

IBM ServerGuide Scripting Toolkit, Windows Edition



# Altiris Deployment Solution User's Reference

*Version 2.40*



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**Note:**

Before using this information and the product it supports, read the information in "Notices".

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## Chapter 1. Introducing ServerGuide Scripting Toolkit

The ServerGuide Scripting Toolkit enables you to tailor and build custom hardware deployment solutions. It provides hardware configuration utilities and operating system (OS) installation examples for IBM® System x® and BladeCenter® x86-based hardware. The ServerGuide Scripting Toolkit, Windows Edition enables you to create a bootable Windows Preinstallation Environment (Windows PE) 2.1 CD, DVD, or USB key that supports the following:

- Network and mass storage devices
- Policy based RAID configuration
- Configuration of System settings using Advanced Settings Utility (ASU)
- Configuration of Fibre Host Bus Adapters (HBAs) under WinPE
- Automated Network Operating System (NOS) Installation support for:
  - Microsoft Windows Server 2003, Standard, Enterprise, and Web Editions
  - Microsoft Windows Server 2003 R2, Standard and Enterprise Editions
  - Microsoft Windows Server 2003, Standard and Enterprise x64 Editions
  - Microsoft Windows Server 2003 R2, Standard and Enterprise x64 Editions
  - Microsoft Windows Server 2008, Standard, Enterprise, Datacenter, and Web Editions
  - Microsoft Windows Server 2008 x64, Standard, Enterprise, Datacenter, and Web Editions
  - Microsoft Windows Server 2008, Standard, Enterprise, and Datacenter Editions without Hyper-V
  - Microsoft Windows Server 2008 x64, Standard, Enterprise, and Datacenter Editions without Hyper-V
  - Microsoft Windows Server 2008 R2 x64, Standard, Enterprise, Datacenter, and Web Editions
- Local self-contained DVD deployment scenarios
- Local CD/DVD and network share based deployment scenarios
- RSA II, IMM, and BladeCenter MM/AMM remote disk scenarios
- UpdateXpress System Packs installation integrated with scripted NOS deployment
- IBM Director Agent installation integrated with scripted NOS deployment. The ServerGuide Scripting Toolkit, Windows Edition supports these versions of the Director Agent:
  - Director Agent 5.1 or higher
  - Common Agent 6.1 or higher
  - Core Services 5.20.31 or higher

The Toolkit provides sample jobs for Altiris Deployment Solution for hardware configuration and OS deployment using Windows PE. The Scripting Toolkit supports Altiris Deployment Solution 6.9 SP1, SP2, and SP3 and the Hewlett-Packard Rapid Deployment Pack (RDP) versions 3.81 and 3.82, 3.83, and 6.0. The Rapid Deployment Pack includes Altiris Deployment Solution, the Hewlett-Packard Scripting Toolkit, and Windows PE 2.1 boot environments packaged together.



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## Chapter 2. Installing the ServerGuide Scripting Toolkit

You can install the Toolkit into the Altiris Deployment Solution by using either a pre-built Windows PE 2.1 environment or by including the files required to build Windows PE 2.1. The prerequisites and installation depend on the method you select.

The ServerGuide Scripting Toolkit, Windows Edition for Altiris Deployment Solution has three components:

1. The IBM Pre-boot environment
2. The IBM Scripting Toolkit Scripts and Utilities
3. The IBM Scripting Toolkit Altiris jobs within the Altiris Deployment Solution console

When you install or reinstall the ServerGuide Scripting Toolkit, Windows Edition for Altiris Deployment Solution, these components are updated as a group. After the update, the Altiris Deployment Solution jobs associated with the previous version of the ServerGuide Scripting Toolkit, Windows Edition for Altiris Deployment Solution will no longer work.

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### Installing with pre-built Windows PE

This section describes the requirements and method for installing Toolkit using a pre-built Windows PE 2.1 environment.

#### Prerequisites

Installing the ServerGuide Scripting Toolkit, Windows Edition using a pre-built Windows PE 2.1 environment requires the following files:

- Altiris Deployment Solution, obtained via one of the following:
  - Altiris Deployment Solution 6.9 SP1, SP2, and SP3 with the Altiris provided Windows PE 2.1 environments already installed, with the following executable files:
    - Altiris\_DS\_Preboot\_WinPE2.1\_x86.exe
    - Altiris\_DS\_Preboot\_WinPE2.1\_x64.exe - required only for deployment of x64 operating systems
  - Hewlett Packard Rapid Deployment Pack 3.81 or higher
- Toolkit, extracted to the Deployment Server folder. The default location of the folder is C:\Program Files\Altiris\Express\Deployment Server\.

#### Installation

To integrate the Toolkit into the Altiris Deployment Solution, follow these steps:

1. If you want to suppress prompts or suppress the display of user settings before installing the Scripting Toolkit into Altiris Deployment Solution, open the Altiris\_SGTKWinPE.ini file and modify the appropriate values shown in the table below.

Table 1.

Value	Description
Section: [SGTKWinPE Build Settings]	

Table 1. (continued)

Value	Description
TK_Build_SuppressPrompts	<p>Suppress interactive prompts which pause the process to enable the user settings to be read after they are displayed. Valid values are:</p> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul> <p><b>Note:</b> : Interactive prompts regarding required removal of jobs during upgrade or reinstall scenarios are always displayed.</p>
TK_Build_DisplayBuildSettings	<p>Display the user settings before installing the Toolkit into Altiris Deployment Solution. Valid values are:</p> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>

2. Open a command window and change the current directory to the directory containing the Altiris\_SGTKWinPE.cmd file. The default file location is C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\Altiris\Altiris\_SGTKWinPE.cmd.
3. At the command window enter the Altiris\_SGTKWinPE.cmd command. It will automatically process the Toolkit settings in the Altiris\_SGTKWinPE.ini file.

**Note:** When you issue the Altiris\_SGTKWinPE.cmd, you will receive a security warning from Windows that the publisher could not be verified for SetRamDiskSize.cmd. This script is part of the Toolkit installation package, and you can safely run this script.

To avoid receiving this warning multiple times during the installation, deselect the **Always ask before opening this file** checkbox.

This process can take between 5 and 20 minutes to complete depending on the server setup. Once completed, the Scripting Toolkit is integrated into Altiris Deployment Solution.

Once the Scripting Toolkit is installed, there will be a new folder with the product name, version, and buildID under the Jobs frame in the Altiris Deployment Solution console. For example: **IBM ServerGuide Toolkit, Windows Edition 2.1 (yyyy-mm-dd)**

## Installing with Windows PE 2.1 build files

This section describes the process for installing the IBM ServerGuide Scripting Toolkit with Altiris Deployment Solution using the files required to build the Windows PE 2.1 environment.

### Prerequisites

Installing the Toolkit into Altiris Deployment Solution and building the Windows PE 2.1 environment requires the following:

- Altiris Deployment Solution 6.9, SP1, SP2, or SP3.

- IBM ServerGuide Scripting Toolkit Windows Edition extracted to the Deployment Server folder. The default location of the folder is C:\Program Files\Altiris\Express\Deployment Server\.
- The English version of the Windows Automated Installation Kit (WAIK) for Windows Vista SP1 and Windows Server 2008. The default location for WAIK is %ProgramFiles%\Windows AIK, normally C:\Program Files\Windows AIK. If you have installed the WAIK to a different location, you must modify the TK\_Path\_WAIK\_Source variable to point to the new location.

## Installation

To install the IBM ServerGuide Scripting Toolkit, follow these steps:

1. Open the Altiris\_SGTKWinPE.ini file and modify the appropriate values shown in the table below. The default file location is C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\Altiris\Altiris\_SGTKWinPE.ini.

Value	Description
[SGTKWinPE Build Settings]	
TK_Build_SuppressPrompts	<p>Suppress interactive prompts which pause the process to enable the user settings to be read after they are displayed.</p> <p>Default Value: No</p> <p><b>Note:</b> Interactive prompts regarding required removal of jobs during upgrade or reinstall scenarios are always displayed.</p>
TK_Build_DisplayBuildSettings	<p>Display the user settings before installing the Toolkit into Altiris Deployment Solution.</p> <p>Default Value: Yes</p>
TK_Altiris_ShareLetter	<p>Specifies the drive letter to use for the Altiris share in Windows PE.</p> <p>Valid values are the letters F-Z.</p> <p>Default: Y</p>
[SGTKWinPE Paths]	
TK_Path_WAIK_Source	<p>This variable has been deprecated. The AIK information is found automatically in the registry. You can uncomment this variable and use it to bypass the registry check, but it is not required.</p> <p>Default (if used): %ProgramFiles%\Windows AIK</p>

2. Open a command window and change the current directory to the directory containing the Altiris\_SGTKWinPE.cmd file. The default file location is C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\Altiris\Altiris\_SGTKWinPE.cmd.
3. At the command window enter the Altiris\_SGTKWinPE.cmd command. It will automatically process the Toolkit settings in the Altiris\_SGTKWinPE.ini file.

**Note:** When you issue the Altiris\_SGTKWinPE.cmd, you will receive a security warning from Windows that the publisher could not be verified for

SetRamDiskSize.cmd. This script is part of the Toolkit installation package, and you can safely run this script.

To avoid receiving this warning multiple times during the installation, deselect the **Always ask before opening this file** checkbox.

The process can take between 5 and 20 minutes to complete depending on the server setup. Once completed, the Scripting Toolkit is integrated into Altiris Deployment Solution.

Once the Scripting Toolkit is installed, there will be a new folder with the product name, version, and buildID under the Jobs frame in the Altiris Deployment Solution console. For example: **IBM ServerGuide Toolkit, Windows Edition 2.1 (yyyy-mm-dd)**

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## Reinstalling the Scripting Toolkit, Windows edition

This section describes the process for reinstalling the Toolkit.

The ServerGuide Scripting Toolkit, Windows Edition for Altiris Deployment Solution has three components:

1. The IBM Pre-boot environment
2. The IBM Scripting Toolkit Scripts and Utilities
3. The IBM Scripting Toolkit Altiris jobs within the Altiris Deployment Solution console

When you install or reinstall the ServerGuide Scripting Toolkit, Windows Edition for Altiris Deployment Solution, these components are updated as a group. After the update, the Altiris Deployment Solution jobs associated with the previous version of the ServerGuide Scripting Toolkit, Windows Edition for Altiris Deployment Solution will no longer work.

To reinstall the Toolkit, follow these steps:

1. Follow the instructions from Chapter 2, "Installing the ServerGuide Scripting Toolkit," on page 3 that apply to your method of installation.
2. The installer displays the following message to indicate that a previous installation has been detected:

The following installed items were detected:

IBM Windows PE Toolkit, Windows Edition 2.3

This must be uninstalled before this process can continue. Please select an option below:

- 1) Exit The Reinstaller.
- 2) Automatically Reinstall The Scripting Toolkit, Windows Edition.

Select an above option:

Follow the steps below for the appropriate removal method.

### Manually removing the Toolkit

To manually remove the Toolkit, follow these steps:

1. Select option number 1 from the prompt to exit the installation process.

2. Remove all jobs associated with the IBM WinPE Toolkit PXE image in the Altiris Deployment Solution console.
3. Open the PXE configuration utility from the Tools menu within the Altiris Deployment Solution Console.
4. Select the image named IBM WinPE Toolkit 2.3.
5. Make certain that the column labeled **In Use By DS** does not say **Yes** for that image. If it does, there are additional jobs associated with that image. Find and remove them.
6. Click the **Delete** button to remove the PXE image.
7. Click **Save** to save the changes
8. Click **OK** to exit the PXE Configuration utility.

## Automatically removing the Toolkit

To automatically remove the Toolkit, follow these steps:

1. Select option 2 from the prompt. You will receive the following prompt:

```
*****
You have chosen to reinstall the following:
```

```
IBM Windows PE Toolkit, Windows Edition 2.3
```

```
You may keep the jobs associated with the currently installed
Scripting Toolkit, however, they will be moved to a folder labeled
IBM Scripting Toolkit, Windows Edition (Archived w/ver. 2.3).
```

```
*****
```

```
Would you like to keep those jobs?<Y/N>
```

2. Select **Y** to remove the current Windows PE Image and move the current IBM ServerGuide Toolkit, Windows Edition jobs to a folder named IBM ServerGuide Toolkit, Windows Edition (Archive). Select **N** to remove all previously installed jobs, not including any user-created jobs.

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## Add files to the source tree

This section provides information on adding files to the source tree. You must add the files to be included in your deployments to the ServerGuide Scripting Toolkit, Windows Edition source tree.

The ServerGuide Scripting Toolkit, Windows Edition provides a Graphical User Interface (GUI) configuration program to add IBM Director Agent files to the source tree. The Toolkit Configuration Utility (tkconfig.exe) is located in the sgdeploy\tkconfig directory. You can start tkconfig.exe from a command prompt or by double-clicking it.

## Adding Windows installation files

Follow these steps to add Windows installation files to the source tree.

### Procedure

1. Start the Toolkit Configuration Utility.
2. Select **Add Operating System Installation Files** from the task list.
3. Follow the GUI Wizard for the operating system type you want.
4. Insert the correct OS installation media into the optical drive of the source system running Windows, or select the specific directory containing the OS installation media.

5. Modify the target path if necessary.
6. Copy the files from the source location to the target location.

**Note:** For Windows 2003 R2 operating systems, the Toolkit Configuration Utility will prompt for Windows 2003 R2 Disc 2. The second CD-ROM is copied to the cd2 folder of the Windows 2003 R2 operating system folder. The second CD-ROM must be copied to this folder to allow automated installation of disc 2 during deployment.

7. Exit the Operating System Installation Files wizard.

## Adding Windows device drivers

The Toolkit allows you to download System Enablement Packs, which include a driver library that contains all of the drivers necessary to complete the installation of Windows Server 2003 and Windows Server 2008. To ensure that all devices are installed, the drivers are up to date, and no errors remain in Device Manager, you must deploy the latest UpdateXpress System Packs.

You can add support for systems released after the current version of the ServerGuide Scripting Toolkit, Windows Edition by downloading the applicable System Enablement Packs. For more information, see Chapter 5, "System Enablement Packs," on page 33.

## Adding UpdateXpress System Packs

Follow these steps to add IBM UpdateXpress System Packs (UXSPs) to the source tree.

### Procedure

Download the UpdateXpress System Pack for the desired machine-type/operating system combination into the source tree in the updates\uxsp directory. When downloading multiple UXSPs for multiple machine types, place them all in this directory. When the UXSP installer runs, it automatically selects the appropriate files. Click **OK** if you are prompted to overwrite existing files.

**Note:** Do not change the filename of any UXSP files, including the use of upper- and lowercase letters. Changing the filename or case can cause the UXSP deployment to fail.

### Results

The UXSP will be installed after the operating system is installed. .

## Adding IBM Director Agent files

Follow these steps to add the IBM Director Agent installation files to the source tree.

### Procedure

1. Download the IBM Systems Director files from <http://www.ibm.com/systems/management/director/downloads/>

**Note:** These downloads require registration with IBM.com.

2. Unzip the Director Agent files in a convenient location.
3. Start the Toolkit Configuration Utility.

4. Select **Add Operating System Application Files** from the task list.
5. Browse to the location where you unzipped the Director Agent files.
6. Copy the files from the source location to the target location.
7. Exit the Operating System Application files wizard.

---

## Update the Windows answer file

The Windows answer file provides responses to prompts encountered during installation, allowing you to perform unattended installations. Four sample answer files are provided with Toolkit, and another is provided by Microsoft.

The Toolkit sample answer files, win2003.txt, win2003x64.txt, win2008.xml, and win2008x64.xml, are located in the Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\Altiris\AnswerFiles directory.

### Customizing the Windows Server 2003 answer file

To customize the Windows 2003 answer file, you can add information to the [UserData] section of the answer file, but it is no longer necessary to provide the ProductID keyword. If it is required by the operating system you are deploying, enter the ProductID as the value of the TK\_NOS\_ProductKey variable in the **Customize Job Variables** section of your deployment job. You do not need to add device-driver information to the answer file. The ServerGuide Scripting Toolkit, Windows Edition process dynamically adds device-driver information to the answer file at runtime.

Customize the Windows Server 2003 answer file using the following procedure:

1. Open the file, sgdeploy\SGTKWinPE\Altiris\AnswerFiles\win2003.txt.
2. Add the item to be customized to the answer file. For example, in the [GuiUnattended] section of the file, add TimeZone. You must ensure that the value you are adding is not already in use in the file.
3. Set the value of the variable you have added to a variable that you will add to the appropriate Scripting Toolkit scenario INI file. Scripting Toolkit environment variables are surrounded by the % sign, as shown in this example:

```
[GuiUnattended]
...
TimeZone = %TK_TimeZone%
...
```

4. For each environment variable you have assigned, include a value in the corresponding scenario INI file. In this example:

```
TK_TimeZone=035
```

or:

```
TK_TimeZone=Pacific Standard Time
```

Typically you will add this value to the [NOS Installation Settings] section of the INI file.

For more information about customizing the answer file, see the Microsoft documentation on the Windows Server 2003 installation CDs. The documentation is located in the \support\tools\deploy.cab file.

## Customizing the Windows Server 2008 answer file

To customize the Windows 2008 answer file:

1. Open the file, sgdeploy\SGTKWinPE\Altiris\AnswerFiles\win2008x64.xml.
2. Add the settings you want to customize. In this example:  
<TimeZone>%TK\_TimeZone%/TimeZone>
3. Set the value of the setting you have added to a variable that you will add to the appropriate Scripting Toolkit scenario INI file. Scripting Toolkit environment variables are surrounded by the % sign, as shown in this example:

```
[GuiUnattended]
...
<TimeZone>%TK_TimeZone%/TimeZone>
...
```

Typically you will add this value to the [NOS Installation Settings] section of the INI file.

4. For each environment variable you have assigned, include a value in the corresponding scenario INI file. Using the format *variable\_name=value*, where *variable\_name* is the name you selected in the answer file and *value* is a valid value for the variable you are using. In this example:

```
TK_TimeZone=035
```

or:

```
TK_TimeZone=Pacific Standard Time
```

Typically you will add this value to the [NOS Installation Settings] section of the INI file.

During deployment, the environment variables specified in the answer file are replaced with the corresponding variables from the scenario INI file.

---

## Chapter 3. Quick start deployment scenarios

This section contains basic information on deployment scenarios to allow you to begin using the Toolkit with Altiris Deployment Solution as quickly as possible.

The Toolkit provides a collection of sample jobs for use by the Altiris Deployment solution. The following topics provide additional information on the most commonly used jobs. For more information on the sample jobs provided by the Scripting Toolkit, see “Sample job definitions” on page 26

The Toolkit for use with Altiris Deployment Solution provides two types of jobs:

- “Modular deployment tools”
- “Deployment solutions” on page 16

For more information on tailoring deployments to your needs, see Chapter 4, “Customizing deployment scenarios,” on page 19.

---

### Modular deployment tools

The sample jobs provided in the **Modular Deployment Tools** folder are designed to be used individually to complete common deployment tasks. This section describes how and in what order to use the modular deployment tools.

The modular deployment tools provided by the Toolkit are each designed to complete one step in the deployment process. The following sections will provide information on using the sample jobs for:

- Preinstallation hardware configuration
- Operating system installation
- Post-installation configuration

---

### Validating the Altiris environment

After installing the Toolkit for use with Altiris Deployment Solution, you should validate that the environment is operating properly. This topic describes the process for doing so, using the sample job provided.

#### Before you begin

Complete the installation method appropriate for your environment as described in Chapter 2, “Installing the ServerGuide Scripting Toolkit,” on page 3.

#### About this task

When the installation steps are complete:

#### Procedure

1. Open the Altiris Deployment Solution console.
2. Run the job **Windows PE Boot Test**, located in the Pre-Boot OS Connectivity Test folder, in the IBM ServerGuide Toolkit, Windows Edition 2.4 folder. The job boots into the Windows PE x86 environment on the target server. Once connectivity is established, it performs a dir command on the eXpress share of the Altiris Server. The job then pauses, requiring user input to continue.

3. Provide the requested user input to complete the job.

---

## Preinstallation tasks

This section provides information on the tasks available before you install an operating system using the modular tools.

Before installing an operating system using the modular tools, you can perform the following tasks:

- Capture and deploy system settings
- Configure RAID
- Replicate RAID
- Server disk analysis

The following sections describe how to perform these tasks using the modular tools.

### Capture and deploy system settings

Before installing an operating system, you can capture system settings from a compatible server to a file and deploy them to your new server using the Toolkit jobs and the Advanced Settings Utility (ASU).

The Toolkit provides sample jobs to capture and deploy settings using ASU. These jobs are located in the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → System Settings Replication** folder.

#### Capture system settings

The **Capture System Settings** sample job captures the system settings of the server and stores them in a file named `ASU_Capture.ini`. By default all captured System Settings are stored in `C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\ASUFiles\Machine_Type` where *Machine\_Type* is the machine type of the captured system.

#### Deploy system settings

The **Deploy System Settings** sample job deploys the system settings from the `ASU_Capture.ini` file located in the specified directory.

You can customize the following variables for these jobs from the Altiris Console. The values shown are the defaults.

- `TK_ASU_File=ASU_Capture.ini`
- `TK_ASU_FileLocation="TK_Altiris_Path\ASUFiles\Machine_Type"`
- `TK_ASU_Mode=save`
- `TK_ASU_Flags= -group-bios`

**Note:** The `TK_ASU_File` variable should not include any path information.

### RAID configuration

Toolkit provides sample jobs to perform a number of RAID configurations. These jobs are located in the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → RAID Configuration** folder, and are named according to the RAID configuration they will create. For example, **Configure RAID [RAID 0]**, and **Configure RAID [RAID 1 + Hot Spare]**.

To perform RAID configuration using the modular tools:

1. Start the Altiris Deployment Solution console.
2. Navigate to the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → RAID Configuration** folder.
3. Run the appropriate job against the target system to create the RAID configuration you want.

## RAID replication

If you have an existing RAID configuration that you want to replicate to other systems, you can use the sample jobs **RAID Capture** and **RAID configuration**, located in the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → RAID Replication** folder in the Altiris Deployment Solution console.

To capture an existing RAID configuration, follow these steps:

1. Start the Altiris Deployment Solution console.
2. Navigate to the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → RAID Replication** folder.
3. Run the **Capture RAID configuration** job against the system whose RAID configuration you want to replicate.

This job will create a RAID configuration file and store it on the source server. By default, it uses the following values:

**RAID configuration filename**

RAID\_Configuration.ini

**Location**

C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\PolicyFiles\*machinetype*, where *machinetype* is the machine type of the captured system.

When you have captured the RAID configuration, you can deploy it using the **Deploy RAID configuration** job in the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → RAID Replication** folder.

To deploy the captured RAID configuration:

1. Start the Altiris Deployment Solution console.
2. Navigate to the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → RAID Replication** folder.
3. Run the **Deploy RAID configuration** job against the target system.

By default, this job uses the same default filename and location as the **Capture RAID configuration** job. See “Customizing sample jobs” on page 19 for information on customizing the filename and location.

## Server disk analysis

The ServerGuide Scripting Toolkit provides a sample job to capture the disk information for all disks attached to a given server. You can use this job after performing RAID configuration to ensure that when you install a supported Windows operating system, you install to disk 0 on the target server.

**Note:** This job must be run after RAID configuration is complete, as disk information is changed by the RAID configuration task.

The job is located in: **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → Server Disk Analysis** in the Altiris Deployment Solutions console.

To perform server disk analysis, follow these steps:

1. Start the Altiris Deployment Solution console.
2. Navigate to the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 1 - Preinstallation Hardware Configuration → Server Disk Analysis** folder.
3. Run the job **Capture Disk Data** against the system for which you want to capture disk information.

The job creates a disk information file and stores it on the source server at:  
C:\Program Files\Altiris\Express\Deployment Server\temp\ID\disk\_details.txt.

---

## Operating system installation

After you have configured RAID on the target server, you can use the jobs provided by the Toolkit to install a supported Windows operating system. This section describes that process.

The ServerGuide Scripting Toolkit, Windows Edition provides two types of jobs for deploying operating system:

- Operating system cloning
- Scripted operating system installation

The following sections describe how to perform each type of installation.

### Operating system cloning

The ServerGuide Scripting Toolkit, Windows Edition provides sample jobs to capture and deploy supported Windows operating system. In order to run the capture Windows image sample job, the Altiris agent must first be installed on the donor system. The scripted operating system installation jobs provided by the Toolkit install the Altiris agent automatically. If you are cloning an operating system that was not installed using the Toolkit, you must install the Altiris agent manually.

To capture a supported operating system from one server and deploy it to another, follow these steps:

1. Start the Altiris Deployment Solution console, and navigate to the **IBM ServerGuide Toolkit, Windows Edition 2.4 → Modular Deployment Tools → Step 2 - Operating System Installation → Operating System Imaging** folder.
2. Open the **Capture Windows Image** job.
3. Select the **Create Disk Image** task and click **Modify**.
4. Change the path and filename for the captured image and click **Finish** to save your changes.
5. Open the **Deploy Windows Image** job.
6. Select the **Distribute Disk Image** task and click **Modify**.
7. Change the path and filename to match the ones you entered for the captured image and click **Finish** to save your changes.
8. Run the **Capture Windows Image** job against the donor server.

9. When it completes, run the **Deploy Windows Image** job against the target server.

## Scripted operating system installation

If you do not want to deploy a clone of an existing operating system installation, the Toolkit provides sample jobs to deploy each of the supported operating systems. Use the following procedure to install a supported Windows operating system using the sample jobs provided:

1. Ensure that you have a properly configured Toolkit source server with the required operating system files. See “Adding Windows installation files” on page 7 for more information.
2. Open the Altiris Deployment Solution console and ensure that the name of the system in the Console is the name you want for the computer name of that system after your deployment. If this is not the case, add the appropriate computer name to the answer file.
3. Navigate to the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 2 - Operating System Installation → Scripted Operating System Installation** folder.
4. Select the job that corresponds to the Windows operating system you want to install, and run it against the target server.

---

## Post installation tasks

When you have completed RAID configuration and operating system installation, you can perform post installation tasks. This section describes the methods for installing the IBM Director Agent and applying IBM UpdateXpress System Pack updates.

The Toolkit provides sample jobs for installing the IBM Director Agent and applying IBM UpdateXpress System Pack (UXSP) updates to a target system on which RAID has been configured and a supported Windows operating system installed. Please note that in order to complete these jobs, the Altiris agent must be installed on the target system. The Altiris agent is installed automatically by the operating system installation tasks provided by the Toolkit. If the operating system on the target system was not installed using these jobs, you might have to install the Altiris agent manually. See “Operating system installation” on page 14 for more information on using the modular deployment tools to install operating systems.

**Note:** Installing IBM Director Agent and UpdateXpress System Pack updates on the client system requires Administrator privileges. To successfully run the Altiris post installation tasks for IBM Director Agent and UpdateXpress System Pack updates, you must change the security context of the task by adding the password for the Administrator account on the client system. See “Changing the security context of an Altiris task” on page 104 for more information.

The following sections describe the process for using the modular deployment tools to install the IBM Director Agent and apply UXSP updates to a target system.

### Installing the IBM Director Agent

Follow these steps to install the IBM Director Agent on a target system:

1. Ensure that the IBM Director Agent source files have been added to the source tree on the source server. For more information, see “Adding IBM Director Agent files” on page 8.
2. Open the Altiris Deployment Solution console and navigate to the **IBM ServerGuide Toolkit, Windows Edition 2.4 → Modular Deployment Tools → Step 3 - Post-Installation Configuration → Application Installation** folder.
3. Run the **IBM Director Agent for Windows Install** job against the target server.

**Note:** If the IBM Director Agent files are not located in the default directory in the source tree, you must modify the TK\_DirAgent\_DirectorAgent job variable to point to the correct location. For more information on modifying job variables, see “Customizing sample jobs” on page 19.

## Installing UpdateXpress System Pack updates

Follow these steps to install UXSP updates on the target system:

1. Ensure that the UpdateXpress System Pack source files have been added to the source tree on the source server. For more information, see “Adding UpdateXpress System Packs” on page 8.
2. Open the Altiris Deployment Solution console and navigate to the **IBM Scripting Toolkit, Windows Edition 2.40 → Modular Deployment Tools → Step 3 - Post-Installation Configuration → IBM UpdateXpress System Packs** folder.
3. Run the **Run UpdateXpress System Pack Installer** job against the target server.

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## Deployment solutions

The sample jobs provided in the **Combined Deployment Solutions** folder are designed to consolidate multiple deployment elements in a single Altiris job. This section describes how to use these jobs to perform complete deployments.

The deployment solutions provided by the Toolkit are designed to perform a combination of deployment steps in a single job. The following sections will provide information on using the sample jobs for:

- Image based deployment (image cloning)
- Scripted deployment

### Image based deployment

The Toolkit provides a set of tools to capture and deploy an existing system configuration, including RAID configuration, operating system, and installed applications and updates. These jobs require the Altiris agent to be installed on the donor system. The Altiris agent is installed automatically as part of the Scripting Toolkit operating system installation jobs. If the donor system operating system was not installed using the Scripting Toolkit, you might need to install the Altiris agent manually.

Follow these steps to capture and deploy a system configuration:

1. Open the Altiris Deployment Solution console and navigate to the **IBM ServerGuide Toolkit, Windows Edition 2.4 → Combined Deployment Solutions → Image-based Deployment** folder.
2. Run the **Capture RAID Configuration and Windows Image** job against the donor system.

3. When that job completes, run the **Deploy RAID Configuration and Windows Image** against the target system.

## Scripted deployment

The scripted deployment sample jobs provided by the ServerGuide Scripting Toolkit are designed to integrate all of the steps in deploying a system configuration in a single Altiris job. To use a scripted deployment job to configure RAID, install an operating system, install the IBM Director Agent, and install UpdateXpress System Pack updates on the target system, follow these steps:

1. Ensure that the necessary operating system, Director Agent, and UXSP files are properly included in the source tree. See “Add files to the source tree” on page 7 for more information.
2. Open the Altiris Deployment Solution console and navigate to the **IBM ServerGuide Toolkit, Windows Edition 2.4 → Combined Deployment Solutions → Scripted Deployment** folder.
3. In this folder, select the job to deploy the operating system of your choice. Modify the following job variables:

**TK\_NOS\_PerformDirectorAgentInstallation="Yes"**

To install the IBM Director Agent.

**TK\_NOS\_PerformPostOSInstallUXSPUpdates="Yes"**

To install UpdateXpress System Pack updates.

See “Customizing sample jobs” on page 19 for more information on configuring job variables.

4. Run the job against the target server.



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## Chapter 4. Customizing deployment scenarios

This section provides information on customizing deployment scenarios.

You can customize your deployment scenarios in the following ways:

- Customize source server settings
- Add PRAID policy files
- Add ASU files
- Customize Fibre HBA boot configuration
- Customize your Windows installation
- Add installation of the IBM Director Agent to your deployment
- Add installation of UpdateXpress System Packs to your deployment
- Modify the Windows PE image
- Add custom scripts to the SGTKWinPE process
- Add files to the Windows PE image.
- Automate the deployment process

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### Customizing sample jobs

This section provides information on customizing the sample Altiris jobs provided with the ServerGuide Scripting Toolkit, Windows Edition.

Each sample job provided within the Altiris Deployment Console that contains customizable settings begins with a task that sets all variables for the job. This task is labeled **Customize Job Variables**. The variables that you can modify are contained within a block that is similar to the following:

```
[User_Customizable_Variables]
```

*Variables*

```
[End_User_Customizable_Variables]
```

You cannot modify variables outside this block. When you modify a job, it is a good practice to create a copy of the job and modify the copy, rather than modifying the original job.

Table 2 provides a list of the variables in the sample Altiris jobs that you can customize. Note that all values for variables must be enclosed in quotation marks.

*Table 2. Customizable variables in Altiris sample jobs*

Variable	Description
<b>[PRAID Settings]</b>	
TK_PRAID_PolicyFile	Specifies the PRAID policy file to be used for the job. This value should not contain any path information. Path information is specified in TK_Path_PolicyFiles, described below.

Table 2. Customizable variables in Altiris sample jobs (continued)

Variable	Description
TK_Path_PolicyFiles	<p>Specifies the location in the Altiris shared directory of the policy file specified by the TK_PRAID_PolicyFile variable. If no value is specified, that is "" is specified, then the policy file must be in the Altiris shared directory. The default Altiris shared directory is "C:\Program Files\Altiris\Express\Deployment Server".</p> <p>For convenience, the TK_Altiris_Path variable specifies the path to the Altiris directory within the Toolkit, by default: C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\Altiris. For example, if the policy file is in the C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\PolicyFiles directory, you can specify the following: %TK_Altiris_Path%\PolicyFiles.<b>Default:</b> Varies per job, see next section.</p>
<b>[Fibre Settings]</b>	
TK_FIBRE_COUNT	<p>Specifies the number of HBA ports to configure.</p> <p>Valid values are 1–<i>n</i>, where <i>n</i> is the number of HBA ports available.</p> <p>This variable affects the use of the following variables:</p> <ul style="list-style-type: none"> <li>• TK_FIBRE_N_HBA_ID</li> <li>• TK_FIBRE_N_BOOT_DISABLE</li> <li>• TK_FIBRE_N_BOOT_PRIM</li> <li>• TK_FIBRE_N_BOOT_ALT1</li> <li>• TK_FIBRE_N_BOOT_ALT2</li> <li>• TK_FIBRE_N_BOOT_ALT3</li> </ul> <p>Where N is the HBA number to be configured. <b>Note:</b> You must complete one of each of these variables for every HBA port you configure. So if TK_FIBRE_COUNT=2, you must complete one set of these variables for the first port and one for the second.</p>

Table 2. Customizable variables in Altiris sample jobs (continued)

Variable	Description
TK_FIBRE_N_HBA_ID	<p>Identifies the HBA to be configured, where <i>N</i> is the HBA number to be configured.</p> <p>Valid values are:</p> <p><i>hba_instance</i></p> <p>the instance number of an HBA port. Valid values are integers from 0 to <i>n-1</i>, where <i>n</i> is the number of HBAs in the system.</p> <p>For example, to configure HBA instance 0: TK_FIBRE_1_HBA_ID=0</p> <p><i>hba_wwpn</i></p> <p>the World Wide Port Name of an HBA port, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxxxx.</p> <p>For example, to configure HBA: 90-87-AA-BB-65-34-BB-E0: TK_FIBRE_1_HBA_ID= 90-87-AA-BB-65-34-BB-E0</p> <p>Default: 0</p>
TK_FIBRE_N_BOOT_DISABLE	<p>Disable the selected current boot device settings on the specified HBA port, where <i>N</i> is the HBA number to be configured.</p> <p>Valid values are</p> <p><b>No</b> Does not clear or disable any boot settings.</p> <p><b>All</b> Disables the primary and all alternate boot settings - Prim, Alt1, Alt2, and Alt3.</p> <p><b>Prim</b> Disables only the primary boot setting.</p> <p><b>Alt1</b> Disables the Alternative 1 boot setting.</p> <p><b>Alt2</b> Disables the Alternative 2 boot setting.</p> <p><b>Alt3</b> Disables the Alternative 3 boot setting.</p> <p>Default: No.</p>
TK_FIBRE_N_BOOT_PRIM = <i>target_wwnn target_wwpn lun_id</i>	<p>Defines the primary boot target settings, where <i>N</i> is the HBA number to be configured, and:</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> - is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: 0 0 0</p> <p>Example:</p> <p>TK_FIBRE_1_BOOT_PRIM= BB-CC-AA-BB-65-34-BB-F1 BB-CC-AA-BB-FF-34-BB-F1 9</p>

Table 2. Customizable variables in Altiris sample jobs (continued)

Variable	Description
TK_FIBRE_N_BOOT_ALT1 = <i>target_wwnn target_wwpn lun_id</i>	<p>Configures the operating system to use the indicated target as the first alternate boot device, where <i>N</i> is the HBA number to be configured, and</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> -is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: blank.</p> <p>Example:</p> <p>TK_FIBRE_1_BOOT_ALT1= BB-CC-AA-BB-65-34-BB-FD BB-CC-AA-BB-FF-40-BB-F1 5</p>
TK_FIBRE_N_BOOT_ALT2 = <i>target_wwnn target_wwpn lun_id</i>	<p>Configures the operating system to use the indicated target as the second alternate boot device, where <i>N</i> is the HBA number to be configured, and</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> -is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: blank.</p> <p>Example:</p> <p>TK_FIBRE_1_BOOT_ALT2= BB-CC-AA-BB-65-34-BB-FD BB-CC-AA-BB-FF-40-BB-F1 5</p>
TK_FIBRE_N_BOOT_ALT3 = <i>target_wwnn target_wwpn lun_id</i>	<p>Configures the operating system to use the indicated target as the third alternate boot device, where <i>N</i> is the HBA number to be configured, and</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> -is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: blank.</p> <p>Example:</p> <p>TK_FIBRE_1_BOOT_ALT3= BB-CC-AA-BB-65-34-BB-FD BB-CC-AA-BB-FF-40-BB-F1 5</p>
<b>[ASU Settings]</b>	

Table 2. Customizable variables in Altiris sample jobs (continued)

Variable	Description
TK_ASU_File	<p>Specifies the file to be used for a Capture System Settings or Deploy System Settings operation. If you are capturing system settings, they will be written to a file with this name. If you are deploying system settings, they will be read from this file.</p> <p>The default value is <b>ASU_Capture.ini</b></p>
TK_Path_ASUFiles	<p>Specifies the path to the file specified by <b>TK_ASU_File</b>.</p> <p>The default is <code>asufiles\machine_type</code>, where <i>machine_type</i> is the four-digit machine type of the target system.</p>
TK_ASU_Mode	<p>Designates the capture class. This variable is used only when capturing system settings.</p> <p>The default value is <b>save</b>.</p>
TK_ASU_Flags	<p>Specifies additional flags for the current mode.</p> <p>The default value is <b>-group-bios</b>.</p>
<b>[Partition Settings]</b>	
TK_Partition_DiskNum	<p>Specifies the disk number on which to create new partition.</p> <p>Valid values are the disk numbers found by diskpart.exe</p> <p>Default: AUTO</p> <p><b>Note:</b> AUTO setting is the first disk on the system.</p>
TK_Partition_Size	<p>Specifies the partition size in MB. Valid values are:</p> <ul style="list-style-type: none"> <li>• "Max" - uses all available space</li> <li>• "number" - specifies the partition size</li> </ul> <p><b>Default:</b> "Max"</p>
TK_Partition_FileSystem	<p>Specifies the file system type to use when formatting the drive. Valid values are:</p> <ul style="list-style-type: none"> <li>• "NTFS"</li> <li>• "FAT32"</li> </ul> <p><b>Default:</b> "NTFS"</p>

Table 2. Customizable variables in Altiris sample jobs (continued)

Variable	Description
TK_Partition_SR_Size	<p>Specifies the partition size, in MB, for a System Reserved Partition.</p> <p>The System Reserved Partition is a primary active partition created during the partitioning step. BitLocker Drive Encryption function requires this partition active partition and formatted ntfs.</p> <p>Valid values are integers greater than 108.</p> <p><b>Default:</b> 108MB</p> <p><b>Note:</b> This setting is supported only for Windows Server 2008 R2. This setting is ignored when booting WinPE in native uEFI mode.</p> <p>For more information on BitLocker Drive Encryption, see: <a href="http://technet.microsoft.com/en-us/library/cc731549%28WS.10%29.aspx">http://technet.microsoft.com/en-us/library/cc731549%28WS.10%29.aspx</a></p>
[NOS Installation Settings]	
TK_NOS_NetworkOperatingSystem	<p>Specifies the NOS to use for the deployment. This must be a valid directory name within the sgdeploy\OS directory in the Toolkit Source Server.<b>Default:</b> Varies per job. For example, "w23_ent" is used for Windows 2003 Enterprise Edition (x86).</p>
TK_NOS_AnswerFile	<p>Specifies the answer file to use for the deployment. This must be a valid filename within the SGTKWinPE\AnswerFiles directory in the Toolkit Source Server. <b>Default:</b> "win2003.txt" for Windows 2003 x86 jobs and "win2003x64.txt" for Windows 2003 x64 jobs.</p>
TK_NOS_ProductKey	<p>Specifies the product key to be used for unattended installations of Windows operating systems.<b>Default:</b> blank.</p>
TK_NOS_DeploymentDriverLibrary	<p>Specifies the Deployment Driver library to use for the deployment. Valid values are:</p> <ul style="list-style-type: none"> <li>• "Auto" - searches all directories within the sgdeploy\drvs directory and selects the newest DDL present that supports the machine and OS being deployed.</li> <li>• "dirname" - must be a valid directory name within the sgdeploy\drvs directory in the Toolkit Source Server. For example, "w23_drv" would be specified for sgdeploy\drvs\w23_drv.</li> </ul> <p><b>Default:</b> "Auto"</p>
TK_NOS_PerformDirectorAgentInstallation	<p>Automatically install the IBM Director Agent. Valid values are:</p> <ul style="list-style-type: none"> <li>• "Yes"</li> <li>• "No"</li> </ul> <p><b>Default:</b> "No"</p>

Table 2. Customizable variables in Altiris sample jobs (continued)

Variable	Description
TK_NOS_PerformPostOSInstallUXSPUpdates	<p>Automatically install UpdateXpress System Packs after the OS is installed. Valid values are:</p> <ul style="list-style-type: none"> <li>• “Yes”</li> <li>• “No”</li> </ul> <p><b>Default:</b> “No”</p>
<b>[Director Agent Settings]</b>	
TK_DirAgent_DirectorAgent	<p>Specifies the location of the IBM Director Agent application files on the source server. Valid values are:</p> <ul style="list-style-type: none"> <li>• dawin</li> <li>• A user-supplied directory in the sgdeploy\apps directory</li> </ul> <p><b>Default:</b> dawin</p>
<b>[UXSP Settings]</b>	
TK_UXSP_ApplyLatest	<p>Specifies whether uxspi should apply latest updates to the target system if no UXSPs are found for the target system. Setting this variable to <i>Yes</i> will force the UpdateXpress System Pack Installer to apply the latest updates to the target system if no UXSPs are found for that system.</p> <p>Valid values: Yes, No</p> <p><b>Default:</b> No</p>
TK_UXSP_UXSPIUpdateFlags	<p>Specifies user provided command line arguments for processing by the UpdateXpress System Pack Installer in Update mode. To provide command line arguments to be processed by UXSPI, set this variable to the command line arguments.</p> <p>See “UpdateXpress System Pack Installer” on page 45 for a list of command line arguments to use with UXSPI in Update mode.</p> <p><b>Default:</b> blank</p>
TK_UXSP_UpdateXpressSystemPacks	<p>Specifies the location of the UpdateXpress System Packs on the source server.</p> <p>Valid values are:</p> <ul style="list-style-type: none"> <li>• uxsp</li> <li>• a user-specified directory in the SGTKWinPE\updates directory</li> </ul> <p><b>Default:</b> uxsp</p>
TK_UXSP_ForceReboot	<p>Specifies whether to reboot the system after executing the UpdateXpress System Pack Installer.</p> <p>Valid vlues are Yes and No.</p> <p><b>Default:</b> No</p>

---

## Sample job definitions

This section provides descriptions of the sample Altiris jobs provided by the Toolkit, including a description of the variables that can be customized for each job.

All of the sample jobs except imaging jobs without RAID configuration and the Windows PE boot test add logging information to C:\Program Files\Altiris\Express\Deployment Server\temp\ID\IBM\_WinPEToolkit.log.

## Customizing Fibre HBA boot configuration

You can use Toolkit variables to customize the configuration of Fibre HBAs on the target system, allowing them to boot from SAN targets.

By default, the ServerGuide Scripting Toolkit will configure the first QLogic HBA on the system to boot from the first available SAN target (for QLogic Fibre HBAs only. Emulex Fibre HBAs are not supported. For more information, see “Known problems and limitations” on page 106). The BIOS configures the first disk drive that it finds that is also a LUN 0 as a boot device. The ServerGuide Scripting Toolkit uses the following variables to configure Fibre HBAs:

**Note:** Please note that while some examples are broken across multiple lines for formatting reasons, when using these settings, you must include all the information for each variable on a single line.

*Table 3. Fibre HBA boot configuration variables*

Variable	Description
TK_FIBRE_COUNT	<p>Specifies the number of HBA ports to configure.</p> <p>Valid values are 1–<i>n</i>, where <i>n</i> is the number of HBA ports available.</p> <p>This variable affects the use of the following variables:</p> <ul style="list-style-type: none"><li>• TK_FIBRE_N_HBA_ID</li><li>• TK_FIBRE_N_BOOT_DISABLE</li><li>• TK_FIBRE_N_BOOT_PRIM</li><li>• TK_FIBRE_N_BOOT_ALT1</li><li>• TK_FIBRE_N_BOOT_ALT2</li><li>• TK_FIBRE_N_BOOT_ALT3</li></ul> <p>Where N is the HBA number to be configured.</p> <p><b>Note:</b> You must complete one of each of these variables for every HBA port you configure. So if TK_FIBRE_COUNT=2, you must complete one set of these variables for the first port and one for the second.</p>

Table 3. Fibre HBA boot configuration variables (continued)

Variable	Description
TK_FIBRE_N_HBA_ID	<p>Identifies the Fibre HBA to be configured, where <i>N</i> is the HBA number to be configured.</p> <p>Valid values are:</p> <p><i>hba_instance</i></p> <p>the instance number of an HBA port. Valid values are integers from 0 to <i>n-1</i>, where <i>n</i> is the number of HBAs in the system.</p> <p>For example, to configure HBA instance 0: TK_FIBRE_1_HBA_ID=0</p> <p><i>hba_wwpn</i></p> <p>the World Wide Port Name of an HBA port, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxxxx.</p> <p>For example, to configure HBA: 90-87-AA-BB-65-34-BB-E0: TK_FIBRE_1_HBA_ID= 90-87-AA-BB-65-34-BB-E0</p> <p>Default: 0</p>
TK_FIBRE_N_BOOT_DISABLE	<p>Disable the selected current boot device settings on the specified HBA port, where <i>N</i> is the HBA number to be configured.</p> <p>Valid values are</p> <p><b>No</b> Does not clear or disable any boot settings.</p> <p><b>All</b> Disables the primary and all alternate boot settings - Prim, Alt1, Alt2, and Alt3.</p> <p><b>Prim</b> Disables only the primary boot setting.</p> <p><b>Alt1</b> Disables the Alternative 1 boot setting.</p> <p><b>Alt2</b> Disables the Alternative 2 boot setting.</p> <p><b>Alt3</b> Disables the Alternative 3 boot setting.</p> <p>Default: No.</p>
TK_FIBRE_N_BOOT_PRIM = <i>target_wwnn target_wwpn lun_id</i>	<p>Defines the primary boot target settings, where <i>N</i> is the HBA number to be configured, and:</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> - is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: 0 0 0</p> <p>Example:</p> <p>TK_FIBRE_1_BOOT_PRIM= BB-CC-AA-BB-65-34-BB-F1 BB-CC-AA-BB-FF-34-BB-F1 9</p>

Table 3. Fibre HBA boot configuration variables (continued)

Variable	Description
TK_FIBRE_1_BOOT_ALT1 = <i>target_wwnn target_wwpn lun_id</i>	<p>Configures the operating system to use the indicated target as the first alternate boot device, where <i>N</i> is the HBA number to be configured, and</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> - is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: blank.</p> <p>Example:</p> <p>TK_FIBRE_1_BOOT_ALT1= BB-CC-AA-BB-65-34-BB-FD BB-CC-AA-BB-FF-40-BB-F1 5</p>
TK_FIBRE_2_BOOT_ALT2 = <i>target_wwnn target_wwpn lun_id</i>	<p>Configures the operating system to use the indicated target as the second alternate boot device, where <i>N</i> is the HBA number to be configured, and</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> - is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: blank.</p> <p>Example:</p> <p>TK_FIBRE_2_BOOT_ALT2= BB-CC-AA-BB-65-34-BB-FD BB-CC-AA-BB-FF-40-BB-F1 5</p>
TK_FIBRE_3_BOOT_ALT3 = <i>target_wwnn target_wwpn lun_id</i>	<p>Configures the operating system to use the indicated target as the third alternate boot device, where <i>N</i> is the HBA number to be configured, and</p> <ul style="list-style-type: none"> <li><i>target_wwnn</i> - is the World Wide Node Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>target_wwpn</i> - is the World Wide Port Name of a device, in the format xx-xx-xx-xx-xx-xx-xx-xx or xxxxxxxxxxxxxx.</li> <li><i>lun_id</i> - is the Logical Unit Number of a device.</li> </ul> <p>Default: blank.</p> <p>Example:</p> <p>TK_FIBRE_3_BOOT_ALT3= BB-CC-AA-BB-65-34-BB-FD BB-CC-AA-BB-FF-40-BB-F1 5</p>

## Capture and Deploy RAID Configuration and Windows image

The ServerGuide Scripting Toolkit provides sample Altiris jobs to perform OS imaging tasks using Altiris. OS Imaging tasks includes capturing a copy of an

installed OS and deploying an image to a target server. You might need to configure the target server before you deploy the OS image.

**Note:** The donor and target systems must be configured identically in order to deploy the captured RAID configuration and Windows image.

These jobs capture a RAID Configuration along with the OS image, so that you can use both to redeploy the image. In order to run the capture RAID configuration and Windows image sample job, you must first install the Altiris agent on the donor system. The Toolkit's scripted OS install jobs automatically install the Altiris agent.

The capture sample job captures the RAID configuration of the server, and then captures an OS image from the target server and stores both on the Altiris server.

Each deployment sample job deploys the captured RAID configuration, and OS image to the target server. The sample job configures RAID, calls a reboot, and then performs the image deployment.

The following variables may be customized for these jobs within the Altiris Console:

- TK\_PRAID\_PolicyFile="Raid\_Configuration.ini"
- TK\_Path\_PolicyFiles="PolicyFiles\%Machine\_Type%"

## Configure RAID + Install Windows OS

This sample job performs a RAID configuration, restarts the system, and then performs a scripted Operating System installation. You must setup the Windows Operating System being deployed in the Toolkit source tree on the Altiris server. See "Adding Windows installation files" on page 7 for details.

The following variables may be customized for this job within the Altiris Console:

- TK\_Partition\_DiskNum="0"
- TK\_UXSP\_ApplyLatest="No"
- TK\_UXSP\_UXSPIUpdateFlags=""
- TK\_PRAID\_PolicyFile=""
- TK\_Path\_PolicyFiles="PolicyFiles"
- TK\_Partition\_Size="8192"
- TK\_NOS\_NetworkOperatingSystem="Win2003\_x64\_EE"
- TK\_NOS\_AnswerFile="win2003x64.txt"
- TK\_NOS\_ProductKey=""
- TK\_NOS\_DeploymentDriverLibrary="Auto"
- TK\_NOS\_PerformDirectorAgentInstallation="No"
- TK\_NOS\_PerformPostOSInstallUXSPUpdates="No"
- TK\_UXSP\_ForceReboot="No"

## Configuring RAID with a policy file

You can configure RAID controllers using standalone jobs that only configure the RAID controllers and then stop, and jobs integrated with scripted and image-based deployment. The jobs that specify a specific RAID level in them use a pre-configured policy file to create a RAID array of that type on the target machine. The other jobs either deploy a previously captured RAID configuration or create the default RAID configuration if no policy file is specified.

Follow these steps to use a user defined policy file:

1. Create the policy file in the sgdeploy\SGTKWinPE\PolicyFiles directory, for example. UserPolicy1.ini. This is the default location specified by the following variable: TK\_Path\_PolicyFiles="PolicyFiles"
2. Copy a pre-existing Toolkit job with RAID configuration.
3. Modify the TK\_PRAID\_PolicyFile variable in the copied job to point to your policy file. In this example: TK\_PRAID\_PolicyFile="UserPolicy1.ini".

## Capture and deploy RAID configuration

The ServerGuide Scripting Toolkit provides sample Altiris jobs to capture and deploy a RAID Configuration, allowing the RAID configuration of a single server to provide a configuration basis for any number of servers. The capture sample job captures the RAID configuration of the server and stores it in a file named RAID\_Configuration.ini.

By default, all captured RAID configurations are stored in the following directory on the Deployment Server:

*AltirisPath\sgdeploy\SGTKWinPE\PolicyFiles\machinetype*

where:

- *AltirisPath* is the fully qualified path to the Altiris Deployment Solution directory, for example C:\Program Files\Altiris\Express\Deployment Server.
- *machinetype* is the machine type of the captured system.

The deployment sample job deploys the captured RAID configuration from RAID\_Configuration.ini located in the above directory by default. You can customize the following variables for these jobs within the Altiris Console:

- TK\_PRAID\_PolicyFile="Raid\_Configuration.ini"
- TK\_Path\_PolicyFiles="PolicyFiles\%Machine\_Type%"

## Server data disposal

These sample jobs perform a server data disposal. The first performs a disposal and resets the RAID Configuration. The second performs only a server data disposal.

The following variables may be customized for these jobs within the Altiris Console:

Variable	Values
TK_Wipe_Level	<ul style="list-style-type: none"><li>• "quick" - performs a quick wipe of the disks.</li><li>• "dod" - performs a multipass wipe of the disks that conforms to DOD standards.</li></ul>
TK_Wipe_Repeat_Number	<i>number</i> - indicates the number of passes to complete.

Variable	Values
TK_Wipe_Disk	<p><i>disk_number</i> - indicates the number of the disk to wipe. By default, "1" is the first disk in the system.</p> <p><b>Note:</b> Disk numbers from diskpart.exe do not translate directly to TK_Wipe_Disk, because diskpart.exe numbers the first disk as disk zero, while TK_Wipe_Disk numbers it as disk one. You must add one to the disk number returned by diskpart.exe to wipe the correct disk with TK_Wipe_Disk.</p>

**Note:** Depending on the size of the drives involved and the wipe level, these jobs can take up to several hours to complete.

## Microsoft Windows unattended scripted installation

These sample jobs perform scripted installation of Windows Server 2003. You must setup the version of the operating system to be installed on the Altiris server before running these jobs. See "Adding Windows installation files" on page 7 for more information.

You can customize the following variables for these jobs (values shown are defaults for Windows 2003 Server, Enterprise Edition):

- TK\_Partition\_DiskNum="0"
- TK\_UXSP\_ApplyLatest="No"
- TK\_UXSP\_UXSPIUpdateFlags=""
- TK\_Partition\_Size="8192"
- TK\_NOS\_NetworkOperatingSystem="w23\_ent"
- TK\_NOS\_AnswerFile="win2003.txt"
- TK\_NOS\_DeploymentDriverLibrary="Auto"
- TK\_NOS\_PerformDirectorAgentInstallation="No"
- TK\_NOS\_PerformPostOSInstallUXSPUpdates="No"
- TK\_UXSP\_ForceReboot="No"

## Capture and deploy a Windows image

The ServerGuide Scripting Toolkit provides sample Altiris jobs to perform OS imaging tasks using Altiris. Operating system imaging tasks include capturing a copy of an installed OS and deploying an image to a target server. You might need to perform RAID configuration on the target server before you can deploy the OS image to it. In order to run the Capture Windows image sample job, the Altiris agent must first be installed on the donor system. The Toolkit's scripted OS install jobs automatically install the Altiris agent.

To modify the filename and location of the captured image, perform the following steps:

1. Double-Click on the **Capture Windows Image** job.
2. Select the **Create Disk Image** task and click **Modify**.
3. Change the path and filename for the captured image.
4. Click **Finish** to save.
5. Double-click on the **Deploy Windows Image** job.

6. Select the **Distribute Disk Image** task and click **Modify**.
7. Change the path and filename to the same values used above for the captured image.
8. Click **Finish** to save the changes.

## Windows PE Boot Test

This sample job performs a basic task to test connectivity between the target server and the Altiris DS Server. The job boots into the Windows PE x86 environment on the target server. Once connectivity is established, it performs a dir command on the eXpress share of the Altiris DS Server. The job then pauses, requiring user input to continue. There are no variables to be customized for this job within the Altiris Console.

---

## Chapter 5. System Enablement Packs

System Enablement Packs (SEPs) are a collection of files and utilities required to support a specific set of machine types. You can use SEPs to add support for systems that were released after the most current version of the Toolkit.

The files in a System Enablement Pack include system specific utilities, drivers, and scripts. In order for the ServerGuide Scripting Toolkit to support a specific machine type, you must download and install the corresponding System Enablement Pack.

### Downloading System Enablement Packs

The Scripting Toolkit provides the `Altiris_DownloadSEPs.cmd` command to download System Enablement Packs for use in creating deployments. The command file is located in the `C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\Altiris\Altiris_DownloadSEPs.cmd` directory. When you run the `Altiris_DownloadSEPs.cmd` command, it downloads the System Enablement Pack for the specified system. For example:

```
Altiris_DownloadSEPs.cmd 7327,7328
```

After you have downloaded the System Enablement Pack, you must install it on the Toolkit source server in order to create deployments for the supported machine types.

### Installing System Enablement Packs

The Toolkit provides three ways to install System Enablement Packs once they have been downloaded:

1. The `Altiris_DownloadSEPs.cmd` command can install the SEPs that it has downloaded.
2. The `Altiris_InstallSEPs.cmd` command will install SEPs that are stored in the default location - `sgshare\sgdeploy\updates\uxsp`, or from another location specified in the command line.
3. Running the `Altiris_SGTKWinPE.cmd` command to create a deployment scenario will automatically prompt you to install any required System Enablement Packs.

---

## Refreshing the IBM WinPE Toolkit PXE image

When you install new System Enablement Packs, you must refresh the Toolkit PXE image with the new WinPE drivers before you can use them to support new machine types.

Use the `Altiris_RefreshWinPEImage.cmd` command, located by default at `C:\Program Files\Altiris\Express\Deployment Server\sgdeploy\SGTKWinPE\Altiris\Altiris_RefreshWinPEImage.cmd` to refresh the PXE image to include support for the new machine types:

```
Altiris_RefreshWinPEImage.cmd
```



---

## Appendix A. Supported target server hardware and software

The ServerGuide Scripting Toolkit supports deployment of Windows operating systems on IBM eServer™ and IBM eServer™ xSeries® servers. In general, the ServerGuide Scripting Toolkit provides support for ServerProven® IBM or third-party adapters in the following categories:

- Ethernet
- Fibre Channel
- IDE and IDE RAID
- SAS and SAS RAID
- SATA and SATA RAID
- SCSI and SCSI RAID (includes Ultra-SCSI)

This section contains the following information about specific hardware and software support for deployment scenarios:

- A table indicating what combination of operating systems and servers are supported
- A table listing which servers support which RAID controllers and Fibre Channel host bus adapters
- A table indicating which network device driver to use for each supported server.
- Any limitations of support for otherwise supported IBM eServer and IBM eServer™ xSeries servers

Additional information on these topics is contained in the readme.htm file.

You can download the latest version of the readme.htm file from the ServerGuide Scripting Toolkit Web page. See IBM deployment resources on the World Wide Web for information.

---

## Operating system support

This section details what operating system deployment/server combinations are supported by the ServerGuide Scripting Toolkit.

You can use the Scripting Toolkit to deploy supported operating systems to any IBM System x, BladeCenter, or iDataPlex server that supports that operating system. To determine what operating system/server combinations are supported, see IBM ServerProven.

The Scripting Toolkit supports these systems:

- IBM xSeries servers:
  - 206m
  - 226
  - 236
  - 260
  - 336
  - 345
  - 346
  - 366
  - 460
- IBM BladeCenter servers:
  - HS12

- HS20
- HS21
- HS21 XM
- HS22
- LS20
- LS21
- LS22
- LS41
- LS42
- IBM System x servers:
  - x3100
  - x3105
  - x3200
  - x3200 M2
  - x3200 M3
  - x3250
  - x3250 M2
  - x3250 M3
  - x3350
  - x3400
  - x3400 M2
  - x3455
  - x3500
  - x3500 M2
  - x3550
  - x3550 M2
  - x3610
  - x3630 M3
  - x3650
  - x3650 M2
  - x3250T
  - x3655
  - x3755
  - x3755 M3
  - x3800
  - x3850
  - x3850 M2
  - x3950
  - x3950 M2
- iDataPlex servers:
  - DX360 M2

---

## RAID controller support

The following tables detail which RAID controller/server combinations are supported by the ServerGuide Scripting Toolkit.

You can use the Scripting Toolkit to configure any RAID controller supported by the IBM System x, BladeCenter, or iDataPlex server in which it is installed. For information on supported RAID controller/server combinations, see IBM ServerProven.

The Scripting Toolkit supports the following RAID controllers:

- ServeRAID:
  - 4H SCSI

- 4Lx SCSI
- 4Mx SCSI
- 5i SCSI
- 6i/6i+ SCSI
- 6M SCSI
- 7E-SATA
- 7e-SCSI
- 7k SCSI
- 7t SATA
- 8E-SAS
- 8E-SATA
- 8i
- 8k SAS
- 8k-l SAS
- 8s
- B5015
- BR10i
- BR10il
- BR10il v2
- M1015
- M5014
- M5015
- M5025
- MR10i
- MR10ie
- MR10is
- MR10k
- MR10m
- MR1015/MR105-R
- Other supported controllers:
  - IBM 3GB SAS HBA v2
  - IBM-SAS 1068
  - LSI-SAS 1064/1064E
  - LSI-SAS 1078
  - LSI-SCSI 1020/1030
  - LSI MegaRAID 8480

---

## Fibre Channel HBA support

The following tables detail which Fibre Channel HBA/server combinations are supported by the ServerGuide Scripting Toolkit.

You can use the Scripting Toolkit to configure any Fibre Channel HBA supported by the IBM System x, BladeCenter, or iDataPlex server in which it is installed. For information on supported RAID controller/server combinations, see IBM ServerProven.

The Scripting Toolkit supports the following Fibre Channel HBAs:

- 4 GB HBAs:
  - 4 GB DS4000® PCI-X Single Port HBA (39M5894)
  - 4 GB DS4000 FC PCI-X Dual Port HBA (39M5895)
  - 4 GB Fibre Channel Expansion Card for Blades (46M6065)
  - 4 GB SFF Fibre Channel Expansion Card for IBM eServer BladeCenter (26R0890)
  - 4 GB Fibre Channel Expansion Card for IBM BladeCenter (41Y8527)

- Ethernet and 4 GB Fibre Channel Expansion Card for IBM BladeCenter (39Y9306)
- 4 GB Standard Fibre Channel Expansion Card for IBM eServer BladeCenter (26R0884)
- 4 GB Single-Port PCIe HBA for IBM System x (39R6525)
- 4 GB Dual-Port PCIe HBA for IBM System x (39R6527)
- 8 GB HBAs:
  - Brocade Single Port 8GB Fibre Channel HBA for System x (46M6049)
  - Brocade Dual Port 8GB Fibre Channel HBA for System x (46M6050)
  - Emulex 8 GB Dual Port Fibre Channel Expansion Card for BladeCenter (46M6140)
  - Emulex 8Gb FC Single/Dual Port HBA (42D0494)
  - QLogic Ethernet and 8GB Fibre Channel Card for Blades (44x1940)
  - QLogic 8 GB Fibre Channel Expansion Card for Blades (44X1945)
  - QLogic 8 GB Fibre Channel Single-port HBA for System x (42D0501)
  - QLogic 8 GB Fibre Channel Dual-port HBA for System x (42D0510)
- 10 GB HBAs:
  - Brocade 2-port 10Gb Converged Network Adapter for IBM BladeCenter
  - Brocade 10 GB Dual Port CAN for System x (42C1820)
  - Qlogic Dual Port CAN for System x (42C1800)
  - QLogic 2 port 10 GB Converged Network Adapter (CFFh) for BladeCenter (42C1830)

---

## Advanced Settings Utility Support

This section lists the systems supported by the Advanced Settings Utility through the Scripting Toolkit.

*Table 4. ASU support by the Toolkit*

Systems supported by ASU and the Scripting Toolkit	
Model	Type
xSeries 260	8865
xSeries 366	8863
xSeries 460	8872
System x3200	4362, 4363
System x3200 M2	4367, 4368
System x3200 M3	7327, 7328
System x3250 M2	4190, 4191, 4194
System x3250 M3	4251, 4252, 4261
System x3350	4192, 4193
System x3400	7973, 7974, 7975, 7976
System x3400 M2	7836, 7837
System x3400 M3	7378, 7379
System x3455	7940, 7941
System x3500	7977
System x3500 M2	7839
System x3500 M3	7380
System x3550	1913, 7978
System x3550 M2	4198, 7946

Table 4. ASU support by the Toolkit (continued)

System x3550 M3	4254, 7944
System x3620 M3	7376
System x3630 M3	7377
System x3650	1914, 7979
System x3650 M2	4199, 7947
System x3650 M3	4255, 7945
System x3655	7943, 7985
System x3690 X5	7148, 7149
System x3755	7163, 8877
System x3755 M3	7164
System x3800	8865, 8866
System x3850	7362, 7365, 8864
System x3850 M2	7141, 7144, 7233
System x3850 X5	7145
System x3950	7363, 7366, 8878
System x3950 M2	7141, 7144, 7234
System x3950 X5	7146
IBM BladeCenter HS12	1916, 8014, 8028
IBM BladeCenter HS20	1883, 8843
IBM BladeCenter HS21	1885, 8853
IBM BladeCenter HS21 XM	1915, 7995
IBM BladeCenter HS22	1936, 7809, 7870
IBM BladeCenter HS22V	1949, 7871
IBM BladeCenter HX5	1909, 7872
AMD Opteron LS20 for IBM BladeCenter	8850
AMD Opteron LS21 for IBM BladeCenter	7971
AMD Opteron LS22 for IBM BladeCenter	7901
AMD Opteron LS41 for IBM BladeCenter	7972
AMD Opteron LS42 for IBM BladeCenter	7902
IBM System x iDataPlex dx360 M3	6391



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## Appendix B. ServerGuide Scripting Toolkit utilities and tools

This section contains information about the utilities that are included in the ServerGuide Scripting Toolkit, and the tools that are shipped with it. For each utility there is a description of parameters, along with examples.

For each included tool there is a brief description of the tool and instructions on using it with the ServerGuide Scripting Toolkit, as well as pointers on where to get more information on the tool and its use.

---

### Altiris\_SGTKWinPE.cmd

#### Purpose

This script builds the IBM specific Windows Preinstallation Environment for Altiris Deployment Solution and integrates the Toolkit into Altiris Deployment Solution

#### Note:

1. This script must be executed from the directory in which it resides.
2. The Altiris Deployment Solution and Toolkit must be installed in a path that does not contain parentheses.

#### Altiris\_SGTKWinPE

#### Parameters

There are no parameters

#### Sample

Altiris\_SGTKWinPE

---

### Altiris\_DownloadSEPs.cmd

TheAltiris\_DownloadSEPs.CMD script is used to download System Enablement Packs for specific Machine Types to the ServerGuide Scripting Toolkit. The syntax is:

Altiris\_DownloadSEPs.cmd *machine\_types* [/?]

#### Parameters

*machine\_types*

A comma-separated list of machine types for which to download System Enablement Packs. To download all available System Enablement Packs, use *all* as the machine type.

/? Displays the help.

---

### Altiris\_InstallSEPs.cmd

The Altiris\_InstallSEPs.CMD script is used to install System Enablement Packs on the ServerGuide Scripting Toolkit source server. The syntax is:

Altiris\_InstallSEPs.cmd *sep\_path* [/F | /?]

## Parameters

*sep\_path*

The fully-qualified path to the folder containing the System Enablement Packs.

**/F** Forces the installation of all detected System Enablement Packs without prompting.

**/?** Displays the help.

---

## Altiris\_RefreshWinPEImage.cmd

The Altiris\_RefreshWinPEImage.cmd script is used to update the Windows PE drivers and regenerate the Windows PE PXE image after installing a new System Enablement pack on the ServerGuide Scripting Toolkit source server.

Use the Altiris\_SGTKWinPE.cmd script whenever you install a new version of the ServerGuide Scripting Toolkit on your source server. Use the Altiris\_RefreshWinPEImage.cmd script whenever you install a new System Enablement Pack on your source server. The Altiris\_RefreshWinPEImage.cmd script maintains the job associations with Windows PE PXE image.

The syntax of the Altiris\_RefreshWinPEImage.cmd is:

Altiris\_RefreshWinPEImage

---

## Tools included with the ServerGuide Scripting Toolkit

The ServerGuide Scripting Toolkit includes several additional tools to make the Toolkit more efficient. This section describes the additional tools provided by this release of the ServerGuide Scripting Toolkit, Windows edition:

- Advanced Settings Utility
- SCLI
- UpdateXpress System Pack Installer

## Advanced Settings Utility

For convenience, the ServerGuide Scripting Toolkit, Windows edition, includes the IBM Advanced Settings Utility (ASU). You can use the IBM® Advanced Settings Utility (ASU) to modify firmware settings from the command line on multiple operating-system platforms.

The ServerGuide Scripting Toolkit uses a subset of the ASU function in order to capture and deploy firmware settings as part of your scripted deployments.

## Usage

This section describes the ASU functions used by the ServerGuide Scripting Toolkit.

*Table 5. ASU functions in ServerGuide Scripting Toolkit*

Command	Description
asu.exe show bios	Is used to display and capture CMOS settings. You can use redirection to store this output in a file as shown here: asu.exe show bios > bios_settings.ini

Table 5. ASU functions in ServerGuide Scripting Toolkit (continued)

Command	Description
asu.exe replicate <i>filename</i>	<p>Is used to apply CMOS settings from a file. ASU looks for the filename specified by <i>filename</i>, and reads the contents. If the contents are valid CMOS settings, they are applied, one line at a time, to the server. This example applies the settings captured above:</p> <pre>asu.exe replicate bios_settings.ini</pre> <p><b>Note:</b> Only settings captured from an identical model can be replicated, due to difference in BIOS settings and valid values between models.</p>

## Updating the ASU executable

This section describes how to update the Advanced Settings Utility executable file used by the ServerGuide Scripting Toolkit, Windows Edition.

### Before you begin

You will need the following to update the ASU executable used by the Scripting Toolkit:

- The file: `ibm_utl_asu_asutversion_windows_i686.exe`, where *version* is the updated version of ASU.
- The file: `ibm_utl_asu_asutversion_windows_x86-64.exe`, where *version* is the updated version of ASU.
- A Scripting Toolkit source server

### Procedure

1. On the source server, navigate to `..\sgdeploy\SGTKWinPE\Bin\win32`.
2. Copy the file `ibm_utl_asu_asutversion_windows_i686.exe` to that directory.
3. Execute the file.
4. When prompted, enter A to overwrite all of the old files.
5. When the update is complete, navigate to `..\sgdeploy\SGTKWinPE\Bin\winx64`.
6. Copy the file `ibm_utl_asu_asutversion_windows_x86-64.exe` to that directory.
7. Delete the file `asu.exe`.
8. Execute `ibm_utl_asu_asutversion_windows_x86-64.exe`.
9. When prompted, enter A to overwrite all of the old files.
10. Rename `asu64.exe` to `asu.exe` in this directory.

## SCLI.EXE

You can use the SCLI utility to configure Fibre Host Bus Adapters (HBAs). 32- and 64-bit versions of this utility come with the ServerGuide Scripting Toolkit, Windows Edition. You can download this utility from QLogic at <http://www.qlogic.com>. You can also view the SCLI documentation in the `sgdeploy\SGTKWinPE\Docs\scli` directory.

## Usage

Table 6. SCLI usage

Command	Description
scli.exe -e (view   ?)	Shows the current boot device information on all HBAs
scli.exe -e (hba_instance   hba_wwpn target_wwnn target_wwpn lun_id [prim   alt1   alt2   alt3])	<p>Configures the Operating System to boot from a particular target, where:</p> <p><b>hba_instance</b> The HBA instance number of an HBA port.</p> <p><b>hba_wwpn</b> The World Wide Port Name of an HBA port.</p> <p><b>target_wwnn</b> The World Wide Node Name of a target device, in the format <i>nn-nn-nn-nn-nn-nn-nn-nn</i> or <i>nnnnnnnnnnnnnnnnnnnn</i>.</p> <p><b>target_wwpn</b> The World Wide Port Name of a target device, in the format <i>nn-nn-nn-nn-nn-nn-nn-nn</i> or <i>nnnnnnnnnnnnnnnnnnnn</i>.</p> <p><b>lun_id</b> The Logical Unit Number of a LUN.</p> <p><b>prim</b> The primary boot port name.</p> <p><b>alt<i>n</i></b> The name of the alternate boot port. You can specify up to three alternate boot ports.</p>
scli.exe -e (hba_instance   hba_wwpn) (view   ?)	Shows the current boot device information for the specified HBA port.
scli.exe -e (hba_instance   hba_wwpn) (enable   0 0 0)	Configures the operating system to boot from the first target found by the BIOS. The default LUN is 0.
scli.exe -e (hba_instance   hba_wwpn) disable [prim   alt1   alt2   alt3]	Clears the selected boot device settings on the indicated HBA port.
scli.exe -l (hba_instance   hba_wwpn)	Displays information about the LUNs attached to the specified HBA port.

## Examples

The following examples illustrate scli.exe utility usage.

**Note:** Please note that while some of these examples are broken across multiple lines, when using SCLI.EXE, you must enter all of the parameters on a single line.

Example	Description
scli.exe -e view	Displays the current boot device information on all HBAs.
scli.exe -e E0-FF-EE-DE-CD-34-56-30 E0-00-ED-DE-CD-34-56-30 E0-10-ED-DE-CD-34-56-30 1 prim	Configures HBA E0-FF-EE-DE-CD-34-56-30 to boot from the primary target.
scli.exe -e E0-FF-EE-DE-CD-34-56-30 view	Displays the current boot setting information for HBA port E0-FF-EE-DE-CD-34-56-30.
scli.exe -e E0-FF-EE-DE-CD-34-56-30 disable prim	Clears the selected boot device setting on HBA port E0-FF-EE-DE-CD-34-56-30.

Example	Description
<code>scli.exe -l E0-FF-EE-DE-CD-34-56-30</code>	Displays information about the LUNs attached to HBA port E0-FF-EE-DE-CD-34-56-30.

## UpdateXpress System Pack Installer

For convenience, the ServerGuide Scripting Toolkit, Windows edition includes the UpdateXpress System Pack Installer (UXSPI) to help you acquire updates for inclusion in your deployment scenarios.

The UpdateXpress System Pack Installer can perform these functions:

- Acquire firmware and driver updates for supported machine type/operating system combinations from a remote location, such as the IBM Support Web site.
- Inventory a system to be updated and compare the inventory to the list of available updates, then recommend and deploy a set of updates for the system.
- Create bootable media on CD-ROM, DVD, or USB key to use in applying firmware to supported systems.

For more information on running the UpdateXpress System Pack Installer, please refer to the UXSPI User's Guide in the `sgdeploy\SGTKWinPE\Docs\uxspi` directory.

## WINLPCFG.EXE

You can use the WINLPCFG utility to configure Fibre Host Bus Adapters (HBAs). 32-bit and 64-bit versions of this utility come with the ServerGuide Scripting Toolkit, Windows Edition. You can download this utility from Emulex at <http://www.emulex.com>. You can also view the Emulex documentation in the `sgdeploy\SGTKWinPE\Docs\winlpcfg` directory.

### Usage

Table 7. WINLPCFG usage

Command	Description
<code>winlpcfg.exe help</code> <code>winlpcfg.exe ?</code> <code>winlpcfg.exe help <i>command</i></code> <code>winlpcfg.exe ? <i>command</i></code>	<p>Displays help for the winlpcfg.exe command.</p> <p>To view a list of all available commands, enter: <code>winlpcfg.exe help</code> or <code>winlpcfg.exe ?</code>.</p> <p>To view the help for a specific command, add the command name. For example:</p> <p><code>winlpcfg.exe help download</code></p> <p>or</p> <p><code>winlpcfg.exe ? download</code></p>
<code>winlpcfg.exe listwnn</code>	Lists all adapters installed in the system and shows the factory-assigned WWN, the nonvolatile WWPN and the WWNN used to identify the adapter in the SAN.

Table 7. WINLPCFG usage (continued)

Command	Description
winlpcfg.exe listhba	Lists the following information for all installed adapters in the system: <ul style="list-style-type: none"> <li>• Adapter number</li> <li>• IEEE address assigned by the manufacturer</li> <li>• Firmware version</li> <li>• Adapter type</li> <li>• Possible mailbox errors</li> </ul>
winlpcfg.exe readbootdevice n=adapter_number	Displays the WWN, LUN, and the topology in use for the indicated boot device.
winlpcfg.exe enableboot n=adapter_number i=index	Enables or disables the BootBIOS specified by the index number on the specified adapter.
winlpcfg.exe setbootdevice n=adapter_number w0=wwpn_word_0 w1=wwpn_word_2 l=lun t=topology	Sets the boot device to the indicated adapter, WWPN, and topology (select 0 for Arbitrated Loop or 1 for Point to Point).
winlpcfg.exe readaltboot n=adapter_number	Displays the WWN and LUN of all possible alternate boot devices. Up to seven alternate boot devices are supported.
winlpcfg.exe setaltboot i=index w0=wwpn_word_0 w1=wwpn_word_2 l=lun	Specifies an alternate boot device. You can set up to seven boot devices by specifying indexes from 1 to 7.

## Examples

The following examples illustrate winlpcfg.exe utility usage.

**Note:** Please note that while some of these examples are broken across multiple lines, when using WINLPCFG.EXE, you must enter all of the parameters on a single line.

Example	Description
winlpcfg.exe help	Displays all available commands.
winlpcfg listwwn	Displays the WWNs of all adapters in the system.
winlpcfg listhba	Lists all adapters in the system.
winlpcfg readbootdevice n=1	Displays the WWN, LUN, and topology for adapter number one.
winlpcfg enableboot n=6 i=1	Enables BootBios on adapter number 6.
winlpcfg setbootdevice n=1 w0=a1b2c3d4 w1=b946a4e8 l=46 t=0	Sets the boot device to adapter number one, LUN 46, with an Arbitrated Loop topology.
winlpcfg readaltboot n=1	Displays the WWN and LUN number of all possible alternate boot devices.
winlpcfg setaltboot n=1 i=1 w0=12345678 w1=a842b6 l=3	Sets the alternate boot device on adapter 1, LUN 3.

---

## ServerGuide Scripting Toolkit utilities

This section contains information about the utilities that are included in the ServerGuide Scripting Toolkit. For each utility there is a description of parameters, along with examples.

The command-line syntax examples in this documentation use the following conventions:

- Variables are shown in *italics*
- Required parameters are shown within <> brackets
- Optional parameters are shown within [] brackets
- Required or optional parameters from which you must make a unique choice are separated by a vertical bar (|) character

You must enter all parameters for a utility on a single command line, even when the information in this documentation is shown on multiple lines.

### CLINI.EXE

The Command Line INI utility can perform the following functions:

- Write information to an INI file:
  - Add new sections, items, or values
  - Remove sections, items, or values
  - Change existing sections, items, or values
  - Change or append to values of existing sections or items
  - Comment or uncomment sections, items, or values
- Read information from an INI file:
  - Read items and store all or part of the value as an environment variable
  - Read items and check all or part of the value for strings, substrings, or tokens
- Merge information from one INI to another.

Two versions of the Command Line INI utility come with the ServerGuide Scripting Toolkit:

- A 32-bit version for use on Microsoft Windows 32-bit operating systems and the 32-bit version of Windows Preinstallation Environment (Windows PE) 2.1. The 32-bit version was formerly named `clini32.exe`.
- A 64-bit version for Windows x64 operating systems and for Windows PE 2.1 (x64).

Storing a value as an environment variable is done by creating a batch file that contains a command to set the environment variable. You must then call the batch file to set the environment variable. By default, the batch file is named `cliniset.bat`. If the batch file already exists, it is deleted and recreated with the new information.

**Note:** Because the media is read-only, this feature cannot be used on a bootable Windows PE CD or DVD.

In addition to setting values, the `clini.exe` program can append values to existing items in an INI file. By default, no delimiter is used to append values. A delimiter can be specified, if required. Appending values provides the ability to 'build' values in the INI file by issuing multiple commands. When reading values from an INI file to set an environment variable, the values can be tokenized to specify a particular token.

The clini.exe program checks the number of characters on the command line and displays a message if the characters exceed the limit. The /O parameter overrides character-limit checking.

The clini.exe utility has the following command-line syntax:

```
clini <filename> <[filename2 [/ES] [/A|/U|/P]]> <[/S:section]
[/I:item] [/V:value|/A:value|/U:value|/E:variable
/=:string|/C:string|/CT:string]> [/B:file_name]
[/D:delimiter] [/T:n] [/R] <[/CMT|/UCMT] [/AI]
[/CC:character]]> [/NS] [/N] [/O]
```

Parameter	Description
<i>filename</i>	Defines the fully qualified path to the INI file to process
<i>filename2</i>	Defines the fully qualified path to an INI file to merge information into from <i>filename</i> . All values in <i>filename</i> are copied into <i>filename2</i> , replacing the value of any preexisting items in <i>filename2</i> .
/ES	Specifies to merge only the items or values in the empty section.
/A	Specifies to append values from items in <i>filename</i> to the items in <i>filename2</i> instead of replacing them. An optional delimiter can be specified using the /D:delimiter parameter.
/U	Specifies to uniquely append values from items in <i>filename</i> to the items in <i>filename2</i> instead of replacing them; only if the value doesn't already exist. An optional delimiter can be specified using the /D:delimiter parameter.
/P	Specifies that the data in <i>filename2</i> is persistent. If duplicate items are found, they are not replaced.
/S:section	Specifies the name of the section within the INI file to write or to read.
/I:item	Specifies the name of the item within the INI file to write or to read.
/V:value	Specifies the value to write to the INI file.
/A:value	Specifies the value to append to the existing item in the INI file. The /I parameter is required to use the /A:value parameter.
/U:value	Specifies a unique value to append to the existing item in the INI file, only if this value does not already exist for the item. The /I parameter is required to use the /U:value parameter.
/E	Convert multiple Items to Environment Variables. The Item name is used for the environment variable name. Use the /NS parameter to replace any spaces in the item names with underscore characters when creating the Environment Variables, if spaces are not desired.
/E:variable	Specifies the environment variable used to store the value of the item from the INI file. The /I parameter is required to use the /E:variable parameter. If the item specified by the /I parameter does not exist, or the section specified by the /S parameter does not exist, the environment variable has no value in the batch file created by clini.exe. If the environment variable exists on the system, it is deleted when the batch file runs.
/=:string	Verifies that the value of the item is equal to <i>string</i> , returning a value of 0 if true and 100 if false.
/C:string	Verifies that value of the item has <i>string</i> as a substring, returning a value of 0 if true and 100 if false.
/CT:string	Verifies that the value of the item has <i>string</i> as one of the tokens, returning a value of 0 if true and 100 if false. The default delimiter is a comma unless the /D:delimiter option is specified.

Parameter	Description
<i>/B:filename</i>	Defines the fully qualified path and file name of the batch file to create for setting the environment variable. The default is CLIniSet.bat if no file name is specified for this parameter. This parameter is only valid when the /E parameter is used.
<i>/D:delimiter</i>	Specifies a delimiter to use when appending values to an item in an INI file or reading tokens from an INI file. This parameter is not valid if the /V parameter is used. The /D parameter is valid only with the /A, /U, or /E parameters. Using the /D parameter without one of these three parameters results in a syntax error.
<i>/T:n</i>	Specifies the token in a delimited value to set as the specified environment variable, where <i>n</i> is a positive integer. The default delimiter is a comma unless otherwise specified with the /D parameter. This parameter is only valid with the /E parameter.
/R	Removes the specified section, item, or value from the INI file. Removing the last item in a section also removes the section.
/CMT	Specifies to Comment out the line indicated by the Section, Item, or Value parameter, if it exists in the INI file. It also allows use of the /AI parameter.
/UCMT	Specifies to Uncomment the line indicated by the Section, Item, or Value parameter, if it exists in the INI file. It also allows use of the /AI parameter.
<i>/CC:character</i>	Specifies the comment character to use when commenting or uncommenting lines. If omitted, the default comment character is the semicolon. This parameter is only valid with the /CMT or /UCMT parameters.
/AI	Specifies to explicitly treat the /V parameter as the value to all items when commenting or uncommenting. This parameter is only valid when using the /CMT or /UCMT parameters.
/N	Deletes an existing INI file and creates a new INI file. This parameter is not valid with the /E parameter.
/NS	Omits spaces around "=" when writing items into INI files. By default, the clini.exe utility concatenates spaces around "=" when writing items.
/O	Overrides the command-line character count. The number of characters on the command line is automatically determined by this utility. An error message is displayed when the character limit is reached, unless you override this feature. The Windows command line is limited to 8189 characters.

The clini.exe utility returns the following values to indicate status:

Value	Description
0	Success or true
1	Syntax error
2	Program error
3	Destination is read-only
4	Current <sup>®</sup> working directory is read-only
5	File not found
100	False

The following examples illustrate Command Line INI utility usage.

Example	Description
<pre>clini info.ini /S:Hardware /I:Machine Type /V:8549 /N</pre>	Deletes any existing info.ini file and creates a new INI file named info.ini with a section called Hardware that contains one item, Machine Type, which has a value of "8549".
<pre>clini info.ini /S:Hardware /I:Machine Name /V:Server1</pre>	Adds the item Machine Name, with a value of Server1, to the existing Hardware section of the info.ini file.
<pre>clini info.ini /S:Hardware /I:Machine Type /E:MachineType  call CLIniSet.bat</pre>	Reads the Machine Type value from the info.ini file, and stores it as an environment variable called MachineType.
<pre>clini info.ini /S:Hardware /I:Machine Type2 /V:%MachineType%</pre>	Writes the value of the environment variable MachineType to the INI file named info.ini, using section Hardware and item Machine Type2.
<pre>clini info.ini /S:Hardware /I:Machine Type2 /E:MachineType2 /B:d:\EnvSet1.bat  call d:\EnvSet1.bat</pre>	Reads the Machine Type value from the info.ini file and stores it as an environment variable called MachineType2 using a custom path and name for the batch file created to set the environment variable.
<pre>Clini info.ini /S:MySection /E  Call cliniset.bat</pre>	This example creates environment variables for all the items found in section MySection.
<pre>Clini info.ini /AI /E /B:setthem.bat  Call setthem.bat</pre>	This example creates environment variables for all the items found in any section of the info.ini file and uses an alternate name for the CLIniSet.bat file.
<pre>Clini info.ini /S:MySection /I:MyItem /E  Call cliniset.bat</pre>	This example creates an environment variable called MyItem if it exists in the info.ini file.
<pre>Clini info.ini /S:MySection /I:My Item /E /NS  Call cliniset.bat</pre>	This example creates an environment variable called My_Item (converts the space to an underscore for the environment variable name) if the item exists in the info.ini file.
<p>After running the first five examples above, in sequence, the info.ini file would contain the following information:</p> <pre>[Hardware] Machine Type = 8549 Machine Type2 = 8549 Machine Name = Server1</pre> <p>Also, two new environment variables would be created as indicated below:</p> <pre>MachineType = 8549 MachineType2 = 8549</pre>	
<pre>clini info.ini /S:User /I:Name /V:Toolkit /N clini info.ini /S:User /I:Name /A: User  or  clini info.ini /S:User /I:Name /V:Toolkit /N clini info.ini /S:User /I:Name /A:User /D:" "</pre>	Creates a new file named info.ini with a section called User and one item called Name, which is set equal to "Toolkit User". The resulting info.ini file contains:  [User] Name = Toolkit User
<pre>clini info.ini /S:Section /I:Item /A:Value1 /D:, /N clini info.ini /S:Section /I:Item /A:Value2 /D:, clini info.ini /S:Section /I:Item /A:Value3 /D:, clini info.ini /S:Section /I:Item /A:Value2 /D:,</pre>	Creates a new file named info.ini with a comma delimited list of values. The resulting info.ini file contains:  [Section] Item = Value1,Value2,Value3,Value2

Example	Description
<pre> clini info.ini /S:Section /I:Item /U:Value1 /D:, /N clini info.ini /S:Section /I:Item /U:Value2 /D:, clini info.ini /S:Section /I:Item /U:Value3 /D:, clini info.ini /S:Section /I:Item /U:Value2 /D:, </pre>	<p>Creates a new file named info.ini with a comma delimited list of unique values. The resulting info.ini file contains:</p> <pre> [Section] Item = Value1,Value2,Value3 </pre>
<pre> clini info.ini /S:Section /I:Item /E:MyEVariable /T:2  or  clini info.ini /S:Section /I:Item /E:MyEVariable /T:2 /D:, </pre>	<p>Reads information from the info.ini file created in the previous example, and sets the second value of the item to the MyEVariable environment variable. The resulting CLIniSet.bat file contains:</p> <pre> Set MyEVariable=Value2 </pre>
<p>Content of doit.bat:</p> <pre> @Echo off clini info.ini /S:Section /I:Item /V:Value1 /N clini info.ini /S:Section /I:Item /=:Value1 if errorlevel 100 goto itsfalse if errorlevel 1 goto error if errorlevel 0 goto itstrue :error Echo Error occurred Goto end :itsfalse Echo It's false Goto end :itstrue Echo It's true :end </pre>	<p>This example creates a file called info.ini with the following content:</p> <pre> [Section] Item = Value1 </pre> <p>Then it checks to see if the value of Item in [Section] is equal to Value1 and displays a message.</p> <p>After running doit.bat, the follow message is displayed:</p> <pre> It's true </pre>
<p>Content of doit.bat:</p> <pre> @Echo off clini info.ini /S:Section /I:Item /V:Value1 /N clini info.ini /S:Section /I:Item /C:alu if errorlevel 100 goto itsfalse if errorlevel 1 goto error if errorlevel 0 goto itstrue :error Echo Error occurred Goto end :itsfalse Echo It's false Goto end :itstrue Echo It's true :end </pre>	<p>This example creates a file called info.ini with the following content:</p> <pre> [Section] Item = Value1 </pre> <p>Then it checks to see if the value of Item in [Section] contains substring alu and displays a message.</p> <p>After running doit.bat, the follow message is displayed:</p> <pre> It's true </pre>

Example	Description
<p>Content of doit.bat:</p> <pre>@Echo off clini info.ini /S:Section /I:Item /V:V1,V2,V3 /N clini info.ini /S:Section /I:Item /CT:V2 if errorlevel 100 goto itsfalse if errorlevel 1 goto error if errorlevel 0 goto itstrue :error Echo Error occurred Goto end :itsfalse Echo It's false Goto end :itstrue Echo It's true :end</pre>	<p>This example creates a file called info.ini with the following contents:</p> <pre>[Section] Item = V1,V2,V3</pre> <p>Then it checks to see if the value of Item in [Section] contains token V2 in a comma delimited list and displays a message.</p> <p>After running doit.bat, the follow message is displayed:</p> <p>It's true</p>
Clini info1.ini info2.ini	This example copies all the Sections, Items, and Values from info1.ini into info2.ini. Any existing values for items in info2.ini are replaced.
Clini info1.ini info2.ini /P	This example copies all the Sections, Items, and Values from info1.ini into info2.ini. Any values for existing items in info2.ini are kept. Only new Items/Values are copied over from info1.ini.
Clini info1.ini info2.ini /S:MySection	This example copies all the Items and Values from the Section called MySection in info1.ini into the Section called MySection in info2.ini replacing any Values that may already exist in the Section called MySection in info2.ini.
Clini info1.ini info2.ini /S:MySection /I:MyItem	This example copies the Value from the Section called MySection, for the Item called MyItem in info1.ini into the same Section and Item in info2.ini replacing the existing Value in info2.ini if it already exists.
Clini info1.ini info2.ini /ES	This example copies all the Items and Values from the empty section (Items and Values that are not in a section) in info1.ini into info2.ini replacing any existing Items in the empty section in info2.ini.
Clini info1.ini info2.ini /A	This example appends all the Values from the Sections and Items from info1.ini to info2.ini.
Clini info1.ini info2.ini /U	This example uniquely appends all the Values from the Sections and Items from info1.ini to info2.ini if the Value does not already exist in info2.ini.
Clini info1.ini info2.ini /U /D:	This example uniquely appends all the Values from the Sections and Items from info1.ini to info2.ini using a comma as the delimiter if the Value does not already exist in info2.ini.
Clini info.ini /V:My Ini Line /CMT	This example comments out the line My Ini Line in the empty section in the info.ini file with a semicolon if the line exists.
Clini info.ini /S:MySection /V:My Ini Line /UCMT	This example uncomments the line My Ini Line in the MySection section of the info.ini if the line exists.
Clini info.ini /I:MyItem /CMT	This example comments out the line idicated by the item MyItem in the empty section of the info.ini file if the item exists.

Example	Description
Clini info.ini /S:MySection /I:MyItem /CMT /CC:#	This example comments out the line indicated by the item MyItem in the section MySection in the info.ini file with a # sign if the item exists.
Clini info.ini /s:MySection /AI /V:My Value /CMT	This example comments out the lines indicated by any item that has a value of <i>My Value</i> of all the items in the section MySection in the info.ini file if the item exists.
Clini info.ini /s:MySection /CMT	This example comments out the section header indicated by MySection in the info.ini file if the section exists.

## DDCOPY.EXE

The Device Driver Copy (ddcopy.exe) utility can copy only those drivers in the driver set that support a specific machine.

Two versions of the utility come with the ServerGuide Scripting Toolkit:

- A 32-bit version for Windows 32-bit operating systems and for the Windows Preinstallation Environment (Windows PE) 2.1 (32-bit)
- A 64-bit version for Windows x64 operating systems and for Windows PE 2.1 (x64).

Microsoft uses the term *device-driver directory* to refer to the directory that contains drivers for an individual device. All device-driver files are located in individual device-driver directories that contain the files for an individual device driver. The following directories are device-driver directories:

- \adaptec
- \asm
- \hal
- \ideraid
- \srvraid

However, when specifying the source path for the ddcopy command, always specify the directory that contains the drvset.ini file. In this case, the source directory is the C:\w03\_drv\%oem%\\$1\drv directory.

When you issue a ddcopy command against a directory that contains device-driver directories, ddcopy copies all of the device drivers that are specific to the specified machine types and any other files located in the drv directory to the new location.

The SupportedSystems keyword in the drvset.ini file is modified to reflect the new machine list.

The ddcopy.exe utility has the following command-line syntax:

```
ddcopy <source_path> <destination_path> [/M:machine_types or platform_ids]
[/C:category] | [/V:n] [/?]
```

Parameter	Description
<i>source_path</i>	Defines the fully qualified path to the directory that contains the device-driver directories and the drvset.ini file.
<i>destination_path</i>	Specifies the fully qualified path of the target directory for copying the device drivers.

Parameter	Description
<i>/M:machine_types or platform_ids</i>	Specifies machine types or platform IDs to limit the number of drivers that are copied. Multiple machine types or platform IDs are allowed when delimited by commas.
<i>/C:category</i>	Specifies the driver categories to limit the device drivers to be copied. Multiple categories can be specified using a comma as the delimiter. If omitted, then all the device driver categories are copied. Valid values are: <ul style="list-style-type: none"> <li>• Network</li> <li>• Video</li> <li>• Management</li> <li>• Chipset</li> <li>• Mass Storage</li> <li>• Application</li> <li>• Tape</li> <li>• Hotfix.</li> </ul> This is only valid with driver sets from ServerGuide 7.4.12 or greater.
<i>/V:n</i>	Specifies the verbose level used to report status during the deployment process. Valid values for n are: <ul style="list-style-type: none"> <li>• <b>0</b> - quiet mode</li> <li>• <b>3</b> - default</li> <li>• <b>5</b> - maximum information</li> </ul>

The ddcopy.exe utility returns the following values to indicate status:

Value	Description
0	Success
1	Syntax error
2	Program error
3	Failed to copy
4	Machine type or platform ID not found
5	Destination is read-only
6	File not found

The following examples illustrate ddcopy.exe utility usage.

Example	Description
ddcopy d:\drivers\%oem%\\$1\drv c:\wininst\%oem%\\$1\drv	Copies all the drivers from the d:\drivers\%oem%\\$1\drv directory to the c:\wininst\%oem%\\$1\drv directory.
ddcopy d:\drivers\%oem%\\$1\drv c:\wininst\%oem%\\$1\drv /M:8832	Copies the drivers that are specifically for machine type 8832 from the d:\drivers\%oem%\\$1\drv directory to the c:\wininst\%oem%\\$1\drv directory and updates the supported systems field in the drivers' DrvInfo.ini file and the c:\wininst\%oem%\\$1\drv\drvset.ini file.

Example	Description
ddcopy d:\drivers\%oem%\\$1\drv c:\wininst\%oem%\\$1\drv /M:8832,8865	Copies the drivers for machine type 8832 and machine type 8865 from the d:\drivers\%oem%\\$1\drv directory to the c:\wininst\%oem%\\$1\drv directory and updates the supported systems field in the drivers' DrvInfo.ini file and the c:\wininst\%oem%\\$1\drv\drvset.ini file.
ddcopy d:\drivers\%oem%\\$1\drv c:\mydrvs /m:8832 /c:network,video	Copies the Network and Video drivers specific to the machine type 8832 from the d:\drivers\%oem%\\$1\drv directory to the c:\mydrvs directory and updates the supported systems field in the drivers' DrvInfo.ini file as well as the c:\mydrvs\drvset.ini file.

## DSCAN.EXE

The Driver Scan utility can perform the following functions:

- Scan a device driver or set of device drivers to determine the installation mode (text mode, Plug and Play, or executable) and write this information to the drvinfo.ini file that is located in each device-driver directory. The drvinfo.ini file is used by the unattend.exe command during the installation of Windows operating systems.
- Create a text mode directory, copy all text mode device drivers into that directory, then dynamically create a master txtsetup.oem file that contains all of the unique information that is in the individual txtsetup.oem files. Known unattended installation defects are automatically addressed.

Two versions of the utility come with the ServerGuide Scripting Toolkit:

- A 32-bit version for Windows 32-bit operating systems and for the Windows Preinstallation Environment (Windows PE) 2.1 (32-bit)
- A 64-bit version for Windows x64 operating systems and for Windows PE 2.1 (x64).

Microsoft uses the term *device-driver directory* to refer to the directory that contains drivers for an individual device. All device-driver files are located in individual device-driver directories that contain the files for an individual device driver. The following directories are device-driver directories:

- \adaptec
- \asm
- \hal
- \ideraid
- \srvraid

However, when specifying the source path for the ddcopy command, always specify the directory that contains the drvset.ini file. In this case, the source directory is the C:\w03\_drv\%oem%\\$1\drv directory.

When you issue a dscan command against a directory that contains device-driver directories, dscan performs its tasks against all of the subdirectories that the

directory contains, with the exception of the drvutils directory. The drvutils directory contains two utilities, Holdit.exe and Reboot.exe, that are used by the unattend utility.

The Driver Scan utility stores information in an INI file named drvinfo.ini in the device-driver directory, for use by the unattend.exe utility. If the drvinfo.ini file already exists for the device driver, it is left unchanged. See “DRVINFO.INI” on page 57 for information about the drvinfo.ini file. See “UNATTEND.EXE” on page 94 for information about the unattend.exe utility.

The Driver Scan utility can also merge text mode device drivers into a single directory. This merges the device-driver files and the txtsetup.oem files for use in unattended installations. If the destination directory for text mode drivers already exists, it is automatically deleted and recreated.

The Driver Scan utility automatically assumes that the device driver being scanned is applicable to all target servers. To make a device driver server-specific, you must modify the drvinfo.ini file to reflect the servers that the device driver supports.

The dscan.exe utility has the following command-line syntax:

```
dscan <driver_path> [/S|/SS|/T[:path]] [/M:machine_type/platform_ID] [/H:filename  
[/OW] [/V:n] [/W:n] [/O:file_name] [/?]
```

Parameter	Description
<i>driver_path</i>	Defines the fully qualified path to the directory to scan for device drivers. Each driver is assumed to be in a separate subdirectory within this path.  If <i>driver_path</i> has \$oem\$ in the path, the Driver Scan utility creates the \$oem\$\textmode directory and merges the text mode device drivers.  If the /SS parameter is used, the path is assumed to be the path to a single device driver.
/S	Specifies to scan device drivers and create drvinfo.ini files only, if necessary. Text mode device drivers are not merged when this parameter is used.
/SS	Specifies to scan a single device driver and create the drvinfo.ini file only, if necessary. Text mode device drivers are not merged when this parameter is used.
/T[:path]	Specifies to build the text mode device drivers only. Other device drivers are not scanned, and drvinfo.ini files are not created when this parameter is used.  If <i>path</i> is specified, the text mode device drivers are merged to the specified path. Otherwise, the <i>driver_path</i> parameter must have \$oem\$ in the path so that the text mode device drivers are merged into the \$oem\$\textmode directory.
/M:machine_type/platform_ID	Specifies a machine type, where <i>machine_type</i> is the machine type of the target server or platform ID, where <i>platform_ID</i> is the platform ID of the target server, that is used to limit merging of the text-mode device drivers. If this parameter is not specified, all text-mode device drivers are merged. The /T parameter is required to use this parameter.
/H:filename	Specifies a fully-qualified path and file name for the hwdetect.ini file that was created by the hwdetect.exe utility. This will limit the merging of the text mode device drivers to only those drivers detected in the system.
/OW	Overwrites the text-mode drivers without deleting and recreating the text-mode directory. This parameter is not valid with the /S parameter or the /SS parameter.

Parameter	Description
/V: <i>n</i>	Specifies the verbose level used to report status during the deployment process. Valid values for <i>n</i> are: <ul style="list-style-type: none"> <li>• <b>0</b> - quiet mode</li> <li>• <b>3</b> - default</li> <li>• <b>5</b> - maximum information</li> </ul>
/W: <i>n</i>	Specifies the version of Microsoft Windows for the device drivers: <ul style="list-style-type: none"> <li>• <b>0</b> for Windows 2000</li> <li>• <b>1</b> for Windows Server 2003</li> <li>• <b>2</b> for Windows 2000 Professional</li> <li>• <b>3</b> for Windows XP</li> <li>• <b>4</b> for Windows Server 2003 x64</li> </ul>
/O: <i>file_name</i>	Combines the information in the DrvInfo.Ini files into a single file specified by the <i>file_name</i> value
/?	Displays usage information

The dscan.exe utility returns the following values to indicate status:

Value	Description
0	Success
1	Syntax error
2	Program error
3	Destination is read-only

The following examples illustrate Driver Scan utility usage.

Example	Description
dscan c:\insttemp\%oem%\\$1\drv	Scans a device-driver set in c:\insttemp\%oem%\\$1\drv, creates the drvinfo.ini files for each device driver, and builds the text-mode directory
dscan c:\drv /S	Scans a device-driver set in c:\drv and creates drvinfo.ini files for each device driver, but does not build the text mode device drivers
dscan c:\drv\mydriver /SS	Scans a single device driver in d:\drv\mydriver and creates the drvinfo.ini file for that device driver, but does not build the text mode device driver
dscan c:\w2\%oem%\\$1\drv /T	Builds the text mode directory in c:\w2\%oem%\textmode using device drivers found in c:\w2\%oem%\\$1\drv, but does not create any drvinfo.ini files
dscan c:\drivers /T:c:\other\textmode	Builds the text mode directory in c:\other\textmode using device drivers found in c:\drivers, but does not create drvinfo.ini files

## DRVINFO.INI

The drvinfo.ini file contains information specific to each device driver. The unattend.exe utility uses this information to add device-driver information to the answer file for Windows deployment scenarios. You can create this file, or have the Driver Scan utility create it automatically.

The drvinfo.ini file contains one section, called [Driver Information], and can contain the following valid variables:

Variable name	Description
Automatically Reboots	<p>Specifies whether the executable device driver automatically restarts (reboots) the target server after the device-driver installation has completed. This variable is only valid when Installation Mode is set to "Executable". Valid values are True or False. The default value is False.</p> <p>If an executable-device-driver installation program restarts the server and this variable is set to False, then any remaining installation procedures are not completed.</p> <p>To use this variable, the drvutils directory must contain the Holdit.exe and Reboot.exe utilities.</p> <p>This variable is only supported for Windows 2000.</p>
Installation Mode	Specifies the installation method for the device driver. Valid values are: Executable, Manual, PnP, or Textmode. If set to <i>Manual</i> , the unattend.exe utility does not install the device driver.
Order Before	Specifies that the device driver is added to the answer file before another specified device driver. This variable is valid only when Installation Mode is set to "PnP" or "Executable". Valid values are a comma-delimited list of the names of the device-driver directories, or the special keyword "All". If more than one device driver has a value of "All", the device drivers are installed in alphabetical order before those that do not have the specification.
Order After	Specifies that the device driver is added to the answer file after all other device drivers. This variable is only valid when Installation Mode is set to "PnP" or "Executable". The only valid value is the special keyword "All". If more than one device driver has this value set to "All", the device drivers are installed in alphabetical order after those that do not have the specification.
Parameters	Defines any required command-line parameters required by the executable device driver. This variable is only valid when Installation Mode is set to <i>Executable</i> .
Path	<p>Specifies the path to the installation file. This variable has a different function, depending on the setting of the Installation Mode variable, as indicated below:</p> <ul style="list-style-type: none"> <li>• <b>Executable</b> - Path specifies the path to the executable installation file</li> <li>• <b>Manual</b> - Path variable is ignored</li> <li>• <b>PnP</b> - Path specifies the path to the INF installation files</li> <li>• <b>Textmode</b> - Path specifies the path to the txtsetup.oem file</li> </ul>
PCIVenDevID	<p>Specifies the PCI Vendor ID or Device ID information used to limit the installation of executable device drivers to only when the specified device is in the target server. This variable is only valid when Installation Mode is set to <i>Executable</i>. Entries must be in the same format as those in the txtsetup.oem file, with multiple entries delimited by commas. For example:</p> <p>PCIVenDevID = PCI\VEN_1002&amp;DEV_5159&amp;SUBSYS_029A1014</p>
Reboot Required	<p>Specifies whether the executable device driver requires the target server to restart (reboot) after the installation of the device driver is completed. This variable is only valid when Installation Mode is set to <i>Executable</i>. Valid values are True or False.</p> <p>To use this variable, the drvutils directory must contain the Holdit.exe and Reboot.exe utilities.</p> <p>This variable is only supported for Windows 2000.</p>

Variable name	Description
Supported Locales	<p>Specifies the locales supported by this device driver. This value can be All, or a comma-delimited list of locales, as specified by the Localization variable in the ProdSpec.ini file from the i386 directory of the applicable operating system installation directory.</p> <p>You cannot use both Supported Systems and Unsupported Systems in the same drvinfo.ini file.</p>
Supported Systems	<p>Specifies the servers supported by this device driver. This value can be All, None, or a comma-delimited list of server machine types or platform IDs</p> <p>You cannot use both Supported Systems and Unsupported Systems in the same drvinfo.ini file.</p>
Unsupported Locales	<p>Specifies locales that are not supported by this device driver. This value must be a comma-delimited list of locales, as specified by the Localization variable in the ProdSpec.ini file from the i386 directory of the applicable operating system installation directory.</p> <p>You cannot use both Supported Locales and Unsupported Locales in the same drvinfo.ini file.</p>
Unsupported Systems	<p>Specifies servers that are not supported by this device driver. This value must be a comma-delimited list of server machine types or platform IDs.</p> <p>You cannot use both Supported Systems and Unsupported Systems in the same drvinfo.ini file.</p>

The following examples illustrate drvinfo.ini file contents.

Example	Description
<pre>[Driver Information] Installation Mode=PnP Path= Parameters= Automatically Reboots= Reboot Required= PCIvenDevID= Order Before= Supported Systems=All ;Unsupported Systems= Supported Locales= ;Unsupported Systems=</pre>	<p>Supports a plug-and-play device driver with INF files in the root of the device driver directory, and supports all target servers</p>
<pre>[Driver Information] Installation Mode=PnP Path=win2000 Parameters= Automatically Reboots= Reboot Required= PCIvenDevID= Order Before= Supported Systems=8673,8679,8687 ;Unsupported Systems= Supported Locales= ;Unsupported Systems=</pre>	<p>Supports a plug-and-play device driver with INF files in the win2000 directory in the root of the device driver directory, and only supports target servers with machine types 8673, 8679, and 8687</p>

Example	Description
<pre>[Driver Information] Installation Mode=PnP Path=win2000 Parameters= Automatically Reboots= Reboot Required= PCIvenDevID= Order Before=All Supported Systems=8673,8679,8687 ;Unsupported Systems= Supported Locales= ;Unsupported Systems=</pre>	<p>Supports a plug-and-play device driver that must be installed before any other plug-and-play device driver, with INF files in the win2000 directory in the root of the device driver directory, and supports only target servers with machine types 8673, 8679, and 8687</p>
<pre>[Driver Information] Installation Mode=Executable Path=win2000\setup.exe Parameters=-Q Automatically Reboots=False Reboot Required=True PCIvenDevID=PCI\VEN_1002&amp;DEV_5159&amp;SUBSYS_1014029A Order Before=All ;Supported Systems= Unsupported Systems=8687 Supported Locales= ;Unsupported Systems=</pre>	<p>Supports an executable device-driver installation using setup.exe, with a -Q parameter, in the win2000 directory in the root of the device driver directory, and supports all target servers (except those of machine type 8687) that have a device installed matching the specified Vendor/Device ID.</p>

## HWDETECT.EXE

HWDETECT is used to perform basic hardware detection functions that are typically obtained using SMBIOS and a PCI scan. This utility contains options that can be used to dump all of the hardware information to an output file, or it can be used to query hardware information and return values that set the *errorlevel* environment variable or the return code in Windows PE.

HWDETECT has basic hardware scan functions, and more complex PCI device detection options. The basic hardware scan functions can only be used singularly. The PCI device detection functions may be used in combination with each other to produce a query based on multiple restrictions. You can only use the hwdetect.exe utility basic hardware scan functions one at a time. The PCI-device detection functions can be combined or used more than once on the same command line.

Two versions of HWDETECT.EXE are provided with the ServerGuide Scripting Toolkit:

- A 32-bit version for use with Windows Server 2003 and Windows PE 2.1 (32-bit)
- An x64 version for use with Windows Server 2003 x64 and Windows PE 2.1 (x64)

The hwdetect.exe utility has the following command-line syntax:

```
hwdetect [/s|/p|/i|/m:type] [/vid:vendor_id] [/did:device_id] [/svid:sub_vendor_id]
[/sdid:sub_device_id] [bn:bus_number] [/dn:device_number] [/add:num]
```

Parameter	Description
<b>Basic hardware scan functions</b>	

Parameter	Description
/s	Determines if the target server is an IBM eServer or IBM eServer xSeries server. The return values are: <ul style="list-style-type: none"> <li>• <b>0</b> for an IBM eServer or IBM eServer xSeries server</li> <li>• <b>1</b> for a non-IBM eServer or IBM eServer xSeries server</li> </ul>
/p	Displays all hardware information for the target server in a variable=value format. The return value is 0 when successful.  You can use the > output-redirect option to save the output to an output file. For example, <code>hwdetect /p &gt; filename</code>
/i	Displays all hardware information for the target server in an INI-file format. The return value is 0 when successful.  You can use the > output-redirect option to save the output to an output file.
/m:type	Compares the machine type of the target xSeries server to the specified machine type, <i>type</i> . The return values are: <ul style="list-style-type: none"> <li>• <b>0</b> when the machine types are different or no basis for comparison exists</li> <li>• <b>1</b> when the machine types match</li> </ul>

Parameter	Description
<b>PCI-device detection functions</b>	
/vid:vendor_id	Determines whether there is a PCI adapter in the target server that matches the specified vendor ID, where <i>vendor_id</i> is a hexadecimal value. The return value is the number of matching adapters in the target server, or 0 if there are no matches.
/did:device_id	Determines whether there is a PCI adapter in the target server that matches the specified device ID, where <i>device_id</i> is a hexadecimal value. The return value is the number of matching adapters in the target server, or 0 if there are no matches.
/svid:sub_vendor_id	Determines whether there is a PCI adapter in the target server that matches the specified sub-vendor ID, where <i>subvendor_id</i> is a hexadecimal value. The return value is the number of matching adapters in the target server, or 0 if there are no matches.
/sdid:sub_device_id	Determines whether there is a PCI adapter in the target server that matches the specified sub-device ID, where <i>subdevice_id</i> is a hexadecimal value. The return value is the number of matching adapters in the target server, or 0 if there are no matches.
/bn:bus_number	Causes the PCI scan to begin at the specified bus number, instead of starting at bus 0, by default. This parameter is only valid when more than one /vid, /did, /svid, or /sdid parameter is specified on the command line.
/dn:device_number	Causes the PCI scan to begin at the specified device number, instead of starting at device number 0, by default. This parameter is only valid when the /bn parameter is specified on the command line.
/add:num	Adds an integer number, <i>num</i> , to the return value before exiting. This is useful to obtain a sum of different PCI adapters, with different PCI IDs, in a target server. The return value is the resultant sum of all other return values plus <i>num</i> .

The following examples illustrate hwdetect.exe utility usage.

Example	Description
<pre> hwdetect /s if errorlevel 1 goto NONIBM if errorlevel 0 goto IBM  :NONIBM rem Perform non-IBM equipment specific steps here goto FINISH  :IBM rem Perform IBM equipment specific steps here  :FINISH </pre>	<p>Determines if the target server is an IBM server or not, and branches accordingly to perform equipment-specific steps.</p>
<pre> hwdetect /m:8676 if errorlevel 1 goto 8676  hwdetect /m:8669 if errorlevel 1 goto 8669  echo System not supported! goto done  :8676 call 8676.bat goto done  :8669 call 8669.bat goto done  :done </pre>	<p>Determines if the target server is either a machine type 8676 or machine type 8669 server, and branches accordingly to call a system-specific batch file or displays a message of non-support for other machine types.</p>
<pre> hwdetect /i&gt;hwdetect.out clini hwdetect.out /S:CI /I:Vendor_ID.0 /E:Vendor CLIniSet.bat </pre>	<p>Creates an output file that lists the hardware configuration for the target server, so that the clini.exe utility can search for a specific PCI adapter from a vendor and set an environment variable accordingly.</p>
<pre> hwdetect /vid:0x9005 /did:0x0250 if errorlevel 1 call 6Mstuff.bat </pre>	<p>Determines if there is at least one IBM ServeRAID 6i/6i+/6M PCI adapter in the target server, and calls a batch file to process adapter-specific tasks.</p>
<pre> hwdetect /vid:0x9005 /did:0x0250 if errorlevel 0 set TOTAL=0 if errorlevel 1 set TOTAL=1 if errorlevel 2 set TOTAL=2 if errorlevel 3 set TOTAL=3  hwdetect /add:%TOTAL% /vid:0x1014 /did:0x01BD if errorlevel 0 set TOTAL=0 if errorlevel 1 set TOTAL=1 if errorlevel 2 set TOTAL=2 if errorlevel 3 set TOTAL=3 if errorlevel 4 set TOTAL=4 if errorlevel 5 set TOTAL=5 if errorlevel 6 set TOTAL=6  echo There are %TOTAL% IBM ServeRAID adapters in this system </pre>	<p>Determines the total number of IBM ServeRAID adapters in the target server, assuming there are no more than three of each type: IBM ServeRAID 4, IBM ServeRAID 5, and IBM ServeRAID 6/6i/6M.</p>
<pre> hwdetect /i&gt;hwdetect.out </pre>	<p>Displays hardware configuration information about the target server. The &gt;hwdetect.out parameter is a Windows output-redirect option that causes the output from the hwdetect.exe utility to be saved in the specified file.</p>

Below is an example of the hwdetect.out file that the last example might create:

```
[System]
Machine_Type=8674
Model_Number=42X
Serial_Number=78Z9506
Product_Name=eserver xSeries 330
BIOS_version=1.04
BIOS_Build_Level=EME112A
BIOS_DATE=06/28/2002
BIOS_Manufacturer=IBM
BIOS_Language=US
Number_Of_Enclosures=1
Enclosure_Type.0=23
Processor_Slots=2
Active_Processors=1
Processor_Family.0=17
Processor_Speed_MHz.0=1400
Processor_X64 = TRUE
Total_Enabled_Memory_Mb=256
ROM_Diagnostics_Build_Level=EME112A
ISMP_Build_Level=BR8T30A
RSA_Build_Level=GEE834A
System_UUID = 8030E01060F010B010605090D0A020F0
Blade_Chassis_UUID = 0F020A0D0900F00F020A0D0900F00F02
Blade_Slot = 02

[PCI]
Total_Number_Devices=10
Bus_Number.0=0
Device_Number.0=1
Function_Number.0=0
Class_Code.0=0000
Revision.0=0
Header_Type.0=0
Vendor_ID.0=5333
Device_ID.0=8A22
Subvendor_ID.0=1014
Subdevice_ID.0=01C5
Bus_Number.1=0
Device_Number.1=2
Function_Number.1=0
Class_Code.1=0000
Revision.1=0
Header_Type.1=0
Vendor_ID.1=8086
Device_ID.1=1229
Subvendor_ID.1=1014
Subdevice_ID.1=105C
```

Running “hwdetect /p” produces the same output with the exception that the section names are tacked onto the beginning of each keyword:

```
System_Machine_Type = 8674
System_Model_Number = 42X
System_Serial_Number = 78Z9506
...
PCI_Bus_Number.0 = 0
PCI_Device_Number.0 = 1
...
```

**Notes:**

1. The BIOS\_DATE value is listed in mm/dd/yyyy format.
2. The Enclosure\_Type.0=23 is based on SMBIOS 2.3 spec. 23 = Main chassis.

3. There is an entry for Processor\_Family and Processor\_Speed\_MHz for each microprocessor in the server.
4. The ROM\_Diagnostics\_Build\_Level is empty for servers that do not support ROM diagnostics.
5. PCI devices are listed in the order they are scanned.
6. PCI devices are listed in the *Value.n* format, where *Value* is the variable name and *n* is the nth PCI device scanned.
7. The header\_type field is not available for versions of hwdetect running on Windows 32 or 64-bit operating systems.
8. The vendor, device, subvendor, and subdevice values are in hexadecimal notation.

## INVRAID.EXE

This program can be used to dump all of the RAID controller configuration information to an output file. INVRAID supports the following RAID controllers:

- ServeRAID-4H
- ServeRAID-4Mx
- ServeRAID-4Lx
- ServeRAID-5i
- ServeRAID-6M
- ServeRAID-6i/6i+
- ServeRAID-7k
- ServeRAID-7t
- ServeRAID-7e SATA
- ServeRAID-7e SCSI
- ServeRAID-8i
- ServeRAID-8k
- ServeRAID-8e SATA
- ServeRAID-8e SAS
- ServeRAID-8s
- ServeRAID-BR10i
- ServeRAID-BR10ie
- ServeRAID-BR10il
- ServeRAID-BR10il V2
- ServeRAID-M1015
- ServeRAID-M1015-R5
- ServeRAID-M5014
- ServeRAID-M5015
- ServeRAID-MR10i
- ServeRAID-MR10ie
- ServeRAID-MR10il
- ServeRAID-MR10is
- ServeRAID-MR10k
- ServeRAID-MR10M
- LSI Integrated SCSI-RAID controller
- LSI Integrated SAS-RAID controller (1064/1064E/1068)

- LSI IDEal RAID controller
- LSI MegaRAID SAS controller
- LSI SAS 1078 IR controller
- IBM SAS HBA 1068E
- IBM 3Gb SAS HBA v2

## Environment requirements

Because INVRAID works by scripting the interfaces of other RAID-configuration utilities, the following utilities must be located in the system search path.

Adapter	Windows PE Utility
ServeRAID-4H, 4Mx, 4Lx, 5i, 6M, 6i, 6i+, 7k	IPSSSEND
ServeRAID-7t, 8i, 8k, 8k-l, 8s	ARCCONF
ServeRAID-7e SATA, 7e SCSI, 8e SAS, 8e SATA	HRCONF
Integrated SCSI with RAID capabilities, integrated SAS with RAID capabilities, LSI SAS 1078 IR, ServeRAID-BR10i, BR10ie, BR10il, BR10il V2, IBM SAS HBA 1068E, IBM 3Gb SAS HBA v2	CFGGEN
IDE RAID	HYPERWIN
ServerRAID-8e SATA	HRCONF
MegaRAID SAS, ServeRAID-MR10i, MR10ie, MR10k, MR10M, M1015, M1015-R5, M5014, M5015	MEGACLI

## Usage

invraid [/I | /P] /L /F

Table 8. INVRAID parameters

Parameter	Description
/I	Displays information about all host adapters in the system in an INI-file format.
/P	Dumps information about all host adapters in a system in a keyword=value format.
/L	Specifies the light version of the RAID utility.
/F	Dumps information about all host adapters in the system to a file.

## Return values

Table 9 lists the values returned by INVRAID.

Table 9. Values returned by INVRAID

Return Value	Description
0	Success
1	Syntax Error
2	Program Error

## Examples

To dump the information about all RAID controllers in a system to a file in INI file format with the name myraid.ini, use the /I parameter as shown here:

```
invraid.exe /i /f:myraid.ini
```

### Returns:

```
[System]
Machine_Type = 7977
Serial_Number = KOKN689
Total_Number_Of_Controllers = 2

[RAIDController.1]
Model = ServeRAID-8k-1
BIOSVersion = 5.2-0 (15412)
FirmwareVersion = 5.2-0 (15412)
DriverVersion = 5.2-0 (15317)
RebuildRate = HIGH
StripeSize = 256
ReadAhead = ADAPTIVE
PCI = 9005:0286:FFFF:FFFF

[RAIDController.1.Array]
Total_Number_Of_Arrays = 1
ID.1 = A
Members.1 = 1,2,3,4

[RAIDController.1.Hotspares]
Total_Number_Of_Hotspares = 0

[RAIDController.1.Logical]
Total_Number_Of_Logicals = 1
Array.1 = A
Size.1 = 279800
Raid_Level.1 = 10
WriteCache.1 = AUTO

[RAIDController.1.Physical]
Total_Number_Of_Physicals = 4
Channel.1 = 1
ID.1 = 0
Size.1 = 140013
Type.1 = SAS
Serial_Number.1 = JDX2JN8K
Channel.2 = 1
ID.2 = 1
Size.2 = 140013
Type.2 = SAS
Serial_Number.2 = Q5902T4N
Channel.3 = 1
ID.3 = 2
Size.3 = 140013
Type.3 = SAS
Serial_Number.3 = Q5902TPA
Channel.4 = 1
ID.4 = 3
Size.4 = 140013
Type.4 = SAS
Serial_Number.4 = Q5902TS8

[RAIDController.2]
Model = ServeRAID-8s
BIOSVersion = 5.2-0 (15411)
FirmwareVersion = 5.2-0 (15411)
DriverVersion = 5.2-0 (15317)
```

```
PCI = 9005:0285:1014:034D
```

```
[RAIDController.2.Array]  
Total_Number_Of_Arrays = 0
```

```
[RAIDController.2.Hotspares]  
Total_Number_Of_Hotspares = 0
```

```
[RAIDController.2.Logical]  
Total_Number_Of_Logicals = 0
```

```
[RAIDController.2.Physical]  
Total_Number_Of_Physicals = 0
```

Using the /P parameter returns the same information, but the section title from the properties file is shown for each value:

```
invraid /p > myfile.ini
```

#### Returns:

```
System_Machine_Type = 7977  
System_Serial_Number = KOKN689
```

```
RAIDController.1.Model = ServeRAID-8k-1  
RAIDController.1.BIOSVersion = 5.2-0 (15412)  
RAIDController.1.FirmwareVersion = 5.2-0 (15412)  
RAIDController.1.DriverVersion = 5.2-0 (15317)  
RAIDController.1.RebuildRate = HIGH  
RAIDController.1.StripeSize = 256  
RAIDController.1.ReadAhead = ADAPTIVE  
RAIDController.1.PCI = 9005:0286:FFFF:FFFF  
RAIDController.1.Array.ID.1 = A  
RAIDController.1.Array.Members.1 = 1,2,3,4  
RAIDController.1.Logical.Array.1 = A  
RAIDController.1.Logical.Size.1 = 279800  
RAIDController.1.Logical.Raid_Level.1 = 10  
RAIDController.1.Logical.WriteCache.1 = AUTO  
RAIDController.1.Physical.Channel.1 = 1  
RAIDController.1.Physical.ID.1 = 0  
RAIDController.1.Physical.Size.1 = 140013  
RAIDController.1.Physical.Type.1 = SAS  
RAIDController.1.Physical.Serial_Number.1 = JDX2JN8K  
RAIDController.1.Physical.Channel.2 = 1  
RAIDController.1.Physical.ID.2 = 1  
RAIDController.1.Physical.Size.2 = 140013  
RAIDController.1.Physical.Type.2 = SAS  
RAIDController.1.Physical.Serial_Number.2 = Q5902T4N  
RAIDController.1.Physical.Channel.3 = 1  
RAIDController.1.Physical.ID.3 = 2  
RAIDController.1.Physical.Size.3 = 140013  
RAIDController.1.Physical.Type.3 = SAS  
RAIDController.1.Physical.Serial_Number.3 = Q5902TPA  
RAIDController.1.Physical.Channel.4 = 1  
RAIDController.1.Physical.ID.4 = 3  
RAIDController.1.Physical.Size.4 = 140013  
RAIDController.1.Physical.Type.4 = SAS  
RAIDController.1.Physical.Serial_Number.4 = Q5902TS8  
RAIDController.2.Model = ServeRAID-8s  
RAIDController.2.BIOSVersion = 5.2-0 (15411)  
RAIDController.2.FirmwareVersion = 5.2-0 (15411)  
RAIDController.2.DriverVersion = 5.2-0 (15317)  
RAIDController.2.PCI = 9005:0285:1014:034D
```

## LEcho.EXE

The Logging Echo utility can perform the following functions:

- Write a message to the display
- Write a message to a log file
- Set the system errorlevel with a specific code
- Display a message to the screen while pausing or running a timer for a discreet amount of time

The ServerGuide Scripting Toolkit provides 32 and 64 bit versions of LEcho.

In order for LEcho.exe to write a message to a log file, you must set the environment variable LECHO\_LOG to a fully qualified path and filename using a command similar to the following:

```
set LECHO_LOG=C:\SGTKWinPE\Lecholog.txt
```

LEcho.exe checks the number of characters on the command line against the current command line limits of 8000 characters for the Windows environment. A message is displayed if the characters exceed the limit.

### Usage

The LEcho.exe utility has the following command-line syntax:

```
LEcho [message] [/F] [/R:n]  
[/E:n] [/P] [/P:n] [/T:n]  
[/SC] [/SN] [/N] [/LO] [/DO] [/?]
```

Parameter	Description
<i>message</i>	The message to display to the screen or log file.

Parameter	Description
/F	<p>Formats the message using the following variables:</p> <ul style="list-style-type: none"> <li>• <b>%d or %nd</b> formats the system date. The format is indicated by <i>n</i>: <ul style="list-style-type: none"> <li>– 0 = Sun 12/31/2006 (Default)</li> <li>– 1 = Sunday, December 31, 2006</li> <li>– 2 = Sun, Dec 31, 2006</li> <li>– 3 = Dec 31, 2006</li> <li>– 4 = 12-31-2006</li> <li>– 5 = 12/31/2006</li> <li>– 6 = 2006-12-31</li> <li>– 7 = 2006-Dec-31</li> <li>– 8 = 2006-December-31</li> <li>– 9 = 20061231</li> </ul> </li> <li>• <b>%t or %nt</b> formats the system time. The format is indicated by <i>n</i>. <ul style="list-style-type: none"> <li>– 0 = 16:12:13 (Default)</li> <li>– 1 = 04:12:13 PM</li> </ul> </li> <li>• <b>\a</b> sets an alert (bell)</li> <li>• <b>\b</b> - backspace</li> <li>• <b>\f</b> - form feed</li> <li>• <b>\n</b> - newline</li> <li>• <b>\r</b> - carriage return</li> <li>• <b>\t</b> - horizontal tab</li> </ul>
/R: <i>n</i>	Repeats the message <i>n</i> times.
/E: <i>n</i>	Displays the error message and sets the system errorlevel to <i>n</i> .
/P	Pauses until a key is pressed.
/P: <i>n</i>	Pauses for <i>n</i> seconds or until a key is pressed
/T: <i>n</i>	Initiates a timer for <i>n</i> seconds. This timer cannot be ended prematurely.
/SC	Suppresses the output of the countdown timer.
/SN	Suppresses the newline character.
/N	Creates a new, blank log file. If the log file already exists, it is overwritten.
/LO	Writes the message to the log file only.
/DO	Writes the message only to the display.
/?	Display a help message containing the application syntax.

## Return codes

The LEcho.exe utility returns the following values to indicate status:

Value	Description
0	Success or true
1	Syntax error
5	Cannot write to log file.
100	False
255	Program error

## Examples

The following examples illustrate Logging Echo utility usage.

Example	Description
LEcho	Sends a blank line to the display, and the log file if LECHO_LOG is set.
LEcho "My Message"	Sends the text "My Message" to the display and to the log file if LECHO_LOG is set.
LEcho /T	Displays a message indicating the current system time to the display and to the log file if LECHO_LOG is set.
LEcho "My Message" /T	Sends the text "13:55:24 – My Message" to the display and the log file if LECHO_LOG is set, 13:55:24 indicating the current system time.
LEcho "My Message" /T /DO	Sends the text "13:55:24 – My Message" to the display only. 13:55:24 indicating the current system time.
LEcho "My Message" /E:200	Sends the text "My Message" to the display and the log file if LECHO_LOG is set, and then sets the system error level to 200.
LEcho /E:155	Sets the system error level to 155. No text is displayed or logged.
LEcho "New Log File" /N /LO	Creates a new log file from LECHO_LOG. If a log file already exists, it is deleted and a new one is created. It then sends the text "New Log File" to the new log file only. No text is displayed to the screen.
LEcho "%dt%t – My Message" /F	Sends the text "Sun 12-31-2006 16:12:13 – My Message" to the screen and log file if LECHO_LOG is set.
LEcho "Pausing for 30 seconds." /P:30	Sends the text "Pausing for 30 seconds," and a countdown timer beginning at 30. This countdown can be bypassed by pressing any key.
LEcho "Running a 30 second timer." /T:30 /SC /SO	Sends the text "Running a 30 second timer." to the screen only, and returns control to the environment after 30 seconds. No timer is displayed.

## PRAID.EXE

PRAID is a scriptable executable program that offers a single user interface for both configuring and replicating all RAID controllers supported by the ServerGuide Scripting Toolkit. PRAID works with both the 32 and 64 bit versions of the Windows Preinstallation Environment.

PRAID has three modes of operation:

- **Deploy mode** – for scripted configuration of RAID controllers.
- **Capture mode** – for replicating RAID controller settings.
- **Restore-defaults mode** – for resetting RAID controllers to factory-default settings only.

### Deploy mode

Used in Deploy mode, PRAID offers the following features:

- Configures all RAID controllers in a server with a single call to the program.
- Automatically resets all RAID controllers to factory-default settings before configuring.
- Uses customizable logic to decide which configuration (policy) is applied to a server based on system hardware. The logic can involve:
  - Machine type of the server
  - Serial number of the server
  - Number of drives connected to the RAID controller
  - RAID controller type
  - Controller number (order) of the RAID controller
- Can be highly customized for specific RAID configurations, or highly generalized to handle many different RAID configurations.
- Provides a default or AUTO mode for automatically creating arrays and logical drives using default settings. This mode requires no knowledge of the number, size, or location of the drives connected to the RAID controllers.
- Automatically applies default values for any RAID configuration parameters that you do not supply. You supply only the parameters that you want to change.
- Default values for each configuration parameter are equivalent to the default settings of the ServeRAID Manager express configuration method, where applicable.
- Allows up to 50 policies for configuring RAID controllers to be specified in a single policies file.

#### Note:

When using PRAID in Deploy mode, the **/r** parameter is required.

To delete RAID configuration on all controllers, specify **/r**. To delete RAID configuration on a specific controller, specify **/r#** where **#** is the controller number.

For example, `praid /f:policy.ini /r /y`.

### Capture mode

Used in Capture mode, PRAID offers the following features:

- Captures the RAID configurations of all supported controllers to a text file, the policies file, with a common format.
- Captured RAID configurations can be immediately used with PRAID in deploy mode to easily replicate the RAID configuration to many servers.
- Allows customizable logic when saving the captured parameters to determine when each captured configuration should be deployed.
- Saves useful information about each captured configuration, including the system machine type, date, and time when the configuration was captured.
- Allows you to edit any RAID configurations that you capture before deploying them to other systems.

## Restore-defaults mode

Used in Restore-defaults mode, PRAID offers the following features:

- Deletes all arrays and logical drives on all RAID controllers.
- Sets other RAID controller settings back to factory defaults.

## Environment requirements

The PRAID utility supports the following RAID controllers:

- For 32-bit Windows PE only:
  - ServeRAID-4H
  - ServeRAID-4Mx
  - ServeRAID-4Lx
  - ServeRAID-5i
  - ServeRAID-6M
  - ServeRAID-6i/6i+
  - ServeRAID-7k
- For both the 32 and 64 bit versions of Windows PE:
  - ServeRAID-6M
  - ServeRAID-7t
  - ServeRAID-8i
  - ServeRAID-8k
  - ServeRAID-8k-l
  - ServeRAID-8s
  - ServeRAID-10k
  - ServeRAID-10M
  - ServeRAID-B5015
  - ServeRAID-BR9i
  - ServeRAID-BR10i
  - ServeRAID-BR10ie
  - ServeRAID-BR10il
  - ServeRAID-M5014
  - ServeRAID-M5015
  - ServeRAID-M5025
  - ServeRAID-MR10i
  - ServeRAID-MR10il
  - ServeRAID-MR10is
  - ServeRAID-MR1015
  - ServeRAID-MR1015-R5
  - LSI SCSI (1020/1030)
  - LSI SAS (1064/1064E/1068/1078)

PRAID works by scripting the interfaces of other RAID-configuration utilities. In order to accomplish this the following utilities must be in the system search path:

Adapter	Utility
ServeRAID 6M	IPSSSEND
ServeRAID-7t, 8i, 8k, 8k-l, 8s	ARCCONF
LSI-SCSI 1020/1030, LSI-SAS 1064/1064E, LSI-SAS 1068, LSI-SAS 1078, ServeRAID BR9i, BR10i, BR10ie, BR10il	CFGGEN
MegaRAID SAS, ServeRAID-M5014, M5015, M5025, MR10i,, MR10ie,MR10il, MR10is, MR10k, MR10M, MR1015, MR1015-R5	MEGACLI
ServeRAID-B5015	BRCLI

## Usage

Each of the modes supported by PRAID requires a specific syntax, but they all share some common parameters, described in Table 10.

Table 10. PRAID parameters common to multiple modes

Parameter	Description	Usage
<p><i>/r:n</i></p> <p>Restore-defaults mode</p>	<p>Restores the RAID controller with the controller number specified by <i>n</i> to factory-default settings and then returns immediately. No RAID configuration is done if you use this parameter.</p> <p>If no value is specified for the controller number, all RAID controllers are reset to factory-default settings.</p> <p>Used alone, the parameter provides Restore-defaults mode. You must use this parameter in conjunction with Deploy mode parameters to reset controllers to the factory default settings before deploying a new configuration.</p>	<p><code>praid /r</code></p> <p>Restores all controllers to factory-default settings.</p> <p><code>praid /r:3</code></p> <p>Restores controller three to factory-default settings. No other controllers are affected.</p> <p><code>PRAID /f:policies.ini /r /v:5 /e1</code></p> <p>Configures the RAID controllers in the system using the policies file <code>policies.ini</code>, sets the verbose mode to maximum, and returns an error code if there were no matching policies for any controllers.</p>
<p><i>/f:policies_file</i></p> <p>Specifies the policy file</p>	<p>The policy file name. This parameter is required for capture mode, and for deploy mode unless the <code>/d</code> parameter is used.</p> <p>In deploy mode, this points to the policies that you would like PRAID to use when configuring the RAID controllers. You cannot use this parameter with the <code>/d</code> parameter.</p> <p>In capture mode, this points to the file where you would like the captured configurations to be written. If the file does not exist, PRAID will create it. If the file does exist, PRAID will append to the end of it.</p> <p>The <code>/f</code> parameter is valid in deploy and capture modes.</p>	<p><code>praid /f:myfile.ini</code></p> <p>Uses the policies file, <code>myfile.ini</code>, to configure all RAID controllers.</p> <p><code>praid /c /f:myfile.ini</code></p> <p>Captures the RAID configuration of all controllers to the policy file, <code>myfile.ini</code>.</p>

Table 10. PRAID parameters common to multiple modes (continued)

Parameter	Description	Usage
<p>/y</p> <p>Suppresses prompting</p>	<p>Suppresses the confirmation prompt. This parameter is optional.</p> <p>If you select the /y parameter, PRAID does not prompt you before resetting controllers to factory-default settings. PRAID always resets all controllers to factory-default settings before configuring them.</p> <p>If you do not supply this parameter, PRAID will pause to warn you before resetting the RAID controllers to factory-default settings.</p> <p>The /y parameter is valid in deploy and restore-defaults modes.</p> <p>This parameter is optional.</p>	<p><code>praid /f:myfile.ini /y</code></p> <p>Uses the policies in myfile.ini to configure the RAID controllers and does not prompt before resetting all controllers to factory-default settings.</p>
<p>/e2</p> <p>Error code 2 if no supported controllers found</p>	<p>Returns an error code of 2 if there were no supported RAID controllers found in the system.</p> <p>By default, PRAID does not return an error if no controllers are found in the system.</p> <p>This parameter is valid in all modes.</p> <p>This parameter is optional.</p>	<p><code>praid /c /f:c:\myfile.ini /e2</code></p> <p>Captures the RAID configuration of all RAID controllers to c:\myfile.ini, and returns an error if no controllers are found in the system.</p>
<p>/e3</p> <p>Error code 3 if no supported drives found</p>	<p>Returns an error code of 3 if at least one controller was found with no drives attached.</p> <p>By default, PRAID does not return an error if no drives are attached to a RAID controller.</p> <p>This parameter is valid in any mode.</p> <p>This parameter is optional.</p>	<p><code>praid /d /e3</code></p> <p>Configures all RAID controllers with default settings and returns an error if one or more controllers has no drives attached.</p>
<p>/v:n</p> <p>Verbose level</p>	<p>Sets the verbosity level, where n is:</p> <ul style="list-style-type: none"> <li>• 0 - quiet</li> <li>• 3 - default</li> <li>• 5 - maximum</li> </ul> <p>This parameter is valid in any mode.</p> <p>This parameter is optional.to 'max'.</p>	<p><code>praid /d /v:5</code></p> <p>Configures all RAID controllers with default settings, and sets the verbose level</p>

## Deploy mode

The syntax for Deploy mode is:

```
PRAID.EXE /f:policies /r /d /p:path /e1 /e2 /e3
/v:n /y /b
```

The parameters unique to Deploy mode are described below.

*Table 11. PRAID Deploy mode parameters*

Parameter	Description	Usage
/d  Configure with defaults	<p>Configure all controllers in the system using default settings instead of using a policies file. The default settings used are the same as the default settings for the policies file.</p> <p>You cannot use this parameter with the /f parameter. See Table 15 on page 89 for the default values that will be assigned for each RAID controller based on the number of drives attached to the controller.</p> <p>This parameter is required unless the /f parameter is specified.</p>	<p><code>praid /d /r</code></p> <p>Configures all RAID controllers in the system using default settings.</p>
/e1  Error if no policy found	<p>Returns an error code of 1 if one or more controllers are not configured due to the fact that there was no policy found to configure them</p> <p>This parameter is optional.</p>	<p><code>praid /f:policy.ini /r /e1</code></p> <p>Configures all RAID controllers using the policies file, policy.ini, and returns an error if no matching policy was found.</p>

## Capture mode

The syntax for Capture mode is:

`PRAID.EXE /c[:p] /f:policies /e2 /e3 /v:n`

The parameters unique to Capture mode are described below.

Table 12. Capture mode parameters

Parameter	Description	Usage
<p>/c[:p]</p> <p>Capture mode</p>	<p>Indicates capture mode. The :p portion is optional. If you do not include the optional portion, then :p will assume the default value: "t,d".</p> <p>You can use :p to provide a list of parameters describing the AppliesTo that should be created when capturing the parameters to a policy. See "AppliesTo.n" on page 80.</p> <p>:p is a list containing any of the following:</p> <ul style="list-style-type: none"> <li>t – Use the type of the RAID controller in the AppliesTo.1 entry for the policy.</li> <li>c – Use the controller number (scan order relative to all other RAID controllers in the system) in the AppliesTo.1 entry for the policy.</li> <li>d – Use the number of drives connected to the RAID controller in the AppliesTo.1 entry for the policy.</li> </ul> <p><b>Note:</b> You must specify the name of the policies file using the /f parameter when using the /c parameter.</p> <p>The policy or policies created are appended to the end of the file if the file exists. If the file does not exist, a new file is created. If there are multiple RAID controllers in the system, their configurations are placed in the file in scan order.</p>	<p>praid /c:m,t /f:myfile.ini</p> <p>Captures the configuration of all RAID controllers to myfile.ini using the machine type of the server and the RAID controller type as the AppliesTo.1 entry.</p>

## Restore-defaults mode

The syntax for Restore-defaults mode is:

```
PRAID /r:n /e2 /v:n /y
```

## Usage examples

### Deploy mode examples

```
PRAID /r /d /y
```

- Configures all RAID controllers in the system using default settings.
- Does not prompt before setting controllers to factory-default settings.
- Performs drive synchronization without prompting, when required.

This example is useful for unattended scripted installations.

```
PRAID /f:policies.ini /r /v:5 /e1
```

- Configures the RAID controllers in the system using the policies file: policies.ini.
- Sets the verbose mode to maximum.
- Returns an error code if there were no matching policies for one or more controllers

## Capture mode examples

```
PRAID /c /f:c:\mydata\policies.ini
```

Captures the configuration of all RAID controllers into the file: C:\mydata\policies.ini.

```
PRAID /c:m,t /f:policies.ini
```

- Captures the configuration of all RAID controllers into the file: policies.ini.
- Uses the system machine type and RAID controller type as the AppliesTo.1 entry in the policies file for each captured configuration.

## Restore-defaults mode examples

```
PRAID /r /v:0 /y
```

- Restores all RAID controllers to factory-default settings.
- Operates in silent mode, no messages are printed to the screen.
- Does not prompt the user before restoring factory-default settings.

## Return codes

- **0** - Success.
- **1** - Execution was successful, but the /e1 parameter was supplied and at least one controller was not configured because there was no matching policy.
- **2** - Execution was successful, but the /e2 parameter was supplied and no controllers were found in the system.
- **3** - Execution was successful, but the /e3 parameter was supplied and at least one controller was not configured because no drives were attached.
- **4** - Syntax error on the command line.
- **5** - Syntax error in the policies file or the policy file could not be opened.
- **6** - Reserved
- **7** - Error resetting a controller to the default settings.
- **8** - Error gathering information about a controller.
- **9** - Error in the policy file.
- **10** - Error during processing.
- **11** - Error during deployment.

## Policies file

When used in configure mode, the policies file directs how PRAID configures the RAID controllers in a system using keywords and values that can be customized by the user. In capture mode, PRAID creates or appends to the end of a policies file the parameters that can configure other RAID controllers identically to the ones in the current system.

A policies file can be created using any of the following methods:

1. Run PRAID in capture mode to create a policies file from an already-configured RAID controller.
2. Use one of the example policies files provided with the ServerGuide Scripting Toolkit, and customize it to configure your RAID controllers.
3. Use an ASCII text editor to create a new policies file.

The policies file is an ASCII text file that is organized in INI-file format. Each INI-file section name indicates the start of a new policy for configuring RAID controllers.

The policies file must contain one or more uniquely-named sections using the format `[Policy.name]` where *name* is a unique user-assigned name that is used to identify the policy. *Name* can be any combination of letters, numbers, underscores, periods, or dashes.

Some examples of legal section names are: `[Policy.1]`, `[Policy.mypolicy]`, and `[Policy.My-RAID5-config]`. Each section in the policies file represents a single policy for configuring RAID controllers. You can have up to 50 policies in a single policies file.

**How PRAID selects a policy:** Each section in the policies file represents a single policy for configuring the RAID controllers. In configure mode, each RAID controller is configured using a single policy, but a single policy can be used to configure multiple controllers. Each policy in a policies file contains one or more *AppliesTo.n* entries, where *n* is the number of the *AppliesTo* parameter within the policy. This entry is required in each section, so every section must contain at least an *AppliesTo.1* entry. See “Policies file parameters” for a full description of the *AppliesTo.n* entry.

These entries are followed by a list of hardware parameters including machine type, number of drives connected to the RAID controller, and scan order, that are evaluated against the current system hardware. If all of the hardware parameters of an *AppliesTo.n* entry match the hardware being evaluated, this policy is used to configure the hardware. For each policy in the policies file, the *AppliesTo.n* entries for that policy are evaluated in order starting with *AppliesTo.1*. If none of the *AppliesTo.n* entries match the current hardware then the policy is not applied and the *AppliesTo.n* entries in the next policy are evaluated. This continues until either a match is found or no more policies exist in the file. If the end of the file is reached without a match then the controller is not configured. Because the policies are evaluated in order, you should place more specific policies at the beginning of the policies file.

**Policies file parameters:** This section describes the parameters used in the policies file. The *Policy.name* header and *AppliesTo.1* entry are the only parameters required. All values are case-insensitive.

If you do not specify a value for any of the other parameters, they will be assigned their default value when applicable. If a parameter is not valid for a RAID controller, it will be ignored.

In addition to this reference, the ServerGuide Scripting Toolkit also provides two example policies files that you can modify for your own use.

- **RAID1-5.ini** Creates a RAID-1 array using the first two drives, and a RAID-5 array using the remaining drives. Valid for ServeRAID-4H, 4Mx, 4Lx, 5i, 6i, 6M, 6i+, 7k, 8i
- **RAID5HSP.ini** Creates a single RAID-5 array with a single hot-spare drive using all available drives. Valid for ServeRAID-4H, 4Mx, 4Lx, 5i, 6i, 6i+, 6M, 7k, 7t, 8i.
- **template.ini** Provides a policies file template containing all parameters with details about each parameter.
- **syntax.txt** Provides a syntax specification for the policies file.

Table 13. Policy file parameters

Keyword	Required?	Default	Description
<code>Policy.name</code>	Yes	None	This header designates the start of a new policy. See “ <code>Policy.name</code> ” on page 80 for additional information.
<code>AppliesTo.n</code>	Yes	None	Use this parameter to describe when the current policy should be chosen to configure the RAID controllers. See “ <code>AppliesTo.n</code> ” on page 80 for additional information.
<code>ReadAhead</code>	No	<ul style="list-style-type: none"> <li>ADAPTIVE (for ServeRAID 4H, 4MX, 4Lx, 5i, 6i, 6i+, 6M, and 7k)</li> <li>ON (for ServeRAID-7t and 8i, 8k, and 8k-l)</li> </ul>	Specifies the read ahead setting that should be applied to the RAID controller. See “ <code>ReadAhead</code> ” on page 82 for additional information.
<code>RebuildRate</code>	No	HIGH	Specifies the rebuild rate that should be applied to the RAID controller. See “ <code>RebuildRate</code> ” on page 82 for additional information.
<code>StripeSize</code>	No	<ul style="list-style-type: none"> <li>8 (for ServeRAID 4H, 4Mx, 4Lx, 5i, 6i, 6i+, 6M, and 7k)</li> <li>64 (for ServeRAID-7t, 8i, 8k, 8k-l, 7e-SCSI, 7e-SATA, 8e-SATA, 8e-SAS, and LIS-IDEal-RAID)</li> </ul>	Specifies the stripe-unit size in KB that the controller should use for its arrays. See “ <code>StripeSize</code> ” on page 82 for additional information.
<code>Array_Mode</code>	No	AUTO	Defines the array-creation policy to use when selecting physical disk drives to include in an array. See “ <code>Array_Mode</code> ” on page 83 for additional information.
<code>Array_Defaults</code>	No	<ul style="list-style-type: none"> <li>0%:1 for ServeRAID-8e-SATA and 8e-SAS, LSI-SCSI-RAID when at least 3 drives are available</li> <li>0%:1 for ServeRAID-4H, 4Mx, 4Lx, 5i, 6i, 6i+, 6M, and 7k, when one or more arrays has 4 or more physical drives</li> <li>0%:0 for all other cases</li> </ul>	Defines the default values to use for the variance and number of hot-spare drives when AUTO is specified for <code>Array_Mode</code> . See “ <code>Array_Defaults</code> ” on page 83 for additional information.

Table 13. Policy file parameters (continued)

Keyword	Required?	Default	Description
<code>Array.letter</code>	No	None	Lets you specify exactly how many arrays are created and the exact physical drives that you would like in each array. See “Array.letter” on page 84 for additional information.
Hotspares	No	None	Defines a list of specific physical drives to designate as hot-spare drives. See “Hotspares” on page 84 for additional information.
<code>Logical_Mode</code>	No	AUTO	Defines the logical-drive creation policy to use when creating logical drives. See “Logical_Mode” on page 84 for additional information.
<code>Logical_Defaults</code>	No	FILL:AUTO:AUTO	Defines the default logical drive settings that should be used when creating logical drives. See “Logical_Defaults” on page 85 for additional information.
<code>Logical.num</code>	No	None	Lets you specify how many logical drives are created and the specific parameters for each logical drive. See “Logical.num” on page 85 for additional information.

#### *Policy.name:*

##### **Description**

This header designates the start of a new policy. You can specify *name* using any combination of letters, numbers, underscores, periods, or dashes. There is no maximum length for *name*, but the maximum length for a single line in the policies file is 256 characters. You can have up to 50 policies in a single policies file.

##### **Examples**

[Policy.RAID-5-Hotspare]

#### *AppliesTo.n:*

##### **Description**

Use this parameter to describe when the current policy should be chosen to configure the RAID controllers. You can define up to 20 AppliesTo.n entries per policy. You must have an AppliesTo.1 entry for each policy, and AppliesTo.n is the only required parameter of a policy.

AppliesTo.n includes a comma delimited list containing one or more of the following parameters:

- *m:mtype*, where *mtype* is the four digit machine type of an IBM eServer or xSeries server.
- *s:serial*, where *serial* is the serial number of an IBM eServer or xSeries server.
- *c:contn*, where *contn* is the controller number (scan order) of the RAID controller with respect to all other RAID controllers in the system.

The number assigned to a particular controller is dependent on the controller's physical PCI slot and the order in which your system scans its PCI slots.

- `t:ctype`, where *ctype* is the type of the controller. The type is not case sensitive, and must be one of the following descriptive names :
  - ServeRAID-4H
  - ServeRAID-4Mx
  - ServeRAID-4Lx
  - ServeRAID-5i
  - ServeRAID-6M
  - ServeRAID-6i/6i+
  - ServeRAID-7k
  - ServeRAID-7t
  - ServeRAID-7e SATA
  - ServeRAID-7e SCSI
  - ServeRAID-8i
  - ServeRAID-8k
  - ServeRAID-8k-l
  - ServeRAID-8e SATA
  - ServeRAID-8e SAS
  - ServeRAID-8s
  - ServeRAID-B5015
  - ServeRAID-BR10i
  - ServeRAID-BR10ie
  - ServeRAID-BR10il
  - ServeRAID-BR10il V2
  - ServeRAID-M1015
  - ServeRAID-M1015-R5
  - ServeRAID-M5014
  - ServeRAID-M5015
  - ServeRAID-M5025
  - ServeRAID-M5025-R6
  - ServeRAID-MR10i
  - ServeRAID-MR10ie
  - ServeRAID-MR10k
  - ServeRAID-MR10il
  - ServeRAID-MR10m
  - ServeRAID-MR10is
  - LSI Integrated SCSI-RAID controller
  - LSI Integrated SAS-RAID controller (1064/1064E/1068)
  - LSI IDEal RAID controller
  - LSI MegaRAID SAS controller
  - LSI SAS 1078 IR
  - IBM SAS HBA 1068E
  - IBM 3Gb SAS HBA v2

- *d:drives*, where *drives* is an integer value specifying the number of drives connected to the controller. Only drives in a **Ready** state after resetting the controller to factory-default settings are counted.
- **ALL**. Indicates that this policy should be used for all RAID controllers. This parameter is good to use if you declare a default policy that is not covered by any of the other policies.

### Examples

Example using the *m,s,c,t*, and *d* parameters:

```
AppliesTo.1 = m:8865,t:ServeRAID-7k
AppliesTo.2 = c:1,d:15,s:87R478U
```

Example using the **ALL** parameter:

```
AppliesTo.1 = ALL
```

*ReadAhead:*

### Description

Specifies the read ahead setting that should be applied to the RAID controller. If this parameter is not applicable for a RAID controller, it is ignored. See “Supported settings for RAID controllers” on page 86 for the list of ReadAhead settings supported by PRAID for each RAID controller. Possible settings are:

- Adaptive
- On
- Off

### Examples

```
ReadAhead = On
```

*RebuildRate:*

### Description

Specifies the rebuild rate that should be applied to the RAID controller. If this parameter is not applicable for a RAID controller, then it will be ignored. See “Supported settings for RAID controllers” on page 86 for the list of RebuildRate settings supported by PRAID for each RAID controller.

- High
- Medium
- Low

### Examples

```
RebuildRate = High
```

*StripeSize:*

### Description

Specifies the stripe-unit size in KB that the controller should use for its arrays. If this parameter is not applicable for a RAID controller, then it will be ignored. See “Supported settings for RAID controllers” on page 86 for the list of StripeSize settings supported by PRAID for each RAID controller. Possible values are any stripe size supported by the controller.

## Examples

`StripeSize = 32`

*Array\_Mode:*

### Description

Defines the array-creation policy to use when selecting physical disk drives to include in an array. Possible values are:

**Auto** Creates arrays using drives that have the same size in MB. This is the default. Each set of drives with same size on will be combined into a single array. The maximum number of drives allowed per array is determined by the limits of the RAID controller. Only drives in a **Ready** state after resetting the controller to factory-default settings are used in arrays. Hot-spare drives are created based on the rules supplied with the `Array_Defaults` parameter.

The `Array_Defaults` parameter allows you to modify the default behavior of the AUTO mode for arrays.

**Custom** Allows you to specify the exact physical disk drives to use in the array. If you specify this value, you must also specify the `Array.Letter` parameter with a list of drives for each array that you want to create. If you want hot-spare drives to be created, you must use the `Hotspares` parameter to list the hot-spare drives.

## Examples

`Array_mode = CUSTOM`

*Array\_Defaults:*

### Description

Defines the default values to use for the variance and number of hot-spare drives when AUTO is specified for `Array_Mode`. This parameter is not valid if `Array_Mode` is set to CUSTOM.

The value of `Array_Defaults` is expressed in the format: *variance:hotspares*, where:

*variance* specifies the percentage variance to use when selecting drives to add to the array. This parameter is useful when you are using drives that may vary slightly in size. Variance is based on a percentage of the drive's size in MB. Valid values are:

- 0% - Only drives with equal size in MB will be combined into a single array.
- 5% - All drives within 5% size in MB will be combined into a single array.
- 10% - All drives within 10% size in MB will be combined into a single array.
- 100% - All drives, regardless of size in MB, will be combined into a single array.

and

*hotspares* is an integer that specifies the total number of hot-spare drives to create. The largest drives are chosen as hot-spare drives first. If not enough drives are available to create hot-spare drives, then PRAID will not create any hot-spare drives.

## Examples

Array\_Defaults = 5%:1

*Array.letter:*

### Description

Lets you specify exactly how many arrays are created and the exact physical drives that you would like in each array. You can specify the physical drives using any of the following methods:

- The channel number and SCSI ID (for SCSI) or bus number and target ID (for SATA/SAS) of each drive. The channel number or bus number is always 1-based. The SCSI ID or target ID is always 0-based.
- A list of integer values indicating that the *n*th drive should be included in the array
- The keyword ALL to indicate that all remaining drives attached to the controller that are not specified in previous arrays should be included in the current array.

The first array must be labeled Array.A. Additional arrays are labeled sequentially, Array.B, Array.C, and so on. The maximum number of arrays allowed per controller is determined by the limits of the specific RAID controller.

## Examples

Example using channel number and SCSI ID:

```
Array.A = 1:1,1:2  
Array.B = 1:3,1:4,1:5,2:1,2:2,2:3,2:4,2:5,2:6  
Array.C = ALL
```

Example using integer values:

```
Array.A = 1,2,3  
Array.B = ALL
```

*Hotspares:*

### Description

Defines a list of specific physical drives to designate as hot-spare drives. You can specify the physical drives using any one of these methods:

- The channel number and SCSI ID (for SCSI) or bus number and target ID (for SATA/SAS) of each drive. The channel number or bus number is always 1-based. The SCSI ID or target ID is always 0-based.
- A list of integer values indicating that the *n*th drive should be included in the array
- The keyword ALL to indicate that all remaining drives attached to the controller that are not specified in previous arrays should be included in the current array.

## Examples

Example using channel number and SCSI ID:

```
Hotspares = 1:12,2:14
```

Example using integer value:

```
Hotspares = 12, 13
```

*Logical\_Mode:*

## Description

Defines the logical-drive creation policy to use when creating logical drives. Possible values are:

- AUTO** Indicates that defaults should be used for all parameters. Default parameters are:
- One logical drive is created on each array using all available space.
  - The RAID level is set using the AUTO (default) scheme
  - Write-cache mode is set using the default value for the controller.

You can adjust these default values using the `Logical_Defaults` parameter.

- CUSTOM** Indicates that you want to specify all of the parameters for each logical drive that is created. If you specify CUSTOM, then you must specify the parameters for each logical drive using the `Logical.num` parameter.

## Examples

```
Logical_Mode = CUSTOM
```

*Logical\_Defaults:*

### Description

Defines the default logical drive settings that should be used when creating logical drives. This parameter is only valid when AUTO is specified for `Logical_Mode`. Values for this parameter are expressed in the format: *size:raidlevel:writemode*, where:

*Size* specifies the size of each logical drive. One logical drive will be created on each array using the given size. *Size* can be in any of the following formats:

- A positive integer – specifies the size in MB.
- A percentage – specifies that a percentage of the total space should be used.
- FILL – indicates that all available space on the array should be used.

*Raidlevel* specifies the RAID level for the logical drive. See “Supported settings for RAID controllers” on page 86 for the list of RAID level settings supported by PRAID for each controller.

*Writemode* is an optional parameter that specifies the write-cache mode for each logical drive. If the write-cache mode cannot be set for a specific configuration, then this parameter will be ignored. See “Supported settings for RAID controllers” on page 86 for the list of write\_cache mode settings supported by PRAID for each RAID controller.

Valid values are:

- ON
- OFF
- AUTO uses the default write-cache mode for the controller. (Recommended for most users.) This is the default value if writemode is not specified.

## Examples

```
Logical_Defaults = 50%:5EE:AUTO
```

*Logical.num:*

## Description

Lets you specify how many logical drives are created and the specific parameters for each logical drive. You can set the array letter where the logical drive is located, logical drive size, RAID level, and write-caching mode for each logical drive. The first logical drive must be labeled Logical.1. Additional logical drives are numbered Logical.2, Logical.3, and so on. You must specify at least one logical drive for each array. The maximum number of drives allowed per array and the maximum total number of logical drives allowed is determined by the specific RAID controller.

Values for this parameter are expressed in the format:

*array:size:raidlevel:writemode* where *array* specifies the array letter, and *size*, *raidlevel*, and *writemode* are as described in “Logical\_Defaults” on page 85.

## Examples

Logical.1 = A:50%:0

Logical.2 = A:50%:5EE

Logical.3 = B:FILL:1:ON

Logical.4 = C:4096:AUTO:AUTO

**Supported settings for RAID controllers:** Table 14 lists the supported settings for each RAID controller when using PRAID.

In some cases, the list of supported settings when using PRAID might differ from the supported settings of the RAID controller. These known cases are indicated in the table.

Table 14. Supported settings for each RAID controller when using PRAID.. Bold settings are defaults.

Controller	Rebuild Rate	Read Ahead	Stripe Size	RAID Levels <sup>1</sup>	Write-cache Mode
ServeRAID-4H	<ul style="list-style-type: none"> <li>HIGH</li> <li>MEDIUM</li> <li>LOW</li> </ul>	<ul style="list-style-type: none"> <li><b>ADAPTIVE</b></li> <li>ON</li> <li>OFF</li> </ul>	8,16,32,64	0,1,1E,5,5E AUTO (RAID-x0 not supported)	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-4Mx	<ul style="list-style-type: none"> <li>HIGH</li> <li>MEDIUM</li> <li>LOW</li> </ul>	<ul style="list-style-type: none"> <li><b>ADAPTIVE</b></li> <li>ON</li> <li>OFF</li> </ul>	8,16,32,64	0,1,1E,5,5E,5EE AUTO (RAID-x0 not supported)	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-4Lx	<ul style="list-style-type: none"> <li>HIGH</li> <li>MEDIUM</li> <li>LOW</li> </ul>	<ul style="list-style-type: none"> <li><b>ADAPTIVE</b></li> <li>ON</li> <li>OFF</li> </ul>	8,16,32,64	0,1,1E,5,5E,5EE AUTO (RAID-x0 not supported)	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-6i/6i+	<ul style="list-style-type: none"> <li>HIGH</li> <li>MEDIUM</li> <li>LOW</li> </ul>	<ul style="list-style-type: none"> <li><b>ADAPTIVE</b></li> <li>ON</li> <li>OFF</li> </ul>	8,16,32,64	0,1,1E,5,5E,5EE AUTO (RAID-x0 not supported)	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-6M	<ul style="list-style-type: none"> <li>HIGH</li> <li>MEDIUM</li> <li>LOW</li> </ul>	<ul style="list-style-type: none"> <li><b>ADAPTIVE</b></li> <li>ON</li> <li>OFF</li> </ul>	8,16,32,64	0,1,1E,5 AUTO (RAID-x0 not supported)	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-7k	<ul style="list-style-type: none"> <li>HIGH</li> <li>MEDIUM</li> <li>LOW</li> </ul>	<ul style="list-style-type: none"> <li><b>ADAPTIVE</b></li> <li>ON</li> <li>OFF</li> </ul>	8,16,32,64	0,1,1E,5 AUTO (RAID-x0 not supported)	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-5i	<ul style="list-style-type: none"> <li>HIGH</li> <li>MEDIUM</li> <li>LOW</li> </ul>	<ul style="list-style-type: none"> <li><b>ADAPTIVE</b></li> <li>ON</li> <li>OFF</li> </ul>	8,16,32,64	0,1,1E,5 AUTO (RAID-x0 not supported)	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-7t	[n/a]	<ul style="list-style-type: none"> <li><b>ON</b></li> <li>OFF</li> </ul>	16, 32, <b>64</b>	0,1,5,10, VOLUME AUTO	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>
ServeRAID-8i	[n/a]	<ul style="list-style-type: none"> <li><b>ON</b></li> <li>OFF</li> </ul>	16, 32, <b>64</b> , 128, 256, 512	0,1,10,1E,5,50,6,60, VOLUME	<ul style="list-style-type: none"> <li>ON</li> <li>OFF</li> <li>AUTO</li> </ul>

Table 14. Supported settings for each RAID controller when using PRAID. (continued). Bold settings are defaults.

Controller	Rebuild Rate	Read Ahead	Stripe Size	RAID Levels <sup>1</sup>	Write-cache Mode
ServeRAID-8k	[n/a]	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> </ul>	16, 32, <b>64</b> , 128, 256, 512, 1024	0,1,1E,10,5,6,60, VOLUME	<ul style="list-style-type: none"> <li>• ON</li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-8k-l	[n/a]	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> </ul>	16, 32, <b>64</b> , 128, 256, 512, 1024	0,1,10, VOLUME, AUTO	[n/a]
ServeRAID-8e SAS	[n/a]	[n/a]	16, 32, <b>64</b>	0, 1, 10, AUTO	[n/a]
ServeRAID-8e SATA	[n/a]	[n/a]	16,32, <b>64</b>	0, 1, 10 <sup>2</sup> , VOLUME, AUTO	[n/a]
ServeRAID-8s	[n/a]	[n/a]	16, 32, <b>64</b> , 128, 256, 512, 1024	0, 1, 10, 1E, 5, 50, 6, VOLUME	<ul style="list-style-type: none"> <li>• ON</li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-7e SATA	[n/a]	[n/a]	16, 32, <b>64</b>	0, 1, AUTO	[n/a]
ServeRAID-7e SCSI	[n/a]	[n/a]	16,32, <b>64</b>	0, 1, 10, AUTO	[n/a]
ServeRAID-B5015	[n/a]	[n/a]	4,8,16,32, <b>64</b> ,128,256,512,1024	0,1,10,1E,5,60,AUTO	[n/a]
ServeRAID-BR10i	[n/a]	[n/a]	[n/a]	0, 1, 1E, AUTO	[n/a]
ServeRAID-BR10ie	[n/a]	[n/a]	[n/a]	0, 1, 1E, AUTO	[n/a]
ServeRAID-BR10il	[n/a]	[n/a]	[n/a]	0, 1, 1E	[n/a]
ServeRAID-BR10il V2	[n/a]	[n/a]	[n/a]	0, 1, 1E, AUTO	[n/a]
ServeRAID-M1015	LOW	ADAPTIVE	64	0, 1, 10	ON
ServeRAID-M1015-R5	LOW	ADAPTIVE	64	0, 1, 10, 5, 50	ON
ServeRAID-M5014	LOW	ADAPTIVE	64	0, 1, 10, 5, 50	ON
ServeRAID-M5015	LOW	ADAPTIVE	64	0, 1, 10, 5, 50	ON
ServeRAID-M5025	<ul style="list-style-type: none"> <li>• HIGH</li> <li>• MEDIUM</li> <li>• <b>LOW</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADAPTIVE</b></li> <li>• ON</li> <li>• OFF</li> </ul>	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, AUTO	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-M5025-R6	<ul style="list-style-type: none"> <li>• HIGH</li> <li>• MEDIUM</li> <li>• <b>LOW</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADAPTIVE</b></li> <li>• ON</li> <li>• OFF</li> </ul>	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, 6, 60 AUTO	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-MR10i	<ul style="list-style-type: none"> <li>• HIGH</li> <li>• MEDIUM</li> <li>• <b>LOW</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADAPTIVE</b></li> <li>• ON</li> <li>• OFF</li> </ul>	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, 6, 60	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-MR10ie	[n/a]	[n/a]	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, 6, 60, AUTO	[n/a]

Table 14. Supported settings for each RAID controller when using PRAID. (continued). Bold settings are defaults.

Controller	Rebuild Rate	Read Ahead	Stripe Size	RAID Levels <sup>1</sup>	Write-cache Mode
ServeRAID-MR10il	<ul style="list-style-type: none"> <li>• HIGH</li> <li>• MEDIUM</li> <li>• <b>LOW</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADAPTIVE</b></li> <li>• ON</li> <li>• OFF</li> </ul>	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, 6, 60	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-MR10is	<ul style="list-style-type: none"> <li>• HIGH</li> <li>• MEDIUM</li> <li>• <b>LOW</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADAPTIVE</b></li> <li>• ON</li> <li>• OFF</li> </ul>	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, 6, 60	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-MR10k	<ul style="list-style-type: none"> <li>• HIGH</li> <li>• MEDIUM</li> <li>• <b>LOW</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADAPTIVE</b></li> <li>• ON</li> <li>• OFF</li> </ul>	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, 6, 60	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> <li>• AUTO</li> </ul>
ServeRAID-MR10M	<ul style="list-style-type: none"> <li>• HIGH</li> <li>• MEDIUM</li> <li>• <b>LOW</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>ADAPTIVE</b></li> <li>• ON</li> <li>• OFF</li> </ul>	8, 16, 32, <b>64</b> , 128	0, 1, 10, 5, 50, 6, 60	<ul style="list-style-type: none"> <li>• <b>ON</b></li> <li>• OFF</li> <li>• AUTO</li> </ul>
LSI-1064x/1068 SAS	[n/a]	[n/a]	[n/a]	0,1,1E,AUTO	[n/a]
LSI 1020/1030 chipset	[n/a]	[n/a]	[n/a]	1, 1E <sup>3</sup> , AUTO	[n/a]
LSI 1078	[n/a]	[n/a]	[n/a]	0, 1, AUTO	[n/a]
LSI IDEal RAID	[n/a]	[n/a]	32, <b>64</b> ,128,256,512,1024,2048,4096	0, 1, AUTO	<ul style="list-style-type: none"> <li>• ON</li> <li>• OFF</li> <li>• AUTO</li> </ul>
LSI MegaRAID SAS	[n/a]	[n/a]	8, 16, 32 64, 128	0, 1, 5, 10, 50, AUTO	[n/a]
IBM SAS HBA 1068E	[n/a]	[n/a]	[n/a]	0, 1, 1E	[n/a]
IBM 3Gb SAS HBA V2	[n/a]	[n/a]	[n/a]	0, 1, 1E	[n/a]

1. RAID levels 5E and 5EE support only one logical drive per array.
2. RAID level 10 is supported for the ServeRAID-8e-SATA on IBM System x3400 models 7973 and 7974 only.
3. RAID level 1E is supported for the LSI 1030 only on the xSeries model 336.

**Note:** The 7e and 8e RAID controllers support one logical drive per array, and ignore the logical drive size, using the FILL setting for the logical drive.

Default RAID levels are described in “Default RAID levels.”

**Default RAID levels:** The default RAID level that is applied to a logical drive depends on the number of drives in the array and the controller type. These default values are designed to match the default values of the express configuration method in ServeRAID Manager where applicable. The following table shows the default RAID values that PRAID will use when AUTO is specified for *raidlevel*.

Table 15. Default RAID levels

Controller	Drives in Array				
	1	2	3	4	5 or more
ServeRAID-4H	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-4Mx	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-4Lx	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-5i	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-6i	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-6M	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-7k	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-7t	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-8i	VOLUME	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-8k-l	VOLUME	RAID 1	RAID 1+Hotspare	RAID 10	RAID 10+Hotspare
ServeRAID-8k	VOLUME	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-7e-SATA	[n/a]	RAID 1	RAID 1+Hotspare	RAID 1+Hotspare	[n/a]
ServeRAID-7e-SCSI	[n/a]	RAID 1	RAID 1+Hotspare	RAID 1+Hotspare	[n/a]
ServeRAID-8e-SAS	[n/a]	RAID 1	RAID 1+Hotspare	RAID 10	[n/a]
ServeRAID-8e-SATA	VOLUME	RAID 1	RAID 1+Hotspare	RAID 1+Hotspare	[n/a]
ServeRAID-8s	VOLUME	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
LSI-SCSI-RAID	[n/a]	RAID 1	RAID 1+Hotspare	RAID 1+Hotspare	RAID 1+Hotspare
LSI-IDEal-RAID	[n/a]	RAID 1	[n/a]	[n/a]	[n/a]
LSI-SAS-RAID	[n/a]	RAID 1	RAID IME	RAID IME+Hotspare	RAID IME+Hotspare
LSI-SAS-RAID	[n/a]	RAID 1	RAID 1+Hotspare	RAID IME+Hotspare	RAID IME+Hotspare
LSI-MegaRAID	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-B5015	[n/a]	RAID 1	RAID 5	RAID 5 + Hotspare	RAID 5 + Hotspare
ServeRAID-BR10i	[n/a]	RAID 1	RAID IME	RAID IME + Hotspare	RAID IME + Hotspare
ServeRAID-BR10ie	[n/a]	RAID 1	RAID IME	RAID IME + Hotspare	RAID IME + Hotspare
ServeRAID-BR10il	[n/a]	RAID 1	RAID IME	RAID IME + Hotspare	RAID IME + Hotspare
ServeRAID-BR10il V2	[n/a]	RAID 1	RAID IME	RAID IME + Hotspare	RAID IME + Hotspare
ServeRAID-M1015	RAID 0	RAID 1	RAID 0	RAID 10 + Hotspare	RAID 10 + Hotspare
ServeRAID-M1015-R5	RAID 0	RAID 1	RAID 5	RAID 5 + Hotspare	RAID 5 + Hotspare
ServeRAID-M5025	RAID 0	RAID 1	RAID 5	RAID 5 + Hotspare	RAID 5 + Hotspare
ServeRAID-M5025-R6	[n/a]	RAID 1	RAID 5	RAID 5 + Hotspare	RAID 5 + Hotspare

Table 15. Default RAID levels (continued)

Controller	Drives in Array				
	1	2	3	4	5 or more
ServeRAID-M5014	RAID 0	RAID 1	RAID 5	RAID 5 + Hotspare	RAID 5 + Hotspare
ServeRAID-M5015	RAID 0	RAID 1	RAID 5	RAID 5 + Hotspare	RAID 5 + Hotspare
ServeRAID-MR10i	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-MR10ie	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-MR10il	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-MR10is	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-MR10k	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
ServeRAID-MR10M	RAID 0	RAID 1	RAID 5	RAID 5+Hotspare	RAID 5+Hotspare
IBM SAS HBA 1068E	[n/a]	RAID 1	RAID IME	RAID IME + Hotspare	RAID IME + Hotspare
IBM 3Gb SAS HBA V2	[n/a]	RAID 1	RAID IME	RAID IME + Hotspare	RAID IME + Hotspare
LSI-SAS-1078-IR	[n/a]	RAID 1	2RAID 1+1Hotspare	2RAID 1+1Hotspare	2RAID 1+1Hotspare

## SAVESTAT.CMD

The Savestat utility allows you to store and retrieve up to twenty-one values to persistent storage. You can use savestat.cmd to return to your place in an installation, even when a reboot is required. This utility is designed to return values that set the *errorlevel* environment variable so that you can branch in a script or batch file based on the result of the utility's execution.

The utility runs in 32- and 64-bit versions of Windows Preinstallation Environment 2.1, Windows Server 2003, and Windows Server 2008.

Savestat.cmd uses the persistent storage capability of ASU. Therefore the following files must be available in order for the script to work:

- ASU.EXE
- device.cat
- ibm\_mdiss\_server\_os.inf
- savestat.vbs script
- savestat.def

## Usage

The savestat utility that comes with the ServerGuide Scripting Toolkit has the following command-line syntax:

```
SAVESTAT [/q] /reset
SAVESTAT [/q] /set1=value [.../set2=value ... /set21=value]
SAVESTAT [/q] /getn
SAVESTAT [/q] /validate
SAVESTAT [/q] /signature
```

Parameter	Description	Usage
<code>/setn=value</code>	<p>Saves an integer value, <i>value</i>, to the <i>n</i>th location in persistent-storage memory, where <i>n</i> is an integer from 1–21</p> <p>Return codes:</p> <ul style="list-style-type: none"> <li>• <b>0</b> if successful</li> <li>• <b>1</b> if not successful</li> </ul>	<p><code>savestat /setn=value</code></p> <p>Where:</p> <ul style="list-style-type: none"> <li>• <i>n</i> is an integer from 1–21</li> <li>• <i>value</i> is an integer from 0–254</li> </ul>
<code>/getn</code>	<p>Retrieves the value currently set in the <i>n</i>th location in persistent-storage memory, where <i>n</i> is an integer from 1–21.</p> <p>Return codes:</p> <ul style="list-style-type: none"> <li>• The value stored at the location specified by <i>n</i>, if successful.</li> <li>• 255 if not successful.</li> </ul>	<p><code>savestat /getn</code></p> <p>Where <i>n</i> is an integer from 1–21</p>
<code>/reset</code>	<p>Resets all persistent-storage memory to zero values.</p> <p>Return codes:</p> <ul style="list-style-type: none"> <li>• <b>0</b> if successful</li> <li>• <b>1</b> if not successful</li> </ul>	<code>savestat /reset</code>
<code>/signature</code>	<p>Verifies that the persistent storage contains the savestat signature.</p> <p>Return codes:</p> <ul style="list-style-type: none"> <li>• <b>0</b> if storage contains the signature</li> <li>• <b>1</b> if storage does not contain the signature</li> </ul>	<code>savestat /signature</code>
<code>/validate</code>	<p>Verifies that the system is supported by savestat.</p> <p>Return codes:</p> <ul style="list-style-type: none"> <li>• <b>0</b> if the system is supported</li> <li>• <b>1</b> if the system is not supported</li> </ul>	<code>savestat /validate</code>
<code>/q</code>	<p>Invokes the quiet mode. This parameter is optional and can be used with any other savestat parameter.</p>	<code>savestat /q /set1=100</code>

## Examples

The following examples illustrate savestat utility usage.

Example	Description
<code>savestat /set2=100</code>	Stores the value 100 in the second persistent-storage memory location
<pre>savestat /get2 if errorlevel 100 goto end if errorlevel 1 goto level1  :level1 call level1.bat  :end</pre>	Retrieves the value of the second persistent-storage memory location and branches in the batch file according to the value returned

## TKSEARCH.EXE

The Toolkit Search utility (tksearch.exe) can perform the following functions:

- Search for the latest ServerGuide driver sets starting from a given path.
- Search for the latest ServerGuide driver set or sets that supports one or more specified machine types.
- Search for the latest ServerGuide driver set or sets that supports a specified Network Operating System.
- Determine the architecture and type of a Network Operating System.

Two versions of the Toolkit search utility come with the ServerGuide Scripting Toolkit:

- A 32-Bit version for Windows 32-Bit Operating Systems and for Windows Preinstallation Environment (Windows PE) 2.1 (32-Bit).
- An x64 version for Windows x64 Operating Systems and for Windows Preinstallation Environment (Windows PE) 2.1 (x64).

### Usage

The syntax of the tksearch.exe command is:

```
tksearch driverpath [/W:n | /WP:nospath | WP:prodspec.ini] [/M:machtype/platform_ID] [/B:filename] [/?]
```

Parameter	Description
<i>driverpath</i>	The fully qualified directory path to start searching for driver sets. For example: F:\sgdeploy\drvs.
/W:n	The Windows version to prefer when searching for device drivers: <ul style="list-style-type: none"><li>• 0 = Windows 2000 Server</li><li>• 1 = Windows 2003 Server (Default)</li><li>• 2 = Windows 2000 Professional</li><li>• 3 = Windows XP</li><li>• 4 = Windows 2003 Server x64</li></ul>
/WP:nospath	The fully qualified path to directory to start searching for Windows prodspec.ini. For example, F:\sgdeploy\os\w23_std
/WP:prodspec.ini	The fully qualified path to Windows prodspec.ini file. For example, F:\sgdeploy\os\w23_std\i386\prodspec.ini
/l:machinetype/platform_ID	The machine types or platform IDs to limit the searching of drivers for. Multiple machine types or platform IDs can be specified using a comma as the delimiter, for example, /l:8853,8854.

Parameter	Description
/B:filename	<p>The name of the batch file in which to place the resulted environment variables.</p> <p>The default is .\DrvSet.bat. Enviroment Variables are:</p> <ul style="list-style-type: none"> <li>TK_NOS_Type - (Win2000,Win2003)</li> <li>TK_NOS_Arch - (I386,AMD64)</li> <li>TK_NOS_Arch_Type - (x86,x64)</li> <li>TK_NOS_DDL_Type - (Win2000Server, Win2003Server, Win2003Serverx64)</li> <li>TK_NOS_DDL_Path_# - (number of drivers sets found)</li> <li>TK_NOS_DDL_Path_1 - (corresponding drivers set)</li> <li>TK_NOS_DDL_Path_2 -(corresponding drivers set) TK_NOS_DDL_Path_3 (corresponding drivers set)</li> </ul>

## Return codes

The tksearch.exe utility returns the following values to indicate status:

Value	Indicates
0	Sucess: One or more driver libraries found
1	Sucess: Zero driver libraries found
2	Error: Command-line syntax error
3	Error: Writing output batch file
4	Error: Driver path not found
5	Error: NOS not found in specified path
6	Error: General application error

## Examples

The following are examples of Device Driver Search utility usage:

Example	Description
tksearch f:\sgdeploy\drvs	Search all ServerGuide drivers sets regarless of machine type or NOS type.
tksearch f:\sgdeploy\drvs /W:4	Search all ServerGuide drivers sets for Windows 2003 x64 regardless of machine type.
tksearch f:\sgdeploy\drvs /WP:f:\w2000\i386\prodspec.ini	Search all ServerGuide drivers sets for Windows 2000 Server regardless of machine type.
tksearch f:\sgdeploy\drvs /M:8853,7978	Search all ServerGuide drivers sets for systems with machine type 8853 and 7978 regardless the NOS type.

Example	Description
tksearch f:\sgdeploy\drvs /M:8853 /W:f:\sgdeploy\os\w23_std	Search all ServerGuide drivers sets for systems with machine type 8853 and Windows 2003 Standard.
tksearch f:\sgdeploy\drvs /M:8853,7978 /B:	Search all ServerGuide drivers sets for systems with machine type 8853 and 7978 regardless the NOS type. The search results are saved as environment variables in Batch file drvset.bat.
tksearch f:\sgdeploy\drvs /M:8853 /WP:F:\sgdeploy\os\w23_ee /B:drivers.bat	Search all ServerGuide drivers sets for systems with machine type 8853 and Windows 2003 The search results are saved as environment variables in Batch file drivers.bat.

## UNATTEND.EXE

The unattend.exe utility adds device-driver specific information to the Microsoft Windows unattended installation answer file for a deployment scenario. The ServerGuide Scripting Toolkit uses the unattend.exe utility to dynamically add server-specific device-driver information to the answer file for an unattended installation. The device drivers on the *IBM ServerGuide Setup and Installation* CD are already configured for use with this utility.

Two versions of the utility come with the ServerGuide Scripting Toolkit:

- A 32-bit version for Windows 32-bit operating systems and for the Windows Preinstallation Environment (Windows PE) 2.1 (32-bit)
- A 64-bit version for Windows x64 operating systems and for Windows PE 2.1 (x64).

The unattend.exe utility processes three types of device drivers:

- Text mode device drivers
- Plug-and-play device drivers
- Executable device drivers

The unattend command adds the device-driver information to the answer file in one or more locations, depending on the type of device-driver:

### Text mode

Text mode device-driver information is added to the [MassStorageDevices] and [OemBootFiles] sections. Entries are not duplicated; existing entries are not changed.

### Hardware abstraction layer (HAL)

HAL device-driver information is assigned to the ComputerType keyword in the [Unattended] section. Any value previously assigned to this keyword is overwritten.

### Plug and Play

The OemPnPDriversPath keyword in the [Unattended] section is set to the path to the PnP device-driver directory. Any value previously assigned to this keyword is overwritten.

### Executable

The executable device-driver information is added to the [GUIRunOnce] section. Existing entries are not changed.

## Path to the \$oem\$ directory

The OemFilesPath keyword in the [Unattended] section is set to the path to the \$oem\$ directory. Any value previously assigned to this keyword is overwritten.

For text mode device drivers, the unattend.exe utility uses the information in the hwdetect.ini file and the txtsetup.oem file (located in the \oem\$\textmode directory of the target server) to add the text mode device driver information to the answer file. This utility also adds the Microsoft retail text mode device drivers using information specified in the txtsetup.sif file from the i386 directory of the Windows operating-system installation source files.

For plug-and-play and executable device drivers, the unattend.exe utility uses information from the hwdetect.ini file (the output of the hwdetect.exe utility) and the drvinfo.ini file in each device-driver directory in the target server to determine the device drivers to add to the answer file. Device drivers that are not supported on the target server are deleted from the device-drivers directory.

## Usage

The unattend.exe utility has the following command-line syntax:

```
unattend [/?] <file_name|/U:file /D:path /H:file /I:path> [/U:file] [/D:path]
[/H:file_name] [/I:path] [/S:drive] [/C] [/T] [/P] [/E] [/V:n]
```

Parameter	Description
/?	Displays all parameters
<i>file_name</i>	Specifies a fully qualified path and file name for the unattend.ini file that contains command-line parameters for the unattend.exe utility. You can put parameters in this file instead of typing them all on the command line, which is useful for long command lines that exceed the 127-character limit. <ol style="list-style-type: none"><li>Any settings for the /U, /D, /H, or /I parameters you place on the command line will override settings in the unattend.ini file.</li><li>If you do not specify a setting for <i>filename</i>, you must specify the /U, /D, /H, and /I parameters on the command line.</li></ol>
/U:file	Specifies a fully qualified path and file name for the answer file
/D:path	Specifies a fully qualified path to the device-drivers directory in the target server. If <i>path</i> does not include \$oem\$ in the path, you must use the /T parameter to process text mode device drivers.
/H:file	Specifies a fully qualified path and file name for the hwdetect.ini file that was created by the hwdetect.exe utility
/I:path	Specifies a fully qualified path to the i386 directory in the target server.
/S:drive	Specifies the drive letter on the target server to which the operating system is being installed
/C	Creates a default unattend.ini file
/T	Causes the unattend.exe utility to add only the text mode device-driver information to the answer file
/P	Causes the unattend.exe utility to add only the plug-and-play device-driver information to the answer file
/E	Causes the unattend.exe utility to add only the executable device-driver information to the answer file

Parameter	Description
/V: <i>n</i>	Specifies the verbose level used to report status during the deployment process. Valid values for <i>n</i> are:  <b>0</b> - quiet mode <b>3</b> - default <b>5</b> - maximum information

## Return codes

The unattend.exe utility returns the following values to indicate status:

Value	Description
0	Success
1	Syntax error
2	Program error
3	Destination is read-only
4	No device-driver information files found

## Examples

The following examples illustrate unattend.exe utility usage.

Example	Description
unattend /U:c:\unattend.txt /D:c:\w2\%oem%\\$1\drv /H:c:\hwdetect.ini /I:C:\i386	Adds plug-and-play and executable device drivers from c:\w2\%oem%\\$1\drv and the text mode device drivers from c:\w2\%oem%\textmode to the answer file, and deletes device drivers not specific to the target server
unattend /U:C:\unattend.txt /D:c:\w2\%oem%\textmode /H:c:\hwdetect.ini /I:c:\i386 /T	Adds only the text mode device drivers from c:\w2\%oem%\textmode directory to the answer file

## UNATTEND.INI

The unattend.ini file contains all required parameters for the unattend.exe utility in a single file. Parameters specified on the command line will override settings in this file.

The unattend.ini file contains two sections, called [Unattend] and [GUIRunOnce]. The [Unattend] section contains variables that you can set instead of providing command-line parameters. The [GUIRunOnce] section enables you to specify a set of commands to run on the target server after the operating system is installed. These commands can run before the executable device drivers are installed, or after they are completed.

None of the commands can cause the server to restart (reboot).

Run commands that require user interaction after the executable device drivers are installed.

The unattend.ini file can contain the following valid variables:

Variable name	Description
<b>[Unattend] section</b>	

Variable name	Description
Drivers Path	Specifies a fully qualified path to the device-drivers directory in the target server. If \$oem\$ is not in the path, you must use the /T parameter to process text mode device drivers.
Executable	Causes the unattend.exe utility to add only the executable device-driver information to the answer file. Valid values are True or False.
HWDetectIni	Specifies a fully qualified path and file name for the hwdetect.ini file that was created by the hwdetect.exe utility
I386 Path	Specifies a fully qualified path to the i386 directory in the target server.
PnP	Causes the unattend.exe utility to add only the plug-and-play device-driver information to the answer file. Valid values are True or False.
System Drive	Specifies the drive letter on the target server to which the operating system is being installed
Textmode	Causes the unattend.exe utility to add only the text mode device-driver information to the answer file. Valid values are True or False.
UnattendTxt	Specifies a fully qualified path and file name for the answer file
Verbose Level	Specifies the verbose level used to report status during the deployment process. Valid values are:  <b>0</b> - quiet mode <b>3</b> - default <b>5</b> - maximum information
<b>[GUIRunOnce] section</b>	
<i>name_Command</i>	Specifies the <i>name</i> of the command to run
<i>name_Supported_Systems</i>	Specifies the servers on which to run the command, <i>name</i> . This value can be All, None, or a comma-delimited list of server machine types or platform IDs. You cannot use both <i>name_Supported_Systems</i> and <i>name_Unsupported_Systems</i> in the same unattend.ini file.
<i>name_Unsupported_Systems</i>	Specifies the servers on which not to run the command, <i>name</i> . This value must be a comma-delimited list of server machine types or platform IDs. You cannot use both <i>name_Supported_Systems</i> and <i>name_Unsupported_Systems</i> in the same unattend.ini file.
After Drivers	Specifies a comma-delimited list of commands to run after the executable device drivers are installed. Each command must have a <i>name_Command</i> variable and either a <i>name_Supported_Systems</i> or <i>name_Unsupported_Systems</i> variable defined.
Before Drivers	Specifies a comma-delimited list of commands to run before the executable device drivers are installed. Each command must have a <i>name_Command</i> variable and either a <i>name_Supported_Systems</i> or <i>name_Unsupported_Systems</i> variable defined.

The following are examples of unattend.ini file contents:

Example	Description
<pre>[Unattend] UnattendTxt=c:\unattend.txt Drivers Path=c:\w2\soem\$\\$1\drv HWDetectIni=c:\hwdetect.ini I386 Path=c:\i386 System Drive= Textmode= PnP= Executable= Verbose Level=</pre>	<p>Adds plug-and-play device drivers from c:\w2\soem\$\\$1\drv and text mode device drivers from c:\w2\soem\$\textmode to the answer file and deletes device drivers not specific to the target server</p>

Example	Description
<pre>[Unattend] UnattendTxt=c:\unattend.txt Drivers Path=c:\w2\soem\$\textmode HWDetectIni=c:\hwdetect.ini I386 Path=c:\i386 System Drive= Textmode=True PnP= Executable= Verbose Level=</pre>	<p>Adds only the text mode device drivers from c:\w2\soem\$\textmode directory to the answer file</p>
<pre>[Unattend] UnattendTxt=c:\unattend.txt Drivers Path=c:\w2\soem\$\1\drv HWDetectIni=c:\hwdetect.ini I386 Path=c:\i386 System Drive= Textmode= PnP= Executable= Verbose Level=  [GUIRunOnce] Before Drivers=LaunchIt,MoveIt After Drivers=DeleteIt,FinishIt  LaunchIt_Command="CMD.EXE /C c:\RunMe.exe" LaunchIt_Supported_Systems=All  MoveIt_Command="CMD.EXE /C Move c:\WinInst\Readme.htm c:\" MoveIt_Supported_Systems=8676,8870  DeleteIt_Command="CMD.EXE /C RMDIR c:\WinInst /q" DeleteIt_Unsupported_Systems=8870  FinishIt_Command="CMD.EXE /C c:\ShowMsg.exe" FinishIt_Supported_Systems=All</pre>	<p>Adds the plug-and-play device drivers and executable device drivers from c:\w2\soem\$\1\drv and the text mode device drivers from c:\w2\soem\$\textmode to the answer file, deletes device drivers not specific to the target server, and runs some specific commands both before and after executable device drivers are installed on specific servers</p>

## VALRAID

VALRAID is a utility program that can be used to validate policy files against inventory files generated by the INVRAID utility.

VALRAID has two modes of operation:

- **Simulation mode** - simulates the effect a policy file would have on a controller.
- **Check mode** - determines whether the policy file matches the configuration represented in the inventory file.

### Simulation mode

Used in simulation mode, VALRAID will simulate the effect that a policy file would have on a RAID configuration if it were applied using the PRAID utility. This capability can be used when creating PRAID policy files. The policy files can be tested without running PRAID on the target system.

## Check mode

Used in check mode, VALRAID determines whether the policy file specified matches the RAID configuration represented in the inventory file. This capability can be used in OS deployment scripts to skip the RAID configuration step if the controller is already configured with the required RAID configuration and thus avoiding an extra reboot before installing the OS. VALRAID will set the return code = 20 to indicate that the policy file does not match the configuration represented by the inventory file.

## Usage

The two modes of operation share most parameters, but the syntax is mode-specific.

The simulation mode syntax is:

```
valraid /ini:input_inventory_file /inp:input_policy_file  
/outi:output_inventory_file /outp:output_policy_file  
/raid:/inifiles
```

The check mode syntax is:

```
valraid /c /ini:input_inventory_file /inp:input_policy_file /raid:/inifiles
```

Table 16. VALRAID parameters

Parameter	Description	Example
<i>/ini:input_inventory_file</i>	Specifies the input inventory file. Generate the inventory file by running INVRAID against a target system.	valraid /ini:myfile.inv /inp:policy.ini /outi:newfile.inv /outp:newpolicy.ini /raid:/inifiles
<i>/inp:input_policy_file</i>	Specifies the input policy file.	valraid /ini:myfile.inv /inp:policy.ini /outi:newfile.inv /outp:newpolicy.ini /raid:/inifiles
<i>/outi:output_inventory_file</i>	Specifies the filename for the output inventory file. This is an inventory file representing the RAID configuration that would result from using the PRAID utility to apply <i>input_policy_file</i> to the system described in <i>input_inventory_file</i> .  This option is valid only for simulation mode.	valraid /ini:myfile.inv /inp:policy.ini /outi:newfile.inv /outp:newpolicy.ini /raid:/inifiles
<i>/outp:output_policy_file</i>	Specifies the filename for the output policy file. This file can be applied to a target system using the PRAID utility.  This option is valid only for simulation mode.	valraid /ini:myfile.inv /inp:policy.ini /outi:newfile.inv /outp:newpolicy.ini /raid:/inifiles

Table 16. VALRAID parameters (continued)

Parameter	Description	Example
/raid:inifiles	Specifies the directory that contains the RAID ini files.  The default is /opt/ibm/sgtk/sgdeploy/sgtklinux/.data/valraid	valraid /ini:myfile.inv /inp:policy.ini /outi:newfile.inv /outp:newpolicy.ini /raid:/inifiles
/c	Specifies check mode.  Check mode compares the configuration from <i>input_inventory_file</i> to the configuration represented in <i>input_policy_file</i> .  The default is simulation mode.	valraid /c /ini:myfile.inv /inp:policy.ini /raid:inifiles

## Return codes

VALRAID uses the following return codes:

- 0 – Success
- 1 – Error parsing input policy file
- 2 – Error parsing input inventory file
- 3 – Controller is not supported
- 4 – Raid level is not supported
- 5 – Stripesize is not supported
- 6 – Number of arrays not supported
- 7 – Number of drives in array not supported
- 8 – Number of logical volumes in array is not supported
- 9 – Not enough drives to create hotspare
- 10 – Not enough drives of the same size
- 11 – Error opening input policy file
- 12 – Error opening input inventory file
- 13 – Error opening output inventory file
- 14 – Error writing to output inventory file
- 15 – Error opening output policy file
- 16 – Error writing output policy file
- 17 – Partial drive sizing not supported
- 18 – Command line syntax error
- 19 – No policy match
- 20 – Controller not configured, does not match policy file

---

## Appendix C. Incorporating the Scripting Toolkit with your existing process

To incorporate Scripting Toolkit procedures into an existing deployment process, use the HWDETECT.EXE utility to determine if the combined process is being executed on Scripting Toolkit supported hardware. You can then add appropriate branches in the batch files to use the existing process or the Scripting Toolkit process.

For example, you might use the /s option of HWDETECT.EXE to determine if the current system is an IBM eServer, xSeries, or BladeCenter server:

```
hwdetect /s
if errorlevel 1 goto NONIBM
if errorlevel 0 goto IBM
```

```
:NONIBM
rem Perform non-IBM equipment specific processing here.
```

```
:IBM
rem Perform IBM eServer or xSeries equipment specific processing here.
```



---

## Appendix D. Hints and tips

This section contains information on known problems and limitations, best practices, and hints and tips for using the Toolkit.

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### Using UXSPI to download updates

This section describes how to acquire firmware and driver updates for your IBM Servers using the graphical user interface (GUI) of the UpdateXpress System Pack Installer (UXSPI). For more information on using UXSPI, please refer to the IBM UpdateXpress System Pack Installer User's Guide (ibm\_utl\_uxspi\_4.20\_anyos\_noarch) located in the `sgdeploy\SGTKWinPE\docs\uxspi\` folder in the location where you installed the IBM ServerGuide Scripting Toolkit Windows Edition

To acquire driver and firmware updates for your system using UXSPI in the GUI mode, follow the instructions below:

1. Go to the location where you installed the ServerGuide Scripting Toolkit, Windows Edition and navigate to the `sgdeploy\updates\uxsp` directory.
2. Start UXSPI by double-clicking the `uxspi420.exe` executable. The main UXSPI window opens.
3. Click **Next** to proceed to the Select Command window.
4. Select **Create a repository of updates** and click **Next**.
5. Follow the on-screen instructions in the wizard to download the latest UXSPs or firmware updates.

---

### Installing an operating system on a multi-adapter system

This section describes the special considerations for installing an operating system on a multi-adapter system.

When you perform a Windows installation the ServerGuide Scripting Toolkit, Windows edition attempts to install Windows to the first disk on the system presented by the `diskpart` command line utility. Due to limitations of the system, when multiple storage adapters are present on the system, the first disk presented by the `diskpart` utility is not always the first disk on the system.

You can control what disk the operating system is installed to using the `TK_Partition_DiskNum` variable in the Partitioning section of the `SGTKWinPE.ini` settings file. To determine the value for the disk you want to install to, complete RAID configuration and then run the utility `GetDiskData.cmd` to determine the available disks.

When a system contains a Fibre HBA that has been configured with a logical drive mapped to Logical Unit Number (LUN) 0, Toolkit uses this drive as the boot device. Therefore, Toolkit will fail if a different drive is selected for Windows installation. If you want to install to a different drive, disable the BIOS for the HBA before beginning your deployment.

---

### Working with Windows 2003 R2 installations

This section provides information specific to deployments of Microsoft Windows 2003 R2 operating systems.

The ServerGuide Scripting Toolkit, Windows Edition will automatically install the second CD-ROM (Disc 2) of Windows Server 2003 R2 if the CD is copied into a folder called cd2 in the folder containing the Disc 1 files. If you select **Windows Server 2003 R2** when using the Toolkit Configuration Utility, you will be prompted for Disc 2, and the files will be copied to the correct location automatically.

The win2003.txt and win2003x64.txt answer files supplied by the Toolkit are already configured to automatically install the Hardware Management optional component (HWMgmt = ON). Installation of this component is necessary to allow the Toolkit to automatically install the Microsoft IPMI device driver. Turning the Hardware Management optional component off in the answer file (HWMgmt = Off) will cancel the automated installation of the Microsoft IPMI device driver by the Toolkit.

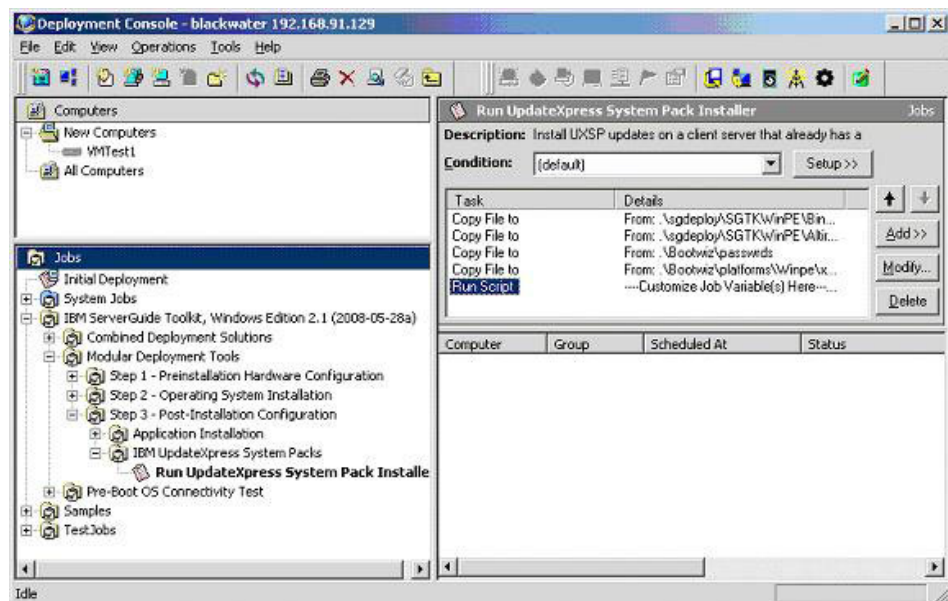
You can enable automatic installation of other optional components of Windows Server 2003 R2 by enabling them in the answer files. The optional components can also be added after the installation is complete by using **Add/Remove Programs**. For more information, see the documentation provided on Disc 2 of Microsoft Windows 2003 Server R2 in \docs\deploy.chm.

## Changing the security context of an Altiris task

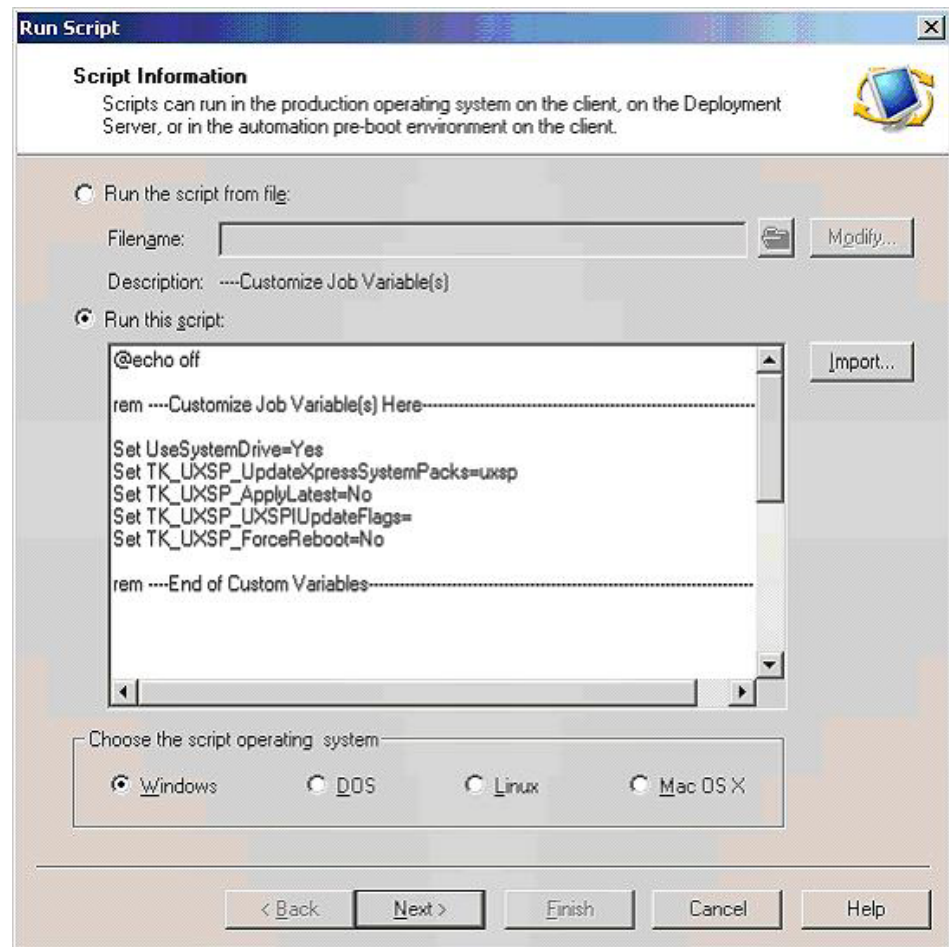
The IBM Director Agent and UpdateXpress System Pack Post Installation jobs need Administrator privileges to run properly. This section describes the process for changing the security context of these jobs.

Follow these steps to change the security context of an Altiris job:

1. Start the Altiris Deployment Solution console, select and expand the **IBM ServerGuide Toolkit, Windows Edition** job folder.
2. Under **Modular Deployment Tools**, expand **Post-Installation Configuration**.
3. Under **Post-Installation Configuration**, expand the appropriate subfolder and select the job you want to modify. This example uses the **Run UpdateXpress System Pack Installer** job.
4. Click the **Run Script** to select it, as shown here:



5. With the **Run Script** task highlighted, click **Modify** to open the Run Script wizard as shown here:



The image shows the 'Run Script' wizard dialog box. It has a title bar 'Run Script' with a close button. Below the title bar is a section titled 'Script Information' with a sub-header 'Script Information' and a description: 'Scripts can run in the production operating system on the client, on the Deployment Server, or in the automation pre-boot environment on the client.' There is a small icon of a computer with a yellow arrow. Below this, there are two radio buttons: 'Run the script from file:' and 'Run this script:'. The 'Run this script:' option is selected. Below the 'Run the script from file:' option is a 'Filename:' text box and a 'Modify...' button. Below the 'Run this script:' option is a large text area containing a script. The script starts with '@echo off', followed by a comment 'rem ---Customize Job Variable(s) Here---', then several 'Set' commands: 'Set UseSystemDrive=Yes', 'Set TK\_UXSP\_UpdateXpressSystemPacks=uxsp', 'Set TK\_UXSP\_ApplyLatest=No', 'Set TK\_UXSP\_UXSPIUpdateFlags=', and 'Set TK\_UXSP\_ForceReboot=No'. It ends with a comment 'rem ---End of Custom Variables---'. To the right of the text area is an 'Import...' button. Below the text area is a section titled 'Choose the script operating system:' with four radio buttons: 'Windows' (selected), 'DOS', 'Linux', and 'Mac OS X'. At the bottom of the dialog are five buttons: '< Back', 'Next >', 'Finish', 'Cancel', and 'Help'.

**Run Script**

**Script Information**  
Scripts can run in the production operating system on the client, on the Deployment Server, or in the automation pre-boot environment on the client.

☐ Run the script from file:

Filename:

Description: ---Customize Job Variable(s)

☒ Run this script:

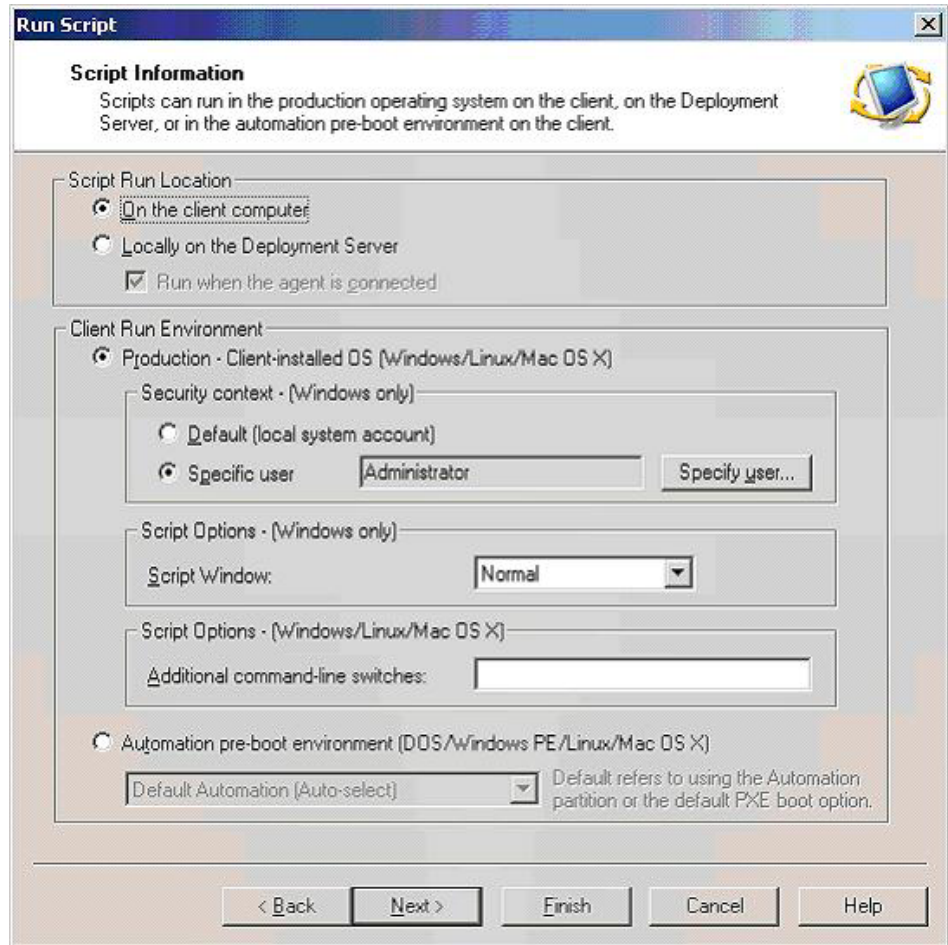
```
@echo off
rem ---Customize Job Variable(s) Here---
Set UseSystemDrive=Yes
Set TK_UXSP_UpdateXpressSystemPacks=uxsp
Set TK_UXSP_ApplyLatest=No
Set TK_UXSP_UXSPIUpdateFlags=
Set TK_UXSP_ForceReboot=No
rem ---End of Custom Variables---
```

Choose the script operating system:

☒ Windows ☐ DOS ☐ Linux ☐ Mac OS X

< Back Next > Finish Cancel Help

6. Click **Next**.
7. Under Client Run Environment, select **Specify user** and enter Administrator, as shown here:



**Run Script**

**Script Information**  
Scripts can run in the production operating system on the client, on the Deployment Server, or in the automation pre-boot environment on the client.

**Script Run Location**

- ☒ On the client computer
- ☐ Locally on the Deployment Server
- ☒ Run when the agent is connected

**Client Run Environment**

- ☒ Production - Client-installed OS (Windows/Linux/Mac OS X)
  - Security context - (Windows only)**
    - ☐ Default (local system account)
    - ☒ Specific user:
  - Script Options - (Windows only)**

Script Window:
- ☐ Automation pre-boot environment (DOS/Windows PE/Linux/Mac OS X)
  - Default refers to using the Automation partition or the default PXE boot option.

< Back   Next >   Finish   Cancel   Help

8. Click **Specify user** to open the Set user name and password dialog.
9. In the dialog, enter the Administrator password for the system, then click **OK**.
10. Click **Next** to proceed to the end of the Run Script wizard, then click **Finish** to exit the wizard.

## Known problems and limitations

This section provides information and alternative solutions for known problems and limitations of the Toolkit.

### The Toolkit will not work on a network share drive or any drive that is not formatted using NTFS

The Toolkit uses the Microsoft Windows Imagex.exe utility during the generation of the Windows PE ISO. The Imagex.exe utility will fail during the creation of the deployment scenario if the Toolkit is installed to a mapped network drive or a USB device if it is formatted with anything other than the NTFS file system.

### Unknown HID SYS device in Windows Device Manager

When an IBM Remote Supervisor Adapter-II is installed in a server, an unknown HID SYS device may appear in the Windows Device Manager list if the adapter OS Type is set Linux. You can remove the unknown HID SYS device by completing the following steps after the OS installation:

1. Boot the machine and press **F1** to enter System Setup.
2. Navigate to **Advanced Setup**.
3. Navigate to **RSA II Setting**
4. Set the OS Type of the Remote Supervisor Adapter-II to **Other**.
5. Save and exit from System Setup.
6. Reboot the machine and start Windows.
7. Navigate to Device Manager.
8. Right-Click the unknown HID SYS device in the Windows Device Manager list.
9. Select **Update Driver** from the menu.
10. Select **No, not at this time** to connect to Windows Update.
11. Click **Next**.
12. Click **Next**.
13. Click **Finish**.

## Altiris Agent Fails To Connect To Altiris Server

When you perform a Windows installation to an IBM blade within an BladeCenter S chassis, the installed Altiris Client Agent might not be able to connect to the Altiris Deployment Solution server after the deployment.

To resolve this issue, apply the following changes to the registry on the target system within the HKEY\_LOCAL\_MACHINE\Software\Altiris\Client Service folder:

Key	Type	Value
LastMCastDiscoveredTcpAddr	REG_SZ	<i>ServerIP</i>
LastMCastDiscoveredTcpPort	REG_SZ	402

Where *ServerIP* is the IP address of the Altiris Deployment Solution server.

After you have made the changes you must restart the Altiris Client Service for them to take effect.

## Installing an operating system to a system with multiple storage adapters from Altiris

When you perform a Windows installation, the ServerGuide Scripting Toolkit, Windows edition attempts to install Windows to the first disk on the system presented by the diskpart command line utility. When multiple storage adapters are present on the system, the first disk presented by the diskpart utility is not always the first disk on the system.

To perform the installation to the first disk on a system with multiple storage adapters, you might need to modify the TK\_Partition\_DiskNum variable in the Altiris job. To locate the first disk, run the Capture Disk Data job by following these steps:

**Note:** Run the Capture Disk Data job after you have configured RAID.

1. Start the Altiris Deployment Solution console.
2. Select **IBM Scripting Toolkit, Windows Edition 2.40** → **Modular Deployment Tools** → **Step 1 - Preinstallation Hardware Configuration** → **Server Disk Analysis** .
3. Run the Capture Disk Data job against the system whose disk information you would like to retrieve.

This job will create a disk information file and store it on the source server. By default, it creates the file: C:\Program Files\Altiris\Express\Deployment Server\temp\ID\disk\_details.txt.

From the output file, locate the disk number where you would like to install Windows. Then, in the Windows installation job in Altiris, modify the TK\_Partition\_DiskNum variable with the correct disk number and perform the Windows Installation.

## Partitioning disks appears to hang at 0 percent complete

When using Scripting Toolkit to partition disks of 300 GB or larger, the process might appear to hang at 0 percent complete. The process is not hung, but it might take 15-20 minutes for the process to complete.

## Windows ComputerName must be alphanumeric

The *ComputerName* variable used for Windows installations must be alphanumeric, and must contain at least one letter. Valid values of *ComputerName* must be 15 characters or less.

If *ComputerName* does not meet these criteria, you will receive an error during unattended Windows 2008 installations saying:

```
Windows could not parse or process the unattended answer file for pass
(specialize).
The settings specified in the answer file cannot be applied.
The error was detected while processing settings for component
[Microsoft-Windows-Shell-Setup].
```

The compname used by Altiris is used as the default value of *ComputerName*. To avoid this error, ensure that the compname in the Altiris console for the node meets the criteria for the Windows *ComputerName* variable. You can edit the answer file to assign a name to the computer, or you can use \* to assign a random name to the computer. The following example shows how to edit the windows2008.xml file to change the computername.

```
<ComputerName>IBM1</ComputerName>
```

or

```
<ComputerName>*</ComputerName>
```

## Limitations for RSA-II installations

You might encounter errors when using RSA-II to install Windows Server 2008 using an ISO image. These errors vary depending on the type of system to which you are installing. In order to avoid these errors, when using RSA-II to install Windows Server 2008, use a mounted physical CD or DVD instead of an ISO image.

## Slow network installations on System x3850 and x3950

Network installations using onboard Ethernet communications on the System x3850 and x3950 are very slow. You can avoid this problem by using an external Ethernet adapter.

## Error for non existent PS/2 mouse in Device Manager

Installations of Windows Server 2003 or Windows Server 2008 can result in an error displayed in Device Manager for a non existent PS/2 mouse. This error is not readily apparent in Windows Server 2003, to see it you must select **View** → **Hidden**.

Because the error refers to a device that is not present, it can be safely ignored.

To fix this error on a System x 3250 server update the BIOS to level 1.42a or higher.

## Deploy System Settings Altiris job fails on System x3250 M2

When using Deploy System Settings to deploy CMOS settings to a System x3250 M2, the job fails with return code 5 and the following command line message:

Passwords cannot be set in "replicate" mode. They can only be set in "batch" or "set" mode.

This error occurs because the System x3250 M2 sets the CMOS values cmosSuperPassword and cmosUserPassword to "hidden", causing the error when the settings are deployed.

To avoid this problem, edit the settings INI file created by the Capture Settings job to remove the following settings:

```
cmosSuperPassword=<hidden>  
cmosUserPassword=<hidden>
```

and then deploy the settings normally.

## Savestat.cmd will not save to location 9 on xSeries 226 with BIOS PME170CUS

On the xSeries 226 with BIOS Level PME170CUS, savestat.cmd cannot save a value to byte nine in persistent storage.

## BladeCenter HS22 unable to access bootable deployment media

When performing deployments to a BladeCenter HS22, type 1936 or 7870, the system might be unable to access the bootable media being used for the deployment. This error is caused by the system's inability to find the mounted media tray.

When this problem occurs, it is possible for all blades in the chassis to lose access to the media tray. To correct the problem, restart the BladeCenter Advanced Management Module (AMM) to restore access to the media tray.

To correct the problem, update the firmware for the system and the BladeCenter chassis to the latest level available.

## Yellow exclamation point for Microsoft ISATAP adapter

A yellow exclamation point icon might be displayed by Device Manager for the Microsoft ISATAP adapter after installing Windows Server 2008. In most cases, the adapter is functioning properly and you can continue to use the device normally.

For more information on this situation, see <http://support.microsoft.com/kb/932520>.

## **Booting from SAN using Brocade Fibre Channel Adapters not supported**

Booting from SAN using the Brocade Fibre Channel Adapters listed in this document is not supported.

## **Windows firewall might block execution of some applications on Windows 2003 SP1 and SP2 installs**

The Windows firewall might block some applications, such as Updates, ASU configuration, Director Agent, and possibly others, from executing after installation of Windows Server 2003 SP1 and SP2. To avoid this problem, you can disable the firewall by including the following text in the Windows 2003 answer file:

```
[WindowsFirewall]
Profiles = WindowsFirewall.TurnOffFirewall
[WindowsFirewall.TurnOffFirewall]
Mode = 0
```

## **Default Fibre configuration not supported on Emulex HBAs**

The Target WWNN, Target WWPN and LUN number on the Fibre HBA Toolkit variables need to be set to configure the Primary, Alternate 1, Alternate 2 and Alternate 3 boot device settings. The default settings will NOT work on Emulex Fibre HBA adapters.

## **No x64 support for SCSI RAID controller configuration**

The IBM Scripting Toolkit supports only 32-bit RAID configuration of ServeRAID SCSI and LSI SCSI RAID controllers. If 64-bit RAID configuration is attempted, you might receive a "No controller found" message. To avoid this issue, use the x86 RAID configuration for the SCSI controllers.

The following controllers are affected by this issue:

- ServeRAID 4H
- ServeRAID 4Lx
- ServeRAID 4Mx
- ServeRAID 5i
- ServeRAID 6i/6i+
- ServeRAID 6M
- ServeRAID 7k
- LSI SCSI (1020/1030)

## **ServeRAID BR10i adapter not supported on iDataPlex™ dx360 M2 with 12 Bay Storage Chassis (Machine type 7321)**

## **IBM Systems Director 6.11 Platform Agent installation fails on Windows 2008**

When installing the platform agent on Windows Server 2008, it might fail with return code 400. This indicates that the target system does not include Windows Installer 4.5.

To resolve this issue, follow the instructions in Microsoft Knowledge Base article 942288: <http://support.microsoft.com/kb/942288>.

**Booting from SAN is not supported for the QLogic 10Gb Dual Port CNA for IBM System x (42C1800)\**



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## Appendix E. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about IBM products, you will find a wide variety of sources available from IBM to assist you. This appendix contains information about where to go for additional information about IBM and IBM products, what to do if you experience a problem with your xSeries or IntelliStation® system, and whom to call for service, if it is necessary.

---

### Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system is turned on.
- Use the troubleshooting information in your system documentation, and use the diagnostic tools that come with your system. Information about diagnostic tools is in the *Hardware Maintenance Manual and Troubleshooting Guide* on the IBM xSeries Documentation CD or in the IntelliStation *Hardware Maintenance Manual* at the IBM Support Web site.
- Go to the IBM Support Web site at <http://www.ibm.com/pc/support/> to check for technical information, hints, tips, and new device drivers or to submit a request for information.

You can solve many problems without outside assistance by following the troubleshooting procedures that IBM provides in the online help or in the publications that are provided with your system and software. The information that comes with your system also describes the diagnostic tests that you can perform. Most xSeries and IntelliStation systems, operating systems, and programs come with information that contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the information for the operating system or program.

---

### Using the documentation

Information about your IBM xSeries or IntelliStation system and preinstalled software, if any, is available in the documentation that comes with your system. That documentation includes printed books, online books, readme files, and help files. See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. IBM maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to <http://www.ibm.com/pc/support/> and follow the instructions. Also, you can order publications through the IBM Publications Ordering System at <http://www.elink.ibm.com/public/applications/publications/cgibin/pbi.cgi>.

---

## Getting help and information from the World Wide Web

On the World Wide Web, the IBM Web site has up-to-date information about IBM xSeries and IntelliStation products, services, and support. The address for IBM xSeries information is <http://www.ibm.com/eserver/xseries/>. The address for IBM IntelliStation information is <http://www.ibm.com/pc/intellistation/>.

You can find service information for your IBM products, including supported options, at <http://www.ibm.com/pc/support/>.

---

## Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with xSeries servers, IntelliStation workstations, and appliances. For information about which products are supported by Support Line in your country or region, go to <http://www.ibm.com/services/sl/products/>.

For more information about Support Line and other IBM services, go to <http://www.ibm.com/services/>, or go to <http://www.ibm.com/planetwide/> for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

---

## Hardware service and support

You can receive hardware service through IBM Services or through your IBM reseller, if your reseller is authorized by IBM to provide warranty service. Go to <http://www.ibm.com/planetwide/> for support telephone numbers, or in the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

---

## Appendix F. Notices

This book contains the following notices designed to highlight key information:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or difficult situations.
- **Attention:** These notices indicate possible damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage could occur.

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### Important notes

When referring to processor storage, real and virtual storage, or channel volume,  
KB stands for approximately 1000 bytes, MB stands for approximately 1 000 000  
bytes, and GB stands for approximately 1 000 000 000 bytes.

When referring to hard disk drive capacity or communications volume, MB stands  
for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible  
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