezUpdate client as an indication that the upgrade failed, and it will start again.

5. By default, the ezUpdate client searches for the listed files in the directory referenced in the ezUpdate server address. If the files exist in a subdirectory of the one specified in the server address, the subdirectory name must be included.

   For example, assume that the ezUpdate server and folder is ftp://10.30.3.6/neoware/. When the ezUpdate client processes the SYSTEM line as written in note 4 on page 76 above, it will search for install.exe and the 3000 software update directory in that folder. If the install.exe and 3000 folder are in ftp://10.30.3.6/neoware/603/, then the SYSTEM line above should read:

   ```
   SYSTEM "6.0.3 (Built on June 10 2003 at 15:15:03)" LOAD_AND_RUN /REBOOT
   603/install.exe 603/3000
   ```

4.3.3 Disabling ezUpdate for Neoware Windows CE

Any of the following methods can be used to disable ezUpdate:

- ezUpdate through DHCP: Shut off DHCP tag 137 on your DHCP server.
- Turn off the FTP service on your ezUpdate server.
- Rename or remove the directory used for ezUpdate on your FTP server.
- Run the disable_ezUpdate_install.2do snapin on all of your Neoware CE thin clients in order to disable ezUpdate. The disable_ezUpdate_install.2do snapin can be downloaded from FAQ NQ518 from:

  http://faq.neoware.com/faq/main.php?from=login

  Enter FAQ number NQ518. This method of disabling ezUpdate will only work until the device is factory reset. ezUpdate can be turned back on without a factory reset by running the disable_ezUpdate_install.2do snapin.

4.3.4 ezUpdate setup on Neoware Windows CE 8.0

To set up ezUpdate perform the following steps:

1. In this version of CE.NET, the referenced ezUpdate configuration file is v2/ezupdate.cfg. For case-sensitive FTP servers, please note the capitalization.
2. Set up your DHCP tag (or ezRemote Manager snapin) with the address and folder name you have selected for ezUpdate, as described under the ezUpdate Server Address section of the general ezUpdate instructions.
3. Set up your FTP server using the IP address and folder name you specified in step 2. Under that folder, create a subfolder named v2.
4. Create an empty file named ezupdate.cfg in folder v2.
5. If you are configuring a software update, do the following:
   a. Open regedit and navigate to [HKLM\Software\Neoware Systems, Inc.\WinCE.net] and select the registry subkey with the name of your current software version.
   b. Note the VersionLocation value under that subkey and navigate to that location in Windows Explorer.
   c. Copy the following files from the folder in step b into the ezUpdate folder you created in step 3:
      - UninSp.dll
      - RegRetrieve.dll

- Regmerge.exe
- MkRegDir.dll
- inputs.txt
- CeLockWrap.exe
- Celock.dll
- ezupdate.exe

Note: If using a case-sensitive FTP server, the file name capitalization must match the capitalization in the list above.

d. Obtain the safenetcopy.exe file included with this document and place it with the other files in the folder created in step 3.

e. Open regedit and navigate to [HKLM\Software\Neoware Systems, Inc.\WinCE.net] and select the registry subkey with the name of your chosen software update.

f. Note the VersionLocation value under that subkey and navigate to that location in Windows Explorer.

g. Copy the update contents subdirectory of the folder in step e (typically named 3000, P620, ST1520, G150, 2200, or 2800) into the V2 directory you created in step 3 on page 77. Do not place them in the top-level folder.

Note that if using a case-sensitive FTP server, the letters in the directory name should be capitalized.

Note: ezUpdate deletes all non-essential files on the client device before downloading a software update. All of the software contents of the update contents directory must be moved, or else the target device will only download a partial image.

h. Open the update contents subdirectory and open the system.rev file into Notepad or Wordpad. Copy the entire contents of the file.

i. Open your config.txt file and create the following line:

```
SYSTEM "xxxx" LOAD_AND_RUN /REBOOT v2/ezupdate.exe v2
```

j. Highlight the xxxx and paste the contents of the system.rev file. Save your config.txt and close it.

Note: You do not need to reference the name of the update contents directory subfolder you created. The ezUpdate client on Neoware Windows CE 8.0 automatically opens the correct subfolder based upon the device hardware platform.

6. If you are configuring device settings and properties, do the following. (Note: In Neoware Windows CE 8.0, Neoware Appliance connections and properties are platform independent, so it is possible to clone ICA connections, RDP Printers, Thin Print settings, etc. from an E300 to an E100 or Capio One and vice versa. The E300 only supports one display resolution, and any invalid value cloned to that resolution will be ignored.)

a. As detailed in your ezRemote Manager User Manual, configure a master terminal, retrieve the connections, and save them to a file named connections.rgy. Then retrieve the properties and save them to a file named properties.rgy.

b. Place the saved connections.rgy file and properties.rgy file into your ezUpdate directory.

c. Open your config.txt file and add the following lines. If you have a SYSTEM line you created in step 5, place the lines beneath it:

```
CONNECTIONS "xxxx" UPDATE_REGISTRY v2/connections.rgy
PROPERTIES "xxxx" UPDATE_REGISTRY /REBOOT v2/properties.rgy
```

d. Replace the "xxxx" in each line you created with the version value of your choice.

e. Save and close your config.txt file.

Your ezUpdate setup is now complete.

4.3.5 Troubleshooting your ezUpdate setup for Neoware CE

The following may assist you in troubleshooting your ezUpdate setup.

1. Disable ezUpdate for your network by either running the included ezUpdate_disable.2do snapin on all of your devices or shutting off DHCP tag 137.
2. Open your ezUpdate configuration file on your server and remove all /REBOOT lines.
3. Locate your test client in Neoware ezRemote Manager. Note the client mainboard, MAC address, and IP address.
4. Modify the included snapin set_ezUpdate_serverIP.2do to point at your ezUpdate server and run it on your test client.
5. From a command prompt on a server, type the following commands in order:

   ```
   rsh <test client IP address> -n password <unit password> log /clear
   rsh <test client IP address> -n password <unit password> netconfig
   ```
   Press Ctrl+C (to return you to a command prompt).
   Wait 30 seconds or more.
   ```
   rsh <test client IP address> -n password <unit password> log >> log.txt
   ```
6. View the created log.txt file in the file viewer of your choice. If the log does not display an ezUpdate end status message of some kind, wait a few seconds and repeat the last command listed in the previous step. For example, if the client IP address is 10.10.9.8 and the password root, the lines would be:

   ```
   rsh 10.10.9.8 –n password root log /clear
   rsh 10.10.9.8 –n password root netconfig
   ```
   Press Ctrl+C.
   ```
   rsh 10.10.9.8 –n password root log >> log.txt
   ```
   The `password <unit password>` can be omitted if the device has no password set.

Many Neoware CE ezUpdate status messages are not formatted, but for most errors it will list what failed and give an error number. An Internet search may reveal the meaning of the error number. In general, an exit status of 0 means success, and any other value implies failure.

- If you are not doing a software update, you may reboot the device when the update completes. It is not likely that a properties or connections setting will render a Neoware CE device unbootable unless the device receives a display resolution setting that its monitor cannot support.
- If you are doing a full software update, make sure that the exit status of the software update is 0 before rebooting. If the update failed, it is likely that the device has an incomplete software image and will fail to boot after a power off. Leave the device on. If you can fix the software update problem with your ezUpdate server, you can run steps 5 through 7 above again. Otherwise, you may push a new software update to the device using Neoware ezRemote Manager.

- If you are not able to fix the update problem on your own, you may attach the log.txt you retrieved to an e-mail to Neoware technical support.

A

Answer file UnattendedTemplate.txt

This sample answer file is located on the MetaFrame Presentation Server CD in the Support\Install directory.

Note: We refer to this answer file in 2.2, “Citrix MetaFrame Presentation Server 3.0” on page 7.

```
;************************************************************
; Sample answer file for unattended installation of
; Citrix MetaFrame Presentation Server 3.0
;
; To run an unattended MetaFrame Presentation Server 3.0 installation,
; make a copy of this file and customize it for your needs.
;
; If you do not use an answer file, or if you use an
; answer file but do not specify answers to some questions,
; default answers are used for those questions.
;
; The default answers used are the same as the answers
; listed in this sample answer file. However, no licenses
; are added.
;
; UPGRADES: When upgrading from Metaframe XP 1.0 and later only
; the entries from the MetaFrame License Agreement, Options,
; MFLicenseServer, and MFRDP sections are taken into account.
; All other entries are ignored.
; For upgrades from versions of MetaFrame prior to MetaFrame XP 1.0
; all entries apply.
;
; Please see the MetaFrame XP Administrator's Guide for
; further installation information.
;************************************************************
```

```
************************************************************
* MetaFrame License Agreement
*
* This section specifies your acceptance of the End-User
* License Agreement. You must set this value to "Yes" to
* indicate your acceptance of the MetaFrame End-User
* License Agreement.
*
* Any value other than "Yes" causes the setup program
* to prompt you with the License Agreement.
************************************************************

[MetaFrame License Agreement]
AcceptLicense=No

************************************************************
* Data Store Configuration
*
* This section specifies whether you are creating or joining
* a farm and how to connect to the data store.
*
* Multiple options are available as follows:
*
* 1. To create a farm using an Access database:
*    - Set CreateFarm to Yes
*    - Set LocalDBType to Access
*    - Set DirectConnect to No
*    - Complete the Farm Settings section
*
* 2. To create a farm using an MSDE database:
*    - Set CreateFarm to Yes
*    - Set LocalDBType to SQL
*    - Set DirectConnect to No
*    - Complete the Farm Settings section
*
* 3. To create a farm using an Oracle, Microsoft SQL Server or
*    IBM DB2 database:
*    - Set CreateFarm to Yes
*    - Set DirectConnect to Yes
*    - Complete the Direct Connect Settings section
*    - Complete the Farm Settings section
*
* 4. To join a farm using an Oracle, SQL Server or DB2 database:
*    - Set CreateFarm to No
*    - Set DirectConnect to Yes
*    - Complete the Direct Connect Settings section
*
* 5. To join a farm by connecting to an Access or MSDE
*    database stored on another server (Indirect Connection):
*    - Set CreateFarm to No
*    - Set DirectConnect to No
*    - Complete the Indirect Connect Settings section
*
* Specify the name of the Zone where this server will reside.
```

```
* If no Zone name is specified, a default Zone name is
* applied to the first server in a farm. If no Zone name is
* specified for servers joining a farm, the servers are
* added to the Zone where the farm resides.
*
* If you are using an Oracle, SQL Server or DB2 database, manually create
* a .DSN file within the ODBC Data Source Administrator
* "File DSN" option before running the unattended
* installation process.
*
* IMPORTANT: Please read your MetaFrame documentation
* for information regarding data store configuration,
* supported databases, setting up a DSN file, moving
* servers within farms, and renaming Zones.
************************************************************

[Data Store Configuration]
CreateFarm=Yes
LocalDBType=Access
DirectConnect=No
; Leave this blank to use the default zone name
ZoneName=

************************************************************
* Direct Connect Settings
*
* This section specifies settings for an Oracle, SQL Server
* or DB2 database.
*
* This section is used only if the value for DirectConnect
* is Yes in the Data Store Configuration section.
*
* In this section you must specify:
*
* 1. The path to the DSN file for this database.
*    - If you are creating a farm, please see the
*      documentation for details on how to create a DSN
*      file to use here.
*    - If you are joining a farm, you must specify
*      the path to the DSN file created on the server where
*      you created the farm or a copy of it. Please see
*      the documentation for details.
*
* 2. The ODBC user name and password for the authentication
*    account that can be used to access this database. If
*    Windows NT authentication is being used, please include the
*    domain in the user name in the form domain\username.
************************************************************

[Direct Connect Settings]
DSNFilePath=
UserName=
Password=

************************************************************
```

```
* MSDE Settings
*
* This section specifies which MSDE settings to use when
* connecting to the database.
*
* Use this section if you set CreateFarm to Yes and
* LocalDBType to SQL
*
* In this section you must specify:
*
* 1. The name of the MSDE instance to use when connecting
*    to the data store. The default is CITRIX_METAFRAME.
*
************************************************************

[MSDE Settings]
InstanceName=CITRIX_METAFRAME

************************************************************
* Indirect Connect Settings
*
* This section specifies settings for connecting indirectly
* to an Access database on another server.
*
* This section is used only if CreateFarm is No AND
* DirectConnect is No.
*
* In this section you must specify:
*
* 1. The name of the server you want to indirectly connect
*    to and the port number to use.
*
* 2. The user name and password and domain for an account that can be
*    used to access this MetaFrame server. This can be either
*    the user designated as Farm Administrator when creating
*    the farm or any other users subsequently designated as
*    farm administrators using Citrix Management Console.
*    Please specify the domain name and the user name as both are required fields.
*
* If you are unsure of any settings, please see the
* MetaFrame documentation for details.
************************************************************

[Indirect Connect Settings]
IndirectServerName=
IndirectServerPort=2512
UserName=
Password=
DomainName=

************************************************************
* Farm Settings
*
* This section specifies settings for the entire farm.
*
```

```
* This section is used only if CreateFarm is Yes in the
* Data Store Configuration section.
*
* In this section you must specify:
*
* 1. The name of the farm you are creating.
*
* 2. A Windows NT user (username and domain) who will be the
*    administrator of this farm. This user can later designate
*    other users as administrators of the farm using
*    Citrix Management Console.
************************************************************

[Farm Settings]
FarmName=Farm
FarmAdministratorUsername=Administrator
FarmAdministratorDomain=

************************************************************
* Shadowing Restrictions
*
* This section specifies whether shadowing is enabled. If
* shadowing is enabled, it specifies what shadowing
* restrictions are to be placed.
************************************************************

[Shadowing Restrictions]
AllowShadowing=Yes
ProhibitRemoteControl=No
ProhibitNotificationOff=No
ProhibitLoggingOff=No

************************************************************
* Citrix XML Service
*
* This section allows you to specify how you want to add
* XML support.
*
* You can share the default port 80 with IIS (if installed)
* or you can dedicate a port for the XML Service.
*
* If ExtendIIS is set to No, the specified port is used
* for the Citrix XML Service and EnableVirtualScripts is isgnored.
* If ExtendIIS is set to Yes, DedicatedPortNumber is ignored and
EnableVirtualScripts is
* used to decide if virtual scripts directory will be created ONLY if
VirtualScriptsDirectory
* doesn't already exist on the system. If it does already, EnableVirtualScripts
has no effect on the installation.
* If you do set ExtendIIS to Yes and IIS is not available, the dedicated port
* number is used.
* If you do set ExtendIIS to Yes and IIS exists and VirtualScriptsDirectory
* doesn't already exist on the system but EnableVirtualScripts is set to No, the
Metaframe install
* will abort.
```

```
*
* If you do not use the default port 80, all Citrix
* ICA Clients using TCP/IP with HTTP server location
* and NFuse-enabled Web servers must be configured
* to make requests to the specified port number.
************************************************************

[Citrix XML Service]
ExtendIIS=No
; This setting applies only if ExtendIIS is No
DedicatedPortNumber=80
; This setting applies only if ExtendIIS is Yes
EnableVirtualScripts=Yes


************************************************************
* Update ICA Clients
*
* This section specifies ICA Client installation, placing clients
* into the ICA Client Creator and the Client Update Database.
* If clients are installed, it specifies the location of the
* client images.
*
* for example to update the client set the UpdateClients to Yes
* and ClientPath to the Directory where the client install package is located.
*
*
* IMPORTANT: Only typical installations of clients can be done
* in this way. See the MetaFrame documentation
* for information on installing ICA Clients using custom
* installation options.
************************************************************

[Update ICA Clients]
UpdateClients=No
ClientPath=


************************************************************
* Options
*
* This section contains additional options for unattended
* setup. The reboot option specifies whether MetaFrame
* Presentation Server Setup shuts down and restarts
* the server after setup completes.
*
* If you set this option to No you must manually restart your
* server before using MetaFrame Presentation Server.
*
* The LogLevel option specifies which granularity to use for
* the log file. Set this option to No to disable logging
* Supported values:
*  No disable logging
*  *  everything (the same as using the options oicewarmup)
*  v  verbose
```

```
*  o  out of disk space
*  i  informational messages
*  c  command line parameters
*  e  error messages
*  w  warning messages
*  a  action execution messages
*  r  informational messages for the currently running action
*  m  out of memory errors
*  u  user request messages
*  p  property values
*  +  append to an existing log file
*  !  flush each line to the log
*  x  extra debugging information - for Windows 2003 only;
*     using the x option when installing to a Windows 2000
*     machine will generate a usage error.
*
* The Logfile option specifies the path to the log file for the
* install.
*
* The UI level specifies how much UI the user can see during the
* silent install. Default should be BASIC_UI_NO_MODAL other options
*             NO_UI  - q
*   OR     BASIC_UI              - qb
*   OR     BASIC_UI_NO_MODAL     - qb- should be default option
*   OR     BASIC_UI_MODAL        - qb+
*   OR     REDUCED_UI            - qr
*
* The Ignore MCM option determines if setup shows an error message if it
* detects MetaFrame Conferencing Manager 2.0 or earlier on your system.
* If Ignore MCM is set to No, an error message is generated. If Ignore
* MCM is set to Yes, no error messages are generated and the installation
* continues. MetaFrame Conferencing Manger 2.0 is not compatible with
* MetaFrame Presentation Server and must first be upgraded to version 3.0
* or greater before installing MetaFrame Presentation Server. MetaFrame
* Conferencing Manager 3.0 is available to all active members of the
* Subscription Advantage program (http://www.citrix.com/sa).
* Supported values:
*  YesIgnore the warning message and continue with the installation.
*     MetaFrame Conferencing Manager 2.0 will no longer work after
*     the install is complete.
*  No Exit the install (default).
*
* The RemoveWITurnkey option configures whether setup will show an error message
* if setup detects that you are upgrading to MetaFrame Presentation Server 3.0
* from MetaFrame XP and you installed Web Interface as part of your MetaFrame XP
* installation. The preferred method for upgrading Web Interface is to first
* upgrade to Web Interface 3.0 before installing MetaFrame Presentation Server
* 3.0. If RemoveWITurnkey equals No and setup detects that an incompatible Web
* Interface version is installed on your system, setup will exit out of the
* installation with an error message. If you want to ignore this error message,
* set RemoveWITurnkey to Yes; note that at the end of the upgrade, Web Interface
* will no longer be installed on your system.
* Supported values:
*  YesRemove Web Interface if it is detected on the system.
*  No Exit out of the install if setup detects Web Interface on
```

```
*     the system (default).

* The ProductCode option lets you specify a ProductCode in case you do not
* want to install the default product code. Set the following in this section
* ProductCode=AAAA-1234
*           where AAAA-1234 is your product code
*
************************************************************

[Options]
RebootOnFinish=Yes
LogLevel=*v
LogFile=c:\msi.log
UILevel= BASIC_UI_NO_MODAL
IgnoreMCM=No
RemoveWITurnkey=No


************************************************************
* MetaFrame Server
* This option specifies the type of MetaFrame server to be installed.
* Possible values are:
*  MetaFrame Enterprise Server  (for MetaFrame XPe)
*  MetaFrame Advanced Server    (for MetaFrame XPa)
*  MetaFrame Server             (for MetaFrame XPs)
*
*
************************************************************

[MetaframeServer]
ServerType=Metaframe Enterprise Server

************************************************************
* MetaFrame License Server
* For "Create Farm",the possible values for LicenseServerChoice are:
* "Point"
* "DontKnow"
*
* For "Join Farm"  ,the possible values for LicenseServerChoice are:
* "Point"
* "UseFarmSettings"
* "DontKnow"
*
* Please specify the LicenseServerName if you chose the value of
LicenseServerChoice="Point"
*
************************************************************

[MFLicenseServer]
LicenseServerChoice="Point"
LicenseServerName="localhost"

************************************************************

************************************************************
```

```
*
* MFRDP
*
* This section refers to the RDP connection support
*
*
* Set DisableRDPPrompForPassword to "Yes" if you enable Terminal
* Services to accept credentials directly from the Remote Desktop
* Windows Client.
* If you set it to "No", users will always be prompted
* for credentials when connecting using the Remote Desktop Protocol.
* If you want to enable this feature at a later time, please see
* the instructions in the ReadMe.
*************************************************************

[MFRDP]
DisableRDPPromptForPassword="Yes"
```

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Additional material

This Redpaper refers to additional material that can be downloaded from the Internet as described below.

Locating the Web material

The Web material associated with this Redpaper is available in softcopy on the Internet from the IBM Redbooks Web server. Point your Web browser to:

ftp://www.redbooks.ibm.com/redbooks/REDP3981

Alternatively, you can go to the abstract page for the Redpaper and click **Additional materials**.

http://www.redbooks.ibm.com/abstracts/redp3981.html

Using the Web material

The files in the ZIP file are intended for reference and sample use only. Some files will need to be modified to match the individual customer's environment dependencies (including but not limited to domain/workgroup name, user credentials, database name, type, etc.).

The ZIP file available at the above FTP address includes the following files:

- CreateFarm.txt
- JoinFarm.txt
- HostedClients.dsn
- CreateFarm.bat
- JoinFarm.bat
- Cygwin.au3
- sshdconfigfortpm.sh
- Autoit.bat (for WNI deployment)
- EditedAutoit.bat (for WCI deployment)

CreateFarm.txt and JoinFarm.txt

The sample CreateFarm.txt and JoinFarm.txt answer files enable the user/administrator to provide answers to the questions asked when setup for the Citrix MetaFrame Presentation Server is run in unattended installation mode. It is through the use of these answer files that the users are able to choose what type of data store they wish to use and whether the install will create a new server farm or join an existing one. A detailed description of each component and the various setup options within these files can be found on the Citrix MetaFrame Presentation Server CD in the Support\Install directory (see the UnattendedTemplate.txt file). The two sample answer files available for download can be used to accomplish these tasks.

It is important to note that these two answer files must be copied to C:\Citrix\Support\Install on the Director server and named exactly as shown (that is, createfarm.txt and joinfarm.txt) *prior* to building the images for deployment via RDM.

HostedClients.dsn

In this solution the unattended installation of the Citrix MetaFrame Presentation Server will connect to an existing SQL server database (that is, CitrixDB1). To accomplish this task a DSN file must be created and copied to c:\citrix\support\install on the RDM server *prior* to building the WNI image for this application.

The body of the DNS file contains various specifics needed when connecting to a remote data store, including DB Driver type (SQL, DB2®, etc.), user ID, trusted connection, network, database name, app, and server name.

The sample DSN file that is available for download satisfies all of these requirements and can be used when connecting to a remote SQL database. It will be necessary to edit this file to match your environment prior to use. This file name must also match the file name given in the DSNFilePath= section of the CreateFarm.txt and JoinFarm.txt answer files described above. In this example the file name given is HostedClients.dsn.

CreateFarm.bat and JoinFarm.bat

In this solution the unattended installation of the Citrix MetaFrame Presentation Server includes connecting to a remote SQL data store. To accomplish this task the DSN file path had to be defined statically in the CreateFarm.txt and JoinFarm.txt answer files. Through the use of the CreateFarm.bat and JoinFarm.bat files, the user can ensure the static location of these files upon deployment via RDM. These batch files will copy the entire contents of the Citrix installation package to a specific temporary location on the newly deployed server, run the unattended installation of the Citrix MetaFrame from there, then clean up and remove this temporary directory and all of its contents.

The entire unattended installation of the Citrix MetaFrame Presentation Server will be driven by RDM through the use of these two batch files. The user/administrator will use RDM to call these batch files during the WNI image creation steps for this application. Both of these files must be copied to the RDM server and placed in the root of the source directory *prior* to building this WNI application image. In this example these files have been copied to C:\citrix on the RDM server.

Cygwin.au3

Given that the Cygwin shell, on its own, does not support being installed in unattended mode, it becomes necessary to use other means to accomplish this task in order to enable its deployment via RDM. In this solution the inclusion of a compiled Autoit 3.0 script file (that is, cygwin.au3) was implemented to accomplish this task. Once compiled, the au3 file will generate an exe file (that is, cygwin.exe), which will be called to run the installation. This

script will launch Cygwin's setup.exe from a static location; choose the installation type and directory, select the installation packages to be installed, and create the Cygwin icons on the desktop and Start menu.

It is important to note that the sample .au3 file available for download includes a call to Cygwin's setup.exe from a static location. This static location gets created in the Autoit.bat file, as described in the Autoit section below.

Once compiled, the cygwin.exe file must be copied to C:\cygwin on the RDM server prior to building this WNI image.

sshdconfigfortpm.sh

The sshdconfigfortpm.sh script configures ssh on the host, generates the encryption keys, appends the (input) TPM server keys to the authorized keys on the local host, turns off StrictHostKeyChecking, and starts the sshd service. This script is called from the Autoit.bat or EditedAutoit.bat, and the script takes a parameter for the name the TPM public key file and a password for a new account created to run the sshd service.

The sample script available for download will accomplish all of these tasks. It has been named sshdconfigfortpm.sh, and must be placed in c:\cygwin on the RDM server prior to building this image.

It is important to note that this file name is specific and will be called in the Autoit.bat file described below.

Autoit.bat (for WNI)

This file is to be used during the WNI image deployment of the Cygwin Shell only.

This .bat file will drive the Cygwin installation by copying the entire installation package to a specific temporary location on the newly deployed server (that is, c:\cygininst), launching the unattended installation of Cygwin via cygwin.exe, moving the sshdconfigfortpm.sh and tpmdsakey.pub files to the local Cygwin\bin directory, launching the **bash** command to configure ssh, then cleaning up and removing the temporary directory and all of its contents.

EditedAutoit.bat (for WCI)

This file is a manually edited variation of the Autoit.bat file described above and is to be used during WCI task deployment only.

Due to various complications when deploying a cloned image of Cygwin, this solution invokes a native install of the Cygwin shell at the end of WCI task deployment.

It is important to note that in this solution this file name remains Autoit.bat once it is copied to the donor machine and edited. It was only given the name EditedAutoit.bat for the sake of clarity here and to differentiate the two sample Autoit.bat files available for download.

Prior to calling this file in the WCI task command list, the user is instructed to copy the entire contents of the source directory for the Cygwin WNI image to a specific location on the donor machine (that is, c:\cygwin2). Once they have completed this step, they will edit the Autoit.bat file by adding two new lines. When called during deployment, this new edited Autoit.bat file will then move command emphasis to the c:\cygwin2 directory, repeat all of the steps described in the Autoit.bat section above, and then clean up both the c:\cygwininst and the c:\cygwin2 directories.

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this Redpaper.

IBM Redbooks

For information on ordering these publications, see “How to get IBM Redbooks” on page 97. Note that some of the documents referenced here may be available in softcopy only.

- *Deploying Citrix MetaFrame on IBM @server BladeCenter with IBM FAStT Storage*, REDP3583

Other publications

These publications are also relevant as further information sources:

- *IBM @server BladeCenter Hosted Clients: Citrix Terminal Session-based solution for Desktop Infrastructure Simplification*

  http://www.ibm.com/servers/eserver/bladecenter/alliance/solutiondetail_citrix.html

- *Creating a hosted client environment on IBM @server BladeCenter with Citrix MetaFrame and IBM @server management tools*

  http://www.ibm.com/servers/eserver/bladecenter/literature/wp_lit.html

Online resources

These Web sites and URLs are also relevant as further information sources.

IBM Web sites

- IBM @server BladeCenter

  http://www.ibm.com/servers/eserver/bladecenter/

- IBM Director 4.20

  http://www.ibm.com/pc/support/site.wss/MIGR-55606.html

- IBM Director 4.21

  http://www.ibm.com/pc/support/site.wss/MIGR-58219.html

- IBM Remote Deployment Manager

  http://www.ibm.com/servers/eserver/xseries/systems_management/sys_migration/rdm.html

- IBM Tivoli Provisioning Manager

  http://www.ibm.com/software/tivoli/products/prov-mgr/

- On Demand Automation Catalog - Automation packages for IBM Tivoli Provisioning Manager and IBM Tivoli Intelligent Orchestrator

  http://www-18.lotus.com/wps/portal/automation

- IBM Orchestration and Provisioning Automation Library

  http://www.developer.ibm.com/tivoli/workflow.html
- Tivoli Software Information Center for IBM Tivoli Intelligent Orchestrator 2.1

  http://publib.boulder.ibm.com/tividd/td/IBMTivoliIntelligentThinkDynamicOrchestrator2.1.html
- On Demand with IBM Tivoli Intelligent Orchestrator and Citrix MetaFrame - Policy-based orchestration using IBM Tivoli Intelligent Orchestrator within a Citrix MetaFrame environment

  http://www.ibm.com/developerworks/tivoli/library/t-tiocitrix
- BladeCenter Alliance

  http://www.ibm.com/servers/eserver/bladecenter/alliance/members.html
- Deployment and the performance of Citrix MetaFrame

  http://www.ibm.com/pc/support/site.wss/MIGR-52686.html

Citrix Web sites

- Support site

  http://support.citrix.com
- Advanced Concepts MetaFrame Presentation Server for Windows Version 3.0

  http://support.citrix.com/kb/entry.jspa?entryID=4462&categoryID=276
- Citrix MetaFrame Presentation Server 3.0 product documentation

  http://support.citrix.com/docs/productdocs.jspa?product=119&version=80&languages=en&x=88y=9
- Critical Hotfixes and Service Packs for Citrix MetaFrame Presentation Server

  http://support.citrix.com/criticalupdates

Aurema

- Home page

  http://www.Aurema.com
- Support site

  http://www.aurema.com/support/armtech.php
- Licensing site

  http://www.aurema.com/support/armtechlicensing.php
- Download site

  http://www.aurema.com/download/index.php

Softricity

- Home page

  http://www.softricity.com
- SoftGrid Platform

  http://www.softricity.com/products/index.asp
- SoftGrid Application Virtualization

  http://www.softricity.com/products/what.asp

- SoftGrid Technology

  http://www.softricity.com/products/technology.asp
- How SoftGrid Works

  http://www.softricity.com/products/howitworks.asp
- SoftGrid and Utility Computing

  http://www.softricity.com/solutions/utility.asp

Neoware

- Neoware thin client appliances

  http://www.neoware.com/products/thinclient/index.html
- disable_ezUpdate_install.2do snapin (see FAQ NQ518)

  http://faq.neoware.com/faq/main.php?from=login

Microsoft

- Guidelines for Deploying Terminal Server

  http://www.microsoft.com/windowsserver2003/techinfo/overview/quickstart.mspx

Cygwin

- Cygwin home page

  http://www.cygwin.com

Hiddensoft

- AutoIt Version 3

  http://www.autoitscript.com/autoit3/

How to get IBM Redbooks

You can search for, view, or download Redbooks, Redpapers, Hints and Tips, draft publications and Additional materials, as well as order hardcopy Redbooks or CD-ROMs, at this Web site:

ibm.com/redbooks

Help from IBM

IBM Support and downloads

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ibm.com/services

Automating the Deployment and Image Management of a Citrix Hosted Client Environment

Redpaper

Migrate from PCs to a hosted environment on IBM @server BladeCenter

Optimize server resource utilitization and centralize image management

Automate the deployment and provisioning of a Citrix farm

In today's enterprise computing environments, IT organizations face an increasing need to gain more centralized control over their servers and applications. Many are making the move from a distributed desktop environment to a more centralized, hosted computing environment.

In a terminal-session solution such as that based on Citrix MetaFrame Presentation Server, simple, stateless, thin-client devices communicate with back-end servers that run the desktop applications. In this hosted-client environment, all user data and configuration information is stored in a centrally managed location that is easier to back up, maintain, and administer.

This IBM Redpaper describes how to use IBM Director and Remote Deployment Manager to construct rapid deployment images for provisioning a Citrix-based hosted client infrastructure including Aurema ARMTech for Citrix, Softricity SoftGrid client, and the Cygwin shell.

The paper includes detailed steps to configure Microsoft's roaming user profiles and folder redirection to manage user data, how to use Citrix MetaFrame Presentation Server to publish a desktop, and how to create an ICA connection from a Neoware thin client to a Citrix MetaFrame publication.

The intended audience includes technical sales support and IT personnel. This document assumes that the reader has some skills in the setup and configuration of the components described above.

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IBM Redbooks are developed by the IBM International Technical Support Organization. Experts from IBM, Customers and Partners from around the world create timely technical information based on realistic scenarios. Specific recommendations are provided to help you implement IT solutions more effectively in your environment.

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