DeploymentManager Ver6.0

First Step Guide

-First Edition -

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Contents

Introduction

Target Audience and Purpose

The "First Step Guide" is targeted to first time users of DeploymentManager (hereinafter, DPM) and explains the DPM product overview, each function, the system operation methods and the configuration.

Document Structure

Part I DeploymentManager Summary and Design

1   About DeploymentManager: Explains the product outline and each function of the DPM.
2   System Design: Explains the information necessary for DPM system design.

Part II Latest Information on DeploymentManager

3   Operating Environment: Explains the operating environment that needs to be confirmed before installing.
4   Latest Version Information: Explains the information in this version.

Appendices
Appendix A Support Tables Support for Managed Machine OS's
Appendix B For Customers Who Cannot Easily Install a DHCP Server
Appendix C Supplementary Information Regarding source code
Appendix D Revision History

DeploymentManager Manual Organization

DPM manuals are structured as described below.
In addition, the various manuals in this publication are listed according to the "Name in this Manual".

Name of Manual	Name in this Manual	Role of Manual
DeploymentManager Ver6.0 First Step Guide	First Step Guide	Intended for DPM users. Provides a product overview, and describes the various functions, system design methods, operating environment, and the like.
DeploymentManager Ver6.0 Installation Guide	Installation Guide	Intended for system administrators who install DPM. Describes tasks such as how to install, upgrade, and uninstall DPM.
DeploymentManager Ver6.0 Operation Guide	Operation Guide	Intended for system administrators who operate DPM. Describes the operation environment setup procedure as well as the various operations performed when operating the program based on an actual operation flow.
DeploymentManager Ver6.0 Reference Guide	Reference Guide	Intended for system administrators who operate DPM. Describes DPM screen operations, tools, maintenance-related information, and troubleshooting. This guide is a supplement to the Installation Guide and the Operation Guide.

Tips	The latest information of DPM can be acquired from the following product site: http://www.nec.com/masterscope/deploymentmanager/ The Reference Guide is not included in the install media, and is only available on the product site..

Documentation Guidelines

The following describes important points regarding the notation used in this manual.

- The notation used for DPM products is as follows:

Notation in this Manual	Product Name
DPM unbundled product	DeploymentManager Ver6.0
SSC product	DeploymentManager Ver6.0 for SSC(*1)

   *1
      This is a product that is bundled with SigmaSystemCenter and VirtualPCCenter.

- The screen images in this manual are based on the DPM unbundled product. The license related displays are only for the DPM unbundled product. They are not displayed for SSC products.

- Product versions and revisions are expressed as follows.
    Example)For DPM Ver6.0, "6" refers to the version and "0" refers to the revision.

- The install media included with the DPM product is called "Install Media" in this manual.

- IA32 architecture is displayed as "IA32" in this manual and EM64T architecture as "EM64T".

- The path used to install DPM on IA32 and EM64T is different for the Windows OS. The IA32 environment is used as a general rule in this manual so please replace it when you read it.
    Example)
     ·For IA32:C:\Program Files\NEC\DeploymentManager
     ·For EM64T:C:\Program Files (x86)\NEC\DeploymentManager

- The registry path for IA32 and EM64T is different for the Windows OS. The IA32 environment is used as a general rule in this manual so please replace it when you read it.
    Example)
     ·For IA32:HKEY_LOCAL_MACHINE\SOFTWARE
     ·For EM64T:HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node

- The SQL Server mentioned in this manual is based on SQL Server 2008 R2 Express that is included in the install media so please replace it when you read it.
    Example)
     DPM database path
     ·For SQL Server 2008 R2 Express x86:
         C:\Program Files\Microsoft SQL Server\MSSQL10_50.DPMDBI\MSSQL\Binn
     ·For SQL Server 2005 Express Edition x86:
         C:\Program Files\Microsoft SQL Server\MSSQL.x\MSSQL\Binn

▪ The meaning of each icon used in this manual is as follows:

Important	Important messages alert you to cautionary or warning items related to functions, operations, and settings. These are items that are especially important for the operation of DPM.
Note	Note messages alert you to cautionary items related to functions, operations, and settings.
Tips	Complementary items for operation such as convenient functions.

▪ The displays and procedures of DPM may differ according to the operating system used. This document is based on Windows Server 2008 and Windows 7, in principle. Read the displays and procedures as those that appear in your operating system. (In part, there may be mention of operating systems prior to Windows Server 2008 and Windows 7.)

  Example)
    The procedure for checking the DPM version differs by operating system as follows:
   ·For Windows Server 2008:
    1) From the **Start** menu, click **Control Panel** -> **Programs and Features**.
    2) Select **View** -> **Choose details**.
    3) On the **Choose Details** screen, check the **Version** check box and click the **OK** button.
   ·For Windows 7:
    1) From the **Start** menu, click **Control Panel** -> **Programs and Features**.
    2) Right-click **Name** that appears in the center of your screen, and select **More**.
    3) On the **Choose Details** screen, check the **Version** check box and click the **OK** button.
   ·For an OS other than the above
    1) From the **Start** menu, click **Control Panel** -> **Add or Remove Programs**.
    2) Select the applicable component, and click on **Click here for support information**.

▪ Windows Server 2003 R2/Windows Server 2008 R2 will not be explained, so please replace Windows Server 2003/Windows Server 2008 when you read it.

▪ In descriptions of screen operation procedures, arbitrary names to be specified by the user appear in bold and italics as follows: ***Scenario Group***.

  Example)
    In the tree view, click the **Resource** icon -> **Scenarios** icon -> ***Scenario Group*** icon.

▪ The version of JRE shown on the screen may not be the latest that DPM can use. Read the displays and procedures as those that appear in your operating system.

▪ Please carry out following procedures when **Finish DPM related tasks** appears in this document. Please add the following value if it exists.
  ·If a scenario is running, wait until the scenario ends.
  ·If an automatic update is in progress, wait until the automatic update ends.
  ·f you are operating the Web Console or the various DPM tool types, please end them.

▪ 1MByte is calculated as 1024Kbyte.
  1GByte is calculated as 1024Mbyte.

Part I DeploymentManager Summary and Design

This section will give a product outline for DPM, explain each function, and explain system design methods and operating environment.

1. About DeploymentManager

This chapter explains the product outline and each function of the DPM.

The items covered in this chapter are as follows:

1.1. DeploymentManager

DPM is system management software which provides backup/restore, cloning and patch or application installation functions for the system regions of those machines it manages. It allows for a reduction in system management costs by allowing control of managed machines to be performed all at once and remotely over the network.

1.1.1. Advantages of Adopting DeploymentManager

Installing DPM has the following benefits.

- ■ System recovery can be performed using a simple procedure.
  Backup using DPM takes an exact copy of the disk image. During a restore that disk image is written as-is onto the disk, allowing system recovery to be performed very easily.

- ■ Machines can be cloned very quickly.
  The OS installation by disk duplication function, which supports backup/restore functions, allows a disk image (master image) taken from one machine (master machine) to be deployed onto other machines with the same composition. By preparing in advance parameters for individual information for each machine (IP address, computer name etc.) these settings will also be made automatically when deploying the master image.

- ■ Allows for flexible installation of patches and applications suited to operational needs.
  For the managed machines, patches and applications selected by the administrator can be forcefully installed (scenario type) or automatically installed (automatic update type) in accordance with pre-defined conditions. Scenario type allows the administrator to operate and install the patches/applications to the desired machine at the desired timing. (For automatic update type, pre-registering the desired patches/applications to the DPM Server, and giving them installation settings such as priority and schedule, will allow the patches/applications to be automatically installed when these conditions are met). When there are multiple DPM Servers, you can set up a server (Package Web Server) to share the packages. Simply registering a patch or application to the server will then make the patch or application to be downloaded to each DPM Server automatically.

- ■ Supprts virtual environments.
  The same controls can be used to manage a virtual machine as a physical one, allowing for simple usage even for an environment with mixed virtual and physical machines.

1.2. DeploymentManager Basic Functions

The following is an explanation of the basic functions of DPM.

Please see "Appendix A Support Tables" about the support status details for each function.

1.2.1. Backup/Restore

The disk on which the managed machine's system (OS) is installed can be backed up or restored as the entire disk, or a partition on the disk can be backed up or restored as the entire partition.
The backup/restore function has the following characteristics.

When backing up, with the OS on the managed machine shut down, a unique Linux OS (hereinafter referred to as "Deploy-OS") will be activated in the memory of the managed machine and the data are read from the disk. This read data will be sent sequentially to the DPM server and a backup image file created. When restoring, send the backup image file data from the DPM Server to the managed machine, and restore the written disk contents to the disk. In this way, performing a backup when the managed machine's OS is shut down (offline backup) allows for the creation of a backup image at a point of complete inactivity, from which the OS can be safely restarted after performing a restore.
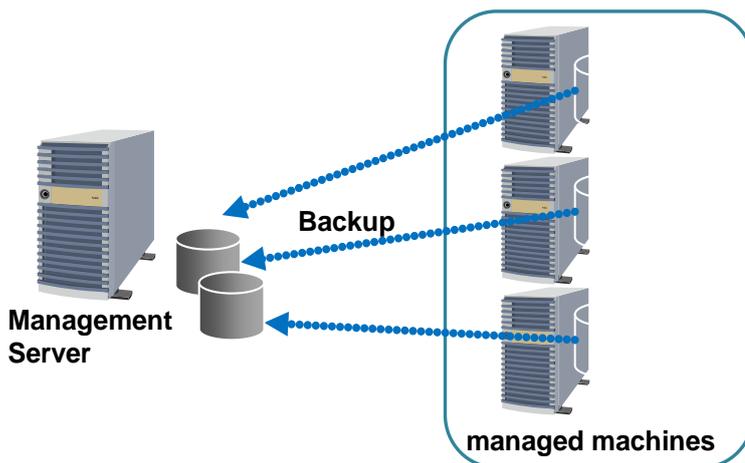
Concerning Backup Types(*1)	
Effective Sector Backup	Effective sector backup is a type of backup that only backups regions (sectors) actually being used by partition. Using effective sector backup can makes the backup response time and backup image size as small as possible. (For further details on the support status for effective sector backup for each file system, see "File System and Disk Type Support" in "Appendix A Support Tables".)
Full Sector Backup	A type of backup that backups all of the sectors on the partition. This takes more time than effective sector backup and the backup image file size will be bigger. When partitions on a file system that doesn't support effective sector backup, the backup will be executed using this type automatically. (For further details on the support status for full sector backup for each file system, see "File System and Disk Type Support" in "Appendix A Support Tables".)

*1
- The backup image data can be compressed when using either, effective sector backup or full sector backup.
- When a backup is performed for an entire disk it can restored to an empty disk.
- To perform a backup by partition, it is necessary that the disk for restore be the same format (number of partitions, organization, size and file system) as the backup destination. Also, restore to the same partition as when backing up.

<For Effective Sector Backup>

Analyze header (bitmap area), and only back up effective areas (sectors)

Header (bitmap area)

Data area

<For Full Sector Backup>

Backup all sectors

Header (bitmap area)

Data area
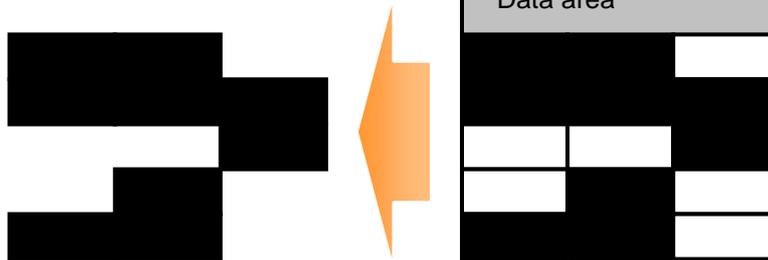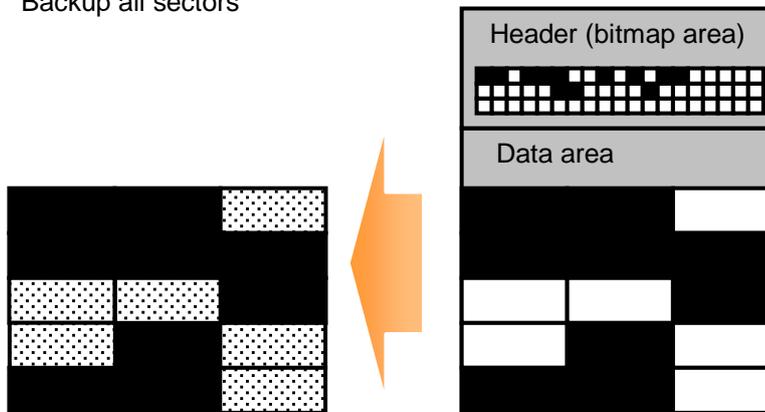
*The bitmap area is the area where the disk sector information is managed.

Backup of a RAID Configuration	
Backup of Hardware RAID	Backup/restore of a hard disk connected to a RAID controller which is supported by DPM is possible. For RAID, backup will be performed for the entire logical disk.
Backup of Software RAID	The backup/restore of software RAID volume (RAID0, RAID1, RAID1 Span, RAID5, and others) created via an OS function or a disk management application is not supported. For FT servers, depending on the machine model, backup after release of RAID or a full sector scenario option specified backup with RAID still in place are supported. Contact your sales or support representative about information on the backup procedure for each machine model.

Other Functions
The disk configuration check function allows the hard disk configuration of the managed machines to be checked prior to performing a backup/restore.
Concerning the boot type of the managed machines, there are network boot (uses DHCP server) and a CD boot (does not use DHCP server) types. For a CD boot, placing a special CD in the target machine will allow a backup/restore to be performed without using DHCP server. Concerning application without using DHCP server, please see "Appendix B Information for Customers Who Cannot Easily Install a DHCP Sever" and "Operation Guide Appendix A Application Without Using DHCP Server".

1.2.2. OS Installation by Disk Duplication

The OS installation by disk duplication function, which uses the backup/restore function, allows the disk image of a single machine (master machine) to be cloned (duplicated).

The OS installation by disk duplication function uses an OS initialization tool to initialize the OS of a single machine, and then creates a backup image (master image) from that state. This machine can then be cloned by restoring this master image into the duplication destination machines and performing parameter settings.
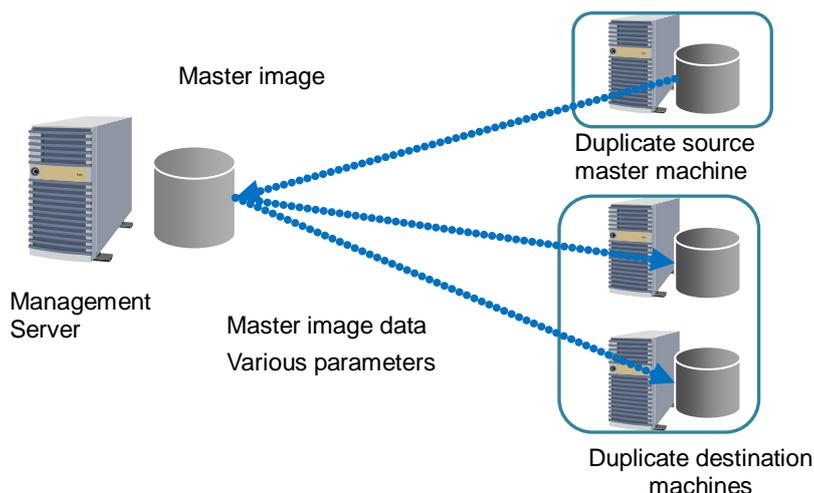
By preparing individual information for each machine (IP address, computer name etc.) as parameters in advance, the setting of this individual information will also be made automatically when deploying the master image, meaning no control on the managed machine side is required. In addition, including patches and applications etc. in the master image allows them to be developed in an identical

Part I DeploymentManager Summary and Design

configuration.

1.2.3.   OS Clear Installation

You can do a clear (new) installation of the Linux OS at the same time as doing the detailed settings on the managed machine.

The OS clear installation function creates an OS image on the DPM Server from the OS media. The OS is then installed in the target machines using this OS image from the DPM Server, and all parameters such as computer name and IP address are performed.
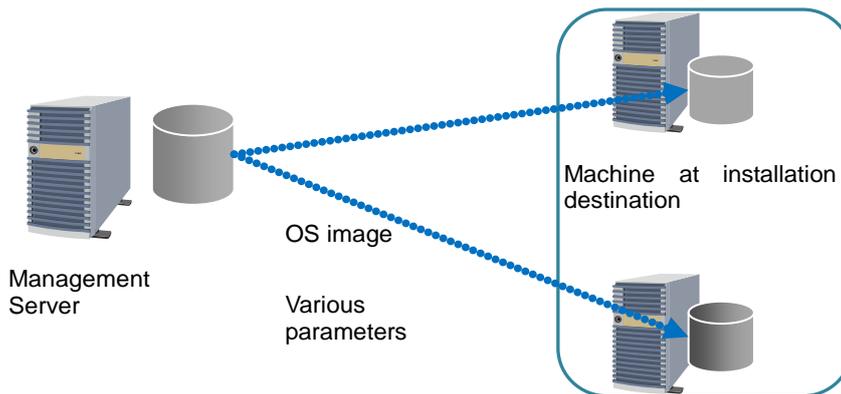
An OS clear installation can be controlled entirely remotely, with no control on the managed machine side required. By initially creating all required settings as parameters, those operations that would normally be performed by a local set up, such as the creation of partitions, formatting and setting of individual information (IP address, computer name etc.) will all be automatically performed. This is all completed automatically in a single action from the Management Server.

1.2.4.   Service Packs/HotFixes/Linux Patch Files/Application

Installation

Service packs, HotFixes, Linux patch files, and applications for the managed machines can be installed either forcefully by control from the administrator's side (scenario type), or when automatically determined to be required by the managed machine that is the installation target's side (automatic update type). (The installation of service packs/HotFixes/Linux patch files/applications may be called remote updates in this manual.)

The image registration tools provided by DPM (Image Builder or PackageDescriber) register the service packs, HotFixes, Linux patch files, and applications to the DPM Server or Package Web Server in units called packages. (For detail of a configuration using the Package Web Server, see "2.1.4. System Configuration"). This package is distributed and applied to the managed machines.
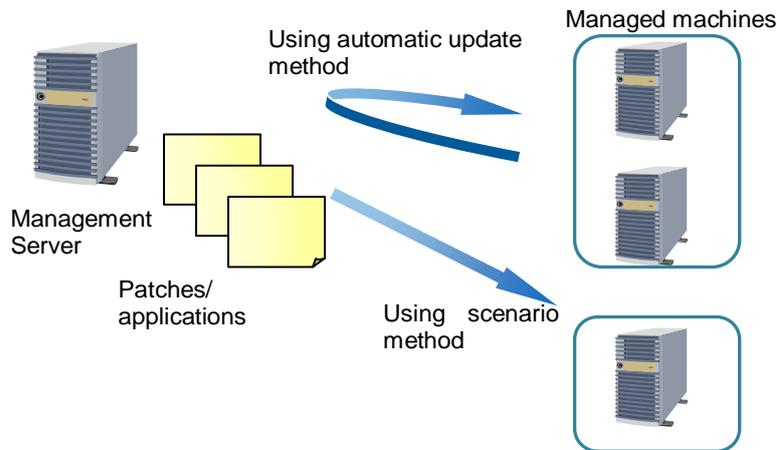
The function to install service packs, HotFixes, Linux patch files, and applications has the following functions depending on the application scene and the status of the managed machine.
- ・ The patch application status of each managed machine can be checked from the Web Console. This allows users to find which machine installation has failed and to determine if need another installation, and to perform the procedure.
- ・ When new machines are added the required patches can all be applied in a single batch.
- ・ You can apply a patch/application that requires administrator authority.
  (DPM performs installations on the local system account).
- ・ Patches and applications can also be installed even when not logged into the managed machines.
- ・ The timing of the installation on the managed machines can be selected. For example, if the machine is in use, application can be performed the next time the managed machine is booted up.
- ・ Even if the managed machine is turned off the remote power on function can be used to boot up the machine to allow installation of patches and applications.
- ・ For a configuration featuring multiple Management Servers, the Package Web Server allows the package to be made common to all of them, and managed from a single source.
- ・ Using multicast allows installation on a larger number of machines in a single batch.

2.   System Design

This chapter explains the methods to determine the system configuration when introducing DPM.

The items covered in this chapter are as follows:

2.1. DeploymentManager System Configuration Examination

This section will explain each of the components included in the DPM. Use the configuration examples to determine the software to be installed on the Management Server and managed machines and the network configuration in response to operating mode.

2.1.1. Component Configuration of the DeploymentManager

The DPM is comprised of the following components.

(1) Management Server Side Components

Component Name	Description	Circumstances Under Which Installation is Required
DPM Server	Performs management of managed machines, and executes processes affecting the managed machines from commands received from the Web Console or the DPM Command Line. Also includes the database that saves the configuration information of the managed machines.	Must be installed.
Web console	The user interface from which the status of the managed machines can be checked, and processes affecting the managed machines can be executed.	No installation operation is required. (Required components will be downloaded from the DPM Server via web browser).
IIS	Used to provide web based functions with the DPM.	Must be installed. (As this is not included in the DPM installation media, you need to prepare this separately yourself).
DHCP Server	Assigns IP addresses when used via a network boot. You can choose to use network boot or CD boot.	Required when using network boot. (As this is not included in the DPM installation media, you need to prepare this separately yourself).
Image Builder	This is a tool for creating packages and disk duplication data file, etc. And registering the created files in the management server.	Installed at the same time as the DPM Server. Various separate installation is required if you wish to use the Image Builder/DPM command line from a different machine than the Management Server. (Under these circumstances it will be referred to as Image Builder (Remote Console) for the Image Builder).
DPM Command Line	The command line interface that executes command on the managed machines and checks the result of their execution.	
Package Web Server	Server to which packages are saved. Saved packages are downloaded to the Management Sever using HTTP protocols.	Required if you need to manage packages from a single source across multiple Management Servers.
PackageDescriber	A tool that creates packages and registers them to the Package Web Server. Can also operate on the Package Web Server itself.	

(2) Managed Machine Side Components

Component Name	Description	Circumstances Under Which Installation is Required
DPM Client	Transfers data with the DPM Server and supervises control on the managed machines.	This is essential for the installation of service pack/HotFix/Linux patch file/ application, remote shutdown or confirming the completion of a scenario by a DPM client.

2.1.2. Technologies Used in DeploymentManager

The following is an explanation of the technologies used in the DPM. Please design your system based on an understanding of the technologies explained in this section.

2.1.2.1. Wake On LAN (WOL)

The DPM uses **Wake On LAN** (abbreviation "**WOL**") in order to remotely turn on the power to a managed machine that has the power turned off. Turning power on using WOL is a function that broadcasts a packet called a magic packet, which includes the MAC address of the managed machine, and this turns on the power to the managed machine. Using the network device to perform direct broadcast routing settings to managed machines in other segments allows their power to be turned on remotely.

Function Used	Power On

Conditions required to perform WOL	·Have a LAN board that is WOL capable.
	·Have performed WOL settings in BIOS.
	·Have performed WOL settings in the OS LAN driver settings.
	  For more details of the conditions required to perform WOL see the description on managed machines in "3.8.2 Precautions".
	  If the managed machine does not support WOL then please turn the power on manually.

Precautions	For precautions concerning WOL, see the description on managed machines in "3.8.2 Precautions".

2.1.2.2. Network Boot

A network boot is one way to boot a machine, using a standard called PXE (Preboot eXecution Environment). Normally, when a machine has an OS installed it is booted from a boot file contained inside the hard disk drive (HHD), but during a network boot the boot file is downloaded from a server on the network and then used to perform the boot. The DPM uses network boots to locate new machines, perform activation checks and for tasks such as backup/restore.

Communication Sequence in a Network Boot (When Management Server and DHCP Server are on the same Server)
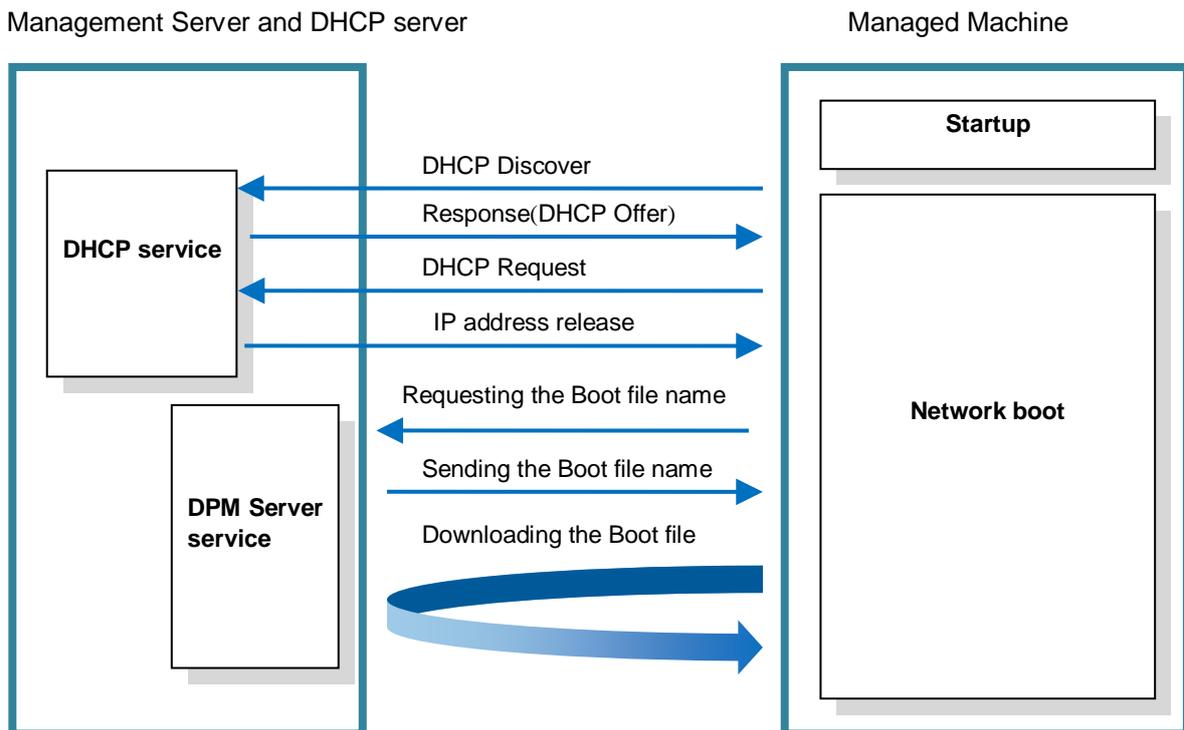
Management Server and DHCP server   Managed Machine

Communication Sequence in a Network Boot (When Management Server and DHCP Server are Different Servers)

Function Used	·Backup/restore (when operating using DHCP server) ·OS Installation by Disk Duplication (") ·OS clear installation (Linux) (") ·Disk Configuration Check (") ·Register a New Managed Machine
Conditions required to perform a network boot	·A DHCP server is active on the network. ·The managed machine's LAN card supports PXE. ·In the BIOS of the managed machine the boot order to the LAN board is set higher than that of the HDD.
Precautions	·You should use the managed machine's onboard LAN card to perform a network boot. ·When the DHCP server and managed machine are in different segments, you should set a DHCP relay agent on the network device. ·When the DPM Management Server and DHCP sever are configured on the same machine, you should perform the assignment of the IP address to the managed machine from the DHCP server on the DPM Management Sever. ·Please do not install an application that has a TFTP server function on the management server other than DPM. (As the DPM Server also uses a TFTP service, sometimes a port number conflict may occur, DPM Server may not work properly). ·Do not set up a network boot server (PXE server) on the network managed by the DPM. When setting up one, prepare a DHCP server for each PXE server, and perform IP address assignment reservation settings. ·In an environment in which you cannot set up a DHCP server, or if the managed machine does not support a network boot, a CD boot can be used in place of a network boot to perform a backup/restore/disk configuration check. Unlike when performing a network boot, operation involving insertion of a boot CD into the managed machine will be required. This will also mean the functions required for the DHCP server and network boot will not be able to be used. For details of functions that can be used in an environment in which a DHCP server cannot be set up see "Appendix B For Customers Who Cannot Easily Install a DHCP Sever." ·When registering a machine with multiple LAN boards to the DPM, set the BIOS boot order so that only the LAN board on which the DPM managed is performed is set higher than the HDD, with all other LAN boards set lower than the HDD. Setting LAN boards on which the DPM management is not performed set higher than the HDD can be the cause of such errors as scenario execution errors.

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2.1.2.3. UUID

UUID stands for Universal Unique IDentifier. It is a 16 byte numerical value housed in a SMBIOS configuration, and is used to uniquely identity hardware.
In order to manage the managed machines, the DPM stores their MAC address and UUID information. The MAC address is used as the key for processes such as turning the power on using WOL, but for machine that have multiple LAN boards (multiple MAC addresses), UUID is used to uniquely identify them. Even if the LAN boards are exchanged, causing the MAC address to change, the machine will be still recognized as the same machine it was before.

Function Used	Management of managed machines
Precautions	If the mother board is exchanged, the UUID will change, meaning the machine will need to be newly registered as a DPM managed machine.

2.1.2.4. Deploy-OS

The DPM's backup/restore is called an offline backup. It is performed when the managed machine's OS is shut down.
When performing a network boot a customized Linux OS unique to the DPM (hereinafter referred to as "Deploy-OS") is sent from the management server to the managed machine. The managed machine is booted using this Deploy-OS. The Deploy-OS reads the managed machine's disk and sends disk data via the network to the Management Sever. During this process, in order to read the disk data and send the data via the network, the Deploy-OS is required to contain a disk controller and LAN board device driver.
By selecting the Deploy-OS suited to each managed machine from the Web Console, the disk controller and LAN board device driver suited to each machine model can be used. Please contact your sales or support representative about Information on Deploy-OS corresponding to your machine model. Also, please contact your sales or support representative about the way to obtain the Deploy-OS, which is not included in the installation media.

1) Start the managed machine with Deploy-OS
   using network boot (DHCP/PXE)

Deploy-OS

Managed machine

Backup
image
file

2) Deploy-OS creates an
   image of the disk
   contents and sends it to
   the Management server

Backup
Target OS

Management
Server
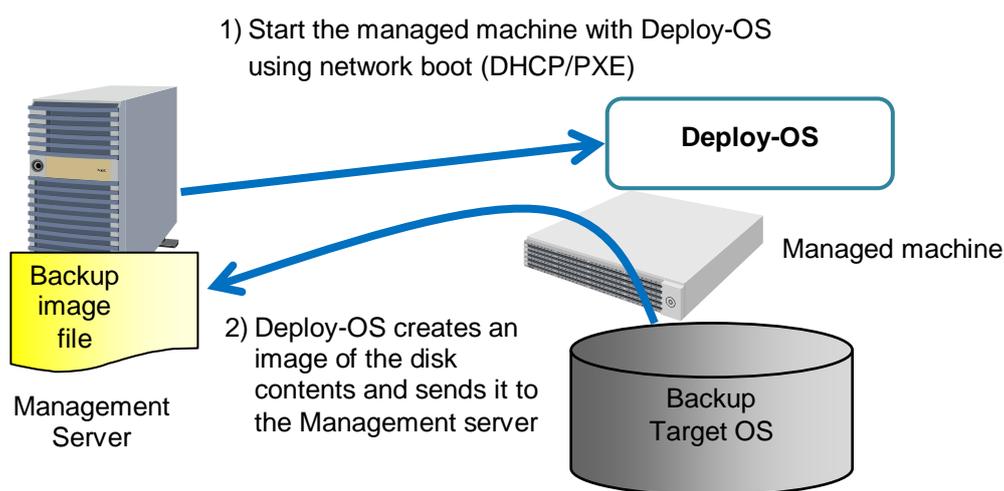
Function Used	·Backup/restore/disk configuration check
	·OS Installation by Disk Duplication
Precautions	When using backup/restore/disk configuration check, OS installation by disk duplication, the Deploy-OS corresponding to the machine model of the target machine should be used.

2.1.2.5. Multicast Distribution

You can choose from two types of image distribution using the DPM, unicast (default) and multicast. The multicast type allows the same image (same packet) to be sent to multiple managed machines, so it reduces network load in comparison to the unicast when distributing the same image to multiple managed machines.

Function Used	·Install patch/application ·OS Installation by Disk Duplication (restore)
Precautions	If even one of the distribution destinations does not receive the data, it will be resent to all managed machines. Depending upon network environment, sometimes this function can be effective and sometimes it can be ineffective in reducing network load.

2.1.3. How DeploymentManager Works

The following is an explanation of how the DPM operates. Please design your system based on an understanding of the structure explained in this section.

2.1.3.1. Disk Duplication Installation

The OS installation by disk duplication function uses an OS initialization tool to initialize the OS of a single machine, and then creates a backup image (master image) from that state. This machine can then be cloned by restoring this master image into the duplication destination machines and performing parameter settings.
For Windows OS the Sysprep (System Preparation Utility) tool provided by Microsoft is used as the OS initialization tool. When running a Linux OS the tool included with the DPM (LinuxRepSetUp) is used.

<OS installation by disk duplication flow (for Windows OS)>
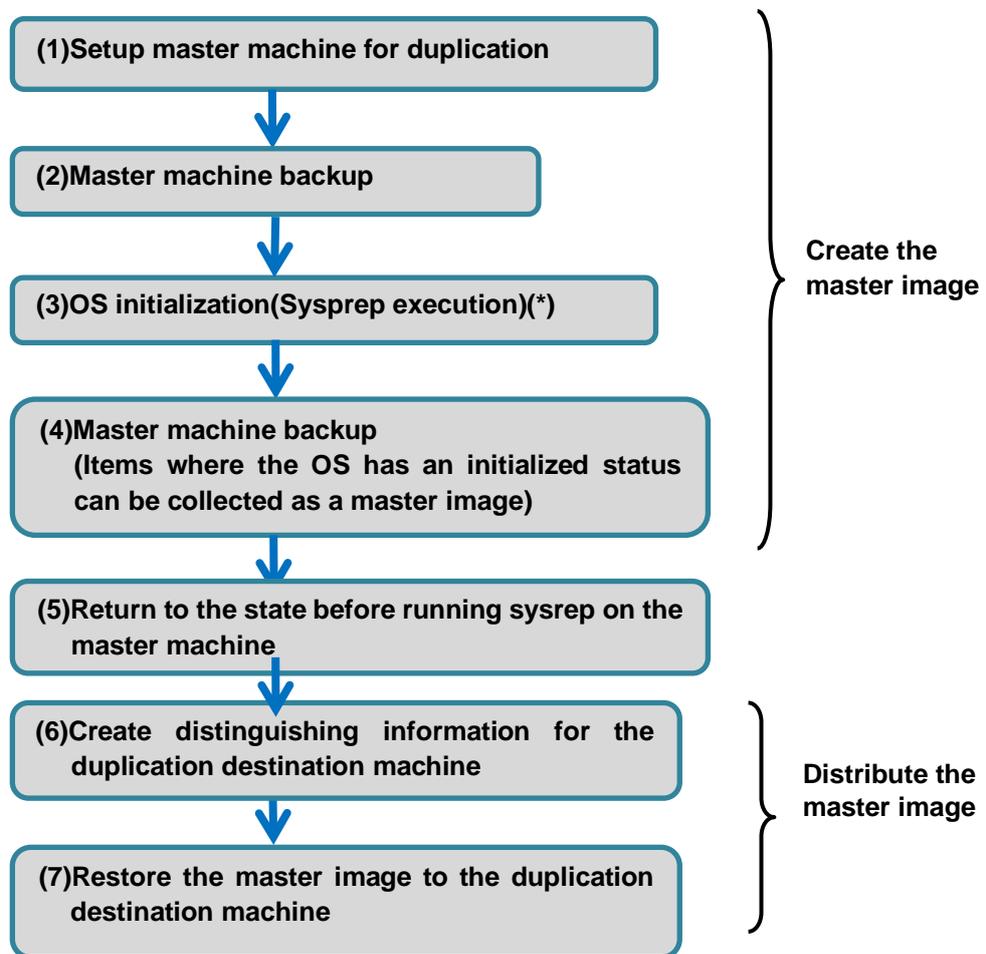
*In the case of Linux, an individual deletion tool (LinuxRepSetUp) will be executed.

(1) Prepare the master machine used for duplication. Manually set each setting and install applications etc. on the master machine.

(2) Perform a backup of the master machine using the Web Console or the DPM Command Line. This is performed so that the master machine can be returned to the state prior to the execution of Sysprep after the master image has been created.

(3) Execute the Sysprep tool on the master machine. The execution of Sysprep will be performed via a patch file provided by the DPM.

(4) Backup the master machine using the Web Console or the DPM Command Line. This backup image file, after Sysprep has been executed, will be the master image used to perform the duplication.

(5) In order to return the master machine to the state prior to execution of Sysprep, now restore the backup image created in step (2) to the master machine.

(6) Prepare information (a disk duplication data file) specific to each of the duplicate destination machines, with Image Builder.

(7) Use the Web Console or the DPM Command Line to restore the master image to the duplicate destination machines. After the restore has been performed, apply the settings contained in the disk duplication data file automatically to the duplicate destination machines.

* You can also create a disk duplication data file for the master machine in order to return it to the state prior to execution of Sysprep. In this case, the original settings of the master machine should be set to a disk duplication data file before the execution of Sysprep in step (3). After performing the backup of step (4), the content of the disk duplication data file will be applied when the machine starts.
* Please see "Operation Guide 3.3. Executing OS Installation by Disk Duplication (Windows)" and "Operation Guide 3.4. Executing OS Installation by Disk Duplication (Linux) " for the steps for OS installation by disk duplication.

Precautions	Please see "2.2.3. Regarding OS Installation by Disk Duplication" for precautions.

2.1.3.2. OS Clear Installation

Use an OS image and Linux installation parameter file to automatically setup the managed machine's OS.
OS clear installation only supports Red Hat Enterprise Linux.

```
┌─────────────────────────────────────┐
│ (1)NFS service setup                 │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐  ┐
│ (2)Red Hat Linux install kernel      │  │
│    preparation                       │  │
└─────────────────────────────────────┘  │   Create the OS
                   │                      ├   image
                   ▼                      │
┌─────────────────────────────────────┐  │
│ (3)Copy the Red Hat Linux            │  │
│    installation CD                   │  │
└─────────────────────────────────────┘  ┘
                   │
                   ▼
┌─────────────────────────────────────┐
│ (4)Create the Linux installation     │
│    parameter file                    │
└─────────────────────────────────────┘
                   │
                   ▼
┌─────────────────────────────────────┐  ┐   Deliver the OS
│ (5)OS image distribution/setup       │  ├   image
└─────────────────────────────────────┘  ┘
```
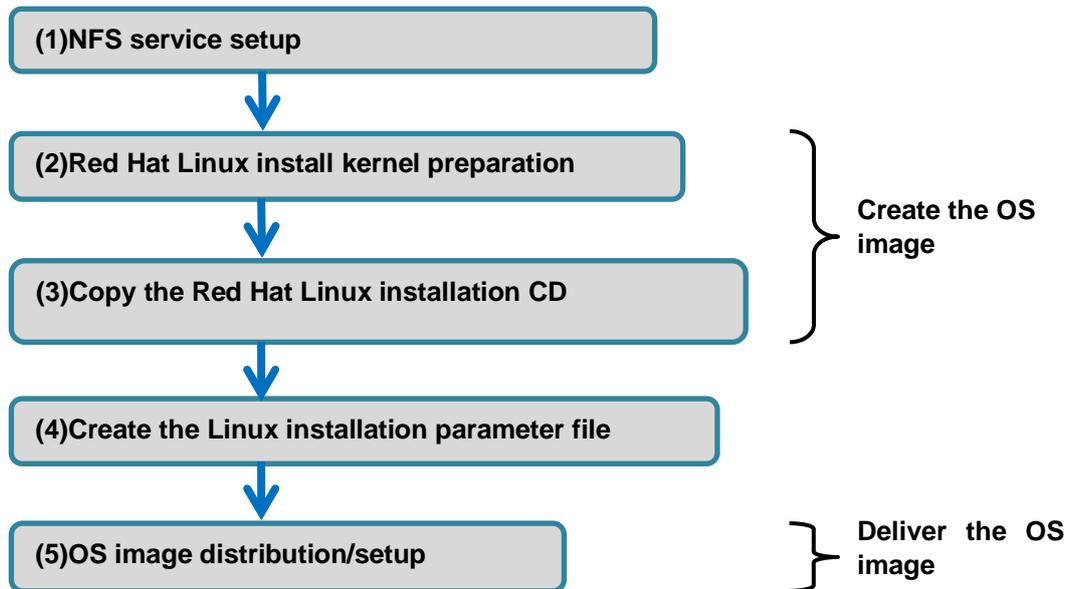
(1) Set up an NFS server in order to distribute the OS image.

(2) For a network boot, prepare the mini-kernels (file name vmlinuz and initrd.img) that will be loaded first and used for network installation. Copy them into the applicable folder on the Management Server from a source such as the OS CD.

(3) Use the Image Builder to register an image of the Red Hat Enterprise Linux install CD to the Management Server.

(4) Create a Linux installation parameter file that will perform settings on the managed machine.

(5) Execute the OS distribution scenario. Execution of the scenario will distribute the OS image to the managed machines. The Linux installation parameter file will also be distributed, and the settings on the managed machines will be executed automatically.

Precautions	Please see "2.2.4. Regarding OS Clear Installation" for precautions.

2.1.3.3. Service Packs/HotFixes/Linux Patch Files/Application Installation

DPM's patch/application installation is that DPM Server communicates with the service installed on the managed machines (DPM client), sends execute files (such as .exe/.msu/ .rpm) and script files (such as .bat/ .vbs/ .sh) and then executes them.

There are two distribution types: scenario type and automatic update type.

<Scenario system structure>
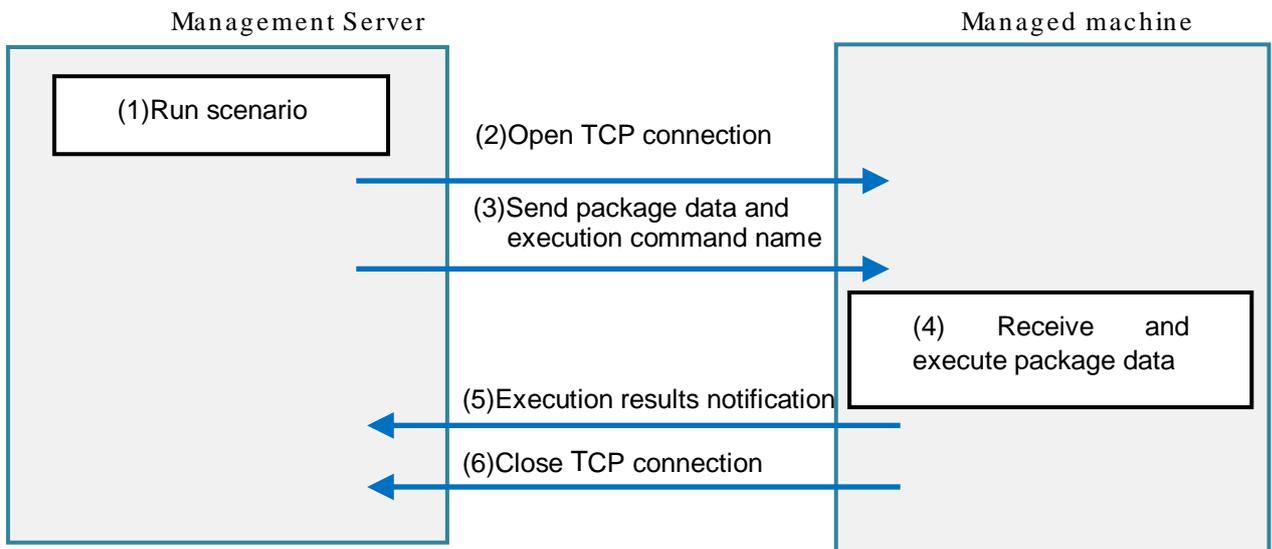
(1)   Run the scenario using the Web Console or the DPM Command Line.

(2)   Connect the Management Server to the managed machine.

(3)   Management Sever sends the package data and command name for executing that is set in the scenario to the managed machine.

(4)   By running the execution file or the script file that is included in the package data, you can install the patch/application.

(5)   The managed machine sends a report of the results of the execution to the Management Server.

(6)   The connection between the Management Server and managed machine is cut.

<Automatic update system structure>
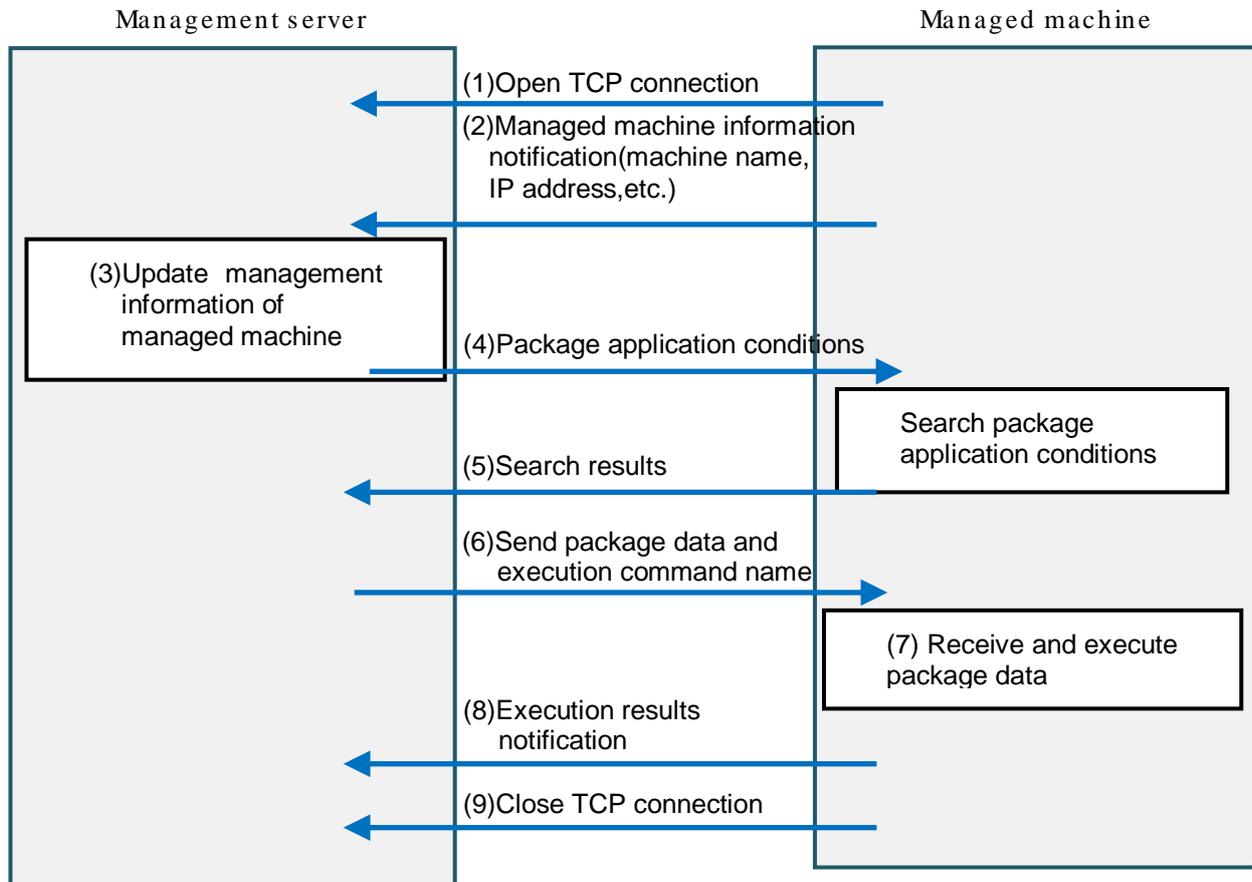
(1) Connect the managed machine to the Management Server.

(2) Managed machine notifies the managed machine information to the Management Server.

(3) An update of the management data of the managed machine on the Management Server is performed.

(4) The information about the application conditions (OS/dependency information/application information) for the package is sent from the Management Server to the managed machine.

(5) Based on the conditions for application of packages, the managed machine returns information on the packages that need to be applied.

(6) The Management Sever sends the package data and execution command name to the managed machine.

(7) The managed machine receives the package data. By running the execution file or the script file that is included in the package data, you can install the patch/application.
     (The actual time at which this will be executed depends on the automatic update settings).

(8) The managed machine sends a report of the results of the execution to the Management Server.

(9) The connection between the Management Server and managed machine is cut.

Prior to application, the service pack, HotFix, Linux patch file or application will be registered to the Management Server or Package Web Server using the Image Builder or PackageDescriber.
Distribution will be automatically performed from the Management Server to any of the machines that meet the conditions below.

- · The package is intended for the targeted OS of automatic update.
- · The package urgency is **high** or **highest**.
- · In the case of a service pack, the major version and minor version, or ID information are/is entered.
- · In the case of a hotfix, the MS number or ID information is entered.
- · In the case of an application, the display name or ID information is entered.

Precautions	The service pack, HotFix, Linux patch file or application must fulfill the following conditions before it can be distributed.
	·It must be capable of silent install. (Respond by inputting key commands etc. during the install is not required. In addition, it can be distributed if it is possible to do a silent install with script file (.bat/.vbs for Windows, shell script for Linux)).
	·A reboot of the OS does not occur during the install.
	·In the case of Windows, the operation is performed using the user permissions of the local system account, so the registry under HKEY_CURRENT_USER and files on the network should not be accessed.
	·The size of the patch/application etc. does not exceed 2 GB.
	·If the process to install the patch/application etc. (for example setup.exe or update.exe) creates a child process during the installation of the patch/application, the parent process must not end without waiting for the created child process to end. In the case of a patch/application in when the parent process does finish first, even if the child process is still in operation the scenario will be recognized as being completed.

2.1.4. System Configuration

This is a DPM system configuration example. There are various structures that make up the system you use.

Below is a basic DPM configuration.

·Web Console
·Image Builder
(Remote Console)
·DPM command Line(*1)

·DPM Server
·Service Pack/HotFix/Linux Patch
File/Application Distribution Image
·Backup Image
·IIS (*3)
·DHCP Service (*3)
·NFS Service (for OS clear installation only) (*3)

DPM Client

Managed machine

Console terminal

Management Server(*2,*4)
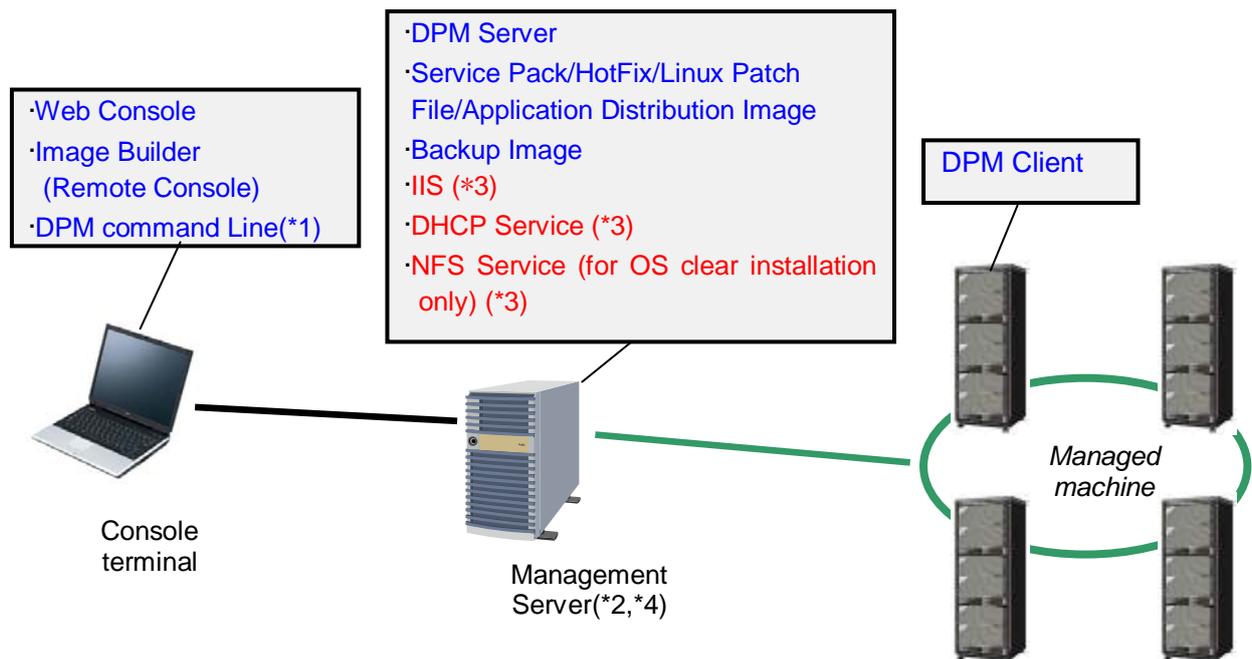
*1
   The Web Console, Image Builder and DPM Command Line can also be operated from the same machine as the Management Server.
*2
   The Image Builder and DPM Command Line will be installed when the DPM Server is installed.
*3
   This is not included in the installation media.
*4
・ A DHCP server configured on the Management Server, or the one configured on a different server can be used, but when using the one configured on the Management Server, that DHCP server must be the only DHCP server on that network. When using a DHCP server configured on a different server, operation is still possible with as many DHCP servers on the same network as you like.
・ A single Management Server can only operate with a DHCP server present or without it. In cases when you wish to perform both kinds of operation simultaneously, such as certain managed machines to operate with a DHCP server present and other managed machines to operate without a DHCP server present, you will need to set up two Management Servers. (One operating with a DHCP server present, and the other operating without a DHCP server present).
・ If the DPM server settings are set to **Use A DHCP Server** then you will not be able to operate multiple Management Servers on the same network. If you want to have multiple DPM servers with the **Use A DHCP Server** setting on the same network you must stop all of the DPM services and DHCP services aside from the one that you wish to operate. Or prepare a DHCP server for each PXE server, and perform IP address assignment reservation settings.
   You can place multiple Management Servers if all of the Management Servers are set to **Do Not Use A DHCP Server**, or if one of the Management Servers is set to **Use A DHCP Server** and all of the other Management Servers are set to **Do Not Use A DHCP Server**. Please see "Installation Guide 1.2.2. Setting Up the DHCP Server" for the DHCP server setting method.
・ The Management Server can have a cluster configuration.

・ Below is a configuration that includes multiple Management Servers. Registering packages such as patches and applications to the Package Web Server means they do not have to be registered individually to each Management Server.
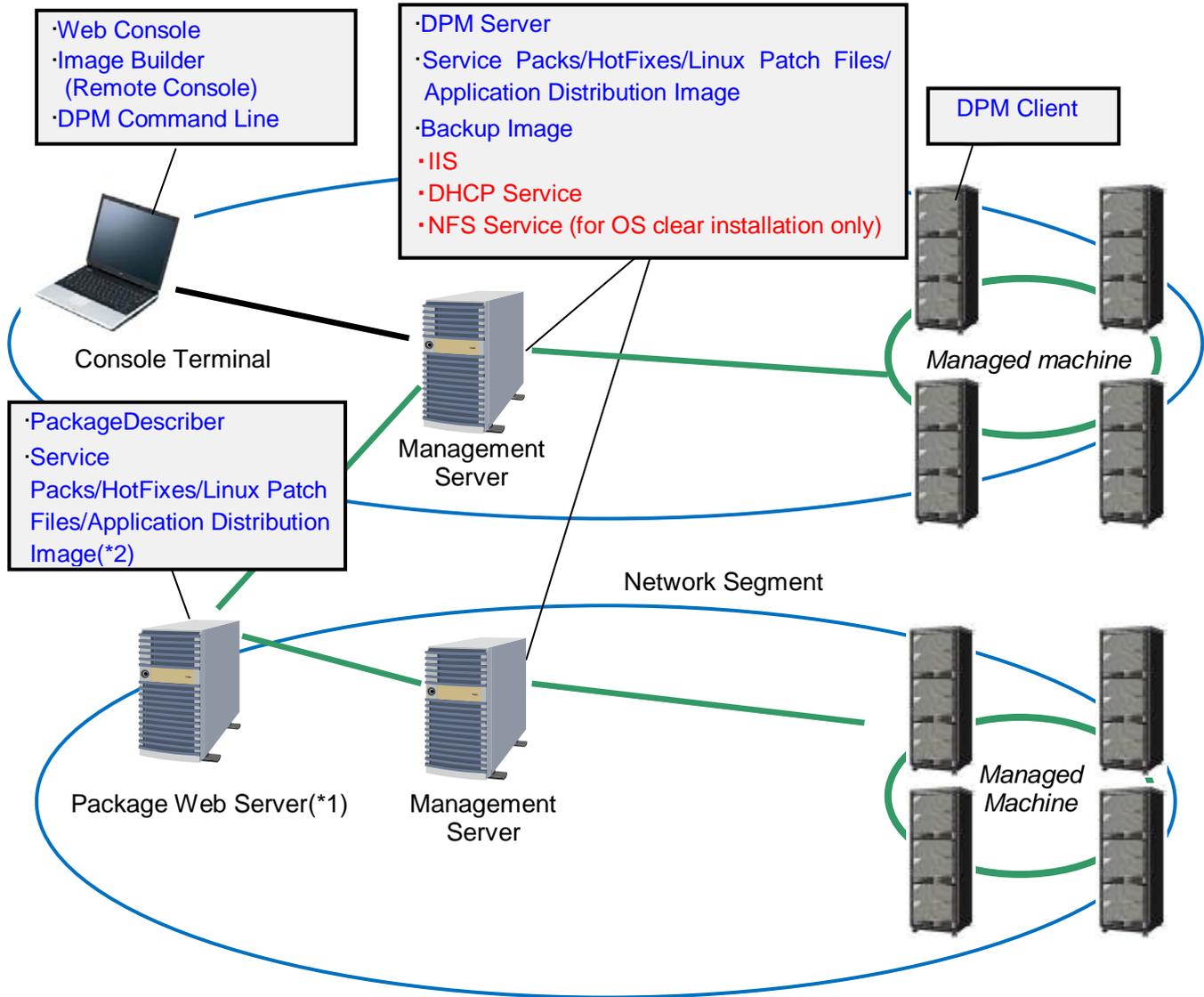
*1
   You can have the same machine be the Management Server and the Package Web Server.
*2
   The distribution image is downloaded from the package Web server by the Management Servers. The other cautions and notes will be similar to those in the Basic Configuration Example.

2.2. Precautions Regarding System Configuration

2.2.1. Regarding the Network Environment

Please confirm that the network managed by DPM meets the following hardware/software environment. Change the settings if it does not meet this.

Hardware environment

LAN Configuration	The Management Server and managed machine are connected using a LAN of 100Mbps or higher (1Gbps or higher is recommended)
Other	·When using a switching hub or a router with spanning tree protocol (STP) that has self-diagnosis function, turn off the STP of the port to which a managed machine is to be connected. Generally, the STP check requires about 30~60 seconds and you can't communicate on the network during this time. If the device is a type that only has a short interval from the time it is turned on until network boot, it won't network boot properly. Even if the STP is set for ports connecting to devices other than managed machines, when an operating LAN is disconnected because of network failure or something, it takes some time as well to find a new route. Therefore, the communication cannot be available at this time. ·With DPM, "Speed" and "Duplex" is negotiated as "Auto" setting. Also with switch setting, "Speed" and "Duplex" must be set as "Auto." If it is not set to Auto, the DPM won't be able to do WOL. Also, the backup/restore capability will be reduced if you are operating at a fixed value (100MB FULL), etc.

Software environment

DHCP Server	This is required to use all of the DPM functions. If there is no DHCP server existing on the network, please set DPM to "Do Not Use A DHCP Server". Please see "Appendix B For Customers Who Cannot Easily Install a DHCP Server" for details. You cannot install or use DHCP server software manufactured by a third party on the same machine as the DPM server. Please use the Windows standard DHCP server if setting up the DHCP server on the same machine.
NFS Server	An NFS server is required to perform a clear install of the Red Hat Enterprise Linux OS with DPM. It is not required if you are not doing a clear install of Red Hat Enterprise Linux OS.

Note

■ You can't start the DPM service correctly if the network is not connected correctly.

■ Please set the managed machine to use the WINS server when the management server is set to use the WINS server in an environment that is structured with a WINS (Windows Internet Name Service) server. If you don't make this setting, the management server won't be able to resolve the managed machine's address and scenario execution, etc. will fail.

■ When a machine with multiple LAN boards is used and IP addresses in the same segment are assigned to the LAN boards, communication may fail if there are any LAN boards which are not connected to LAN cables.
It is recommended that the LAN boards that are not connected with a LAN cable not have a fixed IP assigned, but be set with DHCP, or not set.

■ DPM may not operate correctly if other applications, etc. are using a TFTP (Trivial File Transfer Protocol) port or communication port shown in Reference Guide, "Appendix D, Network Port and Protocol List".
Please confirm the usage status of ports by other applications.

■ You can't change the limit (MTU. Normally 1500Byte) for TFTP communication packets when using DPM.

■ DPM performs name resolution on the registered machine name when confirming the machine's existence or running a scenario, and performs TCP/IP communication using the obtained IP address.
As a result, you must have a network environment that can resolve the name from the machine name.
You must have a DNS (Domain Name System) server or set a hosts file, especially if the machine name is more than 16 characters and there are machines that exceed the subnet. Also, you must have a DNS (Domain Name System) server or set a hosts file if the OS for the managed machine is Linux.
However, name resolution is not necessary once scenario execution or shutdown is performed from the DPM server or the machine is automatically registered with the DPM server when it starts. This is because, once the DPM server can communicate with machine, from then on they can communicate using the IP address.

■ If the DPM client is not installed on the managed machine then it will communicate using the "Machine Name" registered with DPM for existence confirmation (confirming whether the power is ON or OFF). Please set the network environment so that it can communicate by machine name. If the DPM client is installed, the IP address is registered to the management server at the time the machine starts and it is managed using the IP address. For this reason, please set it so it can communicate using the IP address.

> Tips
> ■ It is recommended that the DHCP server be set before the DPM server is installed. Please see "Installation Guide 1.2.2 Setting Up the DHCP Server" if you set the DHCP server after the DPM server is installed.
> ■ If there are problems with the DHCP server or the network configuration, the following message will appear for a few seconds during network boot and application obstacles can occur such as errors with DPM scenario execution. ***PXE-E51:No DHCP or proxyDHCP offers were received.***
>
> If this message is displayed, please confirm if the DHCP server was able to assign an IP address to the managed machine. Please be especially careful of the following points.
> ·DHCP server is recognized by the domain controller
> ·The DHCP server is active
> ·The DHCP server scope is set correctly
> ·The DHCP server has not run out of managed IP addresses
> ·STP is not set on the router or switch
> (Please see "Hardware Environment" above.)

Regarding managing managed machines when the Management Server exceeds the network segment
   On multiple network segments that exceed the router, please set the following on the switch or router in advance to use DPM to manage machines.
   - Direct broadcast routing for doing WOL.
   - Set multicast routing protocol to use multicast transmission.
   - Set the DHCP relay agent on the router/switch for the DHCP packets to relay to the DHCP server.
     (If the DHCP server and the management server are different devices, set the router/switch to also relay to the management server)
   - Routing and forwarding for the port that DPM uses for communication. See "Reference Guide, Appendix D, Network Port and Protocol List" for the ports used by DPM.

> Tips
> Router settings can be configured after installing DPM.
> To manage machines in other segments, create scopes which can lease IP addresses for those segments.

Regarding DPM operation on a Tag VLAN environment
   Functions that perform network boot or CD boot (backup/restore/OS installation by disk duplication, etc.) are not supported in an environment that uses a TagID between the managed machine and the switch (*)/router.
   In this case, you will be able to use functions performed with network boot or CD boot by structuring it to not use the TagID only on the network between the managed machine and the switch (*)/router as shown below.
   -Set the network to be able to communicate using Default VLAN.
   -Configure the settings so that packets including a TagID do not flow on a VLAN that includes managed machines, for example by using the port group configuration function.

   There will be no affect on the DPM operations even if using TagID for the network between the management server and the switch (*)/router. You can install service packs/HotFix/Linux patch files/applications even in an environment using TagID where you can't perform a network boot or a CD boot.
   * This includes a virtual switch in a virtual environment.

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Regarding ports used by DPM

The DPM service may not be able to start when there is a conflict between the port that DPM is using and the port used by other service or application due to the effect of ephemeral port, depending on the type of OS.

The method for confirming and handling an ephemeral port is as below.

See "Reference Guide, Appendix D, Network Port and Protocol" for the port numbers used by DPM.

[For Windows OS]

The setting methods and confirmation methods differ for Windows XP/2003 and prior and for Vista/2008 and later.

·**For Windows XP/2003 and prior**

[Confirmation method]

Please confirm the following registry values.

Please execute the [Method of Response] when the setting value is larger than the ports used by DPM.

This phenomenon does not apply because of using the Windows default value of 5000 as the maximum value when the following registry doesn't exist.

Key	HKEY_LOCAL_MACHINE¥SYSTEM¥CurrentControlSet¥Services¥Tcpip¥ Parameters
Name	MaxUserPort

If port competition occurs even though the registry does not exist, the following problem might be occurring.

Microsoft support online (http://support.microsoft.com/kb/953230)

[Method of Response]

Please add the following registry to reserve the ports to be used by DPM. Please add the following value if it already exists.

Key	HKEY_LOCAL_MACHINE¥SYSTEM¥CurrentControlSet¥Services¥Tcpip¥ Parameters
Name	ReservedPorts
Value	56000-56070
Type	REG_MULTI_SZ

*Refer to the below for details regarding MaxUserPort and ReservedPorts.

Microsoft (http://technet.microsoft.com/en-us/library/bb878133.aspx)

Microsoft support online (http://support.microsoft.com/kb/812873/)

·**For Windows Vista/2008 and later**

See the following Microsoft Knowledgebase method for performing confirmation and handling using netsh command.

Microsoft support online(http://support.microsoft.com/kb/929851/)

[Confirmation method]

Please confirm if the port used by DPM is an ephemeral port from the following command output results.

netsh int ipv4 show dynamicport tcp

netsh int ipv4 show dynamicport udp

Example)
Start Port:49152
Number of Ports:16384
In this case, 49152 through 65536 are being used as ephemeral ports so DPM may not be able to start.

[Method of Response]
Change the range of the ephemeral ports so that the ports used by DPM are not in the ephemeral port range.
Run the following command and adjust so the ports that DPM is using are not included.

```
netsh int ipv4 set dynamicport tcp start=XXXXX num=YYYYY
netsh int ipv4 set dynamicport udp start=XXXXX num=YYYYY
```

Set it with XXXXX being the starting port for the ephemeral ports and YYYYY being the number of ports used as ephemeral ports. You need to consider port number used by other applications when deciding the range of port.

[For Linux OS (including ESX/XenServer)]
[Confirmation method]
Please confirm the content of the following files.
Please execute the [Method of Response] if the ports DPM is using are included in the file content.

/proc/sys/net/ipv4/ip_local_port_range
Example)
cat /proc/sys/net/ipv4/ip_local_port_range
32768 61000
In the case of the above output results, 32768 through 61000 are being used as ephemeral ports so DPM may not be able to start.

[Method of Response]
You can change the ephemeral port range, or change the DPM start order.

·Ephemeral port change method
Change the setting so the ephemeral ports are automatically changed at start up.
Please see the OS documentation regarding the method for using sysctl.

<Process>
1) Add the following line to the /etc/sysctl.conf file.
Create it if it doesn't exist.

net.ipv4.ip_local_port_range = XXXXX ZZZZZ

Set it with XXXXX being the starting port for the ephemeral ports and ZZZZZ being the end port number.
You need to consider port number used by other daemons when deciding the range of port.
2) Make boot.sysctl active for SUSE Linux.
This is automatically set at startup with RedHat Enterprise Linux.

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·Method for changing the DPM start order
 Change the DPM client start order according to the following policy.
 -After the network (start order 10) and syslog daemon (start order 12)
 -Before other daemons that use ephemeral ports
 The ESMPRO/ServerAgent with a start order of 50 on the NEC server uses ephemeral ports.
 Therefore, for example, change it to 40 to allow leeway before and after.
 If there is a daemon that uses ephemeral ports before the ESMPRO/ServerAgent in the environment you are using, please use a start order prior to that daemon.

<Process>
   1) Edit the following file.

       /etc/init.d/depagt

       Before editing : # chkconfig:35 99 99
       After editing : # chkconfig:35 xx 99
       xx is the startup position. Enter the new startup position here.
       It starts from the lowest number.

   2) Run the command shown below:
       chkconfig depagt reset

2.2.2.　　Regarding Backup/Restore

Regarding the backup/restore target machine
   In order to perform a backup/restore, the LAN board and hard disk controller must be supported by the DPM.
   For supporting devices, it could be necessary to install dedicated software according to the machine model. For more details, please contact your sales or support representative.

Regarding the target disk/partition
■　Maximum number of disks
   If the number of disks connected exceeds the maximum number for each disk type shown below, those disks that are above the maximum number of disks will not be able to be backed up.

Disk Type	Maximum number of disks
IDE	4
SCSI, FC	16(*1)(*2)
RAID	8(*3)

   *1
       The total number of SCSI and FC disks together.
   *2
       If several connection paths are set for FC, they could be recognized as something different from the actual connection disk number.
   *3
       Number of logical disks for 1 controller. You can back up with a maximum of 4 controllers connected.

■ Maximum number of partitions
You can't backup basic disks that exceed the following maximum number of partitions.
If you create an extended partition, the number of logical drives that can be backed up is "Partitions – 3". If the structure exceeds this, neither disk backup nor partition backup can be done. Yet, the upper limit for number of partitions on a dynamic disk is 1000.

Disk Type	Maximum number of partitions
IDE	15
SCSI, FC	14
RAID	14(*6)

*The following controllers only can support up to 6.
·Mylex AcceleRAID 160
·Mylex AcceleRAID 352

·Regarding the range that can be recovered with the backup/restore function in response to a physical defect or logical defect with a hard disk

For backup/restore of a disk unit, the disk management information will be returned to the disk along with the disk contents. On the other hand, the disk management information will not be returned with partition unit backup. As a result, handle disk physical defects and logical defects as follows.

-In the case of a physical defect, recover it using the backup image file from the disk unit backup after replacing with a hard disk that works properly. It can't be recovered with a partition unit backup.

-In the case of a logical defect, the hard disk can be recovered without replacement if you use a backup image file from a disk unit backup. However, you may not be able to recover it with a partition unit backup, depending on the location of the defect.

It is recommended that you use the partition unit backup together with the disk unit backup.

·Regarding the target disk data

-Please see "Appendix A Support Tabels" for supported file systems. You can't do backup/restore on other file systems.

-Backup/restore is not supported for a hard disk drive with a sector size larger than normal (512Byte).

-You can't backup a partition that is not formatted. Please always format.

-An error will occur and the backup will be interrupted if a partition on the backup target HDD is not formatted.

Also, it can't correctly backup even if an error doesn't occur. (The backup image size will be a few Kbytes and you can't restore the data correctly.)

-Backup/restore is not supported in the following cases.

The entire disk is designated	·When restoring to a disk that has a different size in bytes than at the time of backup.
	·When restoring to a disk with a different type (IDE/SCSI) than the backup disk.
When partition unit is designated	·When restoring a partition that is formatted with a different file system or with a different Byte unit size than at the time of backup.
	·The following error may occur when restoring to a disk or partition with a different size. **Could not write data of the specified size.(SIZEA/SIZEB)** **The disk may be damaged.** *When perform a backup by partition, please have the disk for restore be the same format (number of partitions/organization/size/file system) as the backup destination. Also, restore to the same partition as when backing up.

-The following phenomenon may occur if the HDD to be backed up has bad sectors.
·An error may occur during the backup even if there is no data saved in those sectors.
·Even if an error doesn't occur, using that backup image file to restore will result in the file being read incorrectly and problems such as the OS not starting up may occur.
If there are bad sectors, swap in a new HDD or physically formatting the HDD and then doing a restore from a previously gathered backup image.
Please confirm if there are bad sectors by running Scan Disk/Check Disk from the OS for the target HDD.
Please see the Help for the OS you are using for the process for running Scan Disk/Check Disk.
It is recommended that you run Scan Disk/Check Disk before performing a backup.

·Other, regarding the backup target
-Backup/restore is not supported for ActiveDirectory server (domain controller).

·Regarding backup of multiple disks/partitions
-You can't backup/restore multiple disks or partitions at the same time with one scenario.
-Please backup all disks/partitions where necessary data is stored in any of the following corresponding cases. In order to maintain consistency of the information between disks and between partitions, please be careful to not start the OS until the backup/restore for all of the disks/partitions has completed. Please enter a check in **Turn Off Power After Scenario Exeution** in the scenario options so that the OS doesn't start during the scenario execution.
-When the backup source and the restore destination are on different devices
-If the restore destination's HDD format (disk order, disk type (SCSI, IDE, etc.)) is different than the backup source (if they are different, there is a chance that there will be problems operating the system after the restore. Please backup and restore with the same format).
-When the data required for OS start is saved over multiple disks
-When the data necessary for the OS start and the data necessary for disk duplication (Windows: sysprep, Linux: /opt/dpmclient) is saved across multiple disks
-If files or data required by the system are saved on a different HDD
-Disks are linked by several disks or several partitions, such as when mounting a directory on a different drive.
-When it is necessary to have consistency in the data between disks or partitions (dynamic disk, LVM1/LVM2, etc.)

·Regarding the backup image file volume
-The approximate estimates of the compression rate for a backup file using effective sector backup is as follows for a backup of a machine immediately after OS installation.

For Windows OS	Approximately 60%
For Linux OS	Approximately 40%

-All sectors will be backed up when a full sector backup is performed. As a result, if there will be no compression or the compression rate will be low, the backup image size may be the same size as the disk size being backed up. (For further details on the support status for backup for each file system, see "File System and Disk Type Support" in Appendix A, "Support Tables.")
-When you run a backup, backup data is temporarily created as a temporary file. This temporary file is renamed to the file specified in the scenario and automatically deleted upon backup completion. As a result, if you execute the same scenario two or more times, you will need disk space for the temporary file temporarily created in addition to the backup image file previously created.
-If you are using generation management, the image file (generation management number +1) is created so please be careful that the hard disk to which the image file will be saved has enough free space.
Example)
If the generation management number is five, and the size of one image file is approximately 5GB, then 5GB x (5+1) = 30GB, so a maximum of 30GB of free space will be required.
-Please be careful since the backup image size cannot exceed the destination storage partition file system size.
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·Regarding the timeout value for communication between the management server and the managed machine

If you backup an NTFS/ext2/ext3 partition with a large size, the following message may be displayed on the managed machine and a scenario error may occur.

ERROR: Broken pipe.
To resolve the problem, please refer to User's Guide.
Press 'p' key to poweroff, 'r' key to reboot:

[Method of Response]
   Please change the value for the communications timeout between the management sever and the managed machine.
   Yet, the set value will be different depending on the managed machine speck and partition size.

Registry
Key   :HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\bkressvc\Parameters
Name   :UnicastReceiveTimeoutMillisec
Value   :60000
Type   :REG_DWORD

     Example)
         In the following case, the UnicastReceiveTimeoutMillisec was set to 1800000 because a scenario abnormality occurred.
         CPU   :Pentium4 3.40GHz
         Memory   :512MByte
         Partition size   :1TByte
         File system   :ext3
         Block size   :1024Byte

·Other
   -Please sufficiently confirm the OS license rules so that there is no violation when performing a backup/restore.
   -A partition with the name "System Reserved" may be automatically created when you install Windows Server 2008 R2/Windows 7.
    This partition may be necessary for the operation of Windows, so be careful of the following for backup/restore of a Windows partition using partition units.
   -If partition with the volume name "System Reserved" exists when confirming the partition structure from the Windows disk manager, please be sure to backup/restore this up along with the Windows system partition.
   -Please do not start up the Windows system or make any system changes, etc. with the tools on the "System Reserved" partition until the backup/restore of the Windows system partition and the "System Reserved" partition has completed.
   -Please see "Operation Guide 3.5. Executing OS Clear Installation (Linux), " "Operation Guide 3.6 Installing Service Packs, HotFixes, Linux Patch Files, and Applications (Scenario Method)," "Operation Guide 3.7. Distributing the BIOS/Firmware Update Floppy Disk Image" regarding performing floppy disk image distribution, OS installation, service pack/HotFix/Linux patch file/application installation, etc. at the same time as a backup, register the image and configure it from the "HW Setting", "OS" and "Package" tabs.

2.2.3.   Regarding OS Installation by Disk Duplication

·Be sure to use the same machine model and same hardware configuration device for the master machine that serves as the duplication source and the machine that serves as the duplication destination. For example, if you create a master without a USB keyboard/mouse connected but a USB keyboard/mouse is connected to the duplication destination, a new device may be detected after disk duplication, requiring rebooting.

·Duplication (restore) with a different size HDD than the master machine device with DPM is not recommended. However, as an exception, you can restore to a larger size disk than at the time of backup. It is anticipated that with multivendor support for the HDD it will be necessary to restore to a HDD that is different than the device that was backed up, and that HDD storage devices of different sizes will be procured in the future, so please read "Reference Guide 9.4.2. HDD Multi-Vendor Support" and prepare countermeasures in advance.

·Please sufficiently confirm the OS license rules so that there is no violation when performing an OS installation by disk duplication.

[For Windows OS]

The following items exist when performing OS installation by disk duplication. It is necessary to confirm in advance that the following items are not affected by the applications operating on the machine that will be the master.

Items set using the Sysprep mini-setup
Items originally set by DPM
Items returned to default by Sysprep

-You will not be able to operate normally if there is installed software that depends on the SID (Security Identifier) or the computer name. In this case, please uninstall the software from the machine that will be the duplication source or set up the OS installation by disk duplication prior to installing.

-Please configure it so that the Windows startup drive is the C drive when performing OS installation by disk duplication in an environment with Windows OS installed. Regarding other drives, if a drive is added or changed, the drive letter can be changed after the disk duplication. Please see the precautions in "Operation Guide 3.3. Executing OS Installation by Disk Duplication (Windows)" for details.

- When you combine an OS image created by this version with an disk duplication data file created by an old version (version prior to DPM Ver6.0) or combine an OS image created by an old version (version prior to DPM Ver6.0) with an disk duplication data file created by this version and use it, you can use the range of functions supported by the old version that is used. (Functions that were added by version upgrades are not supported.)
   *Targeting DPM Ver4.0 and later.

-An Active Directory server (domain controller) cannot be set up using the OS installation by disk duplication function.

[For Linux OS]

The bonding drive at the time of disk duplication is not supported. Please cancel the bonding setting from the master. You won't be able to perform correctly at the time of individual setting if it is not cancelled.

2.2.4.   Regarding OS Clear Installation

OS clear installation is explained.

·It is recommended that files be created with the same version of DPM when combining an OS image and a Linux install parameter file.
When you combine an OS image created by this version with a Linux install parameter file created by DPM Ver4.0~Ver5.2 or combine an OS image created by DPM Ver4.0~Ver5.2 with a Linux install parameter file created by this version and use it, you can use the range of functions supported by the old version that is used (Functions that were added by version upgrades are not supported.)
·The following software will also be required when setting up NFS service on Windows. Please see the instruction manual in the product's appendix regarding the NFS service installation process.
      -For Windows 2000, Windows Server 2003
        Either of Microsoft(R) Windows(R) Services for UNIX 3.0/3.5.
      -For Windows Server 2008
        "NFS (Network File System) Service" for Windows Server 2008
·In addition to DPM, DHCP service and NFS service are required when doing a network installation of Red Hat Linux using DPM. A DHCP service and an NFS service may be built on a non-Windows system(e.g., services built on Linux may be used).
·Be sure to meet the installation conditions for each product when installing Microsoft(R) Windows(R)Services for UNIX.

2.2.5.   Other

Other is as follows.

· For precautions regarding technologies used in DPM, see "2.1.2. Technologies Used in DeploymentManager"
·DPM supports cluster environments. When building a cluster configuration, please contact your sales or support representative.

·All DPM functions can be used when a DHCP server is installed. DPM can be run without a DHCP server being installed, but available functionality is limited if no DHCP server is installed. For details on restrictions, see Appendix B, "For Customers Who Cannot Easily Install a DHCP Server."

2.3.　DeploymentManager Product Line and Licenses

The following editions of DPM are available to suit the scale and functionality you require. The various editions and DPM licenses are described.

2.3.1.　Product Line

The DPM unbundled product and products included in DPM are as follows.
When DPM is used as a unbundled product, a DPM unbundled license is required.
For SygmaSystemCenter/VirtualPCCenter, the relevant licenses are needed for using those products, and not the DPM unbundled license. See the various product sites for details on product configurations and licenses and contact your distributor.

・DeploymentManager
　　This is a DPM unbundled product.　The DPM product site is below.
　　DeploymentManager(http://www.nec.com/masterscope/deploymentmanager)

・SigmaSystemCenter
　　DPM is included with SigmaSystemCenter (hereinafter SSC). The SSC product site is below.
　　SigmaSystemCenter(http://www.nec.com/sigmasystemcenter/index.html)

・VirtualPCCenter
　　DPM is included with VirtualPCCenter (hereinafter VPCC). The VPCC product site is below.
　　VirtualPCCenter(http://www.nec.com/vpcc/index.html)

2.3.2.　Product Configurations and Licenses

DeploymentManager (unbundled product) includes the following products. See "2.3.1 Product Line" for details on product configurations and licenses for SigmaSystemCenter and VirtualPCCenter.

Product Name	Description
DeploymentManager Ver6.0	This is the DPM product. One is needed per management server. Licenses are not given for managed machines with the stand-alone product. Separate licenses are required according to the number and models of managed machines. One license is required for each management server in the case of a cluster configuration.
DeploymentManager Ver6.0 Server Target License(1)	This license is needed when managed machines use a server OS. One license per machine is needed. Example)
DeploymentManager Ver6.0 Server Target License(5)	-Windows Server 2008 R2/Windows Server 2008/Windows Server 2003 R2/Windows Server 2003 are server OSs. -A server license is needed if the OS is a Linux OS (Red Hat Enterprise Linux, SUSE Linux).
DeploymentManager Ver6.0 Server Target License(20)	-For example, if 10 managed machines in which Windows Server 2008 R2 is installed are being managed, then 10 server licenses are required (five server licenses x two bundles, or five server

	licenses x one bundle + one server license x five bundles, or one server license x 10 bundles).
DeploymentManager Ver6.0 Client Target License (1)	This license is needed when managed machines use a client OS.
DeploymentManager Ver6.0 Client Target License (10)	Example) -Windows 7/Windows Vista/Windows XP are client OSs.
DeploymentManager Ver6.0 Client Target License (50)	-If there are 20 managed machines on which Windows 7 is installed, then 20 client licenses are required (10 client licenses x two bundles, or 10 client licenses x one bundle + one client
DeploymentManager Ver6.0 Client Target License (100)	license x 10 bundles, or one client license x 20 bundles).

·Licensing Philosophy

  -Please purchase one license for each machine being managed by a management server. For example, if you buy two products and manage 50 client OS machines on each, please purchase two bundles of fifty client licenses, and not one bundle of 100 client licenses.

  -If you use the OS installation by disk duplication function, then a number of licenses equal to the number of managed machines that are registered, including master machines and duplicate machines, is required.

  -One license is needed for each virtual machine operating in virtualization software. When a moving virtual machine between virtual machine servers such as VMware VMotion, it is considered as a same managed machine, only need 1 license

  -One license is required for each ft server.

  -A number of products equal to the number of nodes in a cluster is required when using a cluster configuration for management servers, but only purchase a number of licenses equal to the actual number of managed machines. In this case, register the same license to multiple servers.

·Transferring Hardware

  When transferring management server hardware, uninstall DPM from the server before transferring, and install DPM in the server after transferring. This way, continuous use is possible. There is no need to re-purchase the product.

  When transferring managed machine hardware, a new license must be purchased.

·Regarding version upgrades
When upgrading, the license for the new version is required.
Example)
  -When upgrading from DPM Ver5.1 to DPM Ver6.0, a license for the new version is required.
  -For a revision upgrade from DPM Ver6.0 to DPM Ver6.1, the existing license can continue to be used.

2.4. DeploymentManager Process up to DeploymentManager Operation

Build the system while reading the relevant manuals.

(1) Verify the operating environment.
   After selecting a system configuration, make sure that the DPM operating environment matches your environment.
   See "3. Operating Environment" for details.

(2) Configure the needed settings before installation of DPM.
   Install and configure modules needed to run DPM before installing DPM.
   See "Installation Guide 1. Before Installing DPM" for details.

(3) Install DPM.
   Install DPM to the management server(s) and managed machine(s) according to the configuration selected during system design.
   See "Installation Guide 2. Installing DPM" for details.

(4) Preparations before running DPM.
   Start the Web Console and register the license key.
   See "Installation Guide 5. Preparing for DeploymentManager Operation" For details.

(5) Register resources to DPM.
   Register managed machines. See "Operation Guide 2. Registering Resources in DeploymentManager" for details on registration.

(6) Perform preparations before executing a scenario. What is done at this point depends on the functions to be used. See the procedures for each function in the Operation Guide.
   When using backup/restore/disk configuration check, OS installation by disk duplication, you must select Deploy-OS corresponding to the machine model from the Web Console. And it could be necessary to install dedicated software according to the machine model. For more details, please contact your sales or support representative.

See "Operation Guide 1.1. Operation Flow: From Startup to Scenario Execution" for details on the procedure after creation of a scenario.

Part II Latest Information on DeploymentManager

This section provides the latest info on DPM. The latest information includes the hardware and software operating environments and the enhanced points of latest releases.

3. Operating Environment

The system must be designed with a thorough understanding of system requirements and the hardware environment before installing DPM. This chapter explains the DPM operating environment.

The items covered in this chapter are as follows:

3.1. Information on Included Software

This section provides information on software included with the DPM unbundled product.
See the relevant product sites listed in "2.3.1 Product Line" for details on products included in SSC products.

The installation media includes the following components aside from the DPM components listed in "2.1. DeploymentManager System Configuration Examination".

 ·Microsoft SQL Server 2008 R2 Express x86/x64
 ·JRE6 Update24
 ·Windows Installer 4.5
 ·.NetFramework 3.5 SP1

3.2.   Management Server

This section describes system requirements for the management server. Install the DPM server in the management server.

3.2.1.   System Requirements

The system requirements for the management server are as follows.

Hardware environment

CPU	Intel Pentium processor (1.8 GHz) or higher	
Memory Size	Approximately 156MByte Note, however, that separate memory is required for the following operations.	
	For each one managed machine that is registered	Approximately 0.3MByte
	For creating one scenario	Approximately 0.07MByte
	For every added machine on which a scenario is run simultaneously	Approximately 8.5MByte
	For each one device increase in the number of devices running automatic updates	Approximately 0.2MByte
	If using Image Builder	Approximately 40MByte
Disk Size	Approximately 1.8GByte (Approximately 600MByte for SQL Server 2008 R2 Express, Approximately 620MByte for .NET Framework and other space needed for the DPM server) *Approximately two times the memory (3.6GByte) will be temporarily required at the time of installation. *Please use the following calculation method for a way to calculate the estimated disk space required for data storage. Approximately 320MByte of disk space is included by default for data storage with SQL Server 2008 R2 Express (approximately 600MByte). If the calculated value below exceeds 320MByte, then that portion of extra disk space will be required. Number of registered machines x 10KByte + number of registered packages x 3KByte + number of registered machines x 0.15KByte x number of registered packages Example) This will be approximately 1.0GByte for 40,000 units registered machines, and 100 registered packages. Separate memory is required equal in size to backup images, OS images, and setup parameter files, patches/service packs/application images and BIOS/firmware update images.	
Other	100Mbps or faster LAN board (1Gbps or faster recommended) CD/DVD drive	

Software environment

OS	(IA32) Windows Server 2003 Standard Edition(SP2)/Enterprise Edition(SP2) Windows Server 2003 R2 Standard Edition(SP2)/Enterprise Edition(SP2) Windows Server 2008 Standard/Enterprise(No SP/SP2)(*1) Windows Storage Server 2003 R2(SP2) (EM64T) Windows Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Storage Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Server 2008 R2 Standard/Enterprise/Datacenter(SP1)(*1)
Database Engine	Microsoft SQL Server 2008 R2 Express x86/x64(*2) Microsoft SQL Server 2008 R2 Standard/Enterprise/Datacenter x86 Microsoft SQL Server 2008 R2 Standard/Enterprise/Datacenter x64 Microsoft SQL Server 2008 Express/Standard Edition/Enterprise x86/x64 Microsoft SQL Server 2005 Express Edition/Standard Edition/Enterprise Edition x86/x64
Java Execution Environment	JRE6 Update24(*2)
Other	Internet Information Service (IIS) 6.0/7.0/7.5 .NET Framework 3.5 SP1(*2) ASP .NET 2.0 DHCP Service Windows Installer 4.5 or later (*3)

*1
   Full installation supported. Always perform installations and other operations while the application is running as an Administrator user.
*2
   Included in the install media.
*3
   If Windows Installer 4.5 is not installed, it is included in the installation media, so install it. Windows Installer 4.5 is already installed with Windows Server 2008 R2.

> **Tips** See the following for details on JRE.
> http://www.oracle.com/technetwork/java/javase/downloads/index.html

3.2.2. Precautions

The precautions are as follows.

·Please use TCP/IP for the management server and set a fixed IP address.

> **Note** Set no more than 128 IP addresses for the management server, including all LAN boards.

·If you are using Microsoft Windows Services for UNIX as the NFS server for the OS clear installation function, CALs (client access licenses) might be needed for all the machines running simultaneously during the installation.

> **Tips** If you are managing an NEC US110, see "Reference Guide 10.2. NEC US110 Support".

3.3. Web Console

This section describes system requirements for the web console.

3.3.1. System Requirements

The system requirements for the Web Console are as follows.

Hardware environment

Display	A display with a resolution of at least 1024 x 768 and a graphics card able to display at least 256 colors are required.

Software environment

OS	Any OS can be used.
Web Browser	Internet Explorer 7/8 (8 is recommended), Firefox 3.5/3.6

> Tips: The Web Console is used through a web browser. It does not need to be installed. It can be used on the same machine as the management server as well as on other machines.

3.3.2. Precautions

Change the security settings in Internet Explorer's **Internet Options**.

JavaScript	Set **Security** - **Custom Level** - **Security Settings** - **Scripting** - **Active Scripting** to **Enable**.
Cookie	-In **Privacy**, move the slider under **Settings** to any setting other than "Blocks all cookies from all websites." -Under **Privacy** - **Sites**, enter the URL of the management server you wish to connect to, and click on **Allow**.

3.4. Image Builder(Remote Console)

This section describes system requirements for Image Builder (Remote Console).

3.4.1. System Requirements

The system requirements for the Image Builder are as follows.

Hardware environment

CPU	Intel Pentium processor (1.8 GHz) or higher
Memory Size	Approximately 40MByte
Disk Size	Approximately 11 MByte When creating an image file, a separate space is needed temporarily for storage.
Other	A display with a resolution of at least 800 x 600 is required.

Software environment

OS	(IA32) Windows Server 2003 Standard Edition/Enterprise Edition(SP1/SP2) Windows Server 2003 R2 Standard Edition/Enterprise Edition(No SP/SP2) Windows Server 2008 Standard/Enterprise(No SP/SP2)(*1) Windows Storage Server 2003 R2(SP2) Windows 7 Professional/Ultimate/Enterprise(No SP/SP1) Windows Vista Business/Enterprise/Ultimate(No SP) (EM64T) Windows Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Storage Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Server 2008 R2 Standard/Enterprise/Datacenter(SP1)(*1)
Java Execution Environment	JRE6 Update24(*2)

*1
Full installation supported. Always perform installations and other operations while the application is running as an Administrator user.
*2
JRE6 Update24 is included in the installation media.

Important	Administrator authority is required to run Image Builder.

Tips	■Image Builder does not need to be installed in machines in which the DPM server has been installed. (A local console is automatically installed.) ■See the following for details on JRE. http://www.oracle.com/technetwork/java/javase/downloads/index.html

3.5.   DPM Command Line

This section describes system requirements for DPM Command Line.

3.5.1.   System Requirements

The system requirements for the DPM Command Line are as follows.

Hardware environment

CPU	Intel Pentium processor (1.8 GHz) or higher
Memory Size	Approximately 6.0MByte
Disk Size	Approximately 6.3MByte

Software environment

OS	(IA32) Windows Server 2003 Standard Edition/Enterprise Edition(SP1/SP2) Windows Server 2003 R2 Standard Edition/Enterprise Edition(No SP/SP2) Windows Server 2008 Standard/Enterprise(No SP/SP2)(*1) Windows 7 Professional/Ultimate/Enterprise(No SP/SP1) Windows Vista Business/Enterprise/Ultimate(No SP) Windows Storage Server 2003 R2(SP2) (EM64T) Windows Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Storage Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows 7 Professional/Ultimate/Enterprise(No SP/SP1) Windows Server 2008 R2 Standard/Enterprise/Datacenter(SP1)(*1)
Other	Windows Installer 4.5 or later (*2)

*1

Full installation supported. Always perform installations and other operations while the application is running as an Administrator user.

*2

If Windows Installer 4.5 is not installed, it is included in the installation media, so install it. Windows Installer 4.5 is already installed with Windows Server 2008 R2.

> **Note**
> Use the same version/revision of DPM Command Line and the DPM Server.
> For example, if you are using DPM Server Ver6.0, use DPM Command Line Ver6.0.

> **Tips**
> DPM Command Line does not need to be installed in machines in which the DPM server has been installed.

3.6. Package Web Server

This section describes system requirements for the Package Web Server.

3.6.1. System Requirements

The system requirements for the Package Web Server are as follows.

Hardware environment

CPU	Intel Pentium processor (1.8 GHz) or higher
Memory Size	Approximately 256MByte
Disk Size	Enough disk space is required to hold the package.

Software environment

Supported OS's	(IA32) Windows Server 2003 Standard Edition/Enterprise Edition(No SP/SP1/SP2) Windows Server 2003 R2 Standard Edition/Enterprise Edition(No SP/SP2) Windows Server 2008 Standard/Enterprise(No SP/SP2)(*1) Windows Storage Server 2003 R2(SP2) (EM64T) Windows Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Storage Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Server 2008 R2 Standard/Enterprise/Datacenter(SP1)(*1)
Other	Internet Information Service (IIS) 6.0/7.0/7.5

*1
   Full installation supported. Always perform installations and other operations while the application is running as an Administrator user.

3.6.2. Precautions

If you want to install multiple DPM Servers, you can commonly manage the packages to be registered on each DPM Server by introducing a Package Web Server.

By deploying Package Web Server, packages are automatically downloaded to each DPM Server simply by registering them to Package Web Server, eliminating the hassle of registering the same package to multiple DPM Servers. PackageDescriber is used to register packages to Package Web Server and the DPM Server uses HTTP for downloading packages from Package Web Server.

Package Web Server does not need to be installed if you are only running one instance of DPM Server.

When building Package Web Server and a DPM Server on the same server, Package Web Server can be built using the IIS used by the DPM Server, so there is no need to install an HTTP server for Package Web Server.

Note | Use the PackageDescriber when creation or editing of a package involves any of the settings shown below. For more details on each setting, see "Reference Guide 6. PackageDescriber."

- ・ When specifying a hyphen (-), period (.), or underscore (_) in **MS number** under the **Basic** tab.
- ・ When specifying a file that includes the **msp** or **msu** extensions in **Execution file** under the **Execution settings** tab.
- ・ When specifying a path described in the registry as a file path in **File Condition List** under the **Dependency information** tab.
- ・ When specifying any of the following in **File Condition List** or **Registry Condition List** under the **Dependency information** tab.
  -Exists (smaller than version)
  -Exists (version or earlier)
  -Exists (larger than version)
  -Exists (version or later)
- ・ When specifying multiple conditions using **And** or **Or** in **Select Conditions** under the **Dependency information** tab.
- ・ When specifying a path described in the registry as the file path under the **ID information** tab.

3.7. PackageDescriber

This section describes system requirements for PackageDescriber.

3.7.1. System Requirements

The system requirements for the PackageDescriber are as follows.

Hardware environment

CPU	Intel Pentium processor (1.8 GHz) or higher
Memory Size	Approximately 64MByte
Disk Size	Approximately 1MByte (approximately 130MByte are separately needed for storing packages and installing JRE.)

Software environment

OS	(IA32) Windows Server 2008 Standard/Enterprise(No SP/SP2)(*1) Windows Server 2003 Standard Edition/Enterprise Edition(No SP/SP1/SP2) Windows Server 2003 R2 Standard Edition/Enterprise Edition(No SP/SP2) Windows 7 Professional/Ultimate/Enterprise(No SP/SP1) Windows Vista Business/Enterprise/Ultimate(No SP) Windows Storage Server 2003 R2(SP2) (EM64T) Windows Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1) Windows Server 2008 R2 Standard/Enterprise/Datacenter(SP1)(*1) Windows 7 Professional/Ultimate/Enterprise(No SP/SP1) Windows Storage Server 2008 Standard x64/Enterprise x64(No SP/SP2)(*1)
Other	JRE6 Update24(*2)

*1
   Full installation supported. Always perform installations and other operations while the application is running as an Administrator user.
*2
   JRE6 Update24 is included in the installation media.

> Tips See the following for details on JRE.
> http://www.oracle.com/technetwork/java/javase/downloads/index.html

3.8. Managed Machines (Physical Machines)

This section describes system requirements for managed machines which are physical machines. DPM Client is installed in the managed machines and managed.

3.8.1. System Requirements

The system requirements for physical managed machines are as follows.

Hardware environment

Memory Size	·12MByte is needed when the DPM client is installed · 320MByte is needed during backup/restore (768MByte or more is recommended)(*1)
Disk Size	·10MByte is needed when the DPM client is installed ·The maximum disk size that can be backed up is up to 8TByte ·The maximum partition size that can be backed up is up to 2TByte

Other	·100Mbps or faster LAN board(1Gbps or faster recommended)
	·A PXE boot (network boot)-compatible LAN board (when using DHCP)
	·A LAN board capable of WOL (if remote power ON is needed)
	·Devices that Deploy-OS supports (when using backup/restore/disk configuration
	  check and OS installation by disk duplication)
	  Supplemental LAN board is not supported in Deploy-OS.

*1
  For 320MByte (minimum)
  The following are factors in partition size.
  NTFS   : 256GByte or less
  ext2/ext3   : 512GByte or less
  Other   : 2TByte or less

Important	It could be necessary to install dedicated software according to the machine model. For more details, please contact your sales or support representative.

Note	■ Multi-boot environments are not supported. ■ PXE boot and WOL with Supplemental LAN board are not supported.

Software environment

OS(*1)	(IA32) Windows Server 2008 Standard/Enterprise Windows Server 2003 Standard Edition/Enterprise Edition Windows Server 2003 R2 Standard Edition/Enterprise Edition Windows 2000 Server/Advanced Server/Professional Windows 7 Professional/Ultimate/Enterprise Windows Vista Business/Enterprise/Ultimate Windows XP Professional Red Hat Enterprise Linux AS3/ES3/AS4/ES4/5(except for 5.0)/5 AP(except for 5.0)/6 SUSE Linux Enterprise 9/10/11 (EM64T) Windows Server 2008 Standard x64/Enterprise x64/Datacenter x64 Windows Server 2008 R2 Standard/Enterprise/Datacenter Windows Server 2003 Standard x64 Edition/Enterprise x64 Edition/Datacenter x64 Edition Windows Server 2003 R2 Standard x64 Edition/Enterprise x64 Edition/Datacenter x64 Edition Red Hat Enterprise Linux AS4 for the x64 Edition/ES4 for the x64Edition/5(x64)(except for 5.0)/5 AP(x64)(except for 5.0)/6(x64) SUSE Linux Enterprise 9/10/11 (ARM) Windows CE 5.0(*2)

*1
 Supported funcation differ depending on the OS. Please see "Appendix A Support Tables" for details.
*2
 VirtualPCCenter is supported only for the NEC US110.

Note	If you are managing an NEC US110, see "Reference Guide 10.2. NEC US110 Support".

Tips	Contact your sales or support representative about information on target OS service packs.

3.8.2.   Precautions

The precautions are as follows.

BIOS Configuration
·Startup Order
  <If there is a DHCP Server on the Network>
    In order to perform PXE boot (network boot), set the start order of the network in the BIOS settings to a position higher than the hard disk. If there are multiple LAN boards, set only the LAN board managed by DPM above HDD and others below HDD. Setting LAN boards on which the DPM management is not performed higher than the HDD can be the cause of such errors as scenario execution errors.

<If there is no DHCP Server on the Network>
    You will have to boot from the bootable CD to execute backup/restore scenarios. Configure the
    BIOS startup order so that CD is first.
      -The BIOS configuration method depends on the BIOS being used. See your hardware manual
       for details or contact the seller. Use extreme caution when changing the BIOS configuration.
      -LAN1 is set to a higher place in the startup order than LAN2 in the Express 5800/Blade Server
       factory settings, so the BIOS does not need to be configured if LAN1 is to be used.

LAN Boards
·If the LAN board configuration has been changed in a managed machine by doing any of the following,
reboot the managed machine so that the information held by the management server is updated.
    -LAN board added
    -LAN board removed
    -Installation position of LAN board changed
    -Startup order in BIOS changed

When switching a LAN board between managed machine in which UUID is registered to the
management server and a managed machine in which it is not, the UUID registered machine should
be rebooted before rebooting the UUID unregistered machine.

Remote Power On Function
·To use the remote power on function, the managed machine must meet the following requirements.
   -The managed machine's on-board LAN must be WOL-enabled.
    The managed machine must support WOL from S5 state after shutting down from the
    OS.Moreover, the power state of the managed machine to be used with WOL must be S5 state.
    (S5 state = shut down)
   -BIOS must be configured for WOL.
    Settings include Wake On LAN, Remote Power On, Resume Power On, etc.
    The BIOS configuration method depends on the BIOS being used. See your hardware manual
    for details or contact the seller. Use extreme caution when changing the BIOS configuration.
   -Set the WOL settings in the OS LAN driver settings.
    This is needed for some machine model/OS combinations. See the hardware manual for
    configuration methods.

·Precautions regarding the remote power on function are as follows.
   -Do not set a password for startup in the BIOS security settings.
   -Do not leave floppy disks or CD's in the managed machine.
   -Wireless LAN and mobile communication cards do not support WOL.
   -Virtual machines do not support WOL.
   -Make sure the MAC addresses displayed in the main screen of the DPM Web Console are the
    same as the MAC addresses of the managed machines.
   -If a managed machine is forcibly shut down by, for example, long-pressing the power button,
    WOL might fail the next time depending on the hardware specifications. In this case, turn the
    machine on manually to start the OS and then shut it down so that the next WOL will work.
   -Some machine models of managed machine will not wake on LAN if the power is turned off after
    automatically registering the machine to DPM via network boot. If the power does not come on,
    turn it on manually.
   -With DPM, "Speed" and "Duplex" are negotiated using the "Auto" setting. Please set the "Speed"
    "Duplex" to the "Auto" for the switch setting. If it is not set to Auto, the DPM won't be able to do
    WOL. Check the LAN link-up with the managed machine off. If the LAN is not linked up, WOL may

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fail from DPM. Check the switch ports and the OS driver configuration, and set Link Speed and Duplex to Aut**o**. If the power does not come on, turn it on manually.

-Depending on the machine, WOL might fail if the LAN link speed is changed. Check the link lamp with the power off or contact the seller.

-If the LAN port of the managed machine is configured for Teaming, make sure the MAC address of the virtual LAN that is using Teaming is the same value as the MAC address of the physical LAN of the actual machine (i.e., the MAC address that is registered to the management server). Note that if Teaming is set up using Out-of-Band (OOB) Management, the virtual LAN and the physical LAN cannot be set to the same value, so powering on using DPM (i.e., WOL) will not be available.

-Configure the following settings if the DPM management server is on a different segment from a managed machine.

-Set the network equipment for direct broadcast routing.

-Set the gateway and subnet mask to the managed machine registered to DPM.

-Because powering on with DPM (i.e., WOL) depends on the hardware configuration, check the hardware configuration if the problem is not resolved after performing the above checks and fixes.

DPM Client

Install the DPM Client in the managed machines. See "Installation Guide 2.2 Installing DPM Client" for the installation method.

Important	Always use a DPM Client that is of the same version/revision as the DPM Server. If you are using an older version of the DPM Client, see Section 3.3, "Upgrading the DPM Client" in Installation Guide to upgrade the DPM Client.

Note	There might be limitations on available functions depending on the OS of the managed machine. See the list in "Appendix A, Support Tables" for details.

Tips	DPM Client is automatically installed if an OS clear installation is performed using DPM.

IP Addresses of Managed Machines

Network connection IP addresses in the OS of managed machines can be acquired either by using automatic acquisition by DHCP or by using a fixed IP addresses.

Note	Make sure the number of IP addresses of machines in which DPM Client is installed does not exceed the following. Windows OS :16 per LAN board, 128 total for all LAN boards Linux OS :16 total for all LAN boards

Linux Managed Machine

・If a managed machine is running a Linux OS, only the following ports can be used to acquire network card information and distribute applications/patches using DPM Client:

For bonding interface:	bond0 ~ bond9
For ethernet interface:	eth0 ~ eth9

・For the bonding driver to work correctly, a proc file system (/proc) must be mounted.
  Also, the current version of DPM Client only supports the active-backup operation mode of the
  bonding driver.
・Configure the MAC address for PXE boot if the LAN board for PXE boot (network boot) is
  duplicated by the bonding driver.
・DPM Client supports the bonding drivers for Red Hat Enterprise Linux AS3, ES3, AS4, ES4, 5
  (but not 5.0), 5 AP (but not 5.0), and SUSE Linux Enterprise 10 and 11.

3.9. Managed Machines (Virtual Environment)

This section describes system requirements for virtual environments which are managed machines.

3.9.1. System Requirements

The system requirements for virtual environments which are managed are as follows.

Hardware environment

Memory Size	·12MByte is needed when the DPM client is installed · 320MByte is needed during backup/restore (768MByte or more is recommended)(*1)
Disk Size	·10MByte is needed when the DPM client is installed ·The maximum disk size that can be backup/restore is up to 8TByte ·The maximum partition size that can be backup/restore is up to 2TByte
Other	·100Mbps or faster LAN board(1Gbps or faster recommended) ·A PXE boot (network boot)-compatible LAN board (when using DHCP) ·A LAN board capable of WOL (if remote power ON is needed) ·Devices that Deploy-OS supports (when using backup/restore/disk configuration check and OS installation by disk duplication) Supplemental LAN boards are not supported in Deploy-OS.

*1
    For 320MByte (minimum)
    The following are factors in partition size.
    NTFS   :256GByte or less
    ext2/ext3   :512GByte or less
    Other:2TByte or less

Virtual SW Environment

Host OS	VMware ESX Server 3.5/4.0/4.1 VMware ESXi 3.5/4.0/4.1 Citrix XenServer Enterprise Edition 5.0/5.5/5.6/5.6 FP1 Microsoft Hyper-V/Hyper-V2.0(*1)
Guest OS(*2)	Guest OS on VMware ESX Server 3.5/4.0/4.1 or higher Guest OS on VMware ESXi 3.5/4.0/4.1 or higher Guest OS on Microsoft Hyper-V/Hyper-V2.0 or higher (*1)

*1
    The guest OS on the following host OS can be managed.
        ·Hyper-V on Windows Server 2008 x64
        ·Hyper-V2.0 on Windows Server 2008 R2
*2
    Supported guest OS's must meet the following conditions.
        ·An OS that the virtualization software supports as a guest OS
        ·An OS that is supported as a DPM managed machine
         (3.8 Managed Machines (Physical Machines))
    For OS's that virtualization software applications support, see the user guides or home pages
    of the relevant products.

See Appendix A, "Support Tables" for details on support of virtualization software products that are supported by DPM as managed machines.

3.9.2.   Precautions

See "3.8.2 Precautions" and "Appendix A Support Tables, Support of Virtualization Environments as Managed Machines" for precautions on various environments.

4. Latest Version Information

This chapter provides the latest information on DPM. The functions and improvements added to the newest releases are listed.

The items covered in this chapter are as follows:

4.1. New Additional Functions

The following are the main newly added functions and enhanced functions from DPM Ver5.1/5.2 to DPM Ver6.0.

・ The design of Web Console has been overhauled. The following functions have been enhanced together with this.
   -Groups of managed machines can be organized in hierarchies.
   -Managed machines can be moved between groups.
   -Scenarios can be managed in hierarchies.
   -New machines can be selected in the New Machines List and registered to the same group at once.
   -The setting for the number of machines displayed to one list screen can be changed.
・ A single backup/restore scenario can be used on multiple managed machines.
・ Backup images, Package images, OS images, and Hardware images can be managed as images.
・ Deploy-OS used by the backup/restore/disk configuration check function can be configured from the Web console.
・ Users logging in to the management server can be managed. User authorities for logged-in users can be configured.
・ Backup/restore is now available for hard disks 1TB and larger.
・ Automatic full sector backup is now available without having to configure the full sector option for file systems for which backup/restore was unsupported.
・ Re-setup of managed machines when disk duplication is performed is now less time-consuming for Windows Vista, Windows7, Windows Server 2008, and Windows Server 2008 R2.
・ The DPM Client version can now be checked in Linux.

4.2. Changed and Removed Functions

These are the major changes from DPM Ver5.1/5.2 to DPM Ver6.0.

・ The component configuration has changed. Management Server for DPM, Web Server for DPM, and Database, which existed up until DPM Ver5.1/5.2, have been combined into DPM Server. Component names have also changed, as outlined in this document.
・ The basic web component has been changed from Tomcat to IIS.
・ The configuration of services running on the management server and the managed machines has changed. See Appendix A, "Service List" in Reference Guide for details on the configuration of services.
・ The database engine included in the installation media was SQL Server 2005 Express Edition up to DPM Ver5.1/5.2, and is now SQL Server 2008 R2 Express.
・ The Updat**e** and Application tabs have been combined into one tab in the scenario file.
・ The Scenario Progress, Scenario Execution List, and Backup/Restore Execution List screens have been combined into one screen.

The following DPM Ver5.1/5.2 functions have been removed from Ver6.0.

・ OS clear installation (Windows)
・ Package Builder
・ AutoRAID, Off-Line Maintenance Utility Installer
・ The following linked functions:
   -Automatic registration/forced shutdown/power on functions by the SIGMABLADE controller
   -Automatic registration/forced shutdown functions by ESMPRO/ServerAgent
   -Power on/forced shutdown functions by DianaScope
・ Scenario execution from clients
・ Support for an IPF machine as a managed machine (however, if an IPF machine is registered as a managed machine in DPM Ver5.1/5.2, it can continue to be managed after DPM Ver6.0 is installed.)

Appendixes

Appendix A Support Tables Support for Managed Machine OS's

Support for Managed Machine OS's is as follows.
When checking the following, also check what OS's are supported by the managed machine.
If not using an OS that is supported by the managed machine, it will not run correctly even if the OS is supported by DPM.
See the relevant hardware and other manuals products for details on which OS's are supported by the managed machine.

Support Tables(Managed Machines Running a Windows OS)

Function	Windows 2000/ Windows XP	Windows Server 2003
	IA32	IA32/EM64T
Backup/restore/disk configuration check(*7)	Yes	Yes
OS Installation by Disk Duplication(*7)	Yes	Yes
OS Clear Installation	No	No
Installing service packs, hotfixes, Linux patch files, and applications	Yes	Yes
Distribution of BIOS/Firmware Floppy Disk Images	Yes	Yes
Service Pack/HotFix/Application(automatic update method)	Yes	Yes
DPM client automatic upgrade	Yes	Yes
Power ON/Shutdown	Yes	Yes
Power ON/OFF State Check	Yes	Yes
Acquisition of OS/Service Pack/HotFix/ Linux Patch File/Application Information	Yes	Yes

Function	Windows Vista/7	Windows Server 2008	Windows CE (*1)
	IA32	IA32,EM64T	ARM
Backup/restore/disk configuration check(*7)	Yes	Yes	No
OS Installation by Disk Duplication(*7)	Yes	Yes	No
OS Clear Installation	No	No	No
Service Pack/HotFix/Linux Patch File/ Application Installation	Yes	Yes	Yes
Distribution of floppy disk image for BIOS/firmware	Yes	Yes	No
Service packs/hotfixes/ applications(automatic update type)	Yes	Yes	Yes
DPM client automatic upgrade	Yes	Yes	Yes
Power ON/Shutdown	Yes	Yes	Yes(*3)
Power On/Off State Check	Yes	Yes	Yes
Acquisition of OS/service packs/hotfixes/ Linux patch files/applications Information	Yes	Yes	Partially(*4)

Support Tables(Managed Machines Running a Linux OS)

Function	Red Hat Enterprise Linux AS3/ES3	Red Hat Enterprise Linux AS4/ES4,5 (excluding 5.0), 5 AP(excluding 5.0)/6	SUSE Linux Enterprise 9/10/11
	IA32	IA32 EM64T	IA32 EM64T
Backup/restore/disk configuration check(*7)	Yes	Yes	Yes(*5)
OS Installation by Disk Duplication(*7)	Yes	Yes	Yes(*2)
OS Clear Installation	Yes(*6)	Yes	No
Service Pack/HotFix/Linux Patch File/ Application Installation	Yes	Yes	Yes
Distribution of BIOS/Firmware Floppy Disk Images	Yes	Yes	Yes
Service Pack/HotFix/Application (automatic update method)	No	No	No
DPM client automatic upgrade	Yes	Yes	Yes
Power ON/Shutdown	Yes	Yes	Yes
Power ON/OFF State Check	Yes	Yes	Yes
Acquisition of OS/Service Pack/HotFix/ Linux Patch File/Application Information	Yes	Yes	Yes

*1
   VirtualPCCenter is supported only for the NEC US110. In addition to the description in this chapter, specialized procedures are required for Windows CE(NEC US110). See also "10.2 NEC US110 Support" in Reference Guide.
*2
   Only supported for SUSE Linux Enterprise 10 and 11.
*3
   Only shutdown is available.
*4
   Only OS information can be acquired.
*5
   To restore a backup image to another managed machine, see the Novell website Knowledgebase (Support TID:3048119).
*6
   When installing Red Hat Enterprise Linux ES3/AS3 on an Express 5800/120Ba-4, a version after or including update3 is needed.
*7
   In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console.
   Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

Support of Virtualization Environments as Managed Machines

> **Important** Various precautions exist when executing scenarios even with functions listed as supported in the tables below. For scenarios, operate them after thoroughly reading about the functions in Operation Guide.

Host OS

■ The function support table for VMware ESX 3.5/4.0/4.1 and ESXi 3.5/4.0/4.1 host OS is given below.

Function	ESX Server 3.5/4.0/4.1	ESXi 3.5/4.0/4.1
Backup/restore/disk configuration check(*4)	No	No
OS Installation by Disk Duplication(*4)	No	No
OS Clear Installation	No(*1)	No
Service Pack/HotFix/Linux Patch File/ Application Installation	Yes	No
Distribution of BIOS/Firmware Floppy Disk Images	Yes	Yes
Power ON/Shutdown	Yes	Partially(*2)
Power ON/OFF State Check	Yes	Yes(*3)
Acquisition of OS/Service Pack/HotFix/ Linux Patch File/Application Information	Yes	No

*1
This function is supported for SSC products. See the SigmaSystemCenter reference guide for details.
*2
Shutdown is not supported.
*3
In DPM, it is necessary to resolve the name from registered computer name.
*4
In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console. Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

■ The function support table for Citrix XenServer Enterprise Edition Version 5.0/5.5/5.6 host OS is given below.

Function	Citrix XenServer Enterprise Edition 5.0/5.5/5,6
Backup/restore/disk configuration check(*2)	Yes
OS Installation by Disk Duplication(*2)	No
OS Clear Installation	No(*1)
Service Pack/HotFix/Linux Patch File/Application Installation	Yes
Distribution of BIOS/Firmware Floppy Disk Images	Yes
Power ON/Shutdown	Yes
Power ON/OFF State Check	Yes
Acquisition of OS/Service Pack/HotFix/ Linux Patch File/Application Information	Yes

*1
  This function is supported for SSC products. See the SigmaSystemCenter reference guide for details.
*2
  In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console. Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

■ The function support table for a Hyper-V1.0/2.0 host OS is given below.

Function	Hyper-V 1.0/2.0
Backup/restore/disk configuration check(*2)	Yes(*1)
OS Installation by Disk Duplication	No
OS Clear Installation	No
Service Pack/HotFix/Linux Patch File/Application Installation	Yes
Distribution of BIOS/Firmware Floppy Disk Images	Yes
Power ON/Shutdown	Yes
Power ON/OFF State Check	Yes
Acquisition of OS/Service Pack/HotFix/ Linux Patch File/Application Information	Yes

*1
  Do not configure the virtual switch to the LAN over which DPM performs backup/restore. Because the MAC address of the virtual switch is passed on when restoring to another server, if a server is replaced due to a breakdown or the like, the MAC address of the server before breakdown is used, which can cause problems such as remote powering not being possible.
*2
  In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console. Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

Guest OS

> **Note** Functions supported by a guest OS must include both the following and support for managed machine OS's described above.

■ The function support table for a VMware ESX 3.5/ESXi 3.5 guest OS is given below.

Function	Windows	Linux
Backup/restore/disk configuration check(*5)	Yes (*1)(*2)	Yes (*1)(*2)
OS Installation by Disk Duplication(*5)	Yes (*1)(*2)	Yes (*1)(*2) (*3)
OS Clear Installation	No	No
Service Pack/HotFix/Linux Patch File/ Application Installation	Yes	Yes
Distribution of BIOS/Firmware Floppy Disk Images	-	-
Power ON/Shutdown	Partially(*4)	Partially(*4)
Power ON/OFF State Check	Yes	Yes
Acquisition of OS/Service Pack/HotFix/ Linux Patch File/Application Information	Yes	Yes

*1
   If the following devices have been selected during creation of a virtual machine, backup/restore/disk duplication check and OS installation by disk duplication functions are not supported. See the user's guide that attached to the product for details on configuration.
   ·vmxnet
   ·Extended vmxnet
*2
   Network boot may fail if E1000 is used as the network adapter type for the virtual machine, due to a problem with VMware ESX3.5.
   The function itself can be run if E1000 is set, but the scenario will not finish.
   This problem is corrected in VMware ESX 3.5 Update 4.
*3
   Only Red Hat Enterprise Linux is supported.
*4
   Power ON is not supported.
*5
   In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console. Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

Appendix

■ The function support table for a VMware ESX 4.0/4.1, ESXi 4.0/4.1 guest OS is given below.

Function	Windows	Linux
Backup/restore/disk configuration check(*5)	Yes (*1)(*2)	Yes (*1)(*2)
OS Installation by Disk Duplication(*5)	Yes (*1)(*2)	Yes (*1)(*2) (*3)
OS Clear Installation	No	No
Service Pack/HotFix/Linux Patch File/Application Installation	Yes	Yes
Distribution of BIOS/Firmware Floppy Disk Images	-	-
Power ON/Shutdown	Partially (*4)	Partially (*4)
Power ON/OFF State Check	Yes	Yes
Acquisition of OS/Service Pack/HotFix/Linux Patch File/Application Information	Yes	Yes

*1
   If the following devices have been selected during creation of a virtual machine, backup/restore/disk duplication check and OS installation by disk duplication functions are not supported. See the user's guide that attached to the product for details on configuration.
   ·vmxnet 2
   ·vmxnet 3
   ·vmware paravirtulization
*2
   Because the CD/DVD drive is recognized before the disk to be processed when performing a backup/restore in VMware ESX 4.1/ESXi 4.1 without using DHCP server, the disk number of the first disk to be backed up/restored is marked 2. Run a disk configuration check to check the disk number before executing a backup/restore scenario.
*3
   Only Red Hat Enterprise Linux is supported.
*4
    Power ON is not supported.
*5
   In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console. Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

■ Citrix XenServer Enterprise Edition Version 5.0/5.5/5.6 guest OS's are not supported.

■ The function support table for a Hyper-V/Hyper-V 2.0 guest OS is given below.

Function	Windows	Linux
Backup/restore/disk configuration check(*5)	Yes(*1)(*2)	Yes (*1)(*2)
OS Installation by Disk Duplication(*5)	Partially (*1)(*2)(*3)	Yes (*1)(*2)
OS Clear Installation	No	Yes (*1)(*2)
Service Pack/HotFix/Linux Patch File/ Application Installation	Yes	Yes (*1)
Distribution of BIOS/Firmware Floppy Disk Images	-	-
Power ON/Shutdown	Partially (*4)	Partially (*1)(*4)
Power ON/OFF State Check	Yes	Yes(*1)
Acquisition of OS/Service Pack/HotFix/ Linux Patch File/Application Information	Yes	Yes(*1)

*1

Specify the following devices when creating a virtual machine.

·Legacy network adapter

·IDE controller

The scenario will not complete successfully if the following devices are selected.

·Network adapter

·SCSI controller

See the user's guide that attached to the product for details on configuration

*2

Please set the following when creating a virtual machine.

·Set the "Legacy network adapter" as the top of BIOS startup order.

See the user's guide that attached to the product for details on configuration.

*3

OS installation by disk duplication is not supported for Windows 2003 (EM64T).

*4

Power ON is not supported.

*5

In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console. Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

Appendix

File System and Disk Type Support

The file system support status for the backup/restore function is as shown below.

Windows OS
Backup/restore cannot be used except for partitions of file system types listed in the following table.

Linux OS
·Backup/restore cannot be used except for partitions formatted by using the following format method.
-Partitions created by executing an OS clear installation.
-File systems that are supported by the current version (see below).
*When installing Red Hat Linux in a managed machine, backup/restore cannot be done with a disk if in the installation settings, the first boot sector is selected as the place for the boot loader be installed into instead of the MBR (master boot record). Please install the boot loader to the MBR.

\<File System Support Table\>

File System Type	What is Being Backed Up		Backup/restore of entire partition	Backup Type	
	Backup/restore of entire disk			Effective sector backup/restore	Full sector backup/restore (*2)
	Basic disk (*6)	Dynamic disk(*1)	Basic disk(*5)		
Windows OS					
FAT16	Yes	Yes	Yes	Yes	
FAT32	Yes	Yes	Yes	Yes	
NTFS	Yes	Yes	Yes	Yes	
Linux OS(*7)					
ext2	Yes		Yes	Yes	
ext3	Yes		Yes	Yes	
Linux Swap Partition	Yes		Yes	Yes	
LVM1	Yes		Yes		Yes(*3)
LVM2**(*8)**	Yes		Yes		Yes(*3)
ReiserFS	Yes		Yes		Yes
JFS	Yes		Yes		Yes
XFS	Yes		Yes		Yes
Other					
Maintenance Partition(*4)	Yes	Yes	Yes	Yes	

*1
Please be careful of the following for backup/restore of a dynamic disk formatted disk.
·Dynamic disks with a GUID partition table (GPT) partition style are not supported.
·Backup/restore of entire partition is not supported.
·A volume over multiple disk cannot be backed up or restored. You can't backup correctly, even if no error occurs.
·You can't backup/restore when one volume is structured with multiple areas. You can't backup correctly, even if no error occurs.
·When Windows RE or a maintenance partition is not installed in the first partition and the disk is changed into the dynamic disk, the backup of the disk is not supported.
·If multiple dynamic-type disks are connected, perform backup/restore on all the disks at one time,

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in order. Starting Windows during execution of multiple backup/restore scenarios on multiple disks might prevent the Windows system from starting normally after restoring.

*2

The Full Sector Option in the "Scenario Option Configuration Tool" does not need to be set.

*3

・Backup/restore of an LVM partition that is configured over multiple hard disks is not supported.

・Please backup/restore all of the LVM partitions included on the disk continuously at one time when doing units of partitions backup/restore of LVM partitions. Starting Linux during the execution of multiple backup/restore scenarios of each LVM partition might prevent the Linux system from starting normally after restoring.

*4

For the Express 5800 Series, a maintenance partition can be created from the EXPRESSBUILDER CD-ROM.

*5

You can't backup/restore an extended partition as units of partitions.
(It is possible to backup/restore a logical drive as units of partitions)
・Basic disks with a GUID partition table (GPT) partition style are not supported.

*6

・You can't backup/restore disks that include an empty extended partition. Please always create at least one logical drive.

・Basic disks with an IA32 GUID partition table (GPT) partition style are not supported.

*7

Please backup/restore disks that contain ext4 after setting full sector option by "Scenario Option Configuration Tool". However, the full sector option is not needed for an LVM logical volume.
Example) Because /boot is ext4 in the default installation of RHEL6.0, the full sector option is required.

*8

Please see the following steps for the method to confirm if the LVM partition created on the basic disk is an LVM2 partition or not.
  Example)To confirm the backup target disk (/dev/sda) on Red Hat Enterprise Linux 5.1
    1)Run the fdisk command and confirm the partition structure.
      #fdisk -l /dev/sda
      *The output will be a result like the following.

```
#fdisk -l /dev/sda

Disk /dev/sda: 164.6 GB, 164696555520 bytes
255 heads, 63 sectors/track, 20023 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes


Device Boot      Start        End        Blocks     Id   System
/dev/sda1   *        1         13        104391     83   Linux
/dev/sda2           14      20023     160730325     8e   Linux LVM
```

    2)Run the pvdisplay command for each partition that shows "Linux LVM" in the output.
      If the output of running the pvdisplay command shows "lvm2" in the "FMT", then it is an LVM2 partition.
      #pvdisplay -C /dev/sda2

*The output will be a result like the following.

```
#pvdisplay -C /dev/sda2
PV          VG           Fmt    Attr    PSize      PFree
/dev/sda2   VolGroup00   lvm2   a-      153.28G    0
```

Support Table for Disk Type, etc.

Disk Type	What is Being Backed Up		Backup Type	
	Backup/ restore of entire disk	**Backup/restore of entire partition**	**Effective sector backup/ restore**	**Full sector backup/ restore**
Windows OS				
BitLocker drive encryption	No	No	No	No
Other				
Software RAID volume	No(*1)	No	No	No (*1)

*1
The backup/restore of software RAID volume (RAID0, RAID1, RAID1 Span, RAID5, and others) created via an OS function or a disk management application is not supported. For FT servers, depending on the machine model, backup after release of RAID or a full sector backup with RAID still in place are supported. Contact your sales or support representative about details on the backup procedure for each machine model.

Support for iSCSI Boot

■ The following is a function support table when a disk is connected to a managed machine using iSCSI and an iSCSI boot has been performed.

Function	Windows (*1)	Linux (*2)
Backup/restore/disk configuration check(*4)	Yes	Yes(*3)
OS Installation by Disk Duplication(*4)	Yes	No
OS Clear Installation	No	No
Service Pack/HotFix /Linux Patch File/Application Installation	Yes	Yes
Distribution of BIOS/Firmware Floppy Disk Images	Yes	Yes
Power ON/Shutdown	Yes	Yes
Power ON/OFF State Check	Yes	Yes
Acquisition of OS/Service Pack/HotFix/Linux Patch File/ Application Information	Yes	Yes

*1
  Only Windows Server 2008 is supported.
*2
  Only Red Hat Enterprise Linux 5.2-5.4 and 5.2 AP-5.4 AP are supported.
*3
  Restore is only supported for the managed machine from which the backup image was created and which has the same LAN board and iSCSI storage configuration.
*4
  In order to use this function, you need to configure a Deploy-OS that is supported for the machine model from the Web Console. Please see "2.1.2.4 Deploy-OS" about Deploy-OS.

Combinations of Functions in Scenarios

■   Multiple functions can be combined in a single scenario in DPM. Permissible function combinations are shown below.
See "10. Precautions" in Reference Guide for precautions when simultaneously executing scenarios in which different service packs/HotFixes/Linux patch files/applications are installed, or different images are restored.

Function	Backup	Restore	Disk Configuration Check	OS Clear Installation	Service Packs / HotFixes / Linux Patch Files/ Application Installation	Updating BIOS/firmware
Backup		No	No	Yes	Yes (*2)	Yes
Restore(*1)	No		No	No	No	Yes
Disk Configuration Check	No	No		No	No	No
OS Clear Installation	Yes	No	No		No	Yes
Service Pack/HotFix/ Linux Patch File/ Application Installation	Yes (*2)	No	No	Yes		Yes (*2)
Updating BIOS/firmware	Yes	Yes	No	Yes	Yes (*2)	

*1
    Includes restores when doing an OS install by disk duplication.
*2
    Can only be executed when configured concurrently with an OS clear installation.

Appendix B For Customers Who Cannot Easily Install a DHCP Server

DPM can be run without a DHCP server used (by booting managed machines from a bootable CD).
However, the available functionality in DPM is limited if a DHCP server is not used.
This section describes supported functions and configurations that have to be made beforehand if no DHCP server is to be used.
See Appendix A, "Operating DPM Without Using the DHCP Server" in Operation Guide for details about creating a bootable CD and operation.

Function	Use a DHCP Server	Don't use a DHCP server (*1)(*2)
Backup/restore/disk configuration check	Yes	Partially (*3)
OS Installation by Disk Duplication	Yes	No
OS Clear Installation	Yes	No
Service Pack/HotFix/Linux Patch File/ Application Installation	Yes	Yes
Distribution of BIOS/Firmware Floppy Disk Images	Yes	No
Service Pack/HotFix/Application (automatic update method)	Yes	Yes
DPM client automatic upgrade	Yes	Yes
Power ON/Shutdown	Yes	Yes
Power ON/OFF State Check	Yes	Yes
Acquisition of OS/Service Pack/HotFix/Linux Patch File /Application Information	Yes	Yes

*1
   Options (power off/reboot) after scenario execution are supported only when installing service packs/HotFixes/Linux patch files/applications.
*2
   Specify scenarios that perform backup/restore or install service packs/HotFixes/Linux patch files/applications alone. For example, a scenario in which the **Backup/Restore** tab and the **Hardware Configuration** tab are both selected is not supported.
*3
   Restore using multicast communication is not supported.

> **Note**
> ■To perform an automatic update, turn the power on, register a new machine, or shut down, DPM Client must be installed in the managed machine.
> ■ While images can be created and scenarios can be created or run with unsupported functions, they will not run correctly.

・Configuring the System to Run Without a DHCP Server

From the "Configuration" screen or the Web Console **Management** view, set **DPM Server** icon → **Configuration** screen → **DHCP Server** tab →**Do Not Use A DHCP Server** when installing the DPM server.(The following is the Web Console screen.)
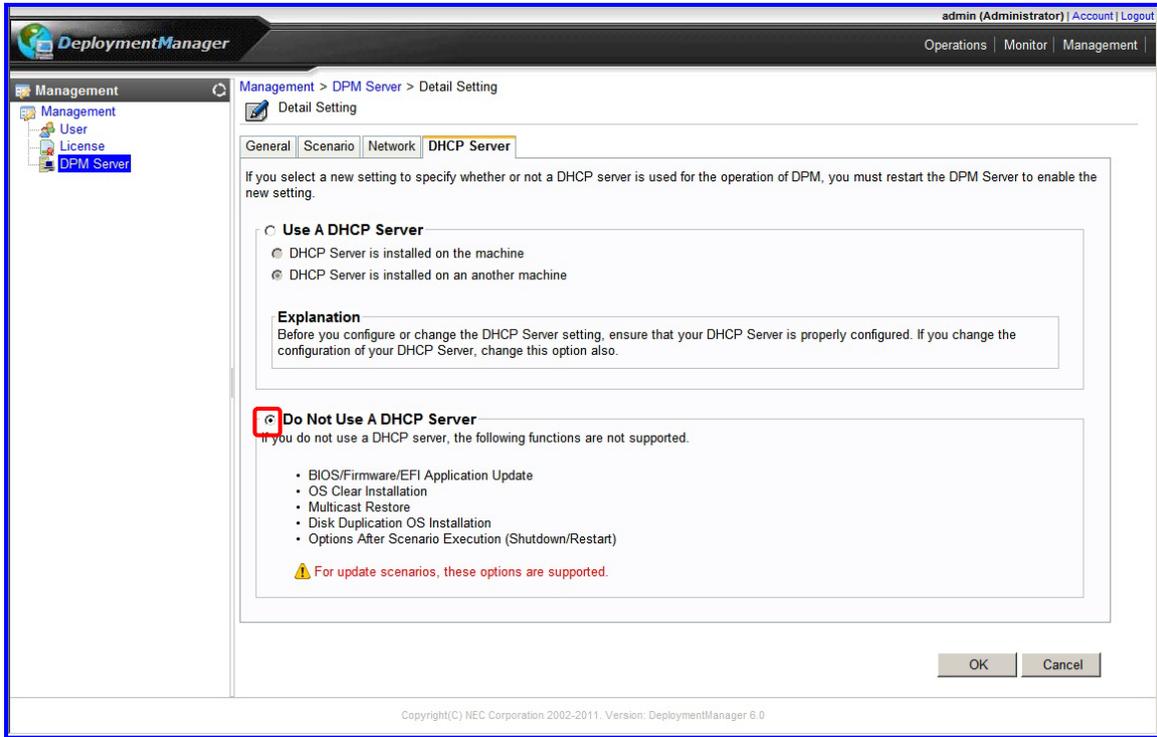
Important	When **Do Not Use A DHCP Server** is selected, PXE boot is unavailable even if there is a DHCP server in the network environment and the managed machine is equipped with a PXE boot (network boot)-compatible LAN board.

Note	The management server must be rebooted when changing between using and not using a DHCP server. The modified settings become active after restarting.

Appendix C   Supplementary Information
Regarding source code

Some of the DPM modules include licensed software that is based on GNU General Public License Version 2.0(GPLv2). In addition to agreeing to the following precautions, customers who purchase DPM obtain the corresponding software source code and may duplicate, redistribute or revise it according to GPLv2.
We will disclose the source code upon request, so please contact our business office or contact window.

*

Please inquire concerning disclosure of the source code listed in "GNU GENERAL PUBLIC LICENSE Version 2" in "Trademarks and Copyrights" in the front of this manual.
*

Our company will not indemnify with regards to the disclosed software.
*

Our company bears no responsibility with regards to the disclosed software.
*

Our company will not respond to requests regarding the source code details, etc.

Appendix D   Revision History

◆ First Edition(Rev.001)(2011.08): New