HITACHI
DATA SYSTEMS

# HiCommand® Provisioning Manager Server Installation and Configuration Guide

MK-93HC038-10

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# Preface

This manual describes how to install and configure the environment settings for HiCommand® Provisioning Manager. In this manual, HiCommand Provisioning Manager is abbreviated to Provisioning Manager.

The intended audience is those who use Provisioning Manager to operate or manage a system that uses a storage subsystem (magnetic disk array unit). The readers of this manual should have the following capabilities:

- A basic knowledge of SANs (Storage Area Networks),
- Knowledge of HiCommand Device Manager installation, user setup, resource group setup, volume (LDEV) creation, and logical group creation,
- A basic knowledge of the Windows®, Solaris™ or Linux® operating system on which Provisioning Manager and Device Manager run, and
- A basic knowledge of the Windows, Solaris, AIX®, or Linux operating system on which the Device Manager agent runs.

***Note:*** The use of the HiCommand Provisioning Manager and all other Hitachi Data Systems products is governed by the terms of your agreement(s) with Hitachi Data Systems.

## Software Version

This document revision applies to HiCommand Provisioning Manager version 5.7.

## Convention for Storage Capacity Values

Storage capacity values displayed by HiCommand Provisioning Manager are calculated based on the following values:

1 KB (kilobyte) = 1,024 bytes
1 MB (megabyte) = $1,024^2$ bytes
1 GB (gigabyte) = $1,024^3$ bytes
1 TB (terabyte) = $1,024^4$ bytes

## Referenced Documents

Manuals related to this manual are listed below. See these manuals when necessary:

- *HiCommand Provisioning Manager User's Guide*, MK-93HC035
- *HiCommand Provisioning Manager Error Codes*, MK-93HC117
- *HiCommand Device Manager Web Client User's Guide*, MK-93HC001
- *HiCommand Device Manager Command Line Interface (CLI) User's Guide*, MK-1HC007
- *HiCommand Device Manager Agent Installation Guide*, MK-92HC019
- *HiCommand Device Manager Server Installation and Configuration Guide*, MK-92HC002
- *HiCommand Device Manager Error Codes*, MK-92HC016

When Dynamic Link Manager is installed on the host:

- *HiCommand Dynamic Link Manager for Windows User's Guide*, MK-92DLM129
- *HiCommand Dynamic Link Manager for AIX User's Guide*, MK-92DLM111
- *HiCommand Dynamic Link Manager for Solaris User's Guide*, MK-92DLM114
- *HiCommand Dynamic Link Manager for HP-UX User's Guide*, MK-92DLM112
- *HiCommand Dynamic Link Manager for Linux User's Guide*, MK-92DLM113

## Readme and Release Notes Contents

These files can be found on the installation CD. They contain requirements and notes for use of HiCommand Provisioning Manager that may not be fully described in the manual. Be sure to review these files before installing HiCommand Provisioning Manager.

## Comments

Please send us your comments on this document. Make sure to include the document title, number, and revision. Please refer to specific section(s) and paragraph(s) whenever possible.

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# Contents

# List of Figures



# List of Tables

# Chapter 1 Reviewing Components and Requirements for Provisioning Manager

This chapter describes the features and components of Provisioning Manager, prerequisite and related products for Provisioning Manager, examples of system configurations (including the minimum configuration), and requirements for storage subsystems:

- Provisioning Manager Features (see section 1.1)
- Provisioning Manager Components (see section 1.2)
- System Requirements (see section 1.3)
- Required Programs (see section 1.4)
- Related Program Products (see section 1.5)
- Software Products that Cannot Be Combined (see section 1.6)

## 1.1 Provisioning Manager Features

Every year, the storage subsystems that support corporate systems and storage service providers (SSPs) increase enormously in size and capability. Additionally, the capacities and numbers of units required by users continue to increase. Consequently, there is a stronger demand to reduce the costs associated with storage management.

In answer to these requirements, Provisioning Manager has been designed to handle a variety of storage subsystems while simplifying storage operation management and reducing associated costs. The features of Provisioning Manager's storage operation management are explained in the following sections.

### 1.1.1 Managing Various Storage Subsystems as a Storage Pool

Provisioning Manager provides the functionality to integrate and manage various models and types of storage subsystems as a single, logical *storage pool*. In Provisioning Manager, a *storage pool* refers to a managed data storage area that resides on a set of storage subsystems. A storage pool is a collection of volumes (LUs). You can use Device Manager's All Storage and My Storage functionalities to place the storage pools into hierarchies and manage a storage pool for each resource group.

Provisioning Manager presents the volumes associated with each resource group as a single, logical volume, which enables these volumes to be managed without having to be aware where the volumes actually reside. This reduces the user workload required to understand the usage conditions for each volume, and to maintain the various volumes. For details about resource groups and All Storage and My Storage functionality, see the *HiCommand Device Manager Web Client User's Guide*.

Figure 1.1 shows a storage pool example.

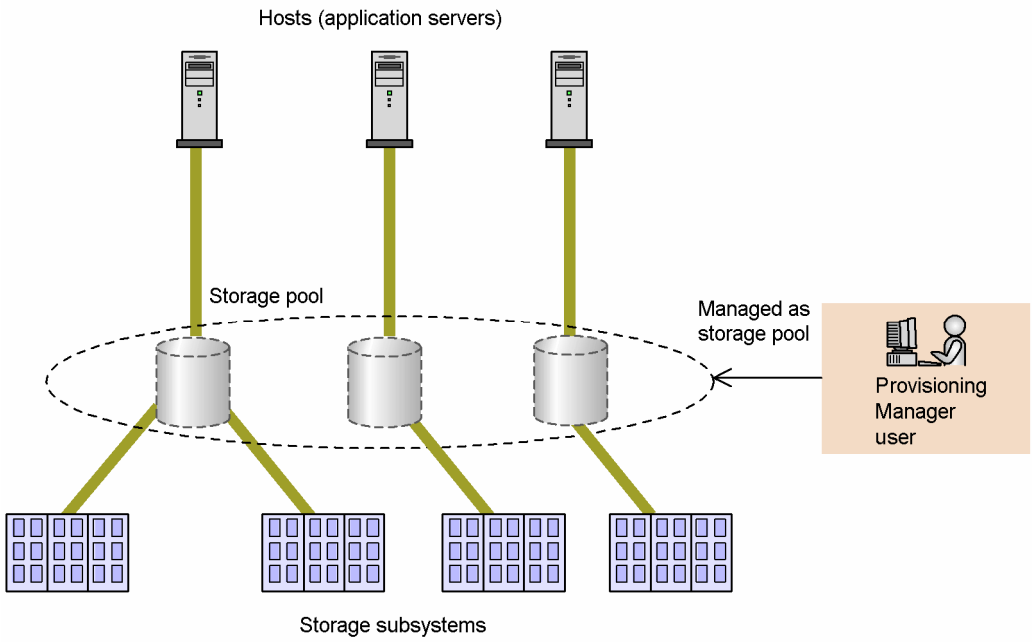


**Figure 1.1 Storage Pool Example**

To search volumes in a storage pool, you can pre-define search conditions for volume allocation. These pre-defined conditions are called a *provisioning plan*. Specifying a provisioning plan when you analyze a storage pool or display a list of volumes enables you to narrow down and display only those volumes that are relevant when searching a large number of volumes.

### 1.1.2 Managing Multiple File Systems and Device Files from a Single GUI

Provisioning Manager provides the means to manage different types of hosts by using a single, consistent graphical user interface. This enables you to efficiently manage hosts without having to be aware of functional differences among them.

Using Provisioning Manager, you can view the information required to manage storage subsystem operation: information such as the configuration of host volumes of file systems and device files, and data paths (consisting of HBA WWNs, storage subsystem ports, and storage subsystem volumes). Moreover, by using volumes from a storage pool that is allocated to various hosts, you can also create and remove file systems and device files.

Figure 1.2 illustrates the settings for storage subsystems and hosts that use Provisioning Manager.

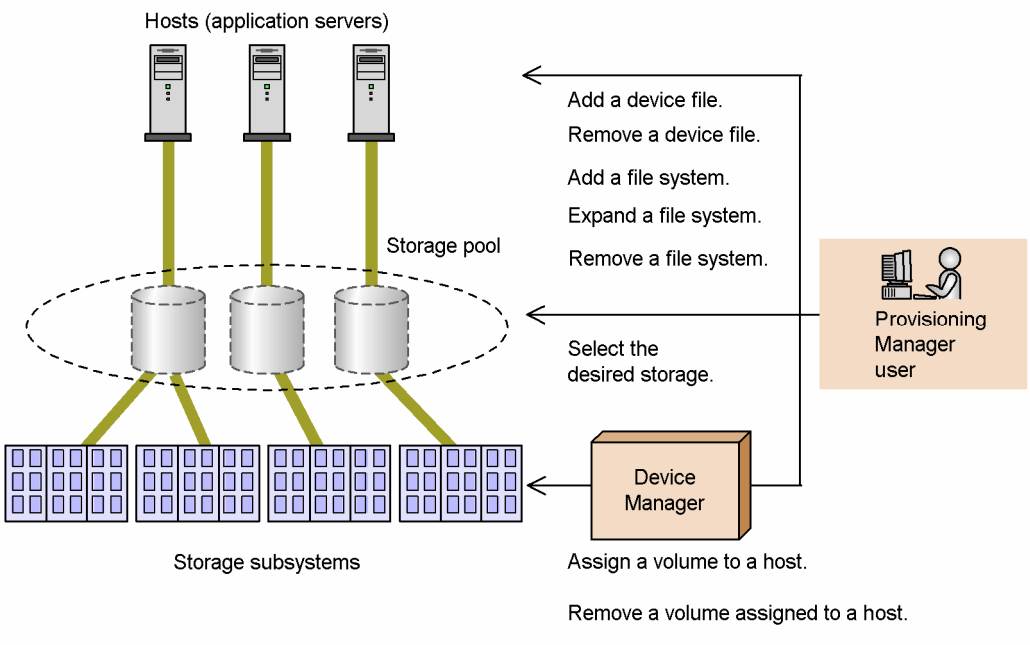


**Figure 1.2 Storage Subsystems and Host Setup**

## 1.2 Provisioning Manager Components

Figure 1.3 illustrates the principal components of Provisioning Manager.

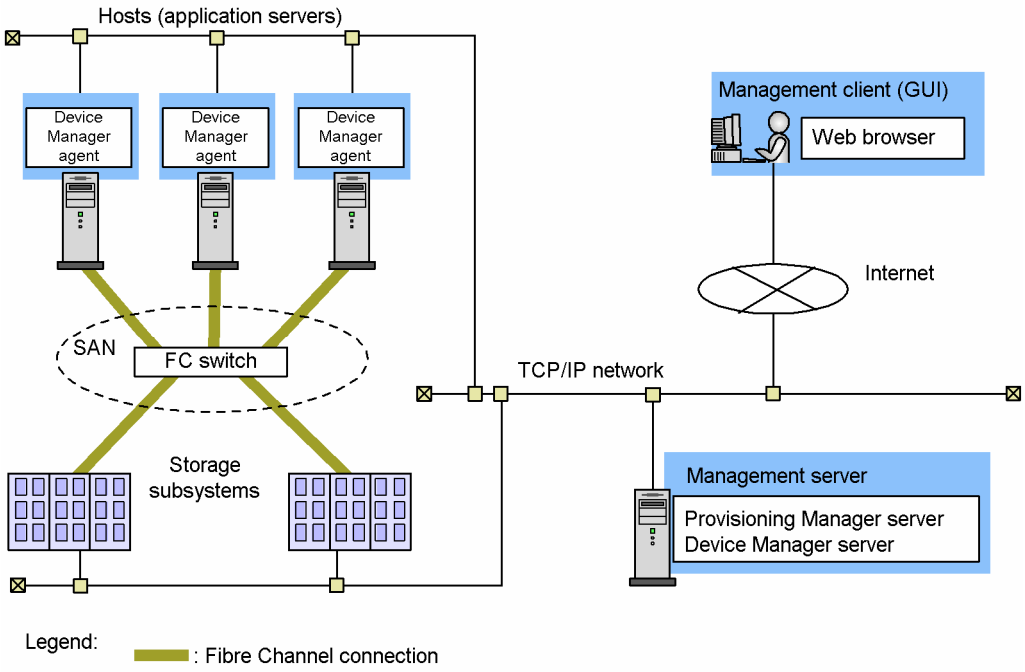


**Figure 1.3 Provisioning Manager Components**

- The Provisioning Manager Server forms storage pools from storage subsystems and allocates volumes to hosts. It issues instructions to the Device Manager agent installed on each host, allowing the user to create or delete file systems and device files, and to expand file systems. For more information about Device Manager agent, see the *HiCommand Device Manager Agent User's Guide*.

  ***Note:*** Install the Provisioning Manager server and the Device Manager agent on different machines.

- The Provisioning Manager client allows users to access the server using a Web browser. For more information about using Provisioning Manager, see the *HiCommand Provisioning Manager User's Guide*.

## 1.3 System Requirements

The following section describes system requirements.

### 1.3.1 Hardware Configuration

You will need the following components:

- Host (application server)
- Storage subsystem
- Management server
- Management client

The subsystem requirements are the same as for Device Manager, which is required to operate Provisioning Manager. For details, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

***Note:*** Setting and reference operations for mainframe volumes are not supported.

Figure 1.4 illustrates a configuration where the management server also acts as the management client.

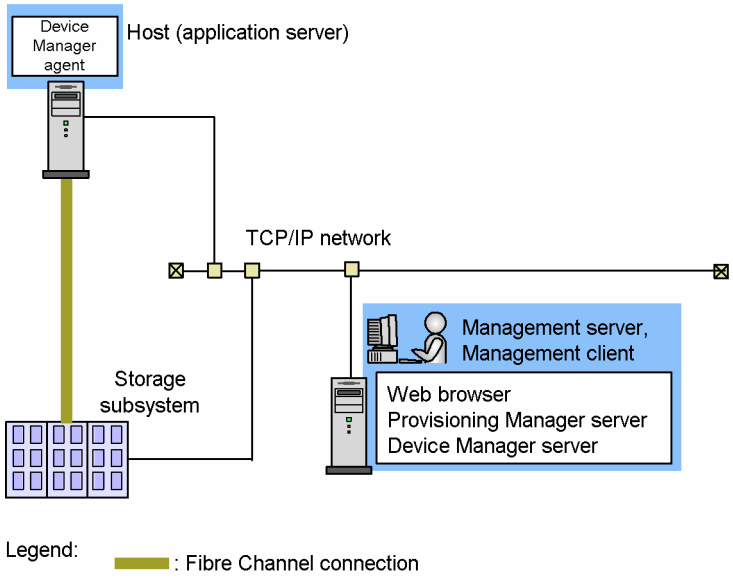


**Figure 1.4 Minimum Hardware Configuration (Example 1)**

Figure 1.5 illustrates a configuration where the management client is set up in another system. The management client can connect either to a TCP/IP network (intranet) or via the Internet.

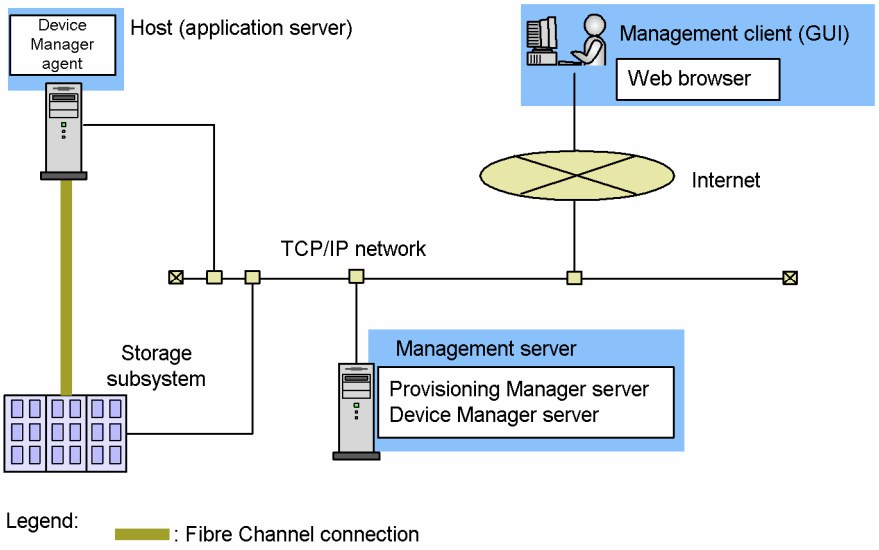


**Figure 1.5 Minimum Hardware Configuration (Example 2)**

Figure 1.6 illustrates a configuration with multiple storage subsystems and hosts. Note that there is no need to connect hosts in which no Device Manager agent is installed on a TCP/IP network.

***Important:*** If your configuration includes multiple storage subsystems, be sure to assign a unique name to each storage subsystem. Duplicate subsystem names are not supported.

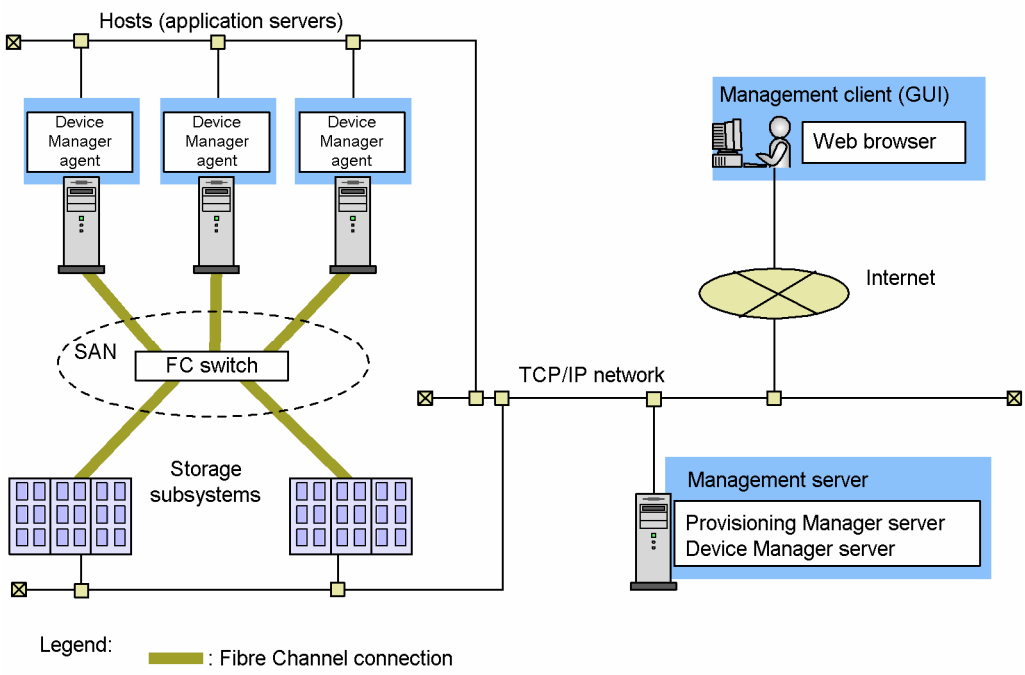


**Figure 1.6 Hardware Configuration with Multiple Subsystems and Multiple Hosts**

### 1.3.2 Server Operating System Requirements

Table 1.1 lists the supported server operating systems.

**Table 1.1 Server Operating Systems**

| Operating System | Supported Versions |
|---|---|
| Windows 2000 | Windows 2000 Server SP3<br>Windows 2000 Advanced Server SP3<br>Windows 2000 Datacenter Server SP3<br>Windows 2000 Professional SP3<br>Windows 2000 Server SP4<br>Windows 2000 Advanced Server SP4<br>Windows 2000 Datacenter Server SP4<br>Windows 2000 Professional SP4 |
| Windows Server™ 2003 (x86) | Windows Server 2003, Standard Edition<br>Windows Server 2003, Enterprise Edition<br>Windows Server 2003, Datacenter Edition<br>Windows Server 2003, Standard Edition SP1<br>Windows Server 2003, Enterprise Edition SP1<br>Windows Server 2003, Datacenter Edition SP1<br>Windows Server 2003, Standard Edition SP2<br>Windows Server 2003, Enterprise Edition SP2<br>Windows Server 2003, Datacenter Edition SP2 |
| Windows Server 2003 x64 Edition | Windows Server 2003, Standard x64 Edition<br>Windows Server 2003, Enterprise x64 Edition<br>Windows Server 2003, Datacenter x64 Edition<br>Windows Server 2003, Standard x64 Edition SP2<br>Windows Server 2003, Enterprise x64 Edition SP2<br>Windows Server 2003, Datacenter x64 Edition SP2 |
| Windows Server 2003 R2 (x86) | Windows Server 2003 R2, Standard Edition<br>Windows Server 2003 R2, Enterprise Edition<br>Windows Server 2003 R2, Datacenter Edition<br>Windows Server 2003 R2, Standard Edition SP2<br>Windows Server 2003 R2, Enterprise Edition SP2<br>Windows Server 2003 R2, Datacenter Edition SP2 |
| Windows Server 2003 R2 x64 Edition | Windows Server 2003 R2, Standard x64 Edition<br>Windows Server 2003 R2, Enterprise x64 Edition<br>Windows Server 2003 R2, Datacenter x64 Edition<br>Windows Server 2003 R2, Standard x64 Edition SP2<br>Windows Server 2003 R2, Enterprise x64 Edition SP2<br>Windows Server 2003 R2, Datacenter x64 Edition SP2 |
| Windows XP | Windows XP Professional SP2 |
| Solaris (SPARC® version) | Solaris 8<br>Solaris 9<br>Solaris 10 |
| Linux (x86) | Red Hat Enterprise Linux AS 4 Update 1<br>Red Hat Enterprise Linux ES 4 Update 1 |

### 1.3.3 Supported Host Operating Systems

Table 1.2 lists supported host operating systems.

**Table 1.2 Supported Host Operating Systems**

| OS | Version |
|---|---|
| Solaris | Solaris 8<br>Solaris 9<br>Solaris 10 |
| AIX | AIX 5.1<br>AIX 5.2<br>AIX 5.3 |
| Linux (x86) | Red Hat Enterprise Linux AS 3 Update 0#1<br>Red Hat Enterprise Linux ES 3 Update 0#1<br>Red Hat Enterprise Linux AS 3 Update 3#1<br>Red Hat Enterprise Linux ES 3 Update 3#1<br>Red Hat Enterprise Linux AS 3 Update 4#1<br>Red Hat Enterprise Linux ES 3 Update 4#1<br>Red Hat Enterprise Linux AS 3 Update 6<br>Red Hat Enterprise Linux ES 3 Update 6<br>Red Hat Enterprise Linux AS 4 Update 1<br>Red Hat Enterprise Linux ES 4 Update 1<br>Red Hat Enterprise Linux AS 4 Update 3<br>Red Hat Enterprise Linux ES 4 Update 3 |
| Linux (IPF) | Red Hat Enterprise Linux AS 4 Update 1<br>Red Hat Enterprise Linux ES 4 Update 1<br>Red Hat Enterprise Linux AS 4 Update 3<br>Red Hat Enterprise Linux ES 4 Update 3 |
| HP-UX | HP-UX 11i v1 (PA-RISC 64 bits)<br>September 2004 version or later of HP-UX 11i v2 (PA-RISC and IPF)<br>HP-UX 11i v3 (PA-RISC and IPF) |
| Windows 2000[2, 3] | Windows 2000 Server SP3<br>Windows 2000 Advanced Server SP3<br>Windows 2000 Datacenter Server SP3<br>Windows 2000 Professional SP3<br>Windows 2000 Server SP4<br>Windows 2000 Advanced Server SP4<br>Windows 2000 Datacenter Server SP4<br>Windows 2000 Professional SP4 |

| OS | Version |
|---|---|
| Windows Server 2003 (x86)[2] | Windows Server 2003, Standard Edition<br>Windows Server 2003, Enterprise Edition<br>Windows Server 2003, Datacenter Edition<br>Windows Server 2003, Standard Edition SP1<br>Windows Server 2003, Enterprise Edition SP1<br>Windows Server 2003, Datacenter Edition SP1<br>Windows Server 2003, Standard Edition SP2<br>Windows Server 2003, Enterprise Edition SP2<br>Windows Server 2003, Datacenter Edition SP2 |
| Windows Server 2003 (IPF)[#2] | Windows Server 2003, Standard Edition<br>Windows Server 2003, Enterprise Edition<br>Windows Server 2003, Datacenter Edition<br>Windows Server 2003, Standard Edition SP1<br>Windows Server 2003, Enterprise Edition SP1<br>Windows Server 2003, Datacenter Edition SP1<br>Windows Server 2003, Standard Edition SP2<br>Windows Server 2003, Enterprise Edition SP2<br>Windows Server 2003, Datacenter Edition SP2 |
| Windows Server 2003 x64 Edition[#2] | Windows Server 2003, Standard x64 Edition<br>Windows Server 2003, Enterprise x64 Edition<br>Windows Server 2003, Datacenter x64 Edition<br>Windows Server 2003, Standard x64 Edition SP2<br>Windows Server 2003, Enterprise x64 Edition SP2<br>Windows Server 2003, Datacenter x64 Edition SP2 |
| Windows Server 2003 R2(x86) | Windows Server 2003 R2, Standard Edition<br>Windows Server 2003 R2, Enterprise Edition<br>Windows Server 2003 R2, Datacenter Edition<br>Windows Server 2003 R2, Standard Edition SP2<br>Windows Server 2003 R2, Enterprise Edition SP2<br>Windows Server 2003 R2, Datacenter Edition SP2 |
| Windows Server 2003 R2 x64 Edition | Windows Server 2003 R2, Standard x64 Edition<br>Windows Server 2003 R2, Enterprise x64 Edition<br>Windows Server 2003 R2, Datacenter x64 Edition<br>Windows Server 2003 R2, Standard x64 Edition SP2<br>Windows Server 2003 R2, Enterprise x64 Edition SP2<br>Windows Server 2003 R2, Datacenter x64 Edition SP2 |

| OS | Version |
|---|---|
| [1]The following limitations apply when the host OS is Red Hat Enterprise Linux AS/ES 3 Update 0, Update 3, or Update 4:<br>▪ Do not perform the following operations while performing a host setting operation (creating or deleting a device file; or creating, expanding, or deleting a file system) by using the Provisioning Manager client:<br>Updating host information in the Provisioning Manager client<br>Updating host information in the Device Manager client<br>Starting the Device Manager agent<br>Executing the Device Manager agent `HiScan` command or `hldutil` command<br>Executing disk control-related commands (such as `blockdev`)<br>▪ Do not perform the following operations while updating host information in the Provisioning Manager client:<br>Setting up a host by using the Provisioning Manager client<br>Executing the Dynamic Link Manager `dlmcfgmgr` command<br>Executing disk control-related commands (such as `blockdev`)<br>▪ Do not perform the following operations while starting the Device Manager agent:<br>Setting up a host using the Provisioning Manager client<br>Executing the Dynamic Link Manager `dlmcfgmgr` command<br>Executing disk control-related commands (such as `blockdev`)<br>▪ Do not perform the following operations concurrently with the Device Manager agent `HiScan` command or `hldutil` command:<br>Setting up a host using the Provisioning Manager client.<br>Executing the Dynamic Link Manager `dlmcfgmgr` command<br>Executing disk control-related commands (such as `blockdev`)<br>▪ Do not perform automatic execution of the Device Manager agent `HiScan` command:<br>If automatic execution of the `HiScan` command has been specified, clear the setting. For details about how to do this, see the *HiCommand Device Manager Agent Installation Guide*.<br>If the `HiScan` command needs to be automatically executed for system-operational reasons, do not perform any operation in the host during automatic execution of the `HiScan` command.<br>[2] Host configuration (creation, expansion, and deletion of file systems, and creation and deletion of device files) is supported for host OSs of the following language versions:<br>▪ For Windows 2000: English, French, German, Italian, Spanish, Simplified Chinese, Traditional Chinese, Korean, Japanese, Portuguese, Brazilian (Portuguese Brazilian), Danish, and Swedish<br>▪ For Windows Server 2003 (x86) , or Windows Server 2003 R2 : English, French, German, Italian, Spanish, Simplified Chinese, Traditional Chinese, Korean, Japanese, Portuguese, Brazilian (Portuguese Brazilian), and Swedish<br>▪ For Windows Server 2003 (IPF), or Windows Server 2003 x64 Edition : English and Japanese<br>Host configuration cannot be executed in the following two cases even if the operating system is one of the above language versions:<br>▪ When MUI (Multilingual User Interface Pack) has been applied.<br>▪ When the language settings of the system have been changed. Host, file system, and device file settings can be viewed from the server no matter what language version of Windows is on the agent host.<br>[3] When the host OS is Windows 2000, installation of the `diskpart.exe` command line utility provided by Microsoft® is required. Install `diskpart.exe` in the *`Windows-system-installation-directory`*`\system32`. | |

### 1.3.4 Supported Host File Systems

The type of file systems that can be used differs depending on the host operating system. Table 1.3 shows the supported host file system types.

**Table 1.3 Supported File System Types**

| Host OS | Supported File System Types | Expandable? | Remarks |
|---|---|---|---|
| Solaris | UFS | No | ▪ Standard OS file system. |
| | VERITAS File System | Yes[1, 2] | ▪ For Solaris 8 or Solaris 9:<br>VERITAS™ File System for UNIX® (Solaris) 3.5 .<br>VERITAS File System for UNIX (Solaris) 4.0.<br>▪ For Solaris 9 or Solaris 10:<br>Veritas File System 5.0<br>▪ A file system can be expanded only when the file system is mounted.<br>▪ VERITAS Volume Manager is required. VxFS is supported only when the VERITAS Volume Manager version is the same as the VERITAS File System version. |
| AIX | JFS | Yes[1] | ▪ Standard OS file system.<br>▪ A file system can be expanded only when the file system is mounted. |
| Linux | ext2, ext3 | Yes[1, 3] | ▪ Standard OS file system.<br>▪ A file system can be expanded only when the file system is mounted.<br>▪ A file system cannot be expanded in the online mode because it is unmounted during expansion. When a file system is expanded, stop jobs. |
| HP-UX | VERITAS File System[4] | Yes[1, 5] | ▪ For HP-UX 11i v1:<br>VERITAS File System for UNIX (HP-UX) 3.5 is supported. To enable VERITAS File System 3.5, install a version of Software Pack (Optional HP-UX 11i v1 Core Enhancements) that was released in or after December 2002.<br>▪ For versions released before the December 2005 version of HP-UX 11i v2:<br>VERITAS File System for UNIX (HP-UX) 3.5, which comes standard with the OS, is supported.<br>▪ For the December 2005 and later versions of HP-UX 11i v2:<br>VERITAS File System for UNIX (HP-UX) 4.1, which comes standard with the OS, is supported.<br>▪ For HP-UX 11i v3<br>VERITAS File System for UNIX (HP-UX) 4.1, which comes standard with the OS, is supported. |
| | HFS[6] | No | ▪ Standard OS file system |

| Host OS | Supported File System Types | Expandable? | Remarks |
|---|---|---|---|
| Windows | NTFS | Yes[1, 7] | ▪ Standard OS file system.<br>▪ A file system can be expanded only when the file system is mounted.<br>▪ A dynamic disk is required. |
| | FAT[6] | No | ▪ Standard OS file system |
| | FAT32[6] | No | ▪ Standard OS file system |

Legend:

Yes: Expandable

No: Not expandable

[1] Operations for expanding a file system can be performed only when the file system is mounted.

[2] VERITAS Volume Manager is required. VERITAS File System is supported only when the VERITAS Volume Manager version is the same as the VERITAS File System version.

[3] A file system cannot be expanded in the online mode because it is unmounted during expansion. When a file system is expanded, stop jobs.

[4] This includes HP OnlineJFS and HP JFS, which are recognized as VERITAS File System on a host.

[5] A file system can be expanded in the online mode if a Device Manager agent version 5.1 or later and HP OnlineJFS are installed on the host. When you install HP OnlineJFS, make sure the system satisfies the conditions listed below.

- You are installing the same version of HP OnlineJFS as the VERITAS File System.

  Provisioning Manager only supports an environment where the versions of VERITAS File System and HP OnlineJFS are the same.

- You enable HP OnlineJFS.

  If HP OnlineJFS is disabled, you cannot use Provisioning Manager to expand file systems.

If a Device Manager agent version earlier than 5.1 is installed on the host, or HP OnlineJFS is not installed on the host, the file system is unmounted during expansion, so it cannot be expanded in the online mode. When a file system is expanded, stop all jobs.

[6] File systems can only be displayed.

[7] A dynamic disk is required.

### 1.3.5 Supported OSs and Web Browsers for Management Clients

The Provisioning Manager graphical user interface (GUI) is available with a Web browser of a management client. Table 1.4 lists the OSs and Web browsers supported by management clients.

**Table 1.4 OSs and Web Browsers Supported by Management Clients That Use the GUI**

| OS Name | OS version | Web browser |
|---|---|---|
| HP-UX | HP-UX 11i v1 (PA-RISC)<br>HP-UX 11i v2 (IPF)<br>HP-UX 11i v2 (PA-RISC) | Mozilla 1.7.8.00<br>Mozilla 1.7.12.01 |
| | HP-UX 11i v3 (IPF) | Mozilla 1.7.13.01 |
| Solaris<br>(SPARC version) | Solaris 8 | Mozilla 1.4 |
| | Solaris 9 | Mozilla 1.4<br>Mozilla 1.7 |
| | Solaris 10 | Mozilla 1.7 |
| Windows 2000 | Windows 2000 Server SP3<br>Windows 2000 Advanced Server SP3<br>Windows 2000 Datacenter Server SP3<br>Windows 2000 Professional SP3<br>Windows 2000 Server SP4<br>Windows 2000 Advanced Server SP4<br>Windows 2000 Datacenter Server SP4<br>Windows 2000 Professional SP4 | Internet Explorer 6.0 |
| Windows Server 2003 (x86) | Windows Server 2003, Standard Edition<br>Windows Server 2003, Enterprise Edition<br>Windows Server 2003, Datacenter Edition | Internet Explorer 6.0 |
| | Windows Server 2003, Standard Edition SP1<br>Windows Server 2003, Standard Edition SP2<br>Windows Server 2003, Enterprise Edition SP1<br>Windows Server 2003, Enterprise Edition SP2<br>Windows Server 2003, Datacenter Edition SP1<br>Windows Server 2003, Datacenter Edition SP2 | Internet Explorer 6.0<br>Internet Explorer 7.0 |
| Windows Server 2003 R2 (x86) | Windows Server 2003 R2, Standard Edition<br>Windows Server 2003 R2, Standard Edition SP2<br>Windows Server 2003 R2, Enterprise Edition<br>Windows Server 2003 R2, Enterprise Edition SP2<br>Windows Server 2003 R2 Datacenter Edition<br>Windows Server 2003 R2 Datacenter Edition SP2 | Internet Explorer 6.0 |
| Windows Vista | Windows Vista Business<br>Windows Vista Enterprise<br>Windows Vista Ultimate | Internet Explorer 7.0 |

| OS Name | OS version | Web browser |
|---|---|---|
| Windows XP | Windows XP Professional<br>Windows XP Professional SP1 | Internet Explorer 6.0 |
| | Windows XP Professional SP2 | Internet Explorer 6.0<br>Internet Explorer 7.0 |

### 1.3.6 Memory and Disk Space Requirements

Table 1.5 lists the memory and disk space requirements for Provisioning Manager.

**Table 1.5 Memory and Disk Space Requirements**

| Machine | Program | Memory Requirements | Disk Space Requirements | Remarks |
|---|---|---|---|---|
| Management server | Provisioning Manager | 500 MB | 350 MB<br>The value, when about 10 storage subsystems are connected. 50 MB is needed during installation. | Extra space is required for running the Device Manager server, which is a prerequisite program for the Provisioning Manager server. |
| Host | The Device Manager agent<br>(The host management functionality of Provisioning Manager is contained in the Device Manager agent.) | See the Device Manager release notes. | | When the host OS is HP-UX, in the `/etc/lvmconf` directory, LVM creates a backup file for the configuration information about volume groups. Therefore, to create a volume group by using the host management functionality of Provisioning Manager, a maximum of 500 MB of free disk space (when 255 volume groups are created) is additionally required under `/etc/lvmconf`. |
| Management client | The GUI of Provisioning Manager | 50 MB per browser | N/A<br>(The GUI does not need to be installed.) | N/A |

## 1.4 Required Programs

- **Device Manager Server** version 5.7. For more information on the Device Manager Server, see the *HiCommand Device Manager Server Installation and Configuration Guide*.
- **The Device Manager agent**

  Table 1.6 lists required versions of the Device Manager agent for each host OS

**Table 1.6 Required Versions of the Device Manager Agent.**

| OS | Version of the Device Manager agent |
|---|---|
| Solaris 8 | 4.0.0-05 or later |
| Solaris 9 | |
| AIX | |
| Windows 2000 | |
| Windows Server 2003 (x86) | |
| Solaris 10 | 4.1.0-01 or later |
| Red Hat Enterprise Linux AS 3 Update 0, Update 3, Update 4, Update 6 (x86) | |
| HP-UX 11i v1 or HP-UX 11i v2 | 4.3.0-01 or later |
| Windows Server 2003 x64 Edition (EM64T) | |
| Red Hat Enterprise Linux AS 4 Update 1 (IPF) | 5.0 or later |
| Windows Server 2003 (IPF) | |
| Red Hat Enterprise Linux ES 3 Update 0, Update 3, Update 4, Update 6 (x86) | 5.1 or later |
| Red Hat Enterprise Linux AS 4 Update 1 (x86) | |
| Red Hat Enterprise Linux ES 4 Update 1 (x86) | |
| Red Hat Enterprise Linux ES 4 Update 1 (IPF) | |
| Windows Server 2003 x64 Edition (AMD64) | |
| Windows Server 2003 R2 | |
| Red Hat Enterprise Linux AS/ES 4 Update3 (x86) | 5.5 or later |
| Red Hat Enterprise Linux AS/ES 4 Update3 (IPF) | |
| HP-UX 11i v3 | 5.6 or later |

For more information on the Device Manager agent, see the *HiCommand Device Manager Agent Installation Guide*.

***Note:*** To create, expand, and delete file systems and device files on the host, and to use host management functions (including file system and device file management), you must install the Device Manager agent, which is a component of Device Manager, on each host. Installing the Device Manager agent onto a host also installs the Provisioning Manager agent.

***Caution:*** Do not uninstall the Provisioning Manager agent by itself, because Device Manager and Provisioning Manager share a common agent. If you do, reinstall the Device Manager agent. After the Device Manager agent is installed on a Windows host, **HiCommand Provisioning Manager-agent** is displayed in **Add/Remove Programs** in the **Control Panel**.

## 1.5 Related Program Products

This section describes programs related to Provisioning Manager.

### 1.5.1 Path Manager

Path redundancy between a host port and storage subsystem port improves system reliability and availability. Path redundancy requires a path manager. Provisioning Manager supports the following path managers:

- Dynamic Link Manager
- PV-link (when the host OS is HP-UX)
- MPIO (when the host OS is HP-UX 11i v3)

For LUs managed by another path manager, Provisioning Manager cannot be used to perform a host setting operation, and there are GUI-based display limitations. For details, see the *HiCommand Provisioning Manager User's Guide*.

#### 1.5.1.1 Dynamic Link Manager

HDLM must be installed on each host but the version to be installed differs depending on the host operating system. Table 1.7 shows the versions of Dynamic Link Manager that are supported by Provisioning Manager.

**Table 1.7 Product Names and Versions of Dynamic Link Manager**

| Operating System | HDLM Required Version |
|---|---|
| AIX | For AIX 5.1<br>▪ HiCommand Dynamic Link Manager 04-00-/G<br>▪ HiCommand Dynamic Link Manager 05-02 or later<br>For AIX 5.2:<br>▪ HiCommand Dynamic Link Manager 05-02 or later<br>For AIX 5.3:<br>▪ HiCommand Dynamic Link Manager 5.4.1 or later |
| HP-UX | For HP-UX 11i v1 or HP-UX 11i v2:<br>▪ HiCommand Dynamic Link Manager 5.6.1 or later<br>For HP-UX 11i v3:<br>▪ HiCommand Dynamic Link Manager is not supported |

| Operating System | HDLM Required Version |
|---|---|
| Linux | ▪ Red Hat® Enterprise Linux AS/ES 3 Update 0, HiCommand Dynamic Link Manager is not supported<br>▪ Red Hat Enterprise Linux AS/ES 3 Update 3, HiCommand Dynamic Link Manager 5.4.2 or later<br>▪ Red Hat Enterprise Linux AS/ES 3 Update 4, HiCommand Dynamic Link Manager 5.6 or later<br>▪ Red Hat Enterprise Linux AS/ES 3 Update 6, HiCommand Dynamic Link Manager 5.7.1 or later<br>▪ Red Hat Enterprise Linux AS/ES 4 Update 1, HiCommand Dynamic Link Manager 5.7.0-02 or later<br>▪ Red Hat Enterprise Linux AS/ES 4 Update 3, HiCommand Dynamic Link Manager 5.8.1 or later |
| Solaris | When using VERITAS Volume Manager 3.5 in Solaris 8 or Solaris 9:<br>▪ HiCommand Dynamic Link Manager 04-01-/A to 04-01-/B<br>▪ HiCommand Dynamic Link Manager 05-02 or later<br>When using VERITAS Volume Manager 4.0 in Solaris 8 or Solaris 9:<br>▪ HiCommand Dynamic Link Manager 5.4.1 or later<br>For Solaris 10:<br>▪ HiCommand Dynamic Link Manager is not supported |
| Windows 2000 | ▪ HiCommand Dynamic Link Manager 04-01-/B<br>▪ HiCommand Dynamic Link Manager 05-02 or later |
| Windows Server 2003 | For Windows Server 2003:<br>HiCommand Dynamic Link Manager 05-02 or later<br>For Windows Server 2003 SP1:<br>HiCommand Dynamic Link Manager 5.6 or later<br>For Windows Server 2003 SP2:<br>HiCommand Dynamic Link Manager 5.9.1 or later |
| Windows Server 2003 x64 Edition | For Windows Server 2003 x64 Edition<br>HiCommand Dynamic Link Manager 5.7 or later<br>For Windows Server 2003 x64 Edition SP2<br>HiCommand Dynamic Link Manager 5.9.1 or later |
| Windows Server 2003 R2 | For Windows Server 2003 R2<br>HiCommand Dynamic Link Manager 5.8 or later<br>For Windows Server 2003 R2 SP2<br>HiCommand Dynamic Link Manager 5.9.1 or later |
| Windows Server 2003 R2 x64 Edition | For Windows Server 2003 R2 x64 Edition<br>HiCommand Dynamic Link Manager 5.8 or later<br>For Windows Server 2003 R2 x64 Edition SP2<br>HiCommand Dynamic Link Manager 5.9.1 or later |

For details about the Dynamic Link Manager, see the *HiCommand Dynamic Link Manager User's Guide*.

#### 1.5.1.2 PV-link

If Dynamic Link Manager is not installed on the host, you can use Provisioning Manager to perform a host setting operation for LUs managed by PV-link. If Dynamic Link Manager is installed, you can view information, but cannot perform a host setting operation.

#### 1.5.1.3 MPIO

In HP-UX 11i v3 you can use Provisioning Manager to perform a host setting operation for LUs managed by MPIO.

### 1.5.2 Volume Manager

To use Provisioning Manager to perform operations on file systems or device files (create, expand, or delete), you must have volume management software (a volume manager). A Volume Manager is required on each host. However, if the host OS is Solaris, you can use Provisioning Manager to create and delete file systems and device files, even without a volume manager.

Table 1.8 shows the product names and versions of supported volume managers.

**Table 1.8 Supported Volume Managers**

| Host Operating System | Supported Volume Manager |
|---|---|
| Solaris | For Solaris 8[1]:<br>▪ VERITAS Volume Manager for UNIX (Solaris) 3.5[2]<br>▪ VERITAS Volume Manager for UNIX (Solaris) 4.0[2]<br>▪ SDS[3]<br>For Solaris 9[1]:<br>▪ VERITAS Volume Manager for UNIX (Solaris) 3.5[2]<br>▪ VERITAS Volume Manager for UNIX (Solaris) 4.0[2]<br>▪ Veritas Volume Manager 5.0#[4]<br>▪ SVM[5]<br>For Solaris 10:<br>▪ Veritas Volume Manager 5.0#[4]<br>▪ SVM[5] |
| AIX | LVM (the OS standard product) |
| Linux | For AS/ES 3:<br>▪ LVM (comes standard with the OS)<br>For AS/ES 4:<br>▪ LVM2 (comes standard with the OS) |

| Host Operating System | Supported Volume Manager |
|---|---|
| HP-UX | For HP-UX 11i v1 and versions released before the December 2005 version of HP-UX 11v2:<br>▪ LVM (comes standard with the OS)<br>▪ VERITAS Volume Manager for UNIX 3.5 (comes standard with the OS) [6]<br>For the December 2005 and later versions of HP-UX 11i v2:<br>▪ LVM (comes standard with the OS)<br>▪ VERITAS Volume Manager for UNIX 4.1 (comes standard with the OS) [6]<br>For HP-UX 11i v3:<br>▪ LVM (comes standard with the OS)<br>▪ VERITAS Volume Manager for UNIX 4.1 (comes standard with the OS) [6] |
| Windows | ▪ Dynamic (the OS standard product)<br>▪ Basic (the OS standard product) [7] |

[1]File systems created without using a volume manager cannot be expanded.

[2]The VERITAS Volume Manager version must be the same as the VERITAS File System version.

[3]Provisioning Manager can only display file systems and device files that are created by using SDS.

[4] Veritas Volume Manager 5.0 is provided as a part of Veritas Storage Foundation.

[5]Provisioning Manager can only display file systems and device files that are created by using SVM.

[6]Provisioning Manager can only display file systems and device files that are created by using VERITAS Volume Manager.

[7]File systems cannot be expanded.

### 1.5.3 Cluster Software

Table 1.9 lists the cluster software supported by hosts.

Provisioning Manager does not set up the cluster software. When you use file systems and device files created by using Provisioning Manager as cluster resources, or when you use a host setting function of Provisioning Manager to operate file systems or device files, set up the cluster software manually.

For details about setting up the cluster software, see the manual for each cluster software product.

**Table 1.9 Supported Cluster Software Versions**

| Host OS | Cluster Software |
|---|---|
| Solaris | For Solaris 8 or Solaris 9:<br>VERITAS Cluster Server 3.5 or VERITAS Cluster Server 4.0<br>For Solaris 10:<br>VERITAS Cluster Server 4.1<br>Sun Cluster 3.1 |
| AIX | For AIX 5.1 or AIX 5.2:<br>HACMP 4.5<br>For AIX 5.3:<br>HACMP 4.5<br>HACMP 5.2 |
| Linux | Cluster software is not supported. |
| HP-UX | For HP-UX 11i v1:<br>ServiceGuard 11.16<br>For HP-UX 11i v2:<br>ServiceGuard 11.16 or ServiceGuard 11.17<br>For HP-UX 11i v3:<br>ServiceGuard 11.17 |
| Windows | Microsoft Cluster Service (MSCS) |

## 1.6 Software Products that Cannot Be Combined

This section describes software products that cannot be used with Provisioning Manager.

- When the host OS is HP-UX:

  Provisioning Manager does not support an environment in which a mirror volume exists or can exist.

  - When the OS is HP-UX 11i v2 or earlier

    If MirrorDisk/UX is installed on the host, you cannot use the Provisioning Manager functionality to view the host information and configure the host.

  - When the OS is HP-UX 11i v3

    MirrorDisk/UX is installed on the host during a standard OS installation.

    You can use the Provisioning Manager functionality to view the host information and configure the host.

    However, a software RAID product that uses MirrorDisk/UX is not supported.

- When the host OS is Windows:

  If VERITAS Volume Manager is installed on the host, you cannot use the host management functionality of Provisioning Manager

# Chapter 2 Installing Programs

This chapter describes the programs installed onto the management server and host (you do not need to install or configure Provisioning Manager client). It also lists the manuals that explain the installation procedures, and contains information about starting and stopping Provisioning Manager and Device Manager:

- Installing programs onto a Management Server (see section 2.1)
- Installing programs onto a host (see section 2.2)
- Starting and stopping Provisioning Manager and Device Manager (see section 2.3)

## 2.1 Installing Programs onto a Management Server

To install programs onto a management server:

1. To use Provisioning Manager, install the Device Manager server and configure its environment settings.

   For details about how to install the Device Manager, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

2. Install the Provisioning Manager server and configure its environment settings.

   For details about messages that might be displayed when installing the Provisioning Manager server, see the *HiCommand Provisioning Manager Error Codes* manual.

## 2.2 Installing Programs onto a Host

To install programs onto a host:

1. Install and configure a volume manager and HiCommand Dynamic Link Manager.
2. To use Provisioning Manager to set up and operate the host, install the Device Manager agent and configure its environment settings.

   When you install a Device Manager agent supported by Provisioning Manager, the agent facility of Provisioning Manager is also installed.

   For details about how to install Device Manager agent, see the *HiCommand Device Manager Agent Installation Guide*.

## 2.3 Starting and Stopping Provisioning Manager Server and Device Manager Agent

- You do not need to start or stop the Provisioning Manager server, because it is started automatically when you launch the Device Manager server. You can check the event log or the syslog to verify that the Provisioning Manager server is running.
- Device Manager and Provisioning Manager share an agent, so launching the Device Manager agent is all that is necessary.

# Chapter 3 Installing a Provisioning Manager Server on a Windows System

This chapter describes how to install, update, and uninstall a Provisioning Manager server on a management server running on a Windows system.

- System and Media Requirements (see section 3.1)
- Preparations for Installation (see section 3.2)
- Installing the Provisioning Manager Server (see section 3.3)
- Upgrading the Provisioning Manager Server (see section 3.4)
- Uninstalling the Provisioning Manager Server (see section 3.5)
- Uninstalling a Provisioning Manager Server in a Cluster Environment (see section 3.6)
- Operating a Database in a Provisioning Manager Server (see section 3.7)

There are two types of installation for a Provisioning Manager server: a new installation and an update installation. In a new installation, a Provisioning Manager server is installed on a management server for the first time. In an update installation, a Provisioning manager server is installed on a management server where a Provisioning Manager server version already exists. During an update installation, the existing property files are backed up and saved. Note that you cannot restore an earlier version of a Provisioning Manager server by using an update installation.

## 3.1 System and Media Requirements

The Windows system requires the following items:

- Prerequisite program product: Device Manager 5.7
- OS: see section 1.3.2
- Graphics card: SVGA (800x600) or higher resolution
- CD-ROM drive
- 10/100 Ethernet® LAN card
- The TCP/IP must be running
- Static IP address
- Provisioning Manager must be connected via LAN to a Universal Storage Platform V, TagmaStore USP, Lightning 9900V, TagmaStore AMS/WMS series, Thunder 9500V, Lightning 9900, or Thunder 9200 storage subsystem.
- The installation of Provisioning Manager requires a user ID of a member of the Administrators group.

## 3.2 Preparations for Installation

Before beginning a new installation and an update installation, you need to check the following items:

- Before installing Provisioning Manager server, install the Device Manager server (5.7) (Provisioning Manager uses the functions of Device Manager). If an attempt is made to install Provisioning Manager server on a machine on which the Device Manager server (5.7) is not installed, a message displays indicating that the Device Manager server has not been installed.
- Install the Provisioning Manager server and the Device Manager agent on different machines.
- Installing Provisioning Manager has a temporary requirement of about 50 MB of free hard disk space.
- The Provisioning Manager database is shared with the Device Manager database. To calculate the total capacity, add the capacity to be used by Device Manager to the capacity to be used by Provisioning Manager. For details, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

  By default, if you perform a new installation of Device Manager, 100 MB is reserved for the Device Manager database (including the capacity to be used by Provisioning Manager). However, when the capacity to be used exceeds 100 MB (for a large configuration), the Device Manager database capacity automatically increases.

  The estimate of the capacity used by Provisioning Manager is as follows:

  Small configuration example:

  In the following configuration, the estimate of the capacity used by Provisioning Manager is 33 MB.

- Number of hosts: 20
- Average number of LDEVs per host: 50
- Number of LDEVs in the entire system: 1,000
- Number of histories: 1,500
- Number of plans: 50

Large configuration example:

In the following configuration, the estimate of the capacity used by Provisioning Manager is 1 GB.

- Number of hosts: 300
- Average number of LDEVs per host: 100
- Number of LDEVs in the entire system: 30,000
- Number of histories: 45,000
- Number of plans: 1,000

- Open the property of the following services from the Services panel to make sure that **Startup Type** is not set to **Disabled**. If **Startup Type** is set to **Disabled**, change the setting to **Automatic** or **Manual**.

  •HBase Storage Mgmt Common Service

  •HBase Storage Mgmt Web Service

  •HiRDB/EmbeddedEdition _HD0

  •HiCommandServer

- Check whether the following programs are installed. If they are installed, take action by following the explanation below:

  •A program that monitors security

  Stop the program that monitors security, or change its settings so that Provisioning Manager can be installed normally.

  •A program that detects viruses

  We recommend that you stop programs that detect viruses, and then install Provisioning Manager.

  If a program that detects viruses is running during installation of Provisioning Manager, the speed of installation might be reduced, installation might fail, or installation might finish in an incorrect state.

  •A program that monitors processes

  Stop the program that monitors processes, or change its settings so that the program does not monitor the services or processes of the HiCommand(R) Device Manager server and the HiCommand Suite Common Component.

  If a program that monitors processes starts or stops the above services or processes during installation of Provisioning Manager, installation might fail.

- Check the Time of a Machine and the Functions that Adjust the Time

If the time of a machine is changed while the services of HiCommand Suite Common Component and HiCommand Suite products are running, Provisioning Manager might not operate correctly. If you need to change this time, do so before installation.

If you want to use functionality that automatically adjusts the time by using a protocol such as NTP, use a function that can gradually adjust the time of a machine without immediately synchronizing the time when the time of the machine is ahead of the actual time. There are some functions that gradually adjust the time if the difference between the time of a machine and the actual time is within a certain fixed period, or immediately synchronize the time if the time difference exceeds a certain fixed period. Therefore, set the frequency of the time adjustments for the function that you are using so that the time difference does not exceed the fixed period.

For example, the Windows Time service can gradually adjust the time of a machine without immediately synchronizing the time if the time is ahead of the actual time by a certain fixed period. Therefore, check the range in which the Windows Time service can gradually adjust the time, and then set the frequency of the time adjustments for the Windows Time service so that the difference between the time of the machine and the actual time does not exceed that range.

Changing the time after installing Provisioning Manager

If you cannot use functionality that adjusts the time automatically, or if you need to change the time immediately, perform the following procedure to change the time of a machine:

Stop the services of HiCommand Suite Common Component and all HiCommand Suite products.

Change the time of the machine.

Restart the machine.

- Ensure that no other applications are currently running.

## 3.3 Installing the Provisioning Manager Server

To perform a new installation of the Provisioning Manager server:

1. Log on to as an administrator.
2. Stop the service applications for all HiCommand Suite products

   For details on how to stop the service applications, see the manual for each product.

   ***Caution***: After the installation finishes, start the HiCommand product services you stopped. For details on how to start them, see the manual for each product.
3. Back up all HiCommand Suite product databases.

   For details about how to make backups, see the applicable product documentation.

   Insert the Provisioning Manager CD-ROM.
4. Use Explorer to display the contents of the CD-ROM, and then execute the `Setup.exe` file.

   The Installation startup window displays.

   A message appears in this window, prompting you to stop the service applications and back up the databases of all HiCommand Suite products.

   ***Caution:*** If Device Manager has not been installed on that machine, a warning panel displays and the installation stops.
5. If you have stopped the service applications and finished backing up the databases of all HiCommand Suite products, click the **Next** button to continue the installation.

   If you have not stopped the service applications or backed up the databases of HiCommand Suite products, click the **Cancel** button to stop the installation, and then stop the service applications and back up the databases.

   If you have stopped the HiCommand product services, the window appears prompting you to select whether the services are to be restarted when installation finishes. When this window appears, go to the next step.

   If you have not stopped the services, clicking the **Next** button displays the Stop HiCommand Suite Product Services window.

   Check the message, and click the **Next** button if there are no problems. The services stop, and a window appears prompting you to select whether the services are to be restarted when installation finishes.
6. Select whether the services are to be restarted when installation finishes. To restart the services when installation finishes, select **Yes**. If you do not want to restart the services, select **No**.

   After making your selection, click the **Next** button. The Pre-installation Confirmation window indicating that the system is ready for installation appears.
7. Check the displayed installation information and the target directory, and then click the **Next** button to start installation.

   Provisioning Manager will be installed in same location as the Common Component. Where Device Manager has been installed in `C:\Program Files\HiCommand\DeviceManager`, Provisioning Manager will be installed in `C:\Program Files\HiCommand\ProvisioningManager`

A window appears, indicating that pre-installation processing is in progress.

8. A window appears, indicating the installation progress and status of Provisioning Manager .
9. Installation will be canceled in the following cases:
   - When you click the **Cancel** button to cancel the installation, the installation stops. If this happens, before reinstallation, choose **Start**, **Settings**, **Control Panel**, and then **Add/Remove Applications** to check if **HiCommand Provisioning Manager** appears in the list of programs.

     If it does not appear, re-install Provisioning Manager.

     If it does appear, click the **Change/Remove** button and uninstall Provisioning Manager. Then, re-install the program.
   - If an error occurs during installation, the installation stops. If this happens, first remove the cause of the error. Then, reinstall Provisioning Manager by using the same procedure as described in the caution above. If Provisioning Manager is still not installed correctly, follow the action described in section 6.2.
10. The Installation Finished window displays. The URL displayed in the message is the URL that you enter when you log in to Provisioning Manager. Make sure you record this URL. Select **Finish** to complete installation.

    ***Caution***: Even if installation of Provisioning Manager fails, the **GO** menu command for starting Provisioning Manager might appear in the Dashboard of other HiCommand Suite products. To remove **GO**, a user with User Management permissions must execute the following command. When this command is executed, the HiCommand Suite Common Component services must be running.

    *installation-folder-for-HiCommand-Suite-Common-Component*`\bin\hcmdsintg /delete /type ProvisioningManager /user` *user-ID* `/pass` *password*

***WARNING***: After finishing a new installation, be sure to back up the HiCommand Device Manager server database. When the Device Manager server database is backed up, the Provisioning Manager server database is also backed up. For details on the backup procedure for the Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

***Important:*** Even if you have installed Provisioning Manager, you cannot use it until you register the license key in the Provisioning Manager management client. For details about the license key, see the *HiCommand Provisioning Manager User's Guide*.

### 3.3.1 Installing a Provisioning Manager Server in a Cluster Environment

When you operate a Provisioning Manager server in a cluster environment, availability of the Provisioning Manager server is enhanced.

If you want to operate a Provisioning Manager server in a cluster environment, you must perform setup for a Device Manager server in a cluster environment. This section describes an installation of Provisioning Manager in a cluster environment with VERITAS Cluster Server or Sun Cluster, by using the following methods:

1. Installing a Provisioning Manager server together with a Device Manager server in a cluster environment
2. Installing a Provisioning Manager server during the Device Manager server's operation in a cluster environment

***WARNING***: After finishing the installation, be sure to back up the HiCommand Device Manager server database. When the Device Manager server database is backed up, the Provisioning Manager server database is also backed up. For details on the backup procedure for the Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

### 3.3.2 Installing a Provisioning Manager Server with a Device Manager Server in a Cluster Environment

When you install a Provisioning Manager server together with a Device Manager server in a cluster environment, follow the procedure for installing the Device Manager server in a cluster environment to install the Device Manager server, and then install the Provisioning Manager server.

For details about installing the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

### 3.3.3 Installing a Provisioning Manager Server During Device Manager Server's Operation in a Cluster Environment

When installing a Provisioning Manager server on a Device Manager server that is operating in a cluster environment, follow the procedure for re-installing the Device Manager server in a cluster environment but, instead of re-installing the Device Manager server, install the Provisioning Manager server. For details on how to re-install the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

## 3.4 Upgrading the Provisioning Manager Server

In an update installation, the existing property file is backed up and saved. If the existing property file contains information that has been modified by a user, such information will be inherited in a new property file.

To perform an update installation of the Provisioning Manager server:

1. Log on to Windows as an administrator.
2. Stop the service applications for all HiCommand Suite products

   For details about how to stop them, see the manual for each product.

   ***Caution***: After the installation finishes, start the HiCommand product services that you stopped. For details about how to start them, see the manual for each product.
3. Back up all HiCommand Suite product databases.

   For details about how to make backups, see the applicable product documentation.

   Insert the Provisioning Manager CD-ROM.
4. Use Explorer to display the contents of the CD-ROM, and then execute the `Setup.exe` file.
5. The Upgrade Installation window displays.

   A message appears in this window, prompting you to stop the service applications and back up the databases of all HiCommand Suite products.

   ***Caution:*** If you attempt to install Provisioning Manager on a machine on which Device Manager is not installed, a window appears informing you that Device Manager has not been installed, and the installation stops.

   If a newer version of Provisioning Manager than the one you attempt to install has already been installed, a window appears, informing you that the version you attempted to install is incorrect, and the installation stops.
6. If you have stopped the service applications and finished backing up the databases of all HiCommand Suite products, click the **Next** button to continue the installation.

   If you have not stopped the service applications or backed up the databases of HiCommand Suite products, click the **Cancel** button to stop the installation, and then stop the service applications and back up the databases.

   If you have stopped the HiCommand product services, the window appears, prompting you to select whether the services are to be restarted when installation finishes. When this window appears, go to the next step.

   If you have not stopped the services, clicking the **Next** button displays the Stop HiCommand Suite Product Services window.

   Check the message, and if there are no problems click the **Next** button. The services stop, and a window appears prompting you to select whether the services are to be restarted when installation finishes.

   ***Important:*** If the *xx* part of the *X.X.X-xx* version number of the version that you are about to install is older than the version that is already installed (such as performing an overwrite installation of version 5.5.0-00 on 5.5.0-02), a message on down installation (earlier-version re-installation) appears. Before continuing, make sure that this will not present a problem.

7. Select whether the services are to be restarted when installation finishes. To restart the services when installation has finished, select **Yes**. If you do not want to restart the services, select **No**.

   After making your selection, click the **Next** button. The Pre-installation Confirmation window indicating that the system is ready for installation appears.

8. Check the displayed installation information and the target directory, and then click the **Next** button to start installation.

   Provisioning Manager will be installed in the location where the existing Provisioning Manager has been installed.

   A window appears, indicating that pre-installation processing is in progress.

9. A window appears, indicating the installation progress and status of Provisioning Manager.

10. Installation will be canceled in the following cases:

    - When you click the **Cancel** button to cancel the installation, the installation stop. If this happens, before reinstallation, choose **Start**, **Settings**, **Control Panel**, and then **Add/Remove Applications** to check if **HiCommand Provisioning Manager** appears in the list of programs.

      If it does not appear, re-install Provisioning Manager.

      If it does appear, click the **Change/Remove** button and uninstall Provisioning Manager. Then, re-install the program.

    - If an error occurs during installation, the installation stops. If this happens, first remove the cause of the error. Then, reinstall Provisioning Manager by using the same procedure as described in the caution above.

      If Provisioning Manager is still not installed correctly, follow the action described in section 6.2.

11. The Installation Finished window displays. The URL displayed in the message is the URL that you enter when you log in to Provisioning Manager. Make sure you record this URL. Select **Finish** to complete the installation.

    ***WARNING***: After finishing an upgrade installation, be sure to back up the HiCommand Device Manager server database. When the Device Manager server database is backed up, the Provisioning Manager server database is also backed up. For details on the backup procedure for the Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

    ***Important:*** Even if you have installed Provisioning Manager, you cannot use it until you register the license key in the Provisioning Manager management client. For details about the license key, see the *HiCommand Provisioning Manager User's Guide*.

### 3.4.1 Overwrite Installation of a Provisioning Manager Server in a Cluster Environment

When performing an overwrite installation of the Provisioning Manager server in a cluster environment, follow the procedure for re-installing the Device Manager server in a cluster environment; however, instead of re-installing the Device Manager server, perform an overwrite installation of the Provisioning Manager server. For details on how to re-install the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

***Note:*** You must start the following services before installing the Provisioning Manager server. If any of the following services have not started, start them in the following order:

1. HiCommand Suite Common Web Service
2. HiCommand Suite Single Sign On Service
3. HiCommand Server

#### 3.4.1.1 Upgrading the Primary Node

To upgrade the primary node:

1. Open the cluster administrator.
2. Stop the services (for example, HiCommand Server).
3. Open `server.properties` and change `server.http.host=`.
4. Move `HiCommand.gbk` from local disk to shared disk.
5. Move `HBASE.GDB` to temporary storage area.
6. Start the services.

#### 3.4.1.2 Upgrading the Secondary Node

To upgrade the secondary node:

1. Return the names of the files `HCOMMAND.GDB` and `HiCOmmand.gbk` to the previous names because the names have been changed when installation is performed on the Secondary Node.
2. Open `database.properties` and change `dbm.url=` from local disk to shared disk.
3. Return the name of the file HBASE.GDB to the previous name.
4. Open `user.conf` and change `DATABASE.path=` from local disk to shared disk.
5. Stop the services (for example, HiCommand Server).
6. Change the name of the `HBASE.GDB` file.
7. Open `server.properties` and change `server.http.host=` from local disk to shared disk.
8. Open `user.conf` and change `DATABASE.path=` from local disk to shared disk.

9. Start the services.
10. Change the name of the `HICOMMAND.GDB` file.
11. Open `database.properties` and change `dbm.url=`.
12. Change the name of the `HBASE.GDB` file.
13. Open `server.properties` and change `server.http.host=`.
14. Open user.conf (if it does not exist, then create it) and change the line beginning with "`DATABASE.path=`".
15. Change the services such as HiCommand Suite Single Sign-on Service to the offline state using the cluster administrator.

## 3.5 Uninstalling a Provisioning Manager Server

Before beginning an uninstallation, you need to check the following items:

- Do not uninstall Provisioning Manager unless you need to redo the entire installation process due to a problem. Uninstalling Provisioning Manager deletes the property files for Provisioning Manager.
- Open the property of the following services from the Services panel to make sure that **Startup** Type is not set to **Disabled**. If **Startup Type** is set to **Disabled**, change the setting to **Automatic** or **Manual**.
  - HBase Storage Mgmt Common Service
  - HBase Storage Mgmt Web Service
  - HiRDB/EmbeddedEdition _HD0
  - HiCommandServer
- Check whether the following programs are installed. If they are installed, take action by following the explanation below:
  - A program that monitors security

    Stop the program that monitors security, or change its settings so that Provisioning Manager can be uninstalled normally.
  - A program that detects viruses

    We recommend that you stop programs that detect viruses, and then uninstall Provisioning Manager.

    If a program that detects viruses is running during uninstallation of Provisioning Manager, the speed of uninstallation might be reduced, uninstallation might fail, or uninstallation might finish in an incorrect state.
  - A program that monitors processes

    Stop the program that monitors processes, or change its settings so that the program does not monitor the services or processes of the HiCommand(R) Device Manager server and the HiCommand Suite Common Component.

    If a program that monitors processes starts or stops the above services or processes during uninstallation of Provisioning Manager, uninstallation might fail.

To uninstall Provisioning Manager:

1. Log on to Windows as an administrator.
2. If any other HiCommand Suite products are running, stop their processes. For details about how to stop them, see the documentation for each product.

   For details about how to stop them, see the documentation for each product.

   ***Caution***: After the uninstallation finishes, start the HiCommand product services you stopped. For details about how to start them, see the manual for each product.
3. Use the Windows Add/Remove Programs utility to launch the Uninstallation startup window. A message appears in this window, prompting you to stop the service applications of all HiCommand Suite products.

4. If you have stopped the service applications of all HiCommand Suite products, click the **Next** button to continue the uninstallation.

   If you have not stopped the service applications of HiCommand Suite products, click the **Cancel** button to stop the uninstallation, and then stop the service applications.

   If you have stopped the HiCommand product services, the window appears, prompting you to select whether the services are to be restarted when uninstallation finishes. When this window appears, go to the next step.

   If you have not stopped the services, clicking the **Next** button displays the Stop HiCommand Suite Product Services window.

   Check the message, and if there are no problems click the **Next** button. The services stop, and a window appears prompting you to select whether the services are to be restarted when uninstallation finishes.

5. Select whether HiCommand product services are to be restarted when uninstallation finishes. To restart the services when uninstallation finishes, select **Yes**. If you do not want to restart the services, select **No**.

   After making your selection, click the **Next** button. The Pre-uninstallation Confirmation window indicating that the system is ready for uninstallation appears.

6. Click the **Next** button to start uninstallation.

   A window appears, indicating the uninstallation progress and status of Provisioning Manager.

7. If you select **Cancel** button, uninstallation will terminate. In this case, before you uninstall again, choose **Start**, **Settings**, **Control Panel**, and then **Add/Remove Programs**, and check if **HiCommand Provisioning Manager** appears in the list of currently installed programs:

   - If it does not appear, install Provisioning Manager, and then uninstall it again.
   - If it does appear, uninstall Provisioning Manager again.

   Once you click the **Next** button in the pre-uninstallation confirmation window, the uninstallation will continue to execute even if an error occurs during the uninstallation and an error message appears. In this case, Provisioning Manager might not be uninstalled correctly.

   - If this happens, first remove the cause of the error. Then, uninstall Provisioning Manager again by using the same procedure as described in the caution above.
   - If Provisioning Manager is still not uninstalled correctly, follow the action described in 6.2.

   In addition to the window that indicates the uninstallation progress and status of Provisioning Manager, another window appears that indicates post-uninstallation tasks are in progress.

8. If uninstallation terminates normally, the Uninstallation Finished window displays. Select **Finish** to complete uninstallation.

9. If a message displays indicating that some files still remain after uninstallation, delete them manually.

***Caution:*** If uninstallation of Provisioning Manager fails, the **GO** menu command for starting Provisioning Manager might remain in the Dashboard of other HiCommand Suite products. To remove **GO**, a user with User Management permissions must execute the following command. When this command is executed, the HiCommand Suite Common Component services must be running.

*installation-folder-for-HiCommand-Suite-Common-Component*\bin\hcmdsintg/delete/type ProvisioningManager/user *user-ID* /pass *password*

## 3.6 Uninstalling a Provisioning Manager Server in a Cluster Environment

When uninstalling a Provisioning Manager server in a cluster environment, follow the procedure for re-installing the Device Manager server in a cluster environment but, instead of re-installing Device Manager server, uninstall the Provisioning Manager server. For details on how to re-install the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

## 3.7 Operating a Database in a Provisioning Manager Server

When the Device Manager server database is backed up, restored, updated, or converted, the same operations are performed for the data in the Provisioning Manager server.

For details about the operations of a Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

# Chapter 4 Installing a Provisioning Manager Server in a Solaris or Linux System

This chapter explains how to install and uninstall a Provisioning Manager server on a management server running in a Solaris or Linux system.

- System and Media Requirements (see section 4.1)
- Preparations for Installation (see section 4.2)
- Installing a Provisioning Manager Server (see section 4.3)
- Upgrading the Provisioning Manager Server (see section 4.4)
- Uninstalling a Provisioning Manager Server (see section 4.5)
- Operating a Database in a Provisioning Manager Server (see section 4.6)

## 4.1 System and Media Requirements

The requirements for Solaris and Linux are as follows:

- Device Manager 5.7 (prerequisite program product)
- OS: see section 1.3.2
- A CD-ROM drive
- 10/100 Ethernet LAN card
- The TCP/IP protocol must be running
- Static IP address
- Provisioning Manager must be connected via LAN to a Universal Storage Platform V, TagmaStore USP, Lightning 9900V, TagmaStore AMS/WMS series, Thunder 9500V, Lightning 9900, or Thunder 9200 storage subsystem.
- To install Provisioning Manager, you must log in as a root user.

## 4.2 Preparations for Installation

Before beginning a new installation and an update installation, you need to check the following items:

- Provisioning Manager uses the functions of Device Manager, so the Device Manager (5.7) must be installed before you install the Provisioning Manager server. If you attempt to install the Provisioning Manager server on a machine on which the Device Manager (5.7) is not installed, a window appears during installation informing you that the Device Manager server has not been installed.
- Install the Provisioning Manager server and Device Manager agent on different machines.
- Do not interrupt the installation by pressing **Ctrl** + **C.** If the installation is interrupted, check if `uninstall.sh` is in the `/opt/HiCommand/ProvisioningManager/inst` directory.

  If `uninstall.sh` is not in the directory, re-install Provisioning Manager.

  If `uninstall.sh` is in the directory, uninstall Provisioning Manager, and then re-install it.
- Do not specify the system's zone settings during installation in Solaris 10 system. If you do specify the settings, installation might finish abnormally.
- Installing Provisioning Manager has a temporary requirement of about 50 MB of free disk space under `/var/tmp`.
- The Provisioning Manager database is shared with the Device Manager database. To calculate the total capacity, add the capacity to be used by Device Manager to the capacity to be used by Provisioning Manager. For details on the capacity used by Device Manager, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

If you perform a new installation of Device Manager, 100 MB is reserved for the Device Manager database (including the capacity used by Provisioning Manager) by default. However, for a large configuration when the used capacity exceeds 100 MB, the capacity of the Device Manager database automatically increases.

The estimate of the capacity used by Provisioning Manager is as follows:

Small configuration example:

In the following configuration, the estimate of the capacity used by Provisioning Manager is 33 MB.

- Number of hosts: 20
- Average number of LDEVs per host: 50
- Number of LDEVs in the entire system: 1,000
- Number of histories: 1,500
- Number of plans: 50

Large configuration example:

In the following configuration, the estimate of the capacity used by Provisioning Manager is 1 GB.

- Number of hosts: 300
- Average number of LDEVs per host: 100
- Number of LDEVs in the entire system: 30,000
- Number of histories: 45,000
- Number of plans: 1,000

- Verify that symbolic links that have the following names have not been created. If they have been created, installation might fail.
  - /opt
  - /var/opt
  - /var/tmp
  - The names of the directories in /opt/HiCommand (including /opt/HiCommand)
  - The names of the directories in /var/opt/HiCommand (including /var/opt/HiCommand)
- Check whether the following programs are installed. If they are installed, take action by following the explanation below:
  - A program that monitors security

    Stop the program that monitors security, or change its settings so that Provisioning Manager can be installed normally.
  - A program that detects viruses

    We recommend that you stop programs that detect viruses, and then install Provisioning Manager.

    If a program that detects viruses is running during installation of Provisioning Manager, the speed of installation might be reduced, installation might fail, or installation might finish in an incorrect state.

- A program that monitors processes

  Stop the program that monitors processes, or change its settings so that the program does not monitor the processes of the HiCommand(R) Device Manager server and the HiCommand Suite Common Component.

  If a program that monitors processes starts or stops the above processes during installation of Provisioning Manager, installation might fail.

- Check the Time of a Machine and the Functions that Adjust the Time.

  If the time of a machine is changed while the services of HiCommand Suite Common Component and HiCommand Suite products are running, Provisioning Manager might not operate correctly. If you need to change this time, do so before installation.

  If you want to use functionality that automatically adjusts the time by using a protocol such as NTP, use a function that can gradually adjust the time of a machine without immediately synchronizing the time when the time of the machine is ahead of the actual time. There are some functions that gradually adjust the time if the difference between the time of a machine and the actual time is within a certain fixed period, or immediately synchronize the time if the time difference exceeds a certain fixed period. Therefore, set the frequency of the time adjustments for the function that you are using so that the time difference does not exceed the fixed period.

  Changing the time after installing Provisioning Manager

  If you cannot use functionality that adjusts the time automatically, or if you need to change the time immediately, perform the following procedure to change the time of a machine:

  Stop the services of HiCommand Suite Common Component and all HiCommand Suite products.

  Change the time of the machine.

  Restart the machine.

- Make sure that no other applications are currently running.

## 4.3 Installing a Provisioning Manager Server

To perform a new installation of the Provisioning Manager server:

1. Log in to Solaris or Linux as a root user.
2. If any other HiCommand Suite products are running, stop their service applications.

   For details on how to stop them, see the manual for each product.

   ***Caution***: After the installation finishes, start the HiCommand product services you stopped. For details about how to start them, see the manual for each product.
3. Back up all HiCommand Suite product databases.

   For details about how to make backups, see the applicable product documentation.
4. Insert the Provisioning Manager CD-ROM. If the CD-ROM is not automatically mounted, mount the CD-ROM to /mnt/cdrom.
5. Move to the directory containing the `install.sh` file, and then execute the following command:

```
# ./install.sh
```

6. The following message appears, prompting you to stop the service applications and back up the databases of all HiCommand Suite products.

```
Checking the OS and its version.
      :
HiCommand Provisioning Manager 5.7.0(5.7.0-00) is installation will now start.
A new installation will be performed.

Please stop all HiCommand Suite products before continuing. This will include HiCommand
Device Manager, HiCommand Suite Common Component and any other HiCommand products on
this system.

Important: Back up the database of all HiCommand Suite products before installation so
it can be recovered if problem occurs during installation.
Do you want to continue  (y/n)?
>
```

7. If you have stopped the service applications and finished backing up the databases of all HiCommand Suite products, enter `y` to continue the installation.

   If you have not stopped the service applications or backed up the databases of HiCommand Suite products, enter `n` to stop the installation, and then stop the service applications and back up the databases.

   If you have stopped the HiCommand product services, a message prompting you to select whether to restart them when installation has finished appears, as shown below. When the message appears, go to the next step.

```
Set Services to Start After Installation:
Do you want the services of all HiCommand Suite products to start after the
installation finishes? (y/n) [default=y]:
```

If you have not stopped the services, entering y displays a message for confirming whether you want to stop them, as shown below.

```
Stop HiCommand Suite Product Services:
HiCommand Suite product services are running.
If you continue the installation, the services of all HiCommand Suite products will be
stopped.

Do you want to continue  (y/n)?
>
```

Check the message, and enter y if there are no problems. The services stop, and a message appears prompting you to select whether the services are to be restarted when installation finishes.

8. Select whether the HiCommand product services are to be restarted when installation finishes. To restart the services when installation finishes, enter y. If you do not want to restart the services, enter n.

   After you enter your selection, the pre-installation confirmation message indicating that the system is ready for installation appears, as shown below.

```
Installation preparation is complete.
This will install the following packages:
HPVM            HiCommand Provisioning Manager (Build 0570-01)
                Version:5.7.0-00

Do you want to continue (y/n)?
>
```

9. Enter y to continue the installation.

   The following message appears, and the installation is performed.

   – Message displayed for Solaris:

```
Processing package instance <HPVM> from </var/tmp/.InstallHPVM/HPVM>
                :
Installation of <HPVM> was successful.

The post-installation software information is being set. Please wait.
```

   – Message displayed for Linux:

```
preparing...   ################################# [100%]

1:HPVM          ################################# [100%]

The post-installation software information is being set. Please wait.
```

   When installation terminates successfully, the following message appears:

```
The URL to access the Provisioning Manager server was configured as follows:
  http://10.208.119.174:23015/ProvisioningManager/

SUCCESS: HiCommand Provisioning Manager Installation succeeded.
The installation trace log file for HiCommand Provisioning Manager has been created.
(/opt/HiCommand/ProvisioningManager/inst/TL_Install_06-22-2007_15-02-55.log)
```

   The URL displayed in the message is the URL that you enter when you log in to Provisioning Manager. Make sure you record this URL.

***WARNING***: After finishing a new installation, make sure you back up the HiCommand Device Manager server database. When the Device Manager server database is backed up, the Provisioning Manager server database is also backed up. For details on the backup procedure for the Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

***Caution***: When you cancel the installation in response to a message, the installation stops. If this happens, before reinstallation, check if `uninstall.sh` is in the `/opt/HiCommand/ProvisioningManager/inst` directory.

If `uninstall.sh` is not in the directory, re-install Provisioning Manager.

If `uninstall.sh` is in the directory, uninstall Provisioning Manager, and then re-install it.

***Caution***: If an error occurs during installation, the installation stops. If this happens, first remove the cause of the error. Then, reinstall Provisioning Manager by using the same procedure described in the caution above.

If Provisioning Manager is still not installed correctly, follow the action described in section 6.2.

***Caution***: Even if installation of Provisioning Manager fails, the **GO** menu command for starting Provisioning Manager might appear in the Dashboard of other HiCommand Suite products. To remove **GO**, a user with User Management permissions must execute the following command. When this command is executed, the HiCommand Suite Common Component services must be running.

`/opt/HiCommand/Base/bin/hcmdsintg -delete -type ProvisioningManager -user` ***user-ID*** `-pass` ***password***

***Important:*** Even if you have installed Provisioning Manager, you cannot use it until you register the license key in the Provisioning Manager management client. For details about the license key, see the *HiCommand Provisioning Manager User's Guide*.

### 4.3.1 Installing a Provisioning Manager Server in a Cluster Environment (Solaris)

In a Solaris system, you can use a Provisioning Manager server in a cluster environment. When you operate a Provisioning Manager server in a cluster environment, availability of the Provisioning Manager server is enhanced.

If you want to operate a Provisioning Manager server in a cluster environment, you must perform setup for a Device Manager server in a cluster environment. This section describes an installation of Provisioning Manager in a cluster environment with VERITAS Cluster Server or Sun Cluster by using the following methods:

- Installing a Provisioning Manager server together with a Device Manager server in a cluster environment.
- Installing a Provisioning Manager server during the Device Manager server's operation in a cluster environment.

***WARNING***: After finishing the installation, make sure you back up the HiCommand Device Manager server database. When the Device Manager server database is backed up, the Provisioning Manager server database is also backed up. For details on the backup procedure for the Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

### 4.3.2 Installing a Provisioning Manager Server with a Device Manager Server in a Cluster Environment

When you install a Provisioning Manager server together with a Device Manager server in a cluster environment, follow the procedure for installing the Device Manager server in a cluster environment to install the Device Manager server, and then install the Provisioning Manager server.

For details about how to install the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

### 4.3.3 Installing a Provisioning Manager Server during Device Manager Server's Operation in a Cluster Environment

When installing a Provisioning Manager server on a Device Manager server that is operating in a cluster environment, follow the procedure for re-installing the Device Manager server in a cluster environment but, instead of re-installing Device Manager server, install the Provisioning Manager server. For details on how to re-install the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

For details about how to upgrade the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

## 4.4 Upgrading a Provisioning Manager Server

In an update installation, the existing property file is backed up and saved. If the existing property file contains information that has been modified by a user, such information will be inherited in a new property file.

To perform an update installation of the Provisioning Manager server:

1. Log in to Solaris or Linux as a root user. If a user other than a root user logs in, an error message appears during installation. The installation then stops.
2. Stop the service applications for all HiCommand Suite products.

   For details about how to stop them, see the manual for each product.

   ***Caution***: After the installation finishes, start the HiCommand product services you stopped. For details about how to start them, see the manual for each product.
3. Back up all HiCommand Suite product databases.

   For details about how to make backups, see the applicable product documentation.
4. Insert the Provisioning Manager CD-ROM. If the CD-ROM is not automatically mounted, mount the CD-ROM to /mnt/cdrom.
5. Move to the directory containing the `install.sh` file (*directory-where-CD-ROM-is-mounted*), and then execute the following command:

```
# ./install.sh
```

   The following message appears, prompting you to stop the service applications and back up the databases of all HiCommand Suite products:

```
Checking the OS and its version.
      :
HiCommand Provisioning Manager 5.7.0(5.7.0-00) installation will now start.
An overwrite installation will be performed.

Please stop all HiCommand Suite products before continuing. This will include HiCommand
Device Manager, HiCommand Suite Common Component, and any other HiCommand products on
this system.

Important: Back up the database of all HiCommand Suite products before installation so
it can be recovered if problem occurs during installation.

Do you want to continue  (y/n)?
>
```

   ***Caution***: If you attempt to install Provisioning Manager on a machine on which Device Manager is not installed, a window appears during installation, informing you that Device Manager has not been installed, and the installation stops. If a newer version of Provisioning Manager than the one you attempt to install has already been installed, a message is displayed informing you that the version you attempted to install is incorrect, and the installation stops.

6. If you have stopped the service applications and finished backing up the databases of all HiCommand Suite products, enter `y` to continue the installation.

   If you have not stopped the service applications or backed up the databases of HiCommand Suite products, enter `n` to stop the installation, and then stop the service applications and back up the databases.

   If you have stopped the HiCommand product services, a message appears prompting you to select whether the services are to be restarted when installation finishes, as shown below. When the message appears, go to the next step.

```
Set Services to Start After Installation:
Do you want the services of all HiCommand Suite products to start after the
installation finishes? (y/n) [default=y]:
```

   If you have not stopped the services, entering `y` displays a message for confirming whether you want to stop them, as shown below.

```
Stop HiCommand Suite Product Services:
HiCommand Suite product services are running.
If you continue the installation, the services of all HiCommand Suite products will be
stopped.

Do you want to continue  (y/n)?
>
```

   Check the message, and if there are no problems enter `y`. The services stop, and a message appears prompting you to select whether the services are to be restarted when installation finishes.

   ***Important***: If the *xx* part of the *X.X.X-xx* version number of the version that you are about to install is older than the version that is already installed (such as performing an overwrite installation of version 5.5.0-00 on 5.5.0-02), a warning message appears as shown below. Before continuing, make sure that this will not present a problem.

```
WARNING:A newer version of HiCommand Provisioning Manager is already installed on this
system.
If you continue installation, you will downgrade HiCommand Provisioning Manager.

Do you want to continue (y/n)?
>
```

7. Select whether the HiCommand product services are to be restarted when installation finishes. To restart the services when installation has finished, enter `y`. If you do not want to restart the services, enter `n`.

   After you enter your selection, the pre-installation confirmation message indicating that the system is ready for installation appears, as shown below.

```
Installation preparation is complete.
This will install the following packages:
HPVM            HiCommand Provisioning Manager (Build 0570-01)
                Version:5.7.0-00

Do you want to continue (y/n)?
>
```

8. Enter `y` to continue the installation.

   The following message appears, and the installation is performed.

   – Message displayed for Solaris

```
Processing package instance <HPVM> from </var/tmp/.InstallHPVM/HPVM>
                :
Installation of <HPVM> was successful.

The post-installation software information is being set. Please wait.
```

   – Message displayed for Linux

```
preparing...   ################################## [100%]

1:HPVM          ################################## [100%]

The post-installation software information is being set. Please wait.
```

   When installation terminates successfully, the following message appears:

```
The URL to access the Provisioning Manager server was configured as follows:
  http://10.208.119.174:23015/ProvisioningManager/

SUCCESS: HiCommand Provisioning Manager Installation succeeded.
The installation trace log file for HiCommand Provisioning Manager has been created.
(/opt/HiCommand/ProvisioningManager/inst/TL_Install_05-22-2007_15-02-55.log)
```

   The URL displayed in the message is the URL that you enter when you log in to Provisioning Manager. Make sure you record this URL.

   ***WARNING***: After finishing an upgrade installation, make sure you back up the HiCommand Device Manager server database. When the Device Manager server database is backed up, the Provisioning Manager server database is also backed up. For details on the backup procedure for the Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

   ***Caution:*** When you cancel the installation in response to a message, the installation stops. If this happens, before reinstallation, check if `uninstall.sh` is in the `/opt/HiCommand/ProvisioningManager/inst` directory.

   If `uninstall.sh` is not in the directory, re-install Provisioning Manager.

   If `uninstall.sh` is in the directory, uninstall Provisioning Manager, and then re-install it.

***Caution***: If an error occurs during installation, the installation stops. If this happens, first remove the cause of the error. Then, reinstall Provisioning Manager by using the same procedure described in the caution above.

If Provisioning Manager is still not installed correctly, follow the action described in section 6.2.

***Important***: Even if you have installed Provisioning Manager, you cannot use it until you register the license key in the Provisioning Manager management client. For details about the license key, see the *HiCommand Provisioning Manager User's Guide*.

## 4.5 Uninstalling a Provisioning Manager Server

Before beginning the uninstallation process, check the following:

- Do not uninstall Provisioning Manager unless you need to redo the entire installation process due to a problem. Uninstalling Provisioning Manager deletes the property files for Provisioning Manager.
- Do not interrupt the uninstallation process by pressing **Ctrl** + **C**. If the uninstallation is interrupted, check if `uninstall.sh` is in the `/opt/HiCommand/ProvisioningManager/inst` directory.

  If `uninstall.sh` is not in the directory, install Provisioning Manager, and then uninstall it again.

  If `uninstall.sh` is in the directory, uninstall Provisioning Manager again.
- Do not specify the system's zone settings during uninstallation in Solaris 10 system. If you do specify the settings, uninstallation might finish abnormally.
- Check whether the following programs are installed. If they are installed, take action by following the explanation below:
  - A program that monitors security

    Stop the program that monitors security, or change its settings so that Provisioning Manager can be uninstalled normally.
  - A program that detects viruses

    We recommend that you stop programs that detect viruses, and then uninstall Provisioning Manager.

    If a program that detects viruses is running during uninstallation of Provisioning Manager, the speed of uninstallation might be reduced, uninstallation might fail, or uninstallation might finish in an incorrect state.
  - A program that monitors processes

    Stop the program that monitors processes, or change its settings so that the program does not monitor the processes of the HiCommand(R) Device Manager server and the HiCommand Suite Common Component.

    If a program that monitors processes starts or stops the above processes during uninstallation of Provisioning Manager, uninstallation might fail.

To uninstall Provisioning Manager:

1. Log in to Solaris or Linux as a root user.
2. If any other HiCommand Suite products are running, stop their processes. For details, see the manual for each product.

   For details about how to stop them, see the manual for each product.

   ***Caution***: After the uninstallation finishes, start the HiCommand product services you stopped. For details about how to start them, see the manual for each product.

3. Move to the root directory.

```
# cd /
```

4. Enter the following command:

```
# /opt/HiCommand/ProvisioningManager/inst/uninstall.sh
```

The following message appears, prompting you to stop the service applications for all HiCommand Suite products:

```
Checking user.
      :
Starting the removal of HiCommand Provisioning Manager 5.7.0(5.7.0-00).

Please stop all HiCommand Suite products before continuing. This will include HiCommand
Device Manager, HiCommand Suite Common Component, and any other HiCommand Suite
products on this system.

Do you want to continue  (y/n)?
>
```

5. If you have stopped the service applications for all HiCommand Suite products, enter y to continue the uninstallation.

   If you have not stopped the service applications for HiCommand Suite products, enter n to stop the uninstallation, and then stop the service applications.

   If you have stopped the HiCommand product services, a message appears prompting you to select whether the services are to be restarted when uninstallation finishes, as shown below. When the message appears, go to the next step.

```
Set Services to Start After Uninstallation:
Do you want the services of all HiCommand Suite products to start after the
uninstallation finishes? (y/n) [default=y]:
```

If you have not stopped the services, entering y displays a message for confirming whether you want to stop them, as shown below.

```
Stop HiCommand Suite Product Services:
HiCommand Suite product services are running.
If you continue the uninstallation, the services of all HiCommand Suite products will
be stopped.

Do you want to continue  (y/n)?
>
```

Check the message, and enter y if there are no problems. The services stop, and a message appears prompting you to select whether the services are to be restarted when uninstallation finishes.

6. Select whether the HiCommand product services are to be restarted when uninstallation finishes. To restart the services when uninstallation has finished, enter `y`. If you do not want to restart the services, enter `n`.

   After you enter your selection, the pre-uninstallation confirmation message indicating that the system is ready for uninstallation appears, as shown below.

```
Uninstallation preparation is complete.
This will remove the following packages:
HPVM            HiCommand Provisioning Manager (Build 0570-01)
                Version:5.7.0-00

Do you want to continue  (y/n)?
>
```

7. Enter y to continue the uninstallation.

   The following message appears, and the uninstallation is performed.

   Message displayed for Solaris:

```
The software information settings are being released. Please wait.

Starting package removal.
                :
Removal of <HPVM> was successful.
```

   Message displayed for Linux:

```
The software information settings are being released. Please wait.

Starting package removal.
```

   If uninstallation terminates normally, the following message appears:

```
HiCommand Provisioning Manager uninstalled successfully.
```

   ***Caution:*** If you cancel the uninstallation in response to a message asking you whether you want to continue operation, uninstallation will terminate. If this happens, before another uninstallation, check if `uninstall.sh` is in the `/opt/HiCommand/ProvisioningManager/inst` directory.

   If `uninstall.sh` is not in the directory, install Provisioning Manager, and then uninstall it again.

   If `uninstall.sh` is in the directory, uninstall Provisioning Manager again.

   ***Caution:*** Once you enter `y` to continue uninstallation in step 6, the uninstallation will continue to execute even if an error occurs during the uninstallation and an error message appears. In this case, Provisioning Manager may not have been uninstalled correctly.

   If this happens, first remove the cause of the error. Then, uninstall Provisioning Manager again by using the same procedure described in the caution above.

   If Provisioning Manager is still not uninstalled correctly, follow the action described in section *6.2*.

***Caution***: If uninstallation of Provisioning Manager fails, the **GO** menu command for starting Provisioning Manager might remain in the Dashboard of other HiCommand Suite products. To remove **GO**, a user with User Management permissions must execute the following command. When this command is executed, the HiCommand Suite Common Component services must be running.

```
/opt/HiCommand/Base/bin/hcmdsintg -delete -type
ProvisioningManager -user user-ID -pass password
```

### 4.5.1 Uninstalling a Provisioning Manager Server in a Cluster Environment (Solaris)

In a Solaris system, you can use a Provisioning Manager server in a cluster environment. To uninstall a Provisioning Manager server that has been used in a cluster environment, perform the procedures for re-installing a Device Manager server in a cluster environment. For details on how to re-install the Device Manager server in a cluster environment, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

However, instead of following the procedure that describes how to reinstall a Device Manager server, follow the procedure for uninstalling a Provisioning Manager server.

## 4.6 Operating a Database in a Provisioning Manager Server

When the Device Manager server database is backed up, restored, updated, or converted, the same operations are performed for the data in the Provisioning Manager server.

For details about the operations of a Device Manager server database, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

# Chapter 5 Configuring a Provisioning Manager Environment

This chapter describes the properties of Provisioning Manager server, the properties of a related Device Manager agent, and the environment settings for the Provisioning Manager server and the host:

- Overview of Provisioning Manager Server Properties (see section 5.1)
- Server Properties (see section 5.2)
- Overview of Device Manager Agent Properties (see section 5.3)
- Device Manager Agent Properties (see section 5.4)
- Security Settings (see section 5.5)
- Warning Banner Settings (see section 5.6)
- Firewall Settings (see section 5.7)
- Settings When 100 or More LUs Are Recognized by the Host (see section 5.8)
- Generating Audit Logs (see section 5.9)

## 5.1 Overview of Provisioning Manager Server Properties

Provisioning Manager server properties can be divided into two types:

- Server configuration properties are located in the `server.properties` file.
- Server log properties are located in the `logger.properties` file.

The default directory for the properties files is as follows:

Windows:

```
C:\Program Files\HiCommand\ProvisioningManager\conf
```

Solaris or Linux:

```
/opt/HiCommand/ProvisioningManager/conf
```

These files are formatted as Java™ properties files, which means you can use a text editor to update the properties. A property is specified by connecting its property name and the appropriate value with an equals sign, as in `foo.bar=12345`. Each such specification of a name and a value is delimited by the appropriate end-of-line character as defined by the OS.

Any line in a Provisioning Manager properties file that begins with a hash mark (#) is handled as a comment. You do not need to enclose a literal (character string or numerics) in double quotation marks. The Boolean values are `true` and `false` (not case-sensitive). Any other specification (for example, `yes`) is interpreted as `false`.

In a Java properties files, the backslash (\) is a reserved character that represents the escape character. The backslash is used to indicate that the character immediately following it is a control character, such as a tab or linefeed. Because absolute path names in Windows generally contain backslashes, in a properties file you must insert the backslash escape character preceding any path name backslash. For example, if a file's path name is:

`c:\HiCommand\docroot\foo.bar`, enter

`c:\\HiCommand\\docroot\\foo.bar`.

In general, you do not need the backslash escape character for any other characters in property specifications.

If you modified the `server.properties` file, the change will be applied after restarting HiCommand Server.

If you modified the `logger.properties` file, the change will be applied after restarting HiCommand Server and the HiCommand Suite Common Component services.

For details on how to restart HiCommand Server and the HiCommand Suite Common Component services, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

If you do not specify properties, or if a specified value for a property exceeds the valid range, the Provisioning Manager server operates using default values.

Table 5.1 lists the Provisioning Manager properties and indicates where each property is explained in detail.

**Table 5.1 Summary of Provisioning Manager Server Properties**

| Classification | File Name | Property | See Section |
|---|---|---|---|
| Properties related to server configuration information. | server.properties | server.operation.abortTimeout | 5.2.1.1 |
| | | server.operation.eventTimeout | 5.2.1.2 |
| | | server.rmiapi.port | 5.2.1.3 |
| | | server.history.maxNumber | 5.2.1.4 |
| | | server.history.maxDays | 5.2.1.5 |
| | | server.installTime | 5.2.1.6 |
| Properties related to server log functionality. | logger.properties | logger.loglevel | 5.2.2.1 |
| | | logger.sysloglevel | 5.2.2.2 |
| | | logger.MaxBackupIndex | 5.2.2.3 |
| | | logger.MaxFileSize | 5.2.2.4 |

## 5.2 Server Properties

The following section describes server properties.

### 5.2.1 Server Configuration Information Properties

The following section describes server configuration information properties.

#### 5.2.1.1 server.operation.abortTimeout

This property sets the timeout period for host operations, starting from the time when suspension of a host operation begins, and ending when that operation is to be stopped automatically.

Specify a value (in hours) from 0 to 10000. If 0 is specified, a suspended operation will not be stopped automatically. The default is 24.

#### 5.2.1.2 server.operation.eventTimeout

This property sets the timeout period for transaction logs, starting from the time when Provisioning Manager begins holding the transaction logs, and ending when those logs are purged automatically.

Specify a value (in hours) from 0 to 10000. If 0 is specified, the operation history is not purged automatically. The default is 24.

#### 5.2.1.3 server.rmiapi.port

This property specifies the management server port number. The default is 20333.

#### 5.2.1.4 server.history.maxNumber

This property sets the maximum number of items to be recorded in the transaction logs. Specify a value from 1 to 100000. The default is 10000.

#### 5.2.1.5 server.history.maxDays

This property sets the number of days to retain transaction logs. Any log older than the specified number of days is deleted.

Specify a value from 1 to 100000 (days). There is no default value.

#### 5.2.1.6 server.installTime

The date, time, and time zone in which installation was completed are written into this property.

### 5.2.2 Server Log Properties

#### 5.2.2.1 logger.loglevel

This property sets the output level threshold for trace logs and message logs.

The following trace and message logs are affected (* indicates a file number):

- `HPvMGuiTrace*.log`
- `HPvMGuiMessage*.log`
- `HPvMServerTrace*.log`
- `HPvMServerMessage*.log`

Provisioning Manager specifies 0, 10, 20, or 30 as the output level for each log output message according to its content, regardless of whether the message type is error, warning, or information. Only messages with an output level that is less than or equal to the value set in this field are output to the trace log or message log.

Although this field will accept 0, 10, 20, and 30 as values, the default output level of 20 is recommended.

#### 5.2.2.2 logger.sysloglevel

This property sets the output level threshold for the Common Component logs that are output to the OS (event log in Windows, syslog in Solaris or Linux).

Provisioning Manager specifies 0, 10, 20, or 30 as the output level for each log output message according to its content, regardless of whether the message type is error, warning, or information. Only messages with an output level that is less than or equal to the value set in this field are output to the event log or syslog.

Although this field will accept 0, 10, 20, and 30 as values, use of the default output level of 0 is recommended. The default is 0.

#### 5.2.2.3 logger.MaxBackupIndex

This property sets the maximum number of trace log files and message log files that can be output.

***Caution:*** This property affects the Provisioning Manager server and GUI trace log files and message log files.

A log file is created with a size as specified in the `Logger.MaxFileSize` property (see section 5.2.2.4), and is assigned a file name with a version number added (e.g., `HPvMServerTrace1.log` and `HPvMServerTrace2.log`). Log files are used in the order of their numbers, and trace information is written into them. When the last file becomes full, the first file is overwritten.

Specify a value from 1 to 16. The default is 10.

#### 5.2.2.4 logger.MaxFileSize

This property sets the maximum size of a trace log file or message log file. If you do not specify KB (for kilobytes), MB (for megabytes), or GB (for gigabytes), the specified value is assumed to be in bytes. This property is applied to the Provisioning Manager server, GUI trace log files, and message log files.

You can specify a value from 4096 bytes to 2147483647 bytes (up to but not including 2 GB). The default is 1 MB.

## 5.3 Overview of Device Manager Agent Properties

Device Manager agent properties can be divided into two types:

Device Manager agent properties can be divided into the three types described below, which are stored in the `server.properties` file, `logger.properties` file, and `hldutil.properties` file of Device Manager, respectively.

- Property related to an agent's HTTP communication function, located in the `server.properties` file.
- Property related to the log function of an agent, located in the `logger.properties` file.
- Property related to the device files that are used to configure a host running HP-UX 11i v3

  `hldutil.properties` file

The default directory for the properties files is as follows:

In Windows:

```
\agent\config
```

In Solaris, AIX, Linux, or HP-UX:

```
/agent/config
```

The `hldutil.properties` file resides in the following directory, under the installation directory of the Device manager agent.

In Windows:

```
\util\bin\
```

In Solaris, AIX, Linux, or HP-UX:

```
/util/bin
```

If you modify the `logger.properties` or `server.properties` file, the change will be applied after restarting the Device Manager agent.

For details on how to restart the Device Manager agent, see the *HiCommand Device Manager Agent Installation Guide*.

If you do not specify the properties, or if a specified value for a property exceeds the valid range, the Device Manager agent uses the default value.

Table 5.2 lists the Device Manager agent properties and indicates where each property is explained in detail.

**Table 5.2 Device Manager Agent Properties**

| Classification | File Name | Property | See Section |
|---|---|---|---|
| Properties related to an agent's HTTP communication function. | `Server.properties` | `server.agent.fs.moduleTimeOut` | 5.4.1.1 |
| | | `server.agent.vm.moduleTimeOut` | 5.4.1.2 |
| | | `server.agent.os.moduleTimeOut` | 5.4.1.3 |
| Properties related to an agent's log function. | `logger.properties` | `logger.loglevel` See ***Note*** | 5.4.2.1 |
| | | `logger.MaxBackupIndex` See ***Note*** | 5.4.2.2 |
| | | `logger.MaxFileSize` See ***Note*** | 5.4.2.3 |
| Properties related to the device files used to configure an HP-UX 11i v3 host | `hldutil.properties` | `agent.util.hpux.displayDsf` | 5.4.3 |

***Note:*** The log files that are targeted by these properties are `trace.log` and `error.log`.

## 5.4 Device Manager Agent Properties

The following section describes Device Manager agent properties.

### 5.4.1 Properties Related to Agent HTTP Communication Functions

The following section describes properties related to agent HTTP communication properties.

#### 5.4.1.1 server.agent.fs.moduleTimeOut

This property is used to set the timeout value from when a file system operation command is executed, until the command execution result is to be returned. You can specify a value from 1 to 2147483647 seconds. The default is 1200.

#### 5.4.1.2 server.agent.vm.moduleTimeOut

This property is used to set the timeout value from when a volume manager operation command is executed, until the command execution result is to be returned. You can specify a value from 1 to 2147483647 seconds. The default is 1200.

#### 5.4.1.3 server.agent.os.moduleTimeOut

You use this property to set the timeout value from when a host setup command (such as a device recognition command) is executed, until the command execution result is to be returned. You can specify a value from 1 to 2147483647 seconds. The default is 180.

### 5.4.2 Agent Log Properties

The following section describes agent log properties.

#### 5.4.2.1 logger.loglevel

You use this property to set the *threshold value* for the output level of the trace log and error log that are output by the log output function.

The values you can specify are, in the order of importance, `ERROR` (error), `WARN` (warning), `INFO` (information), and `DEBUG` (debug). Only messages that exceed the value set in this field are output to the trace log. The default is INFO.

#### 5.4.2.2 logger.MaxBackupIndex

You use this property to set the maximum number of backup files for the trace log files and error log files that are output by the log output function.

When the backup file size reaches the maximum size specified by `logger.MaxFileSize`, a counter indicating the ordering of the files is added, and the file name is updated. For example, `access.log` becomes `access.log.1`. As additional log files are created, the counter continues increasing until the specified number of backup files is reached (for example, `access.log.1` becomes `access.log.2`). Once the specified number of backup files has been reached, the oldest backup file is deleted, as a new one is created.

You can specify a value from 1 to 20. The default is 10.

#### 5.4.2.3 logger.MaxFileSize

You use this property to set the maximum size for the trace log files and error log files that are output by the log output function. When the log file size exceeds the specified value, a new log file is created.

When setting a value, you must specify KB or MB as the unit. Otherwise, the specified value is interpreted as being specified in bytes. Note that for this property, KB and MB are interpreted to be 1024 bytes and 1024 KB, respectively.

You can specify a value from 512 KB to 32 MB. The default is 1 MB.

### 5.4.3 Properties Related to the Device Files Used to Configure an HP-UX 11i v3 Host

#### 5.4.3.1 agent.util.hpux.displayDsf Property

When the host OS is HP-UX 11i v3, you can use this property to specify device files used for Provisioning Manager host settings. The specifiable values are `disk`, `ctd`, and `mix`.

When `disk` is specified:

The setting operation is performed for the `disk` device files.

When `ctd` is specified:

The setting operation is performed for the `ctd` device files.

When `mix` is specified:

The setting operation is performed for both the `disk` device files and `ctd` device files.

The default is `mix`.

## 5.5 Specifying Security Settings

To implement secure communications between a management server and management client (GUI), you must specify the security settings, which include data encryption and user authentication using SSL (Secure Sockets Layer) and TLS (Transport Layer Security). For more information on server security, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

After the server is installed, use the http protocol to access the server from the client. To change the protocol, use the HiCommand Suite Common Component's **hcmdschgurl** command.

## 5.6 Warning Banner Settings

An optional message (warning banner) can be displayed as a security risk measure at login. Issuing a warning beforehand to third parties that might attempt invalid access can help reduce the risk of problems such as data loss or information leakage.

For details on how to set the message, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

## 5.7 Firewall Settings

If a firewall is enabled in the Provisioning Manager server OS (either Windows Server 2003 with SP1 or later, Windows XP with SP2 or later, or Linux), or in the host OS (either Windows Server 2003 with SP1 or later, Windows Server 2003 x64 Edition with no SP or with SP2, Windows Server 2003 R2 with no SP or with SP2, or Linux), specify the following settings to run Provisioning Manager.

- **Provisioning Manager Server Settings**

  As Device Manager is a required program, it needs to be added to the firewall exceptions list on the server. If you have already added Device Manager to the exceptions list, you do not need to add it again.

  For details on how to configure a firewall and how to check the settings, see the *HiCommand Device Manager Server Installation and Configuration Guide*.

- **Host Settings**

  Add the Device Manager agent to the firewall exceptions list on the host. If you have already added the Device Manager agent to the exceptions list, you do not need to add it again.

  For details on how to configure a firewall and how to check the settings, see the *HiCommand Device Manager Agent Installation Guide*.

## 5.8 Settings When 100 or More LUs Are Recognized by the Host

If the number of LUs managed by Provisioning Manager and recognized by a single host is 100 or more, the following problems might occur:

- When the `HiScan` command is executed, the `KAIC22009-E`, `KAIC22014-E`, `KAIC22019-E`, or `KAIC22048-E` error message is output, and the host information cannot be registered in the Provisioning Manager server.
- When the host is refreshed, an OutOfMemory error occurs on the host, and the host does not respond even after waiting.

To avoid these problems, change the following values based on the setting values indicated in the tables in section 5.8.1:

- The maximum length of data that can be received by the Device Manager server: Set this value for the `server.http.entity.maxLength` property in the `server.properties` property file of the Device Manager server. For details on the `server.http.entity.maxLength` property, see the *HiCommand Device Manager Server Installation and Configuration Guide*.
- The timeout value for the processing to register information in a server: Set this value for the `server.http.server.timeOut` property and `server.util.processTimeOut` property in the `server.properties` property file of the Device Manager agent. For details on the `server.http.server.timeOut` property and `server.util.processTimeOut` property, see the *HiCommand Device Manager Agent Installation Guide*.
- The memory heap size

  Set this value for the `server.agent.maxMemorySize` property in the `server.properties` property file of the Device Manager agent.

  For details about the `server.agent.maxMemorySize` property, see the *HiCommand Device Manager Agent Installation Guide*.

This section provides estimates for the setting values depending on whether or not a volume manager is used.

Depending on your environment, the estimated values described here might be insufficient. Make sure that you adjust the values to suit your environment.

### 5.8.1 When a Volume Manager Is Not Used

Table 5.3 lists approximate standards for the setting values.

**Table 5.3 Setting Values When a Volume Manager Is Not Used**

| Number of LUs Managed by Provisioning Manager, and Recognized by the Host | server.http.entity.maxLength (Units: Bytes) | server.http.server.timeOut# (Units: Seconds) | server.util.processTimeOut (Units: Milliseconds) |
|---|---|---|---|
| 100 | Default value (131072) | Default value (600) | Default value (600000) |
| 256 | 153600 | 600 | 600000 |
| 512 | 307200 | 1000 | 600000 |
| 1024 | 614400 | 1800 | 1200000 |

### 5.8.2 When a Volume Manager Is Used

The following tables list approximate standards for the setting values of each host OS.

**Table 5.4 Setting Values When a Volume Manager Is Used (in Windows)**

| Number of LUs and Logical Volumes Managed by Provisioning Manager and Recognized by the Host | server.http.entity. maxLength (Units: Bytes) | server.http.server.time Out (Units: Seconds) | server.util.processTime Out (Units: Milliseconds) | server.agent. maxMemory Size (Units: MB) |
|---|---|---|---|---|
| 88/10 | 230000 | Default value (600) | Default value (600000) | 64 |
| 88/20 | 750000 | 600 | 600000 | 64 |
| 100/200 | 12000000 | 600 | 600000 | 128 |
| 100/500 | 30000000 | 1000 | 600000 | 384 |

**Table 5.5 Setting Values When a Volume Manager Is Used (in Solaris)**

| Number of LUs and Logical Volumes Managed by Provisioning Manager and Recognized by the Host | server.http.entity. maxLength (Units: Bytes) | server.http.server.time Out (Units: Seconds) | server.util.processTime Out (Units: Milliseconds) | server.agent. maxMemory Size (Units: MB) |
|---|---|---|---|---|
| 100/200 | 3100000 | Default value (600) | Default value (600000) | 128 |
| 100/500 | 7200000 | 1000 | 600000 | 384 |
| 150/500 | 12000000 | 1000 | 600000 | 512 |
| 250/500 | 18000000 | 1000 | 600000 | 768 |

| Number of LUs and Logical Volumes Managed by Provisioning Manager and Recognized by the Host | server.http.entity.maxLength (Units: Bytes) | server.http.server.timeOut (Units: Seconds) | server.util.processTimeOut (Units: Milliseconds) | server.agent.maxMemorySize (Units: MB) |
|---|---|---|---|---|
| 500/1000 | 36000000 | 1000 | 720000 | 768 |

**Table 5.6 Setting Values When a Volume Manager Is Used (in AIX)**

| Number of LUs and Logical Volumes Managed by Provisioning Manager and Recognized by the Host | server.http.entity.maxLength (Units: Bytes) | server.http.server.timeOut (Units: Seconds) | server.util.processTimeOut (Units: Milliseconds) | server.agent.maxMemorySize (Units: MB) |
|---|---|---|---|---|
| 100/200 | 2500000 | Default value (600) | Default value (600000) | 128 |
| 100/500 | 6000000 | 1000 | 600000 | 384 |
| 175/500 | 11000000 | 1000 | 670000 | 640 |
| 250/500 | 15000000 | 1000 | 1200000 | 768 |
| 500/1000 | 19000000 | 1000 | 1800000 | 768 |

**Table 5.7 Setting Values When a Volume Manager Is Used (in Linux)**

| Number of LUs and Logical Volumes Managed by Provisioning Manager and Recognized by the Host | server.http.entity.maxLength (Units: Bytes) | server.http.server.timeOut (Units: Seconds) | server.util.processTimeOut (Units: Milliseconds) | server.agent.maxMemorySize (Units: MB) |
|---|---|---|---|---|
| 100/50 | 748000 | Default value (600) | Default value (600000) | 64 |
| 100/100 | 1420000 | 1000 | 600000 | 64 |
| 100/256 | 3600000 | 1000 | 600000 | 192 |
| 200/256 | 7100000 | 1000 | 600000 | 512 |

**Table 5.8 Setting Values When a Volume Manager Is Used (in HP-UX)**

| Number of LUs and Logical Volumes Managed by Provisioning Manager and Recognized by the Host | server.http.entity.maxLength (Units: Bytes) | server.http.server.timeOut (Units: Seconds) | server.util.processTimeOut (Units: Milliseconds) | server.agent.maxMemorySize (Units: MB) |
|---|---|---|---|---|
| 100/50 | 745000 | Default value (600) | Default value (600000) | 64 |
| 100/100 | 1400000 | 1000 | 600000 | 64 |
| 100/256 | 3500000 | 1000 | 600000 | 192 |

| Number of LUs and Logical Volumes Managed by Provisioning Manager and Recognized by the Host | server.http.entity.maxLength (Units: Bytes) | server.http.server.timeOut (Units: Seconds) | server.util.processTimeOut (Units: Milliseconds) | server.agent.maxMemorySize (Units: MB) |
|---|---|---|---|---|
| 200/256 | 7000000 | 1000 | 600000 | 512 |
| 500/1000 | 40000000 | 1000 | 600000 | 896 |
| 1000/100 | 8000000 | 1000 | 600000 | 192 |
| 1000/500 | 42000000 | 1000 | 1200000 | 896 |

## 5.9 Generating Audit Logs

Audit logs for Provisioning Manager and other Hitachi storage-related products can be generated in order to prove to auditors and evaluators the compliance with regulations, security evaluation standards, and other business standards. The following table lists and describes the categories of audit log data that can be generated from Hitachi storage-related products.

**Table 5.9 Categories and Descriptions**

| Categories | Description |
|---|---|
| `StartStop` | Events indicating starting or stopping of hardware or software.<br>▪ Starting or shutting down an OS<br>▪ Starting or stopping a hardware component (including micro components)<br>▪ Starting or stopping software on Lightning/Thunder or SVP, and HiCommand Suite products |
| `Failure` | Events indicating hardware or software failures.<br>▪ Hardware failures<br>▪ Software failures (memory error, etc.) |
| `LinkStatus` | Events indicating link status among devices.<br>▪ Whether a link is up or down |
| `ExternalService` | Events indicating communication results between Hitachi storage-related products and external services.<br>▪ Communication with a RADIUS, LDAP, NTP, and DNS server<br>▪ Communication with a management server (SNMP) |
| `Authentication` | Events indicating that a device, administrator, or end user succeeded or failed in connection or authentication.<br>▪ FC login<br>▪ Device authentication (FC-SP authentication, iSCSI login authentication, SSL server/client authentication)<br>▪ Administrator or end user authentication |

| Categories | Description |
|---|---|
| AccessControl | Events indicating that a device, administrator, or end user succeeded or failed in gaining access to resources.<br>▪ Access control for devices (IP/FC LUN Security)<br>▪ Access control for the administrator or end users |
| ContentAccess | Events indicating that attempts to access important data succeeded or failed.<br>▪ Access to important files on NAS or to contents when HTTP is supported<br>▪ Access to audit log files |
| ConfigurationAccess | Events indicating that the administrator succeeded or failed in performing an allowed operation.<br>▪ Reference or update of the configuration information<br>▪ Update of account settings including addition or deletion of accounts<br>▪ Security configuration<br>▪ Reference or update of audit log settings |
| Maintenance | Events indicating that a performed maintenance operation succeeded or failed.<br>▪ Addition or deletion of hardware components<br>▪ Addition or deletion of software components |
| AnomalyEvent | Events indicating that anomalies such as a threshold excess occurred.<br>▪ Excess over network traffic threshold<br>▪ Excess over CPU load threshold<br>▪ Over-limit pre-notification or wraparound of audit logs temporarily saved inside |
| | Events indicating that abnormal communication occurred.<br>▪ SYN flood attacks to a regularly used port, or protocol violations<br>▪ Access to an unused port (port scanning, etc.) |

The audit log types that can be generated vary according to products. The following sections describe the audit logs that can be generated by using Provisioning Manager. For details on the audit logs for other products, see their respective manuals.

### 5.9.1 Categories of Information Output to Audit Logs in Provisioning Manager

The following table lists the categories of information output to audit logs in Provisioning Manager and the audit events. Each audit event is assigned a severity level. You can filter audit log data to be output according to their the severity levels of events.

**Table 5.10 Categories of Information Output to Audit Logs, and Audit Events**

| Category | Description | Audit Event | Severity |
|---|---|---|---|
| StartStop | Start and stop of software | Successful SSO server start | 6 |
| | | Failed SSO server start | 3 |
| | | SSO server stop | 6 |
| Authentication | Administrator or end user | Successful login | 6 |

| Category | Description | Audit Event | Severity |
|---|---|---|---|
| | authentication | Failed login (wrong user ID or password) | 4 |
| | | Failed login (logged in as a locked user) | 4 |
| | | Failed login (logged in as a non-existing user) | 4 |
| | | Failed login (no permission) | 3 |
| | | Failed login (authentication failure) | 4 |
| | | Successful logout | 6 |
| | Automatic account lock | Automatic account lock (repeated authentication failure or expiration of account) | 4 |
| ConfigurationAccess | User registration | Successful user registration | 6 |
| | | Failed user registration | 3 |
| | User deletion | Successful single user deletion | 6 |
| | | Failed single user deletion | 3 |
| | | Successful multiple user deletion | 6 |
| | | Failed multiple user deletion | 3 |
| | Password change (from the administrator panel) | Successful password change by the administrator | 6 |
| | | Failed password change by the administrator | 3 |
| | Password change (from the user's own panel) | Failed in authentication processing for verifying old password | 3 |
| | | Successful change of login user's own password (from the user's own panel) | 6 |
| | | Failed change of login user's own password (from the user's own panel) | 3 |
| | Profile change | Successful profile change | 6 |
| | | Failed profile change | 3 |
| | Permission change | Successful permission change | 6 |
| | | Failed permission change | 3 |
| | Account lock | Successful account lock | 6 |
| | | Failed account lock | 3 |
| | Account lock release | Successful account lock release | 6 |
| | | Failed account lock release | 3 |
| | Database backup or restore | Successful backup using the hcmdsdb command | 6 |

| Category | Description | Audit Event | Severity |
|---|---|---|---|
| | | Failed backup using the `hcmdsdb` command | 3 |
| | | Successful full restore using the `hcmdsdb` command | 6 |
| | | Failed full restore using the `hcmdsdb` command | 3 |
| | | Successful partial restore using the `hcmdsdb` command | 6 |
| | | Failed partial restore using the `hcmdsdb` command | 3 |
| | Database input/output | Successful data output using the `hcmdsdbmove` command | 6 |
| | | Failed data output using the `hcmdsdbmove` command | 3 |
| | | Successful data input using the `hcmdsdbmove` command | 6 |
| | | Failed data input using the `hcmdsdbmove` command | 3 |
| | Database area creation or deletion | Successful database area creation using the `hcmdsdbsetup` command | 6 |
| | | Failed database area creation using the `hcmdsdbsetup` command | 3 |
| | | Successful database area deletion using the `hcmdsdbsetup` command | 6 |
| | | Failed database area deletion using the `hcmdsdbsetup` command | 3 |
| | Authentication data input/output | Successful data output using the `hcmdsdbauthmove` command | 6 |
| | | Failed data output using the `hcmdsdbauthmove` command | 3 |
| | | Successful data input using the `hcmdsdbauthmove` command | 6 |
| | | Failed data input using the `hcmdsdbauthmove` command | 3 |
| | Reception of a request to the Provisioning Manager server and transmission of response | Reception of request (during normal processing) | 6 |
| | | Reception of request (common, in the event of an error) | 3 |
| | | Transmission of response (during normal processing) | 6 |
| | | Transmission of response (in the event of an error) | 3 |

### 5.9.2 Editing Audit Log Environment Settings File

To generate the Provisioning Manager audit logs, you must edit the environment settings file (`auditlog.conf`). The audit logs can be generated by setting audit event categories, in `Log.Event.Category` of the environment settings file, to be generated. For Windows, the audit logs are output to the event log files (application log files). For Solaris™ and Linux, they are output to the `syslog` file.

***Caution:*** A large volume of audit log data might be output. Change the log size and back up or archive the generated logs accordingly.

The following describes the storage destination for the `auditlog.conf` file.

- For Windows:

```
installation-folder-for-HiCommand-Suite-Common-Component\conf\sec\auditlog.conf
```

- For Solaris or Linux:

```
/opt/HiCommand/Base/conf/sec/auditlog.conf
```

The table below shows the items that are set for the `auditlog.conf` file.

**Table 5.11 Items Set for auditlog.conf**

| Item | Description |
|---|---|
| `Log.Facility` | Specify (by using a number) the facility to be used when the audit log messages are output to the `syslog` file. `Log.Facility` is used, in combination with the severity levels set for each audit event (see Table 5.10), for filtering the output to the `syslog` file.<br>For details about the values that can be specified for `Log.Facility`, see Table 5.12. For details about the correspondence between the severity levels set for audit events and those set in the `syslog.conf` file, see Table 5.13.<br>`Log.Facility` has an effect in Solaris™ or Linux only. `Log.Facility` is ignored in Windows, even if it is specified. Also, if an invalid value or a non-numeric character is specified, the default value is used.<br>Default value: `1` |
| `Log.Event.Category` | Specify the audit event categories to be generated. When specifying multiple categories, use commas (`,`) to separate them. If `Log.Event.Category` is not specified, audit log data is not output. For information about the available categories, see Table 5.10. `Log.Event.Category` is not case-sensitive. If an invalid category name is specified, the specified file name is ignored.<br>Default value: (not specified) |

| Item | Description |
|---|---|
| Log.Level | Specify the severity level of audit events to be generated. Events with the specified severity level or lower will be output to the event log file..<br>For information about the audit events that are output from Provisioning Manager and their severity levels, see Table 5.10. For details about the correspondence between the severity levels of audit events and the types of event log data, see Table 5.13.<br>Log.Level has an effect in Windows® only. Log.Level is ignored in Solaris™ and Linux, even if it is specified. Also, if an invalid value or a non-numeric character is specified, the default value is used.<br>Specifiable values: 0 to 6 (severity level)<br>Default value: 6 |

The table below shows the values that can be set for Log.Facility and the corresponding values specified in the syslog.conf file.

**Table 5.12 Log.Facility Values and the Corresponding Values in syslog.conf**

| Facility | Corresponding Values in syslog.conf |
|---|---|
| 1 | user |
| 2 | mail# |
| 3 | daemon |
| 4 | auth# |
| 6 | lpr# |
| 16 | local0 |
| 17 | local1 |
| 18 | local2 |
| 19 | local3 |
| 20 | local4 |
| 21 | local5 |
| 22 | local6 |
| 23 | local7 |

# Although you can specify this value, we do not recommend that you specify it.

The table below shows the correspondence between the severity levels of audit events, the values indicating severity that are specified in the syslog.conf file, and the types of event log data.

**Table 5.13 Correspondence Between the Severity Levels of Audit Events, the Severity Levels in syslog.conf, and the Types of Event Log Data**

| Severity of Audit Events | Severity in syslog.conf | Type of Event Log Data |
|---|---|---|
| 0 | emerg | Error |
| 1 | alert | |
| 2 | crit | |
| 3 | err | |
| 4 | warning | Warning |
| 5 | notice | Information |
| 6 | info | |
| 7 | debug | |

The following shows an example of the `auditlog.conf` file:

```
Log.Facility  1
Log.Event.Category Authentication,ConfigurationAccess
Log.Level 6
```

In the example above, the audit events related to `Authentication` or `ConfigurationAccess` are output. For Windows®, `Log.Level 6` outputs audit log data corresponding to the Error, Warning, and Information levels. For Solaris™ or Linux, `Log.Facility 1` outputs the audit log data to the `syslog` file that is defined as the `user` facility in the `syslog.conf` file.

### 5.9.3 Format of Output Audit Log Data

This section describes the format of output audit log data.

- For Windows:

  When you open an event by choosing **Event Viewer** and then **Application**, the following is displayed in the **Description** area in the **Event Properties**.

  ```
  program-name [process-ID]: message-portion
  ```

- For Solaris or Linux:

  The contents of a `syslog` file

  ```
  date-time server-name (or IP-address) program-name[process-ID]: message-portion
  ```

The format and contents of *message-portion* are described below.

#### The output format of message-portion:

*uniform-identifier*,*unified-specification-revision-number*,
*serial-number*,*message-ID*,*date-and-time*,*detected-entity*,*detected-location*,*audit-event-type*,
*audit-event-result*,*audit-event-result-subject-identification-information*,
*hardware-identification-information*,*location-information*,*location-identification-information*,
*FQDN*,*redundancy-identification-information*,*agent-information*,*request-source-host*,
*request-source-port-number*,*request-destination-host*,*request-destination-port-number*,
*batch-operation-identifier*,*log-data-type-information*,*application-identification-information*,
*reserved-area*,*message-text*

**Table 5.14 Information Output to message-portion**

| Item# | Description |
|---|---|
| *uniform-identifier* | Fixed to `CELFSS`. |
| *unified-specification-revision-number* | Fixed to `1.1`. |
| *serial-number* | Serial number of audit log messages. |
| *message-ID* | Message ID.<br>For details, see section 5.9.4. |
| *date-and-time* | The date and time when the message was output. This item is output in the format of `yyyy-mm-ddThh:mm:ss.s`*time-zone*. |
| *detected-entity* | Component or process name. |
| *detected-location* | Host name. |
| *audit-event-type* | Event type. |
| *audit-event-result* | Event result. |
| *audit-event-result-subject-identification-information* | Account ID, process ID, or IP address corresponding to the event. |
| *hardware- identification-information* | Hardware model or serial number. |
| *location-information* | Identification information for the hardware component. |
| *location-identification-information* | Location identification information. |
| *FQDN* | Fully qualified domain name. |
| *redundancy-identification-information* | Redundancy identification information. |
| *agent-information* | Agent information. |
| *request-source-host* | Host name of the request sender. |
| *request-source-port-number* | Port number of the request sender. |
| *request-destination-host* | Host name of the request destination. |
| *request-destination-port-number* | Port number of the request destination. |
| *batch-operation-identifier* | Serial number of operations through the program. |
| *log-data-type-information* | Fixed to `BasicLog`. |
| *application-identification-information* | Program identification information. |
| *reserved-area* | Not output. This is a reserved space. |
| *message-text* | The contents vary according to the audit events.<br>Characters that cannot be displayed are output as asterisks (`*`).<br>For details, see section 5.9.5. |

# Some items are not output for some audit events.

**Example of message-portion output for the Login audit event:**

```
CELFSS,1.1,0,KAPM01124-I,2006-05-15T14:08:23.1+09:00,HBase-SSO,management-host,
Authentication,Success,uid=system,,,,,,,,,,,BasicLog,,,"The login process has
completed properly."
```

**Example of audit log data output when a request to the Provisioning Manager server is received:**

```
CELFSS,1.1,0,KARF91200-I,2006-11-10T18:21:17.9+09:00,PvM,CZA92G,Configuration
Access,Success,uid=System,,,,,,,from=10.208.64.128,,,,,BasicLog,PvM,,
"PvM123456789 GetSPoolSum info='All Resources' CID=Pv1163150475209G"
```

### 5.9.4 Audit Log Message ID

The following two types of audit log message IDs are output:

1. KAPM: Audit events occurring during HiCommand Suite Common Component processing

   For information on the message text corresponding to each message ID, see section 5.9.5.1.

2. KARF: Audit events occurring during processing other than 1 above.

   The table below shows the message IDs and their contents.

**Table 5.15 Audit Log Message IDs and Their Contents**

| Message ID | Description | Section for the corresponding message format |
|---|---|---|
| KARF91000 to KARF91399 | When a request to the Provisioning Manager server is received and when a response is sent (during normal processing) | 5.9.5.2 |
| KARF91400 to KARF91799 | When a request to the Provisioning Manager server is received and when a response is sent (during error handling processing) | |

### 5.9.5 Message Text Component of Audit Log Data

The format of message text in audit log data varies from one audit event to another. This section describes the message text format for each audit event. The item enclosed by square brackets ([ ]) in the message text format might not be output.

#### 5.9.5.1 When Output as Processing Results of HiCommand Suite Common Component

Information on the audit event that has occurred is output in a character string. For more information on the message text, see *HiCommand Device Manager Error Codes*. The following shows an example of message text.

**Example of message text output upon login:**

```
"The login process has completed properly."
```

#### 5.9.5.2 When Output as Processing Results of Provisioning Manager Server

This section describes the format of messages that are output to the message text, and the information displayed when a request to the Provisioning Manager server is received or a response is sent.

**Format of messages output when a request is received (during normal processing):**

*unique-ID details-of-request parameter command-ID*

**Format of messages output when a request is received (in the event of an error):**

*unique-ID details-of-request parameter command-ID error-code*

**Format of messages output when a response is sent (during normal processing of a view or setting operation or when processing for either of those operations is suspended):**

*unique-ID command-ID operation-ID*

**Format of messages output when a response is sent (during abnormal processing of a view or setting operation):**

*unique-ID command-ID error-code*

**Format of messages output when a response is sent (during normal polling processing):**

*unique-ID command-ID status operation-ID*

**Format of messages output when a response is sent (during abnormal polling processing):**

*unique-ID command-ID error-code operation-ID*

**Table 5.16 Information That Is Displayed in the Message Text When a Request to the Provisioning Manager Server Is Received or a Response Is Sent**

| Item | Description |
|---|---|
| *unique-ID* | Displays a unique value as the ID that identifies a request or response. |
| *details-of-request* | Displays a character string as the details of a request to the Provisioning Manager server. For the meaning of the character string that is displayed as the details of a request, see 5.9.6 |
| *parameter* | Displays the parameter information for identifying the target resource, from among the parameters that are passed when a request is issued. If there are no parameters, this information is not displayed. For details about the parameters that are displayed, see 5.9.6<br>The format for output parameters is as follows:<br>▪ A parameter is displayed in the format: `info='...'`. If there are multiple parameters, each parameter is separated by a comma (`,`). Such as: `info='X,Y,Z'`.<br>▪ If a parameter is an array, each value in the array is separated by a space and the entire array is enclosed in square brackets, such as: `[a1 a2 a3]`.<br>▪ If a parameter value contains a single quotation mark (`'`), comma (`,`), or square brackets (`[]`), the relevant symbol is replaced with a question mark (`?`). |
| *command-ID* | Displays the ID that is assigned to an operation so that the logs related to the operation can be identified.<br>The format for output command-IDs is as follows:<br>▪ A command ID is displayed in the format `CID=...`<br>▪ A command ID is not displayed when you register or view a license.<br>▪ Except for the above case, if a command ID cannot be obtained, the character string `Unknown` is displayed. |
| *status* | Displays a character string that indicates the polling results. Some Provisioning Manager operations take a long time to finish after a request is issued. In this case, the processing status is checked by a polling operation.<br>One of the following character strings is displayed:<br>▪ COMPLETED: The processing was completed.<br>▪ FAILED: The processing failed.<br>▪ SUSPENDED: The processing was suspended. |
| *error-code* | Displays the message ID. |
| *operation-ID* | Output character string that shows that the log before the operation was interrupted is related to the log after the operation resumes.<br>This item is displayed in the following situations:<br>▪ When a response for a setting operation is sent (during normal processing)<br>▪ When a response for polling is sent (during normal processing)<br>▪ When a response for polling is sent (during abnormal processing) |

The following shows an example of the displayed message text:

**Example of message text that is displayed for the audit event *reception of request (during normal processing)*:**

```
"PvM123456789 GetAlloc info='32' CID=Pv243488034G"
```

**Example of message text that is displayed for the audit event *transmission of response (in the event of an error)*:**

```
"PvM123456789 CID=Pv243488034G KARF15000-E"
```

### 5.9.6 Details of Requests, and Parameters That Are Output to the Audit Log

The following table lists and describes the details of requests, their descriptions, and parameters that are output by Provisioning Manager to the audit log.

**Table 5.17 Details of Requests to the Provisioning Manager Server and the Parameters That Are Output**

| Details of Request | Description | Parameter that is Output |
|---|---|---|
| AddLicense | Adds a license by using a single license key. | Fixed to * * * * * |
| | Adds a license by using a license key file. | Size of the license key file |
| CreateAllocPl | Creates a new allocation plan. | Information about the allocation plan#1 |
| DelAllocPl | Deletes an allocation plan. | Resource identifier of the allocation plan that is to be deleted#2 |
| GetAllocVols | Acquires a list of volumes that are to be displayed in the list of allocated LDEVs. | ▪ Names of the resource groups in a storage pool from which the volumes are acquired<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong#2<br>▪ Information about the allocation plan (if specified)#1 |
| GetAllocPls | Acquires all allocation plans that can be referenced by the logon user. | -- |
| GetAllocPl | Acquires the allocation plan that has the specified resource identifier. | Resource identifier of the allocation plan#2 |
| GetAllocPlByName | Acquires the allocation plan that has the specified name. | Allocation plan name |
| GetConPortInfoByDevF | Acquires the port connection information that has been set between the specified device file and the volume. | ▪ Resource identifier of the volume#2<br>▪ Resource identifier of the device file#2 |

| Details of Request | Description | Parameter that is Output |
|---|---|---|
| GetConPortInfoByHost | Acquires the port connection information that has been set between the specified host and the volume | ▪ Resource identifier of the volume[#2]<br>▪ Resource identifier of the host[#2] |
| GetDevF | Acquires the device file that has the specified resource identifier. | Resource identifier of the device file[#2] |
| GetDevFByName | Acquires the device file that has the specified name. | ▪ Resource identifier of the host[#2]<br>▪ Device file name |
| GetDevFHost | Acquires the device file of the specified host. | Resource identifier of the host[#2] |
| GetDevFsSumByHost | Acquires the device file of the specified host. | Resource identifier of the host[#2] |
| GetDevOprLogDtl | Acquires the details of the device operation log information that has the specified device operation log ID. | Log ID |
| GetDevOprLogs | Acquires device operation log information. | -- |
| GetFSys | Acquires the file system that has the specified resource identifier. | Resource identifier of the file system[#2] |
| GetFSysMP | Acquires, on the specified host, the file system at the mount point. | ▪ Resource identifier of the host[#2]<br>▪ Mount point |
| GetFSysByHost | Acquires the file system of the specified host. | Resource identifier of the host[#2] |
| GetFSysSumHost | Acquires the file system of the specified host. | Resource identifier of the host[#2] |
| GetFiltSPoolDtl | Acquires storage pool information for the specified resource group and the resource groups immediately below it. | ▪ Target resource group name<br>▪ Information about the allocation plan (if specified)[#1] |
| GetFiltSPoolSum | Acquires the storage pool information for the specified resource group | ▪ Target resource group name<br>▪ Information about the allocation plan (if specified)[#1] |
| GetHost | Acquires the host information that has the specified resource identifier. | Resource identifier of the host[#2] |
| GetHostByIPAddress | Acquires the host information that has the specified IP address. | IP address |
| GetHostByName | Acquires the host information that has the specified name. | Host name |
| GetHosts | Acquires the host information for all management-target hosts. | -- |
| GetHostSum | Acquires the host information for all management-target hosts. | -- |
| GetLicenseInfo | Acquires the license information. | -- |
| GetLogLevel | Dynamically acquires the log output level. | -- |

| Details of Request | Description | Parameter that is Output |
|---|---|---|
| GetOprEvent | Acquires a host setting event. | Operation ID of the host setting processing that was acquired as the return value of the host setting operation API |
| GetProvInfo | Acquires provisioning settings. | Operation ID of the host setting processing that was acquired as the return value of the host setting operation API |
| GetSA | Acquires storage subsystem information that has the specified resource identifier. | Resource identifier of the storage subsystem to which the acquired volumes belong[#2] |
| GetSAByTypeSrlNum | Acquires storage subsystem information specified by the model and serial number. | ▪ Model name of the storage subsystem<br>▪ Serial number of the storage subsystem |
| GetSAs | Acquires storage subsystem information for all management targets. | -- |
| GetSAByName | Acquires storage subsystem information that has the specified name. | Storage subsystem name |
| GetSPoolDtl | Acquires an array whose elements are the storage pool information for the specified resource group and the resource groups immediately below it. | Target resource group name |
| GetSPoolDispArrFamDtl | Acquires an array whose elements are the storage pool information for the specified resource group and the resource groups immediately below it. | Target resource group name |
| GetSPoolDispArrFamSum | Acquires storage pool information for the specified resource group for each series. | Target resource group name |
| GetSPoolDispArrTypeDtl | Acquires an array whose elements are the storage pool information for the specified resource group and the resource groups immediately below it. | Target resource group name |
| GetSPoolDispArrDypeSum | Acquires storage pool information for the specified resource group for each model. | Target resource group name |
| GetSPoolRaidTypeDtl | Acquires an array whose elements are the storage pool information for the specified resource group and the resource groups immediately below it. | Target resource group name |
| GetSPoolRaidTypeSum | Acquires storage pool information for the specified resource group for each RAID type. | Target resource group name |
| GetSPoolSANameDtl | Acquires an array whose elements are the storage pool information for the specified resource group and the resource groups immediately below it. | ▪ Target resource group name<br>▪ Information about the allocation plan[#1] |

| Details of Request | Description | Parameter that is Output |
|---|---|---|
| GetSPoolSANameSum | Acquires storage pool information for the specified resource group for each device. | ▪ Target resource group name<br>▪ Information about the allocation plan#1 |
| GetSPoolSum | Acquires storage pool information for the specified resource group. | Target resource group name |
| GetSprtSAFams | Acquires a list of supported series. | -- |
| GetSprtSATypes | Acquires a list of supported models. | -- |
| GetUnAllocVols | Acquires a list of volumes for displaying a list of allocated LDEVs. | ▪ Names of the resource groups in a storage pool from which the volumes are acquired<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong#2<br>▪ Information about the allocation plan#1 |
| GetUGrp | Acquires the resource group to which the logon user belongs. | -- |
| GetUGrpByName | Acquires the resource group that has the specified name. | Resource group name |
| GetUGrpForVol | Acquires an array of resource groups to which the specified volume belongs. | Array of the resource identifiers of the volume#2 |
| GetUGrps | Acquires an array that indicates the parent-child relationship of the resource groups to which the logon user belongs and the resource groups immediately below it. | -- |
| GetVer | Acquires the version information. | -- |
| GetVolSADevNum | Acquires the volume in the specified storage subsystem and device number. | ▪ Resource identifier of the storage subsystem#2<br>▪ Device number |
| GetVolSA | Acquires the volume in the specified storage subsystem. | Resource identifier of the storage subsystem#2 |
| GetVolForAddDevF | Acquires a list of volumes for creating a device file. | ▪ Resource identifier of the target host to which the volumes being acquired are to be allocated#2<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong#2 |
| GetVolForAddFSys | Acquires a list of volumes for creating a file system. | ▪ Resource identifier of the target host to which the volumes being acquired are to be allocated#2<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong#2 |

| Details of Request | Description | Parameter that is Output |
|---|---|---|
| GetVolForExpFSys | Acquires a list of volumes for expanding a file system. | ▪ Resource identifier of the file system to be expanded[#2]<br>▪ Resource identifier of the target host to which the volumes being acquired are to be allocated[#2]<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong[#2] |
| GetVolForModPool | Acquires a list of volumes for displaying the storage pool change window. | ▪ Names of the resource groups in a storage pool from which the volumes are acquired<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong[#2]<br>▪ Information about the allocation plan[#1] |
| GetVolSumForAllocPool | Acquires summary information for volumes to display a list of allocated LDEVs. | ▪ Names of the resource groups in a storage pool from which the volumes are acquired<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong[#2]<br>▪ Information about the allocation plan[#1] |
| GetVolSumForModPool | Acquires summary information for volumes to display the storage pool change window. | ▪ Names of the resource groups in a storage pool from which the volumes are acquired<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong[#2]<br>▪ Information about the allocation plan[#1] |
| GetVolSumForUnAllocPool | Acquires summary information for volumes to display a list of unallocated LDEVs. | ▪ Names of the resource groups in a storage pool from which the volumes are acquired<br>▪ Resource identifier of the storage subsystem to which the acquired volumes belong[#2]<br>▪ Information about the allocation plan[#1] |
| IsUsedLogicVolName | Checks whether the logical volume name is already in use. | ▪ Resource identifier of the host[#2]<br>▪ Logical volume name |
| IsUsedVolGrpName | Checks whether the volume group name is already in use. | ▪ Resource identifier of the host[#2]<br>▪ Volume group name |
| ModAllocPl | Edits an existing allocation plan. | Information about the allocation plan[#1] |

| Details of Request | Description | Parameter that is Output |
|---|---|---|
| ModPool | Changes the storage pool that owns the specified volume as OWN. | ▪ Resource group name to which the volume belonged before the move<br>▪ Resource group name after the move<br>▪ Array of the resource identifiers of the volume to be moved#2 |
| RefreshHostInfo | Refreshes host information. | Resource identifier of the host to be refreshed#2 |
| ResumeOpr | Restarts the host setting operation that has been suspended. | Operation ID acquired as the return value of the host setting operation API when the host setting operation was suspended |
| SetLogLevel | Dynamically changes the log output level. | Log output level |
| SetStatus | Changes the status (public or private) of the provisioning plan. | ▪ Resource identifier of the provisioning plan#2<br>▪ Status after change (public or private) |
| StartAddDevF | Creates a device file. | ▪ Resource identifier of the target host#2<br>▪ Resource identifier of the target volume#2<br>▪ Type of the volume manager to be used<br>▪ Volume group name<br>▪ Logical volume name<br><br>***Caution***: Volume group name and logical volume name are displayed only when they are specified. |
| StartAddFSys | Creates a file system. | ▪ Resource identifier of the target host#2<br>▪ Resource identifier of the target volume#2<br>▪ Type of the file system to be created<br>▪ Mount point of the file system to be created<br>▪ Type of the volume manager to be used<br>▪ Volume group name<br>▪ Logical volume name<br><br>***Caution***: Volume group name and logical volume name are displayed only when they are specified. |
| StartDelDevF | Deletes a specified device file. | Resource identifier of the device file to be deleted#2 |

| Details of Request | Description | Parameter that is Output |
|---|---|---|
| StartDelFSys | Deletes a specified file system. | Resource identifier of the file system to be deleted#2 |
| StartExpandFSys | Expands a file system. | ▪ Resource identifier of the file system to be expanded#2<br>▪ Resource identifier of the target volume#2 |

#1 For details about the parameters that are output as information about the allocation plan, see Table 5.18. The allocation plan information is displayed enclosed in square brackets ([]), and values are separated by a semicolon (;).

**Table 5.18 Parameters That Are Output as Information About the Allocation Plan**

| Information about the allocation plan | Output | |
|---|---|---|
| | ModAllocPl | Other than ModAllocPl |
| Plan name | Y | Y |
| Model name of storage subsystem | Y | Y |
| RAID level | Y | Y |
| Plan creation date | Y | -- |
| Plan owner resource group | Y | -- |
| User who created the plan | Y | -- |
| Plan creation resource group | Y | -- |
| Plan update date and time | Y | -- |
| User who updated the plan | Y | -- |
| Plan update resource group | Y | -- |
| Plan status (public or private) | Y | -- |

Legend: Y: Output, --: Not output

#2 The resource identifier consists of several elements. For details about the elements of each resource identifier, see Table 5.19. The elements of each resource identifier are output, separated by a hyphen (-).

**Table 5.19 Elements of the Resource Identifier**

| Resource Type | Element of Resource Identifier |
|---|---|
| File system | File system ID, host ID |
| Device file | Device file ID, host ID |
| Plan | Plan ID |
| Volume | Model name of storage subsystem, serial number, LDEV number |
| Storage subsystem | Model name of storage subsystem, serial number |
| Host | Host ID |

For the correspondence between the storage subsystem name that is displayed in the audit log and the actual model name, see Table 5.20. Note that Device Manager versions 5.7 and later do not support T3. However, if a T3 storage subsystem is already registered as a management target of Device Manager in earlier versions and you perform an operation for that storage subsystem, information about T3 might be output to the audit log.

**Table 5.20 Correspondence Between the Storage Subsystem Name That Is Displayed in the Audit Log and the Actual Model Name**

| Name Output to the Audit Log | Model |
|---|---|
| R600 | Universal Storage Platform V |
| R500 | TagmaStore USP, TagmaStore NSC55 |
| R450 | Lightning 9970V, Lightning 9980V |
| R400 | Lightning 9900 |
| D700 | TagmaStore AMS 200, TagmaStore AMS 500, TagmaStore AMS 1000, TagmaStore WMS 100 |
| D600 | Thunder 9530V, Thunder 9570V, Thunder 9580V |
| D500 | Thunder 9200 |
| T3 | Sun StorEdge T3 |

# Chapter 6 Troubleshooting

This chapter describes the types of problems that might occur while you are installing or uninstalling Provisioning Manager and how to resolve them.

- Troubleshooting information (see section 6.1)
- Actions To Be Taken When an Error Occurs During Installation or Uninstallation of Provisioning Manager Server (see section 6.2)

## 6.1 Troubleshooting Information

Table 6.1 shows general information for troubleshooting while you are installing a Provisioning Manager.

**Table 6.1 Troubleshooting Information**

| Problem | Cause | Corrective Action |
|---|---|---|
| An attempt to install a Provisioning Manager server failed. | Device Manager has not been installed. | Install Device Manager before you install a Provisioning Manager server. |
| | The version of the installed Device Manager is older than the Provisioning Manager version. | Before you install a Provisioning Manager server, install a version of Device Manager that is the same as or newer than the server version. |
| | There is insufficient free space remaining on the disk on which Device Manager is installed. | Free up space on the disk, and then re-install.<br>For details about the disk capacity required for installing Provisioning Manager, see section 3.3 or section 4.3. |
| | A user who does not have administrator-level privileges attempted to install a Provisioning Manager server. | Have a user with administrator-level privileges perform the installation. |
| | HiRDB/EmbeddedEdition _HD0 has not been started (for Windows only). | In the Control Panel, choose **Administrative Tools**, and then **Services** to open the Services window. In this window, start HiRDB/EmbeddedEdition _HD0 and then re-install the Provisioning Manager server. |
| Provisioning Manager's actions do not correspond to the setting in the property file. | Because the property file setting is invalid, Provisioning Manager is running according to the default value. | Correct the setting of the property file, by following the description in Chapter 5 of this manual. |
| The Provisioning Manager server could not be started. | The prerequisite program product (Device Manager) is not installed. | Ensure that the prerequisite program product has been correctly installed.<br>For details about how to check the results of Device Manager installation, see the *HiCommand Device Manager Server Installation and Configuration Guide*. |
| | Initialization or startup of the prerequisite program product (Device Manager) failed. | Take appropriate action by following the manual for the prerequisite program.<br>For details about how to start the Device Manager server, see the *HiCommand Device Manager Server Installation and Configuration Guide*. |
| The Device Manager agent could not be installed. | The available disk space is insufficient. | Allocate the necessary disk space, and then reinstall.<br>For details about the disk capacity required for installing the Device Manager agent, see the *HiCommand Device Manager Agent Installation Guide*. |
| | The user who attempted the installation does not have administrator privileges. | Install as a user who has administrator privileges. |

| Problem | Cause | Corrective Action |
|---|---|---|
| | Either the OS itself or the OS version in the installation target host is not supported. | Use an OS version that is supported.<br>For details about the OSs supported by the Device Manager agent, see the *HiCommand Device Manager Agent Installation Guide*. |
| | An attempt is being made to install a version of the Device Manager agent that is older than the installed Device Manager agent. | Install the same or a newer version of the Device Manager agent than the installed version. |

In a Windows system, if an error occurs during installation or uninstallation, a window appears and displays an error message.

In a Solaris or Linux system, if an error occurs during installation or uninstallation, an error message appears.

For details about what action to take when an error message appears, see 6.2.

## 6.2 Actions To Be Taken When an Error Occurs During Installation or Uninstallation of Provisioning Manager Server

If an error occurs during installation or uninstallation of the Provisioning Manager server, perform the following procedure:

1. Check the status at the time of the error.

   Check output messages and operations that were being performed when the error occurred. If an error message is output, complete the recommended action. For details about messages, see the *HiCommand Provisioning Manager Error Codes* manual.

2. Collect information to check the cause of the error.

   If the problem remains after you perform step 1, collect all the following information and then contact the Hitachi Data Systems Support Center:

   - Error information indicated in the recommended action for the message.
   - Log file

     If one of the following log files is found, collect that file.

   If the OS is Windows

   <*system-drive*>\HPvM_TL_Begin_*mm-dd-yyyy_hh-mm-ss*.log

   If the OS is Solaris or Linux

   /tmp/TL_Install_*mm-dd-yyyy_hh-mm-ss*.log (for a new or an overwrite installation)

   /tmp/TL_Uninstall_*mm-dd-yyyy_hh-mm-ss*.log (for an uninstallation)

   *mm-dd-yyyy_hh-mm-ss* indicates the month, day, year (last two digits), and time when a file is output. The format is *month-day-year_hour-minute-second*.

   For example, in the case of Solaris or Linux, if a file is output on June 1, 2007, at 10 seconds past 11:16, then the name is one of the following:

   TL_Install_06-01-2007_11-16-10.log or

   TL_Uninstall_06-01-2007_11-16-10.log.

# Acronyms and Abbreviations

| | |
|---|---|
| AMS | Adaptable Modular Storage |
| EM64T | extended memory 64 technology |
| GUI | graphical user interface |
| HBA | host bus adapter |
| HDLM | HiCommand Dynamic Link Manager and Hitachi Dynamic Link Manager |
| IPF | Itanium Processor Family |
| JFS | Journaled file system |
| LDEV | logical device |
| LVM | logical volume manager |
| NSC | TagmaStore Network Storage Controller |
| NTFS | NT file system |
| OS | Operating system |
| SAN | storage area network |
| SDS | Solstice DiskSuite |
| SSL | secure socket layer |
| SVGA | super video graphics array |
| SVM | Solaris Volume Manager |
| TCP/IP | transmission control protocol/internet protocol |
| TLS | transport layer security |
| UFS | UNIX file system |
| URL | Uniform Resource Locator |
| USP | Universal Storage Platform |
| WMS | Workgroup Modular Storage |

# Index

## T



## U



## V



## W