



smartstart scripting toolkit

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technical white paper

next generation server deployment tools: smartstart scripting toolkit

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introduction

The explosive growth of ISPs/ASPs and server farms is accelerating the requirement that servers be quick to deploy and easy to manage, providing virtual presence anywhere on the network. HP redefined the paradigm for quick and easy server deployment with SmartStart. The HP SmartStart Scripting Toolkit radically simplifies high-volume server deployment, enabling customers to deploy hundreds to thousands of servers in a quick and reliable fashion.

The SmartStart Scripting Toolkit includes a modular set of utilities and important documentation that describes how to apply the tools to build an automated server deployment process. This automated process reduces time for each server deployed, making it possible to rapidly scale server deployments to high volumes in rapid fashion.

IMPORTANT: Because the SmartStart Scripting Toolkit practices align with SmartStart releases, version 1.8 and forward is optimized for SmartStart 6.0 and later, while SmartStart Scripting Toolkit version 1.7 and earlier will align to releases of the SmartStart 5.x family. For additional information, visit the website

www.hp.com/servers/sstoolkit

intended audience

The SmartStart Scripting Toolkit is intended for use by network administrators who have advanced skills using unattended and automated software installation methods.

CAUTION: Some of the utilities in the SmartStart Scripting Toolkit can destroy data if used incorrectly. Because of the potential risk of data loss, take all necessary precautions to safeguard data so that mission-critical systems are not disrupted if a failure occurs.

benefits

The SmartStart Scripting Toolkit:

- Provides automated, unattended installation, which frees up scarce IT resources
- Scales to support high-volume server deployments, lowering the cost per server as more servers are deployed
- Delivers consistent server configurations across multiple servers
- Integrates into popular methods for operating system deployment
- Provides a user guide with valuable best practices examples on how to build scripts for high-volume server deployment

overview

HP scripting utilities enable customers to configure and deploy servers in a customized, predictable, and automated fashion. Using SmartStart technology, the new Scripting Toolkit provides a flexible way to create standard server configuration scripts that automate many of the manual steps in the server configuration process. By combining scripts for server configuration and operating system installation, IT administrators can rapidly configure a new server and install the operating system in an unattended fashion.

The SmartStart Scripting Toolkit consists of a set of modular utilities that are used to create a set of configuration data files, which are combined using a script or batch file to provide an automated installation process.

Three main steps are necessary to use the Scripting Toolkit:

1. Generate the server profile from a previously configured server.
2. Create a script (batch) file that reads in server configuration files to configure the server hardware and install the server operating system.
3. Build the server configuration diskette that initiates the automated deployment process.

IMPORTANT: The SmartStart Scripting Toolkit 1.8 was designed to work primarily with the ProLiant ML, DL, and BL server lines. The SmartStart Scripting Toolkit 1.7 includes support for servers prior to the ML and DL lines. Refer to the SmartStart Scripting Toolkit Support Matrix on the HP website at

www.hp.com/servers/sstoolkit

Refer to the *SmartStart Scripting Toolkit User Guide* for more detailed information and for sample scripts on the use of the various utilities included in the toolkit.

step 1 — generating the server profile

The server profile for target servers is generated from an optimally configured source server that has booted from a DOS diskette. The server profile consists of four main configuration files and an optional fifth file (for the Remote Insight Lights-Out Edition) that may be edited to match the servers that are being deployed:

- **Hardware script file**—Contains server hardware configuration information
- **Array script file**—Contains disk array configuration information
- **Partition script file**—Contains disk partition information
- **Remote Insight Lights-Out Edition script file (optional)**—Contains data for boot-strapping a Remote Insight Lights-Out Edition (RILOE) board or a Remote Insight Lights-Out Edition II (RILOE II) configuration to a server. This file is optional for customers who want to use the toolkit on servers with RILOE or RILOE II installed.

NOTE: RILOE and RILOE II scripting is not supported with Linux operating systems or when using the NetWare Client.

- **Unattended text file**—Contains unattended operating system software installation information. This file is defined by the operating system installation process and is not created by the toolkit.

NOTE: The unattended text file is created by the user. Examples are provided in the *SmartStart Scripting Toolkit Best Practices*.

These six configuration script files contain all the server configuration information and become the basis for the server batch file.

IMPORTANT: The utilities will not function properly in an emulated DOS window in Microsoft Windows 95, Windows 98, Windows NT, or Windows 2000. The utilities will not function in a DOS emulator running under Red Hat Linux 6.2 or 7.x. The SmartStart Scripting Toolkit utilities require a true DOS mode.

configuration utilities

HP has developed six utilities that create configuration files for the hardware, array, partition, and optional RILOE configurations from an existing server. The utilities included in the Toolkit read the configuration of a source server and duplicate it on a target server by means of a generated script file.

configuration replication utility

The Configuration Replication Utility (CONREP.EXE) is used for ProLiant ML, DL, and BL servers. CONREP generates a hardware configuration file based on the server that they are initially run on. Run the appropriate configuration utilities to create the hardware configuration data files that make up the server profile.

NOTE: While all of the Toolkit utilities, except the CONREP Utility, should run on all unsupported servers, the utilities have been tested only on the servers and controllers listed in the SmartStart Scripting Toolkit Support Matrix on the HP website at

www.hp.com/servers/sstoolkit

configuration replication utility for pre-ML/DL servers

The Configuration Replication Utility for Pre-ML/DL Servers (CF_REP.EXE) is used for Compaq ProLiant 1600, 1850R, 3000, 6400R, and 8500 servers. CF_REP will not create an editable file, and the target servers must be identical (except for memory and processor speed and type) for the replication file to work appropriately.

IMPORTANT: This utility is included with SmartStart Scripting Toolkit version 1.7. Because the SmartStart Scripting Toolkit practices align with SmartStart releases, version 1.8 and forward is optimized for SmartStart 6.0 and later, while SmartStart Scripting Toolkit version 1.7 and earlier will align to releases of the SmartStart 5.x family. For additional information, visit the website

www.hp.com/servers/sstoolkit

array configuration replicator utility

The Array Configuration Replicator Utility (ACR.EXE) creates a configuration script file containing the array controller configuration information. Run the ACR utility to create the array configuration data file.

IMPORTANT: If deploying a ProLiant ML330 G2 server with an embedded AMI ATA RAID controller, use HYPERCFG to generate a noneditable array configuration data file. Do not use ACR.

integrated ATA RAID replication utility

The Integrated ATA RAID Replication Utility (HYPERCFG.EXE) creates a configuration script file containing the array controller configuration information for the ProLiant ML330 G2 server embedded ATA RAID controller. The utility provides the basic capabilities to capture and write the controller configuration information.

compaq disk partition creation utility

The Compaq Disk Partition Creation Utility (CPQDISK.EXE) creates a configuration script file that defines the disk partition of the first logical drive of the server. Run the CPQDISK Utility to create the disk partition data file.

The CPQDISK Utility will recognize the system partition type and record any active partition it detects as a primary DOS partition when saving the data to the file.

compaq lights-out DOS utility

The Compaq Lights-Out DOS Utility (CPQLODOS.EXE) generates a hardware configuration script file that is used to duplicate the RILOE or RILOE II configuration of an optimally configured source ProLiant ML or DL server onto a target server.

The Compaq Lights-Out DOS Utility is not intended for continued administration. Use the Compaq Lights-Out Configuration Utility (CPQLOCFG.EXE) for administration purposes. These utility names may change.

NOTE: RILOE and RILOE II scripting is not supported with Linux operating systems or when using the NetWare Client.

For more information on these utilities, refer to the *Remote Insight Lights-Out Edition User Guide* or *Remote Insight Lights-Out Edition II User Guide* available at

www.hp.com/servers/lights-out

unattended installation text file

The sixth configuration file is the unattended installation file as defined by the operating system being installed on the server. This file contains the information needed to install the server operating system in an unattended fashion, and is created and customized by the user. Refer to the operating system documentation for details on creating this file. If you do not want to perform an unattended installation, this configuration file is not necessary.

Additional information on creating the unattended installation text file can be found in the following documents:

- Microsoft Windows NT Server 4.0 Resource Kit
- Deployment Resources Roadmap: A Guide to Deploying Windows NT Server 4.0
This document is available at

www.microsoft.com/ntserver/techresources/deployment/NTserver/DeployRoadmap.asp

- Microsoft Windows 2000 Server Resource Kit
- Automating the NetWare 5 Installation with a Response File
This document is available at

www.novell.com/documentation/lq/nw51/othr_enu/data/a2zj6s4.html

This document can also be obtained under Technical Information Document (TID) number 10055290.

- Automating the NetWare 6 Installation with a Response File
This document is available at

www.novell.com/documentation/lq/nw6p/index.html?othr_enu/data/a2zj6s4.html

- RedHat Linux KickStart HOWTO
This document is available at

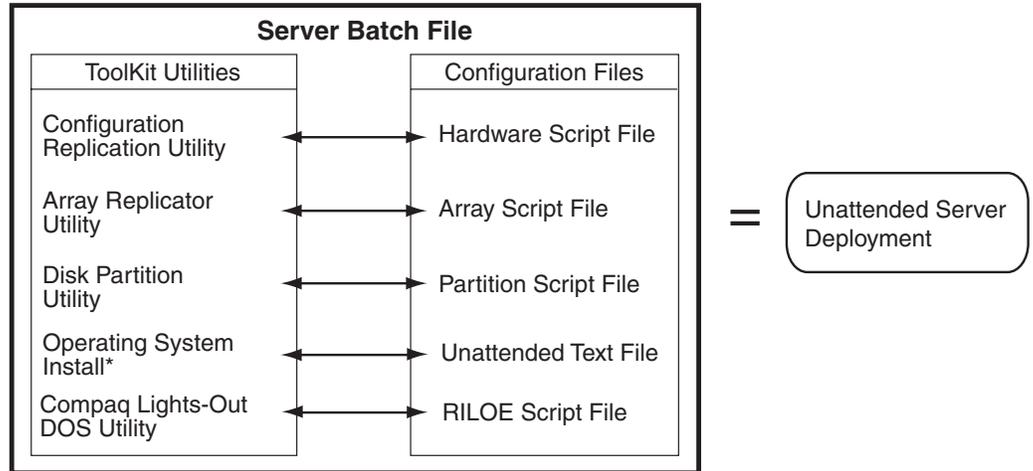
www.linux.org/docs/lqp/howto/HOWTO-INDEX/index.html

step 2—creating a server batch file

After the server configuration information is captured, it can be incorporated into a batch file for automated deployment. The batch file integrates the separate utilities of the Toolkit to read configuration information and launch the operating system installation process.

This server batch file is the instruction set for the installation process. Use the following set of tools in the batch file to configure the server hardware and storage array and install the operating system.

figure 1. automated server deployment overview



*Supplied by the operating system vendor

boot utilities

During configuration and setup, the target server may need to reboot several times. The Toolkit contains four boot utilities that instruct the target server about when and how to reboot. Using the boot utilities, the user can customize the boot process.

set boot utility

The Set Boot Utility (SETBOOT.EXE) tells the server what device to boot to on the next reboot. This utility does not actually perform the reboot. The Set Boot Utility is useful when the installation process will reboot the server, the server can boot from different devices, and you need to control which device the server boots from. This utility sets the boot order for the next reboot only.

reboot utility

The Reboot Utility (REBOOT.EXE) reboots the server during the installation process. Like the Set Boot Utility, this utility sets which device the server boots to next. Unlike the Set Boot utility, the Reboot Utility actually performs the system reboot. If no parameter is specified, the server reboots to the default boot device as defined by the system configuration.

set boot order utility

The Set Boot Order Utility (STBTORDR.EXE) changes the boot order for the server for all reboots following this command. This utility changes the default boot order of the server for all reboots and not just the next reboot. This utility does not reboot the server.

Due to the adoption of the BIOS Boot Spec for ProLiant ML G2 and DL G2 servers, STBTORDR functionality has been replaced with the enhanced functionality of the CONREP utility and data files for those lines. STBTORDR only works with the ProLiant servers prior to the ML G2 and DL G2 server lines. Use CONREP to modify the boot order on ProLiant ML G2 and DL G2 server systems.

PXE boot
enable/disable utility

The PXE Boot Enable/Disable Utility (PXEBOOT.EXE) enables or disables PXE boot functionality for embedded network controllers on supported systems. Only one network controller can be enabled at a time.

disk utilities

Disk utilities are used to manipulate the logical disks during server setup.

compaq disk
partition creation
utility

The Compaq Disk Partition Creation Utility (CPQDISK.EXE) creates a script file that defines the disk partition of the first logical drive of the server. Use this utility to set up the disk drive and to create partitions up to 4000 MB in size. This utility is operating system-independent and works on all types of hard drive partitions.

compaq disk
formatting utility

The Compaq Disk Formatting Utility (CPQFMT.COM) formats a hard drive (up to a 4000 MB partition). When setting up a new system, the hard drives may need to be formatted before an operating system can be installed.

The partition size can be extended beyond 4000 MB for Windows 2000 installations by using the unattended text file. Refer to the SmartStart Scripting Toolkit README.TXT file for more information.

system partition
enabling utility

The System Partition Enabling Utility (SYSPART.EXE) changes the partition type of the partitions on the hard drive. It can be used to change the DOS partition in the master boot record to an EISA system partition, and vice versa.

IMPORTANT: This utility is included with SmartStart Scripting Toolkit version 1.7. Because the SmartStart Scripting Toolkit practices align with SmartStart releases, version 1.8 and forward is optimized for SmartStart 6.0 and later, while SmartStart Scripting Toolkit version 1.7 and earlier will align to releases of the SmartStart 5.x family. For additional information, visit the website

www.hp.com/servers/sstoolkit

populate system
partition utility

The Populate System Partition Utility (PSYSPART.EXE) copies the system partition files to an EISA system partition on the hard drive.

IMPORTANT: This utility is included with SmartStart Scripting Toolkit version 1.7. Because the SmartStart Scripting Toolkit practices align with SmartStart releases, version 1.8 and forward is optimized for SmartStart 6.0 and later, while SmartStart Scripting Toolkit version 1.7 and earlier will align to releases of the SmartStart 5.x family. For additional information, visit the website

www.hp.com/servers/sstoolkit

system utilities

The system utilities control various steps in the installation process or the setup of a diskette for use during the installation process.

state manager utility

The State Manager Utility (STATEMGR.EXE) manages persistent state information between system reboots. The utility can set and read a state variable in the batch file process. The state variable can be any word (8 characters or less), and the value can be an integer between 0 and 254. This utility can also be used to clear the state variable.

system type utility

The System Type Utility (SYSTYPE.EXE) identifies the server and translates the system ID to an integer between 0 and 254. This utility enables you to branch the deployment process to server-specific configuration batch file versions within the AUTOEXEC.BAT file.

array type utility

The Array Type Utility (ARRTYPE.EXE) reports which array controllers based on PCI ID are configured on the target server, or displays all array controllers supported on the target server.

sign disk utility

The Sign Disk Utility (SIGNDISK.EXE) creates a signature on the boot disk that allows the system ROM to bypass the F1/F10 prompt. This capability allows the system to continue running without user input, enabling an unattended setup. This utility is not intended for use during the batch file execution. It is designed to run once, from a workstation, on each bootable diskette that is created.

NOTE: This utility will operate under a DOS window in Windows NT and Windows 2000. It does not work when run under Windows 95 or Windows 98.

CD eject utility

The CD Eject Utility (CDEJECT.EXE) controls the CD drive eject functions. It uses the MS-DOS CD-ROM driver (MSCDEX.EXE) utility to eject the CD tray from a target server. MSCDEX.EXE must be installed on the target server for this utility to work. Drive letters are used to specify which CDs are to be ejected.

The CD trays are retracted after the CDs are ejected. If no command line parameters are given, the utility ejects all CDs it can find. These would be in the A: type format, where A: is the drive letter of the CD assigned by MSCDEX. Multiple drive letters can be used. This utility is most effective with a Slimline CD-ROM drive tray, because the tray remains open until the user closes the tray. Other CD-ROM drive models retract the tray after a specified time or after a system reboot. The utility may not work when using a Windows 98 boot diskette.

file copy utility

The File Copy Utility (FILECOPY.EXE) copies files based on a list described in a text file. To copy files to a new system as part of the server deployment, the File Copy Utility allows files that are listed to be copied to the specific location. The File Copy Utility is similar to the DOS XCOPY command, but it offers enhanced functionality and is not dependent on a specific DOS version.

virtual floppy utility

The Virtual Floppy Utility (VFLOP.EXE) controls the status of the RILOE Virtual Floppy Drive. This utility enables you to set the boot and write-protect properties for the Virtual Floppy Drive from a script, without using a Web browser.

IMPORTANT: VFLOP requires that Virtual Floppy Drive functionality on the RILOE board be set up properly. For more information on the Remote Insight Lights-Out Edition, refer to the HP website:

www.hp.com/servers/lights-out

step 3— building the configuration diskette

The server configuration diskette must meet the following minimum requirements:

- Boots Caldera DOS 7.2 (NetWare) or MS-DOS 6.22 or DOS 7.0 (Microsoft Windows or Linux).
- Be signed using the Sign Disk utility.
- Contain an AUTOEXEC.BAT file that loads the appropriate drivers and launches the configuration batch file.

If the target server does not have access to a network share, the server configuration diskette can also contain the configuration batch file, script files, and the Toolkit utilities. Otherwise, these files are stored on a network share and are run from the network location, as long as the appropriate network stacks are created at the beginning of the configuration process.

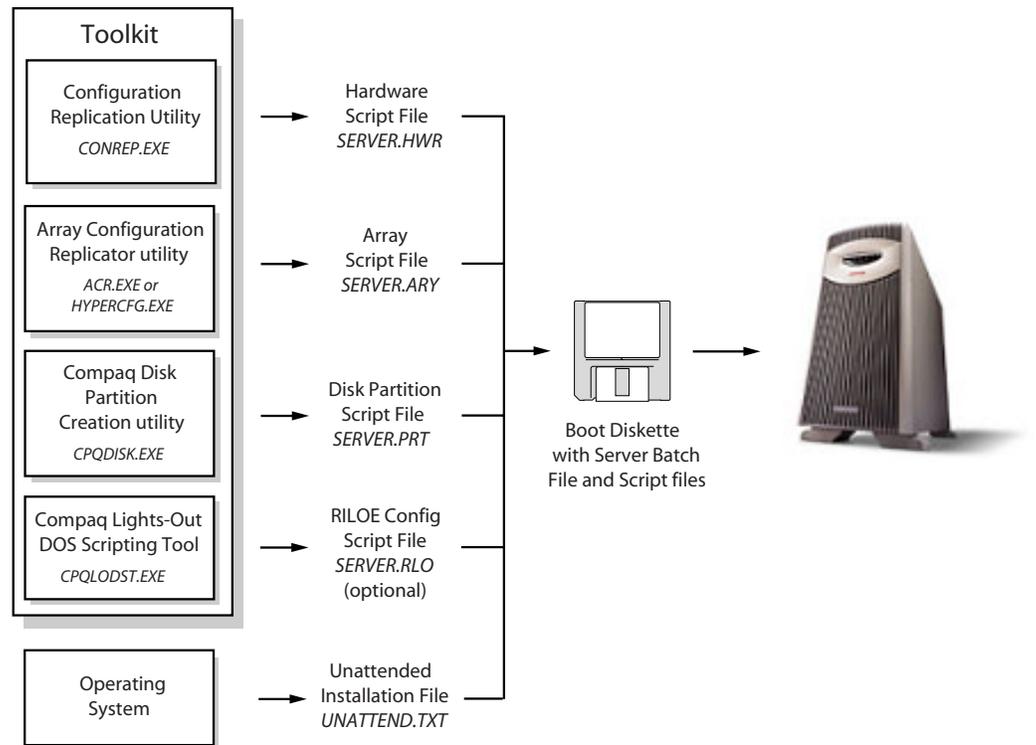
You can also create an installation CD containing all the software necessary to install the operating system on the target server and to run the toolkit utilities. Then you can determine and maintain the directory structure of the CD.

ROM flash scripting capability

Before deploying a target server, flash the ROM on the server by adding the ROMPaq firmware upgrade to the system configuration diskette and making the appropriate changes to the server batch file.

For more information on ROM Flash scripting, refer to Appendix B, "Flashing the Target Server ROM," in the *SmartStart Scripting Toolkit Best Practices*.

figure 2. creating the server configuration diskette



NOTE: For more detailed information on building the server configuration diskette, refer to the *SmartStart Scripting Toolkit User Guide*.

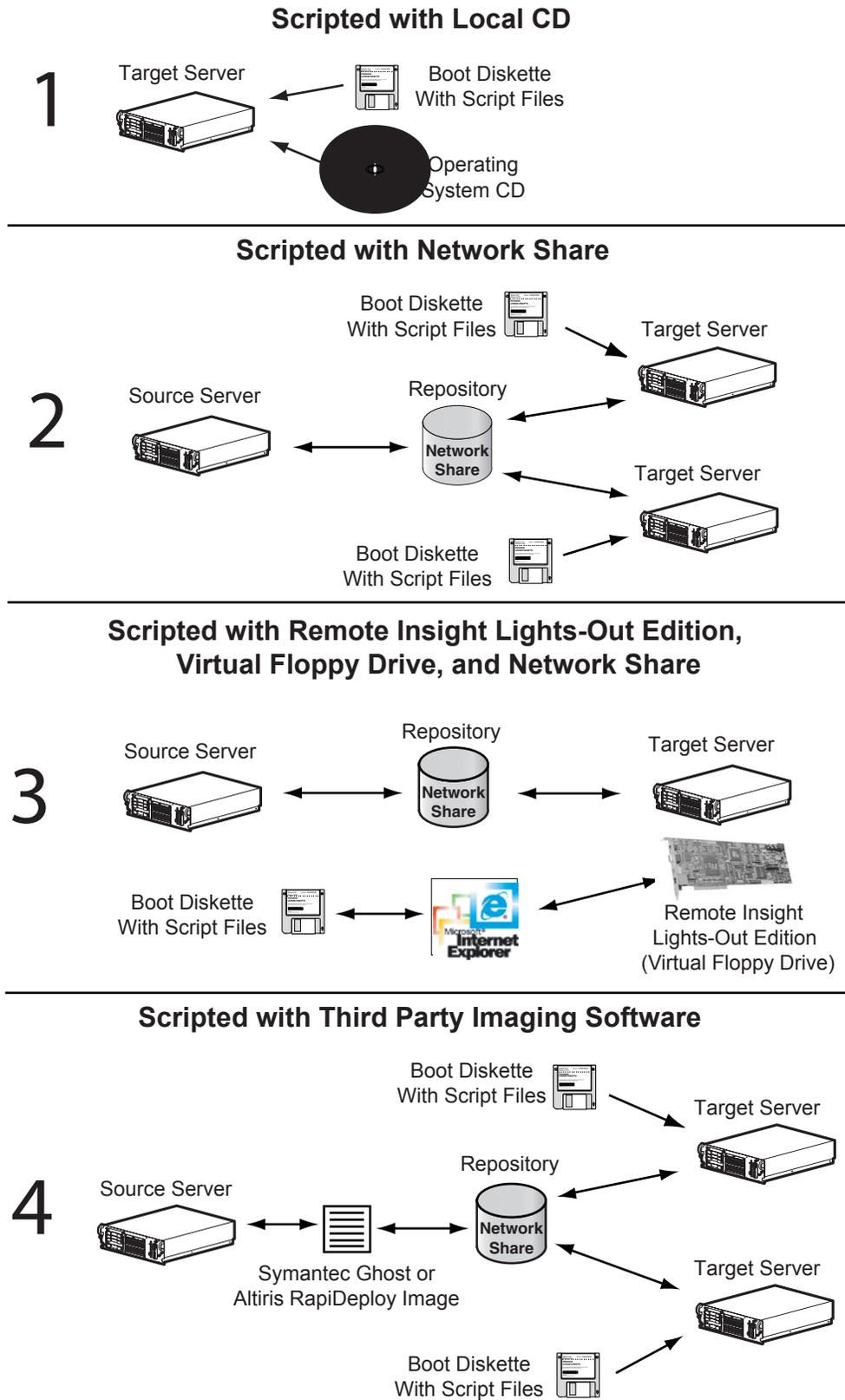
usage scenarios

The four scenarios in this section illustrate some of the ways that the toolkit enables users to customize a server deployment to fit system needs. The server configuration diskette offers flexibility in building an automated deployment process. Refer to Figure 3 for an overview of the following four common deployment scenarios:

1. **Installing the operating system from a local CD:** Run a server batch file from the server configuration diskette inserted in a server in conjunction with a custom installation CD that contains the toolkit, Management Agents, HP drivers, utilities, and the operating system.
2. **Installing the operating system from a network share drive:** Run a server batch file from the server configuration diskette inserted in a server in conjunction with access to a shared network drive (repository) that contains the toolkit, Management Agents, HP drivers, utilities, and the operating system.
3. **Installing the operating system remotely:** Run a server batch file from the server configuration diskette remotely in conjunction with access to a shared network drive (repository) that contains the toolkit, Management Agents, HP drivers, utilities, and the operating system. This application works only with the Virtual Floppy Drive feature of the Remote Insight Lights-Out Edition.
4. **Installing the operating system with third-party imaging software:** Run a server batch file from the server diskette remotely in conjunction with access to a shared network drive (repository) that contains the toolkit and an image of the source server created with either Norton Ghost or Altiris RapiDeploy.

NOTE: For detailed information on usage scenarios and best practices, refer to the *SmartStart Scripting Toolkit Best Practices*.

figure 3. server deployment strategies



conclusion

Using SmartStart technology, the toolkit provides a flexible way to create standard server configuration scripts that automate many of the manual steps in the server configuration process. This automated server configuration process reduces time for each server deployed, making it possible to rapidly scale server deployments to high volumes.

Refer to the SmartStart Scripting Toolkit Support Matrix for supported hardware and operating systems, or download the toolkit at

www.hp.com/servers/sstoolkit

The download package includes the toolkit and the following documentation:

- *SmartStart Scripting Toolkit User Guide*
- *SmartStart Scripting Toolkit Best Practices*
- *SmartStart Scripting Toolkit Server Deployment Guide: Windows 2000 Network Deployment* white paper
- General FAQs and Troubleshooting FAQs

For proactive notification of new updates, subscribe to ActiveUpdate on the following website:

www.compaq.com/activeupdate

For more information on the Remote Insight Lights-Out Edition or the Remote Insight Lights-Out Edition II, refer to:

www.hp.com/servers/lights-out

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