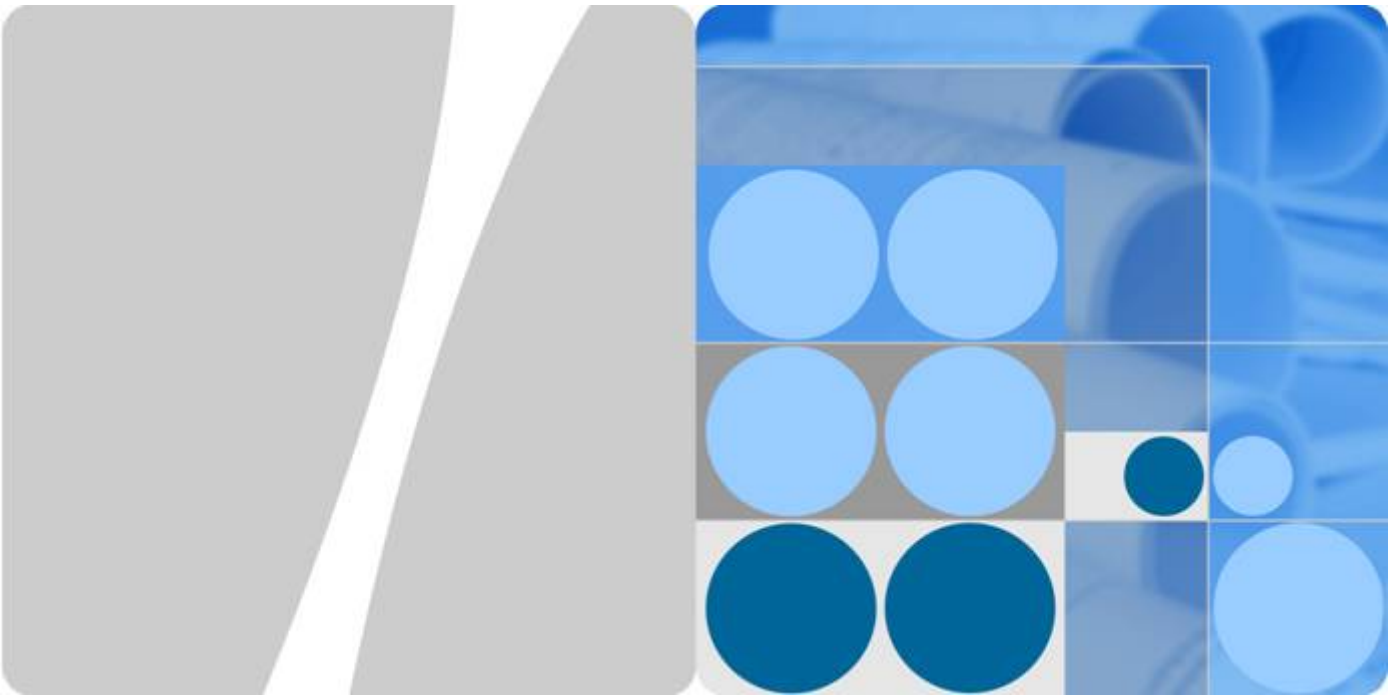

Tecal ES3000 High Performance PCIe SSD Card

V100R002C01

User Guide

Issue 04

Date 2014-03-05

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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://enterprise.huawei.com

About This Document

Purpose

Huawei provides the Tecal ES3000 PCIe SSD high-performance storage card (ES3000 for short) of 800 GB, 1.2 TB, and 2.4 TB. PCIe standards for Peripheral Component Interconnect Express, and SSD standards for solid state drive.

The document describes the ES3000 in terms of its appearance, functions, features, and technical specifications and how to install, configure, operate, and maintain the ES3000.

NOTE

The document does not contain the commands for production, equipment, return detection, and fault locating and debugging. These commands are commonly used during engineering and fault location. Incorrect use of the commands results in device exceptions or service interruption. To obtain the commands, contact Huawei technical support.

Intended Audience

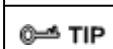
This document is intended for:

- Server installation personnel
- Server maintenance personnel

Symbol Conventions

The following table lists the symbols that may be found in this document.

Symbol	Description
	**DANGER** indicates a hazard with a high level or medium level of risk which, if not avoided, could result in death or serious injury.
	**WARNING** indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

Symbol	Description
	**CAUTION** indicates a potentially hazardous situation that, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.
	**TIP** indicates a tip that may help you solve a problem or save time.
	**NOTE** provides additional information to emphasize or supplement important points of the main text.

Change History

Updates between document issues are cumulative. The latest document issue contains all changes made in previous issues.

Issue 04 (2014-03-05)

The product appearance is upated.

Some detail problems are corrected.

Issue 03 (2013-01-20)

Added SNMP management function.

Issue 02 (2012-12-13)

Figures showing the ES3000 appearance are updated.

Added two commands about querying temperature and clearing data.

Issue 01 (2012-08-30)

The issue is the first official release.

Contents

1 Security

About This Chapter

This topic describes the safety precautions to be observed when you install and maintain devices.

1.1 Overview
This document describes the safety information you must comply with when installing and maintaining the devices.

1.2 General Safety Notice
This topic describes the safety precautions you must take before installing or maintaining Huawei equipment.

1.3 Labels on Devices
This topic describes the warning labels, grounding labels, and electrostatic discharge (ESD) labels on devices.

1.4 General Requirements
To minimize risk of personal injury and damage to equipment, read and follow all the precautions in this document before performing any installation or maintenance.

1.5 Inflammable Environment
This topic describes safety notice about inflammable environment.

1.6 Battery
This topic describes safety notice about storage battery and lithium battery.

1.7 Radiation
This topic describes safety notice about electromagnetic field exposure and laser.

1.8 Working at Heights
This topic describes safety notice about hoisting heavy objects and using ladders

1.9 Mechanical Safety
This topic describes how to deal with drilling holes, sharp objects, handling fans and lifting heavy objects.

1.10 ES3000 Safety Precautions
This topic describes the safety precautions for operating the ES3000.

1.11 Other

This topic describes safety precautions about installing and removing a board, bundling signal cables, and laying out cables.

1.1 Overview

This document describes the safety information you must comply with when installing and maintaining the devices.

Before you perform any operation, ensure that you are familiar with all operation instructions, especially the dangers, warnings, and cautions mentioned in product documents. This can avoid damaging devices or hurting human bodies, and can minimize the risk of accidents.

Before you install and maintain the devices, be sure to read all documents on safety information shipped with the devices. If the contents in this document are not consistent with the information mentioned in those documents, refer to the documents shipped with the devices.

When you perform operations, observe the local safety directives. If the safety preventive measures in this document conflicts with the local safety directives, follow the local safety directives.

Only the qualified professionals can install and maintain the devices. They must be trained and familiar with correct operation skills and all safety preventive measures.

1.2 General Safety Notice

This topic describes the safety precautions you must take before installing or maintaining Huawei equipment.

Overview

- To ensure safety of humans and the equipment, pay attention to the safety symbols on the equipment and all the safety instructions in this document.
- The "NOTE", "CAUTION", and "WARNING" marks in other documents do not represent all the safety instructions. They are only supplements to the safety instructions.

Local Safety Regulations

When operating Huawei equipment, you must follow the local laws and regulations. The safety instructions in this document are only supplements to the local laws and regulations.

Basic Requirements

- Installation and maintenance personnel must understand basic safety precautions to avoid hazards.
- When operating Huawei equipment, in addition to following the general precautions in this document, follow the specific safety instructions given by Huawei.
- Only trained and qualified personnel are allowed to install, operate, and maintain Huawei equipment.

Ground

- Do not damage the ground conductor or operate the device in the absence of a properly installed ground conductor. Conduct the electrical inspection carefully.
- The device must be connected permanently to the protection ground before an operation.

Human Safety

- Do not operate the device or cables during lightning strikes.
- Move or lift the chassis by holding its lower edge. Do not hold the handles on certain modules such as power supply, fans, and boards because they cannot support the weight of the device.
- At least two persons are required to lift the chassis. When lifting it, keep your back straight and move stably.
- Do not look into the optical port without eye protection.
- Do not wear jewelry or watches when you operate the device.

Installation

- The device (or system) must be installed in an access-controlled location.
- The device must be fixed securely on the floor or to other immovable objects such as walls and mounting racks before operation.
- When installing the unit, always make the ground connection first and disconnect it at the end.
- Do not block the ventilation while the device is operating. Keep a minimum distance of 5 cm between the device and the wall or other objects that may block the ventilation.
- Tighten the thumbscrews by using a tool after initial installation and subsequent access to the panel.

1.3 Labels on Devices

This topic describes the warning labels, grounding labels, and electrostatic discharge (ESD) labels on devices.

Table 1-1 describes the safety labels on devices.

Table 1-1 Safety labels

Label	Meaning	Description
	Warning	This label indicates that wrong operations may cause device damage or human injury.

Label	Meaning	Description
	External grounding	This label indicates grounding of external devices. The terminals of the grounding cable are connected to different devices. This ensures normal running of the devices and the safety of the operator.
	Internal grounding	This label indicates grounding of internal devices. The terminals of the grounding cable are connected to different components of the same device. This ensures normal running of the devices and the safety of the operator.
	ESD-Preventive Label	This label indicates an static sensitive area. Do not touch the device with your hands. When operating the device within this area, take electrostatic discharge (ESD)-preventive measures. For example, wear an ESD-preventive wrist strap.

1.4 General Requirements

To minimize risk of personal injury and damage to equipment, read and follow all the precautions in this document before performing any installation or maintenance.

Ensure that the instructions provided in this document are followed completely. This section also provides guidelines for selecting the measuring and testing devices.

Installation

- The device (or system) must be installed in an access-controlled location.
- The device must be fixed securely on the floor or to other immovable objects such as walls and mounting racks before operation.
- When installing the unit, always make the ground connection first and disconnect it at the end.
- Do not block the ventilation while the device is operating. Keep a minimum distance of 5 cm between the device and the wall or other objects that may block the ventilation.

- Tighten the thumbscrews by using a tool after initial installation and subsequent access to the panel.

Ground

- Do not damage the ground conductor or operate the device in the absence of a properly installed ground conductor. Conduct the electrical inspection carefully.
- The device must be connected permanently to the protection ground before an operation.

Power Supply

- For AC-supplied models: The device applies to TN, TT, or IT power system.
- For DC-supplied model: The device applies to DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements in IEC 60950-1 based safety standards.
- Prepared conductors are connected to the terminal block, and only the appropriate AWG/ Type of wire is secured with the lug terminals.
- For this device, a readily accessible disconnect device must be incorporated in the building installation wiring.
- For AC-supplied model: The plug-socket combination must be accessible at all times because it serves as a main disconnect device.
- The device is connected with several power supplies. To switch off it, disconnect all the power supplies.

Human Safety

- Do not operate the device or cables during lightning strikes.
- Move or lift the chassis by holding its lower edge. Do not hold the handles on certain modules such as power supply, fans, and boards because they cannot support the weight of the device.
- At least two persons are required to lift the chassis. When lifting it, keep your back straight and move stably.
- Do not look into the optical port without eye protection.
- Do not wear jewelry or watches when you operate the device.

Operator

- Only qualified professional personnel are allowed to install, configure, operate, and disassemble the device.
- Only the personnel authenticated or authorized by Huawei are allowed to replace or change the device of the parts of the device (including the software).
- Any fault or error that might cause safety problems must be reported immediately to a supervisor.
- Only qualified personnel are allowed to remove or disable the safety facilities and to troubleshoot and maintain the device.

1.5 Inflammable Environment

This topic describes safety notice about inflammable environment.

Operating the electrical device in an inflammable environment can be fatal.

DANGER

Do not place the device in an environment that has inflammable and explosive air or gas. Do not perform any operation in this environment.

1.6 Battery

This topic describes safety notice about storage battery and lithium battery.

1.6.1 Storage Battery

DANGER

Before operating storage batteries, carefully read the safety precautions for battery handling and connection.

NOTICE

Improper handling of storage batteries causes hazards.

When operating storage batteries, avoid short circuit and overflow or leakage of the electrolyte. Electrolyte overflow may damage the device. It will corrode metal parts and circuit boards, and ultimately damage the device and cause short circuit of circuit boards.

Basic Precautions

Before installing and maintaining the battery, note the following:

- Do not wear metal articles such as wristwatch, hand chain, bracelet, and ring.
- Use special insulation tools.
- Take care to protect your eyes when operating the device.
- Wear rubber gloves and a protective coat in case of electrolyte overflow.

- When handling a storage battery, ensure that its electrodes are upward. Leaning or reversing the storage battery is prohibited.

Short Circuit

CAUTION

Battery short circuit may cause human injuries. Although the voltage of ordinary batteries is low, the instantaneous high current caused by the short circuit releases a great deal of energy.

There is danger of explosion if the battery is incorrectly replaced. Therefore, replace the battery only with the same or equivalent type recommended by the manufacturer.

NOTICE

Keep away metal objects, which may cause battery short circuit, from batteries. If metal objects must be used, first disconnect the batteries in use before performing any other operations.

Hazardous Gas

NOTICE

- Do not use unsealed lead acid storage batteries. Lead acid storage batteries must be placed horizontally and stably to prevent the batteries from releasing flammable gas, which may cause fire or erode the device.
- Lead acid storage batteries in use emit flammable gas. Therefore, ventilation and fireproofing measures must be taken at the sites where lead acid storage batteries are used.

Battery Temperature

NOTICE

If a battery overheats, the battery may be deformed or damaged, and the electrolyte may overflow.

When the temperature of the battery is higher than 60°C, check the battery for electrolyte overflow. If the electrolyte overflows, absorb and counteract the electrolyte immediately.

Battery Leakage

NOTICE

When the electrolyte overflows, absorb and counteract the electrolyte immediately.

When moving or handling a battery whose electrolyte leaks, note that the leaking electrolyte may hurt human bodies. When you find the electrolyte leaks, use the following substances to counteract and absorb the leaking electrolyte:

- Sodium bicarbonate (baking soda): $NaHCO_3$
- Sodium carbonate (soda): Na_2CO_3

Select a substance to counteract and absorb the leaking electrolyte according to the instructions of the battery manufacturer.

1.6.2 Lithium Battery

CAUTION

- There is danger of explosion if the battery is incorrectly replaced. Therefore, replace the battery only with the same or equivalent type recommended by the manufacturer.
- Exhausted lithium ion batteries must be disposed of according to the instructions.
- Do not throw lithium ion batteries into fire.

1.7 Radiation

This topic describes safety notice about electromagnetic field exposure and laser.

1.7.1 Electromagnetic Field Exposure

CAUTION

Radio-frequency signals with high intensity are harmful to human body.

Before installing or maintaining an antenna on a steel tower or a mast with a large number of transmitter antennas, coordinate with the parties concerned to shut down the transmitter antennas.

1.7.2 Restricted Area

Observe the following rules:

- Antenna sites should be planned in the electromagnetic radiation overweight area where the public cannot be close to.
- Electromagnetic radiation area should be within the 10 m range of the antenna. Before entering such an area, staff should understand radiation overweight regional position and switch off emitter.
- Each restricted area should establish physical barriers and eye-catching warning signs.

1.7.3 Laser

The laser hazard level of this device is Class 1.

CAUTION

When handling optical fibers, do not stand close to or look at the optical fiber outlet directly with unprotected eyes.

General Laser Information

Laser transceivers or transmitters are used in optical transmission systems and associated test tools. The wavelength of the laser is between 780 nm and 1600 nm. The laser transmitted through optical fibers has very high power density and is invisible to human eyes. A beam of light causes damage to the retina.

Laser of wavelengths used in telecommunications causes thermal damage to the retina.

Lasers used in lightwave systems have a larger beam divergence, typically 10 to 20 degrees. Looking at an un-terminated fiber or damaged fiber with unprotected eyes at a distance greater than 150 mm (6 inches) does not cause eye injury. Eye injury, however, may be caused if an optical tool such as a microscope, magnifying glass, or eye loupe is used to view the energized fiber end.

A lightwave system in normal operating mode is totally enclosed and presents no risk of eye injury. The automatic laser shutdown (ALS) feature of the lightwave system also ensures safety. The ALS, however, can be applied to bi-directional transmission only. If the receiver side does not detect the laser from the transmitter side, it sends the transmitter side a signal. Upon receiving the signal, the ALS shuts down the laser emission within 100 ms.

Safety Guidelines

Follow the following guidelines to avoid laser radiation:

- Read the instructions before installing, operating, and maintaining the device. Ignoring the instructions can cause exposure to dangerous laser radiation.
- Wear a pair of eye-protective glasses when you are handling lasers or fibers.

- Only qualified personnel are allowed to perform laser-related operations.
- Make sure that the optical source is switched off before disconnecting optical fiber connectors.
- Before opening the front door of an optical transmission system, make sure that you are not exposed to laser radiation.
- Do not look at the end of an exposed fiber or an open connector when you are not sure whether the optical source is switched off or not.
- Use an optical power meter to check that the optical source is switched off and verify that it is off by measuring the optical power.
- Do not use an optical tool such as a microscope, a magnifying glass, or an eye loupe to view the optical connector or fiber.

Handling Fibers

Read the instructions before handling fibers:

- Only trained and qualified personnel can cut or splice fibers.
- Before cutting or splicing a fiber, ensure that the fiber is disconnected from the optical source. After disconnecting the fiber, use protecting caps to protect all the optical connectors.

1.8 Working at Heights

This topic describes safety notice about hoisting heavy objects and using ladders

CAUTION

Avoid object falling when you work at heights.

When working at heights, fulfill the following requirements:

- Only trained personnel can work at heights.
- Prevent the devices and tools that you carry from falling down.
- Take safety and protection measures, for example, wear a helm and safety belt.
- Wear warm clothes when working at heights in a cold region.
- Before working at heights, check that all the lifting facilities are in good condition.

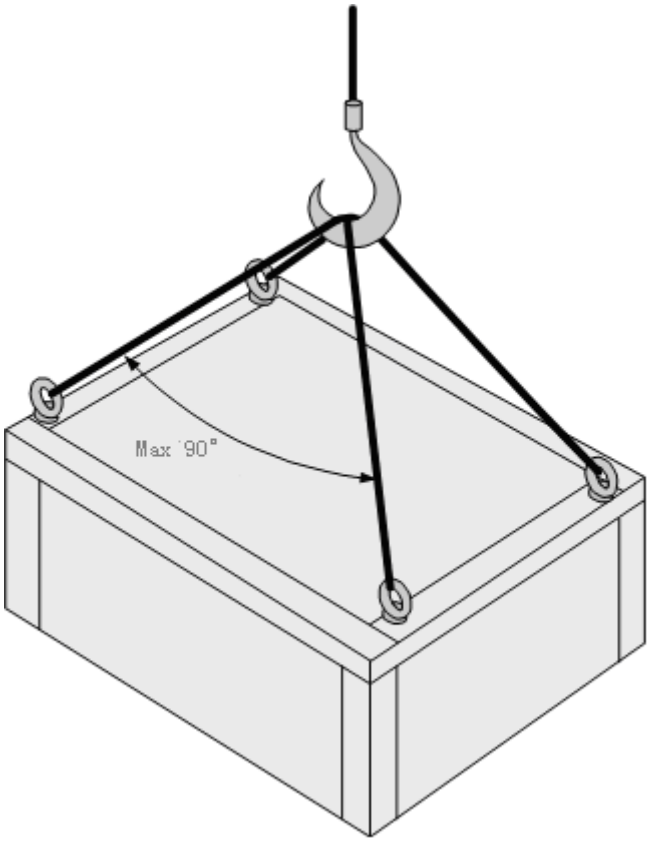
1.8.1 Hoisting Heavy Objects

CAUTION

Do not walk below the cantilever or hoisted objects when heavy objects are being hoisted.

- Only trained and qualified personnel can perform hoisting operations.
- Before hoisting heavy objects, check that the hoisting tools are complete and in good condition.
- Before hoisting heavy objects, ensure that the hoisting tools are fixed to a secure object or wall with good weight capacity.
- Issue orders with short and explicit words to avoid misoperations.
- Ensure that the angle formed by two cables is not larger than 90 degrees. See **Figure 1-1**.

Figure 1-1 Hoisting heavy objects



1.8.2 Using Ladders

Checking a Ladder

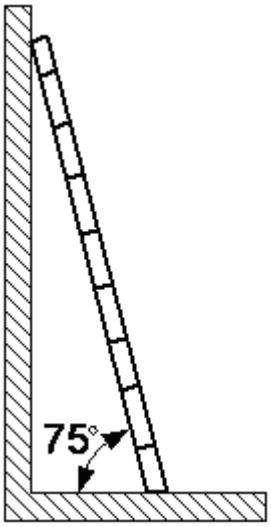
- Before using a ladder, check whether the ladder is damaged. Only the ladder in good condition can be used.
- Before using a ladder, you should know the maximum weight capacity of the ladder. Avoid overweighing the ladder.

Placing a Ladder

The recommended gradient of ladders is 75 degrees. You can measure the gradient of the ladder with an angle square or your arms, shown in **Figure 1-2**. When using a ladder, ensure that the

wider feet of the ladder are downward, or take protection measures for the ladder feet to prevent the ladder from sliding. Ensure that the ladder is placed securely.

Figure 1-2 75-degree ladder

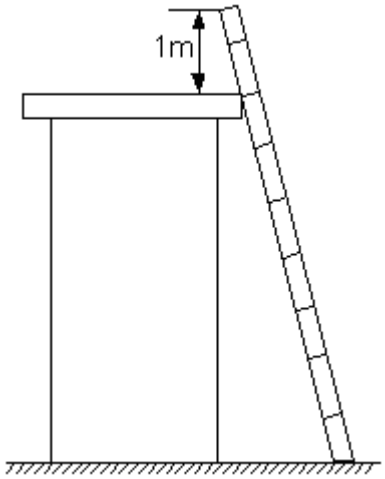


Climbing Up a Ladder

When climbing up a ladder, note the following:

- Ensure that the center of gravity of your body does not deviate from the edges of the two long sides.
- To minimize the risk of falling, hold your balance on the ladder before any operation.
- Do not climb higher than the fourth rung of the ladder (counted from up to down).
- If you want to climb up a roof, ensure that the ladder top is at least one meter higher than the roof, shown in **Figure 1-3**.

Figure 1-3 Ladder of 1 m higher than the roof



1.9 Mechanical Safety

This topic describes how to deal with drilling holes, sharp objects, handling fans and lifting heavy objects.

Drilling Holes

CAUTION

Do not drill the cabinet at will. Drilling holes without complying with the requirements affects the electromagnetic shielding performance of the cabinet and damages the cables inside the cabinet. In addition, if the scraps caused by drilling enter the cabinet, the printed circuit boards (PCBs) may be short circuited.

- Before you drill a hole in the cabinet, wear insulated gloves and remove the internal cables from the cabinet.
- Wear an eye protector when drilling holes. This is to prevent your eyes from being injured by the splashing metal scraps.
- Ensure that the scraps caused by drilling do not enter the cabinet.
- Drilling holes without complying with the requirements affects the electromagnetic shielding performance of the cabinet.
- After drilling, clean the metal scraps immediately.

Sharp Objects

CAUTION

Before you hold or carry a device, wear protective gloves to avoid getting injured by sharp edges of the device.

Handling Fans

When handling fans, note the following:

- When replacing a component, place the component, screws, and tools in a safe place. Otherwise, if any of them fall into the operating fans, the fans may be damaged.
- When replacing a component near fans, do not insert your fingers or boards into the operating fans until the fans are switched off and stops running.

Lifting Heavy Objects

Wear protective gloves when moving heavy objects to avoid injuries.

CAUTION

- Be careful when moving heavy objects to avoid any injury to the human body.
- Be careful when pulling a chassis out of the rack to avoid any injury to the human body caused by unstable or heavy devices.

- Do not move a heavy chassis by yourself. Work with you partner. When moving a chassis, Keep your back straight and move smoothly to avoid any injury.
- Hold the chassis handles or bottom edges when moving or lifting a chassis. Do not use the handles on any component, such as fan modules, PSUs or boards.

1.10 ES3000 Safety Precautions

This topic describes the safety precautions for operating the ES3000.

NOTICE

To ensure your personal safety and to avoid damaging the equipment, only trained and qualified technical personnel are allowed to install or replace an ES3000.

NOTICE

Before installing an ES3000, turn off the power to the server.

NOTICE

Do not touch the components on an ES3000 with bare hands. The electrostatic discharge (ESD) on the human body may damage the electrostatic sensitive components on the circuit board. Ensure that you wear an ESD wrist strap or ESD gloves when operating the ES3000 hardware.

NOTICE

To prevent yourself from being scalded, do not touch the heat sink with bare hands because the heat sink temperature is high during the running of the ES3000.

1.11 Other

This topic describes safety precautions about installing and removing a board, bundling signal cables, and laying out cables.

Installing and Removing a Board

NOTICE

When installing a board, wear an electrostatic discharge (ESD) wrist strap or ESD gloves and use proper force to avoid damage to the board or slot.

When installing or removing a board, note the following:

- Insert the board along the guide rails.
- Prevent the surface of a board from contacting the surface of another board. This is to prevent the boards from being short-circuited or scratched.
- To prevent electrostatic-sensitive devices from being damaged by ESD on the human body, do not touch the circuits, components, connectors, or connection slots on boards.

Bundling Signal Cables

NOTICE

Do not bundle signal cables with high current cables or high voltage cables.

Laying Out Cables

When the temperature is very low, violent strike or vibration may damage the cable sheathing. To ensure safety, comply with the following requirements:

- Cables can be laid or installed only when the temperature is higher than 0°C (32°F).
- Before laying out cables that have been stored in a temperature lower than 0°C (32°F), move the cables to an environment of room temperature and store them at room temperature for at least 24 hours.
- Handle cables with caution, especially at a low temperature. Do not drop the cables directly from the vehicle.

2 Introduction to the ES3000

About This Chapter

This topic describes the ES3000 features.

The ES3000 meets the requirements for high input/output operations per second (IOPS), high reliability, high bandwidth, and large data storage capacity. It applies to services with frequent random read and write operations, such as search, cache, and databases.

2.1 Overview

This topic describes the ES3000 appearance.

As a high-performance solid state drive (SSD) card launched by Huawei, the ES3000 provides local data storage for servers to improve input/output operations per second (IOPS) performance. It applies to frequent random or sequential read and write operations and high IOPS services, such as search engines, cache, databases, and videos.

The ES3000 is a standard Peripheral Component Interconnect Express (PCIe) 2.0 x8 card of full height and half length and it can be installed in a universal server such as a rack server.

Figure 2-1 shows the ES3000 delivered in November 2013 or earlier.

Figure 2-1 ES3000 delivered in November 2013 or earlier

Figure 2-2 shows the ES3000 delivered in December 2013 or later.

Figure 2-2 ES3000 delivered in December 2013 or later

2.2 Features and Specifications

This topic describes the features and specifications of the ES3000.

The ES3000 uses the MLC (Multi-Level Cell) Nand Flash storage medium and provides the following capacities:

- 800 GB
- 1.2 TB
- 2.4 TB

The ES3000 has the following features:

- Uses the Peripheral Component Interconnect Express (PCIe) 2.0 x8 slot and provides a maximum of 3.2 GB/s read bandwidth and 2.8 GB/s write bandwidth.
- Ensures data integrity by using multiple data technologies.
  - Ensures data reliability by using the error checking and correcting (ECC) technology.
  - Extends the service life by combining static wear leveling and dynamic wear leveling.
  - Prevents errors by using the data scrubbing technology.

  - Recovers data after an error occurs in a channel by using the embedded RAID 5 alike algorithm for correcting errors based on channels.
  - Supports power failure protection.
- Provides multiple maintenance and management tools with comprehensive functions and high performance.
  - Supports in-band online upgrade to meet customization requirements.
  - Provides general device information, including the types, capacities, versions, wear status, and bad blocks.
  - Supports log query for monitoring device health status.
  - Manages asset information, including the manufacture date, manufacturer, and serial number, and supports self-defined electronic asset labels.
  - Supports SNMP query for unified network management.

Table 2-1 lists the technical specifications of the ES3000.

Table 2-1 Technical specifications

Model	ES3000		
Capacity	800 GB	1.2 TB	2.4 TB
Maximum read bandwidth	2.2 GB/s	3.2 GB/s	3.2 GB/s
Continuous random read IOPS@4KB	570K	760K	760K
Read latency	49 us	49 us	49 us
Maximum write bandwidth	1.2 GB/s	1.8 GB/s	2.8 GB/s
Continuous random write IOPS@4KB	120K	180K	240K
Write delay	8 us	8 us	8 us
Hybrid (R/W: 75/25) random IOPS@4KB	260K	400K	430K
Maximum power consumption	35 W	50 W	60 W
Standby power consumption	20 W	25 W	25 W
Power failure protection	Supported	Supported	Supported

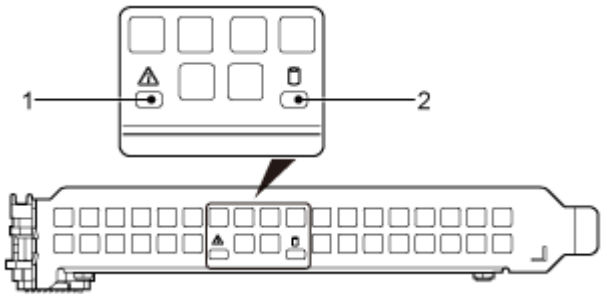
Granule failure protection	Supported	Supported	Supported
Operating temperature	0-55°C (32-131°F) (Wind Speed≥1.5m/s, Air Flow≥300LFM)	0-55°C (32-131°F) (Wind Speed≥1.5m/s, Air Flow≥300LFM)	0-55°C (32-131°F) (Wind Speed≥1.5m/s, Air Flow≥300LFM)
Trim	Supported	Supported	Supported
Weight	0.3 kg (0.66 lb)	0.35 kg (0.77 lb)	0.35 kg (0.77 lb)
Dimensions (H x W x D)	181 mm x 127 mm x 20 mm (7.13 in. x 5.00 in. x 0.79 in.)		
Certifications	FCC, CE, RoHS, WEEE, REACH, UL, VCCI, and KCC		

2.3 Indicators

This topic describes the status indicators of the ES3000.

The ES3000 has two status indicators: active indicator and fault indicator, as shown in **Figure 2-3**.

Figure 2-3 Status indicators



1	Fault indicator
2	Active indicator

You can observe the indicators to determine the current operating status of the ES3000. **Table 2-2** describes the indicator status.

Table 2-2 Status indicators

Indicator	Meaning	Color	Description
Active indicator	Status indicator	Green	● Off: The ES3000 is not powered on. ● Blinking: Data is being read from or written to the ES3000. ● Steady on: The ES3000 is operating properly.
Fault indicator	Status indicator	Yellow	● Off: The ES3000 is not powered on or is operating properly. ● Blinking: The ES3000 is being initialized. ● Steady on: The ES3000 fails.

2.4 Server Configuration Requirements

This topic describes the ES3000 requirements for server software and hardware.

Hardware Requirements

The ES3000 has the following minimal requirements for the server hardware:

- 2 GB memory
- One Peripheral Component Interconnect Express (PCIe) x8 slot of full height and half length

Software Requirements

The ES3000 supports the following operating systems (OSs):

- RHEL 5U3
- SLES 11.1
- Windows Server 2008 R2
- VMware 4.1

- VMware 5.0

NOTE

For details about the OSs supported by the ES3000, see the **compatibility list**

3 Installation and Configuration

About This Chapter

This topic describes the process for installing and configuring the ES3000.

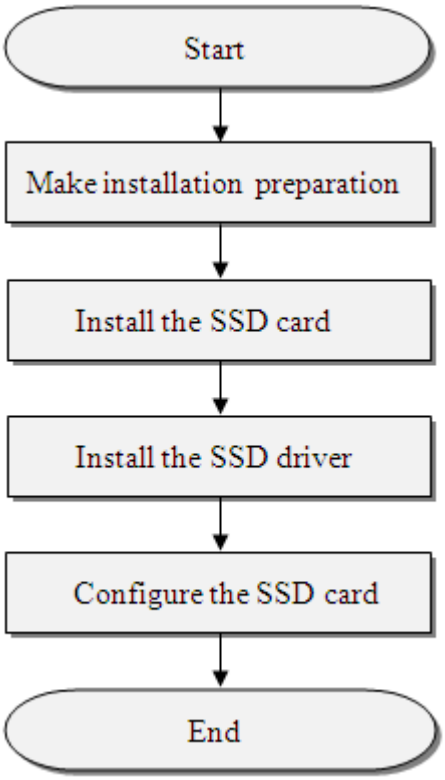
3.1 Process for Installing and Configuring the ES3000

This topic describes the process for installing and configuring the ES3000.

Ensure that you follow the installation and configuration process so that the ES3000 works properly.

Figure 3-1 shows the process for installing and configuring the ES3000.

Figure 3-1 Process for installing and configuring the ES3000



3.2 Installing an ES3000 on a Riser Card

This topic describes how to install an ES3000 on a riser card.

Operation Scenarios

When the server is 1 U or 2 U high, install the ES3000 on a riser card and then install the riser card in the server.

Preparations

- You have stopped the running service, backed up data, logged out of the operating system (OS), and shut down the server.
- You have turned off the power to the server and removed the chassis cover.
- You have obtained a riser card that can work with the server.
- Unpacking and inspecting the components

  Check that the components shipped are intact based on the following list:

  - ES3000
  - QuickStart Guide
  - Warranty card
- Tools
  - Phillips screwdriver

    Used to tighten small screws and bolts. A Phillips screwdriver has a cross on the head to provide a small tighten torque.
  - Electrostatic discharge (ESD) gloves

    Used to prevent ESD damage when you insert, remove, and hold an ES3000 or hold a precision device.

Procedure

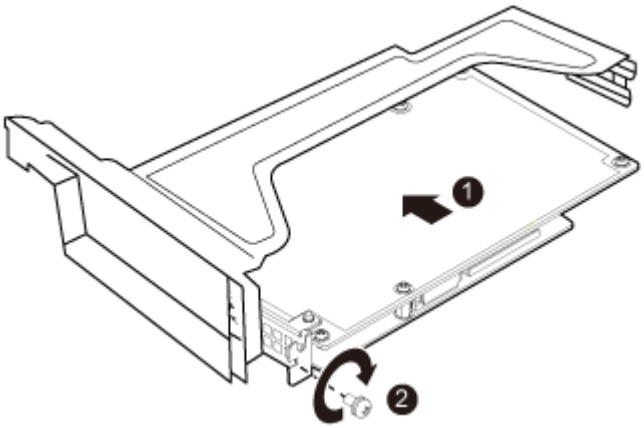
Step 1 Wear ESD gloves.

Step 2 Take the new ES3000 out of the ESD bag.

Step 3 Hold the upper edge of the ES3000 with your hands, align its connecting part with the Peripheral Component Interconnect Express (PCIe) slot, and insert the ES3000 slowly into the PCIe slot on the riser card. See step (1) in **Figure 3-2**.

Step 4 Screw the ES3000 using a Phillips screwdriver. See step (2) in **Figure 3-2**.

Figure 3-2 Installing an ES3000 on a riser card



Step 5 Install the riser card in the server. For details, see related server manuals.

----End

Follow-up Procedure

Step 1 Power on the server.

- If the indicator on the ES3000 is green, the ES3000 is properly installed.
- If the indicator on the ES3000 is off, power off the server, remove the ES3000 and install it again.

Step 2 Install the chassis cover back.

----End

3.3 Installing an ES3000 Directly in a Server

This topic describes how to install an ES3000 directly in a server.

Operation Scenarios

When a server is 3 U or higher and has sufficient internal space, install an ES3000 in the server directly.

Preparations

- Stop the running service, back up data, log out of the operating system (OS), and shut down the server. (You do not need to perform this operation for the server that supports the hot swap of a PCIe card, for example, the RH5885 V2.)
- Power off the server and remove the chassis cover. (You do not need to perform this operation for the server that supports the hot swap of a PCIe card, for example, the RH5885 V2.)
- Unpack and inspect the components.

  Check that the components shipped are intact based on the following list:

  - ES3000
  - QuickStart Guide
  - Warranty card
- Tools
  - Phillips screwdriver

    Used to tighten small screws and bolts. A Phillips screwdriver has a cross on the head to provide a small tighten torque.
  - Electrostatic discharge (ESD) gloves

    Used to prevent ESD damage when you insert, remove, and hold an ES3000 or hold a precision device.

Procedure

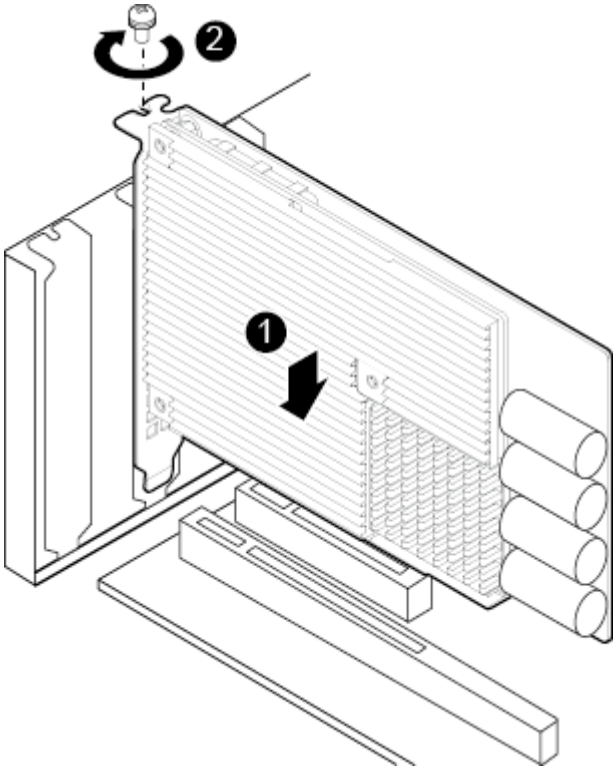
Step 1 Wear ESD gloves.

Step 2 Take the ES3000 out of the ESD bag.

Step 3 Hold the upper edge of the ES3000 with your hands, align its connecting part with the Peripheral Component Interconnect Express (PCIe) slot, and vertically insert the ES3000 downwards into the PCIe slot. See step (1) in **Figure 3-3**.

Step 4 Screw the ES3000 using a Phillips screwdriver. See step (2) in **Figure 3-3**.

Figure 3-3 Installing an ES3000 directly in a server



----End

Follow-up Procedure

Step 1 Power on the server.

- If the indicator on the ES3000 is green, the ES3000 is properly installed.
- If the indicator on the ES3000 is off, power off the server, remove the ES3000 and install it again.

Step 2 Install the chassis cover back.

----End

3.4 Driver Description

This topic describes the driver supported by the ES3000 and how to obtain them.

Table 3-1 lists the drivers supported and related operating systems (OSs). You can log in to **http://support.huawei.com/enterprise**, choose **Software Downloads** > **IT** > **Server** > **Accelerator** > **Tecal ES3000**, and download the required driver program.

NOTE

2.0.0.5 in the driver file name indicates the software version, and the actual version may be different. Download the latest driver file please.

Table 3-1 Supported drivers

OS	Driver
RHEL 5U3	hio-2.0.0.5-2.6.18_128.el5.x86_64.rpm
SLES 11.1	hio-2.0.0.5-2.6.32.12_0.7_default.x86_64.rpm
Windows Server 2008 R2	HW_SSD_Driver_v2.0.0.5_4.exe
VMware 4.1	hio-2.0.0.5.x86_64.rpm
VMware 5.0	hio-2.0.0.5.vib
Note: For details about the OS types supported by the ES3000, see **Compatibility List**.	

3.5 Transferring Files by Using WinSCP

This topic describes how to transfer files by using WinSCP. You can also transfer files by using other software.

Scenarios

Transfer files on the local computer by using WinSCP.

Prerequisites

Conditions

The FTP service has been enabled on the destination device.

Data

The following data has been obtained:

- IP address of the server to be connected
- User name and password for logging in to the server to be connected

Software

WinSCP.exe: a free software available on the Internet.

Procedure

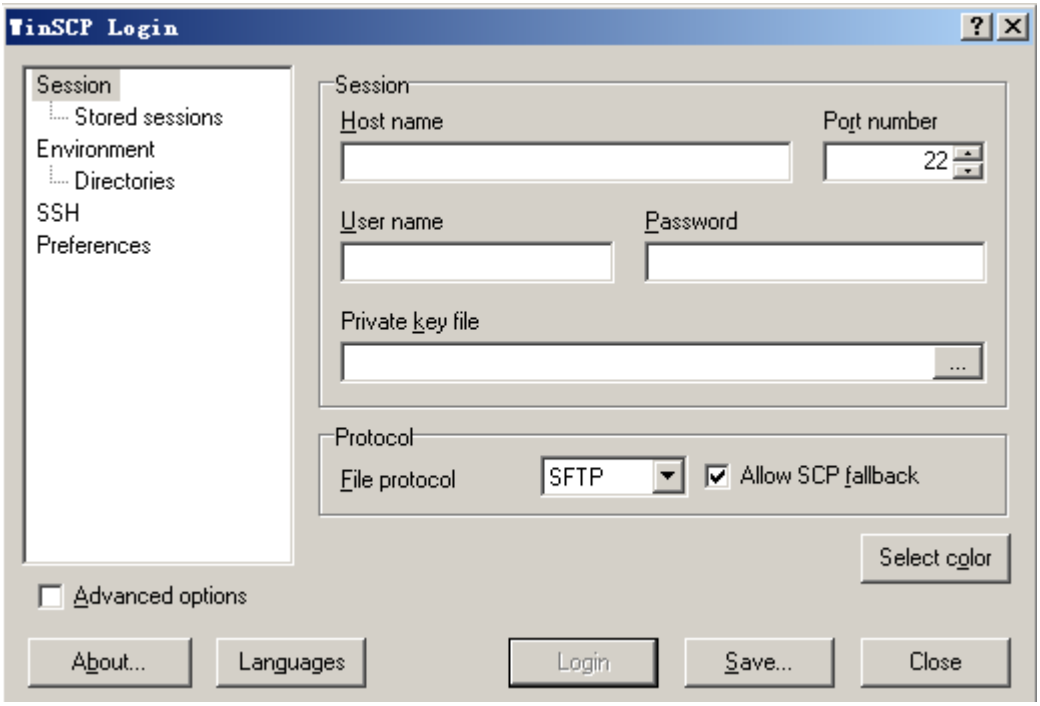
Step 1 Open the **WinSCP** folder, and double-click **WinSCP.exe**.

The **WinSCP Login** dialog box is displayed, as shown in **Figure 3-4**.

NOTE

If the operating system (OS) is not an English system. Click **Languages** to set the displayed language.

Figure 3-4 WinSCP login



Step 2 Set the login parameters.

The parameter descriptions are displayed as follows:

- Host name: Specifies the IP address of the device to be connected. For example: **191.100.34.32**.
- Port number: The default value is **22**.
- User name: Specifies the username. For example: admin123
- Password: Specifies the password. For example: admin123
- Private key file: The default value is **None**. Do not change the default value.
- Protocol: Select the default value is **SFTP**, and then select **Allow SCP fallback**.

Step 3 Click **Login**.

The **WinSCP** file transfer page is displayed.

NOTE

- If a key file was not selected during the first login, a warning **Continue connecting and add host key to cache** is displayed. Click **Yes**. The **WinSCP** file transfer page is displayed.
- In the left pane of the page, open the **C:\Documents and Settings\Administrator\My Documents** directory. The device's **/root** directory is opened in the right pane by default.

Step 4 In the right pane, select a directory of a remote server for storing files, for example **/root/firmware**.

Step 5 In the left pane, select a directory of the local computer for storing files, for example **E:\Software**, and then select the file to be transferred.

Step 6 Choose **File** > **Copy**.

The **Copy** dialog box is displayed.

Step 7 Confirm the file to be copied and the directory of the remote server, and then click **Copy**.

File copying starts.

----End

3.6 Installing Drivers

This topic describes how to install the ES3000 driver in various operating systems (OSs).

3.6.1 Installing the ES3000 Driver in Linux

Operation Scenarios

You need to install the ES3000 driver on the server before using an ES3000.

NOTE

- If you install multiple ES3000s on a server, you need to install the driver only once.
- A driver package is named "hio-<*driver version*>-<*supported kernel version*>.<*hardware platform*>.rpm", for example, **hio-2.0.0.5-2.6.32.12_0.7_default.x86_64.rpm**.
- The driver package must support the kernel version. You can run the **uname -r** command to obtain the kernel version.

  uname -r

  The following command output is an example:
  ```
  2.6.32.12-0.7-default
  ```

  After the hyphens (-) in the command output are replaced with underscores (_), the command output must be the same as the kernel version in the driver package name.
- Run the **hio_info** command and check the command output. If the value of **Driver version** is not blank in the command output, the driver of an earlier version has been installed. You need to uninstall the driver of the earlier version. For details about how to uninstall the driver, see **5.3.1 Upgrading the ES3000 Driver in Linux**.

```
[root@localhost ~]# hio_info
hioa     Size(GB):           803
    Max size(GB):       803
    Serial number:      030PXS10CB000062
    Driver version:     2.0.0.40
    Bridge firmware version:    326
    Controller firmware version:    NA
    Battery firmware version:    111
    Battery  status:    OK
    Run time (sec.):    858781
    Total  IO  read:    4010544002
    Total  IO write:    2609916620
    Total  read(MB):    53282383
    Total write(MB):    37119436
    IO timeout:         0
    R/W error:          0
    Max bit flip:       28
    Average EC:         149
    Max bad block rate:    0.089%
    Event log:          OK
    Health:             OK
```

Preparations

Before installing the ES3000 driver, check that:

- You have properly installed the ES3000 in the server.
- You have uploaded the driver package to the server by using WinSCP or other software, for example, the **/root/ES3000** path.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Navigate to the directory storing the driver package, for example, **/root/ES3000**.

Step 3 Install the ES3000 driver by running the following command:

rpm -ivh hio-2.0.0.5-2.6.32.12_0.7_default.x86_64.rpm

After successful installation, the command output is as follows:

```
Preparing... ########################################### [100%]
   1:hio     ########################################### [100%]
```

NOTE

An SSD device named **hio*** is generated in the **dev** directory. For details about an SSD device, see **4.1.1 Naming Rules and Conventions of an ES3000**.

NOTE

Step 4 Run the following command to check that the device is detected:

hio_info

----End

Driver Parameters

The following information describes the ES3000 driver parameters in Linux:

The command format is as follows:

modprobe hio *Parameter=Value*

Table 3-2 describes the driver parameters.

Table 3-2 Driver parameter description

Parameter	Default Value	Description
int_mode	2	Specifies the interrupt mode. The options are as follows: ● **0**: legacy interrupt ● **1**: MSI interrupt ● **2**: MSIX interrupt
wmode	0	Specifies the write mode. The options are as follows: ● **0**: write buffer ● **2**: write through ● **3**: auto (int)

3.6.2 Installing the ES3000 Driver in Windows

Operation Scenarios

You need to install the ES3000 driver on the server before using an ES3000.

NOTE

- If you install multiple ES3000s on a server, you need to install the driver only once.
- The driver package contains the ES3000 driver program and ES3000 tools.

Preparations

Before installing the ES3000 driver, check that:

- You have correctly installed the ES3000 in the server. If you can see the ES3000 in the Device Manager, the ES3000 has been correctly installed.
- You have downloaded the ES3000 driver package to the server.

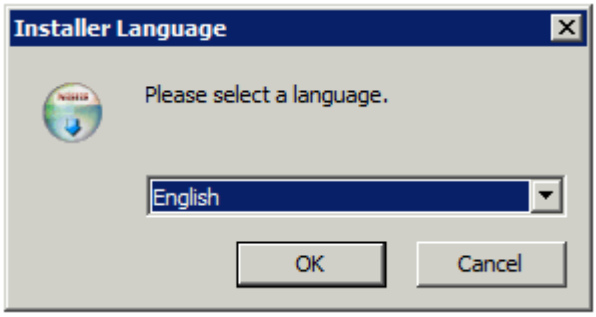
Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Go to the folder that stores the driver package. Double-click the driver package to install it.

Step 3 In the **Installer Language** dialog box, select a language, as shown in **Figure 3-5**. Click **OK**.

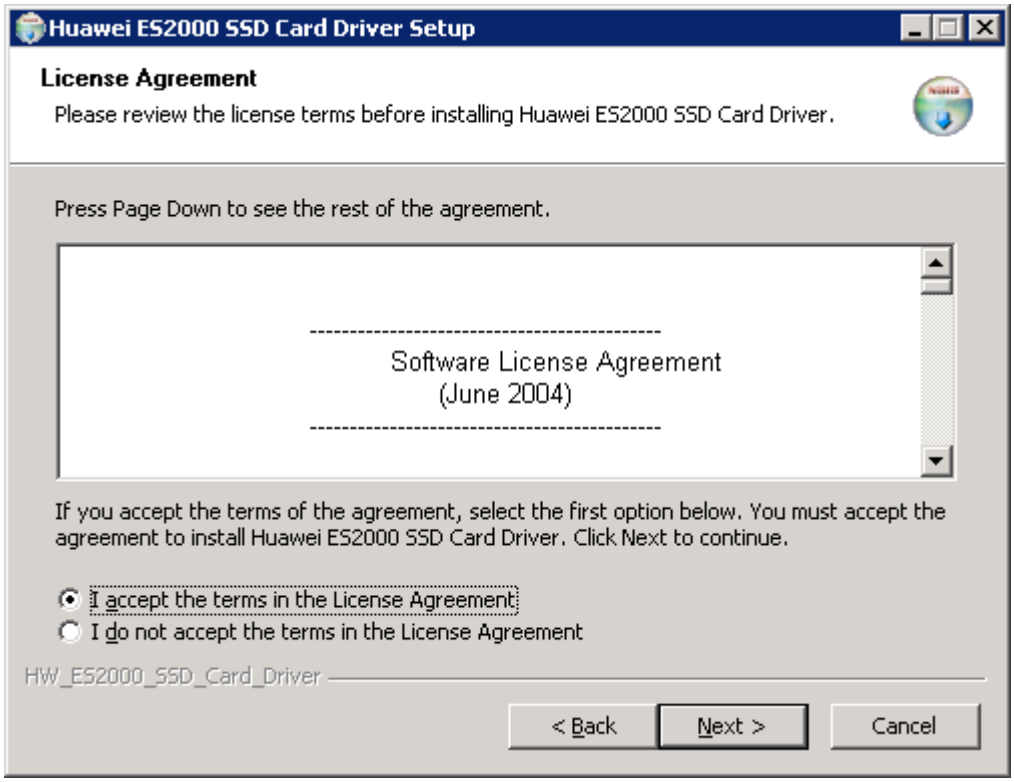
Figure 3-5 Selecting a language



Step 4 In **Setup Wizard**, click **Next**.

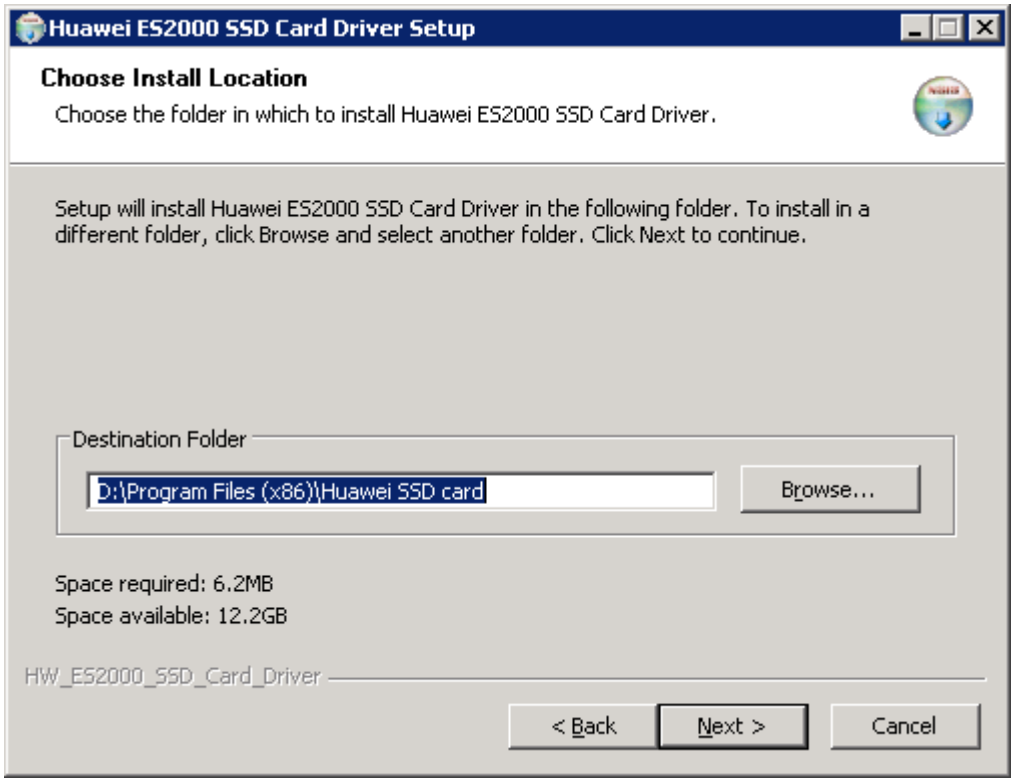
Step 5 In **License Agreement**, select **I accept the terms in the license agreement**, as shown in **Figure 3-6**. Click **Next**.

Figure 3-6 License agreement



Step 6 In **Choose Install Location**, choose a path for installing the driver (the default path is recommended), as shown in **Figure 3-7**. Click **Next**.

Figure 3-7 Choose Install Location



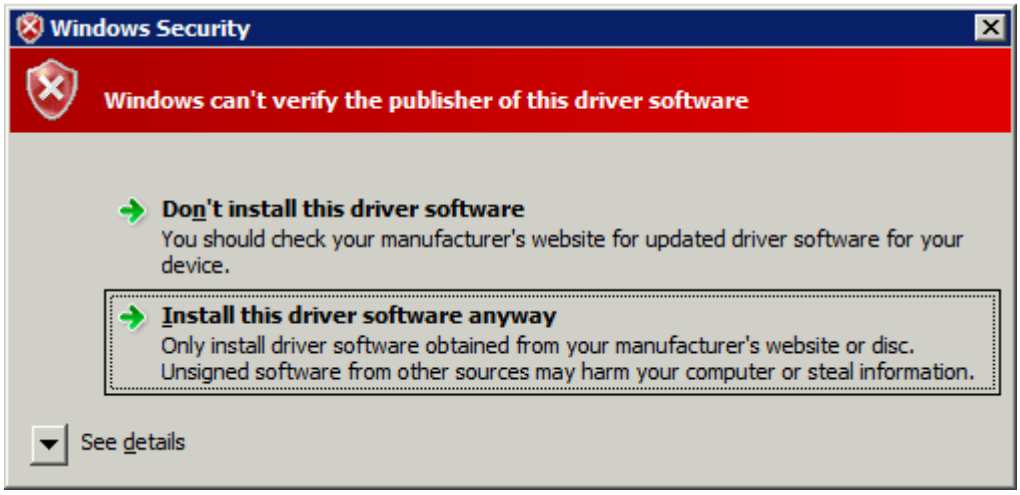
Step 7 In **Choose Start Menu Folder**, click **Install**

Step 8 Choose whether to display the **Windows Security** window.

- If yes, go to **Step 9**.
- If no, go to **Step 10**.

Step 9 In **Windows Security**, click **Install this driver software anyway**, as shown in **Figure 3-8**.

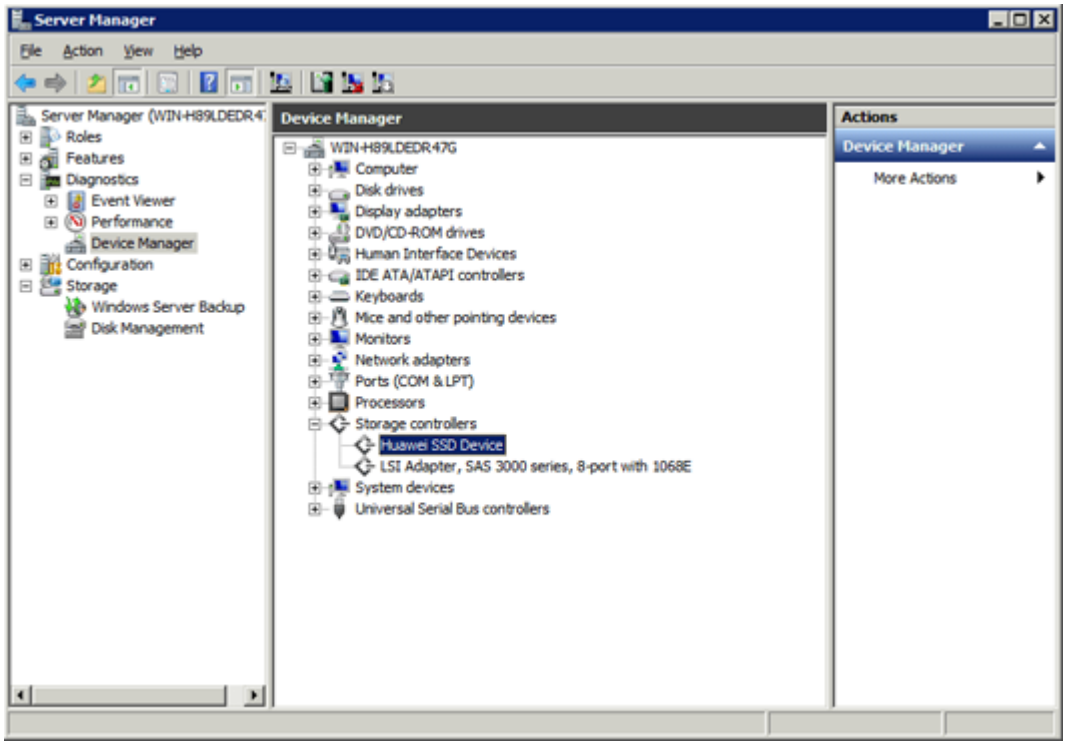
Figure 3-8 Windows Security



Step 10 The system finishes the installation automatically.

After the driver is installed, you can choose **Server Manager** > **Diagnostics** > **Device Manager** and check that the driver is successfully installed, as shown in **Figure 3-9**.

Figure 3-9 The driver is successfully installed



----End

3.6.3 Installing the ES3000 Driver in VMware

Operation Scenarios

You need to install the ES3000 driver on the server before using an ES3000.

NOTE

If you install multiple ES3000s in a server, you need only to install the driver once.

Preparations

Before installing the ES3000 driver, check that:

- You have properly installed the ES3000 in the server.
- You have uploaded the driver package to the server by using WinSCP or other software.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Install the ES3000 driver.

NOTICE

If you use the ESXi 5.0 OS, the driver package must be stored in / directory.

- If you use the ESX 4.1 OS, run the following command to install the ES3000 driver:

  rpm -ivh hio-2.0.0.5.x86_64.rpm

  The command output is as follows:

```
Preparing... ########################################### [100%]
   1:hio     ########################################### [100%]
```

- If you use the ESXi 5.0 OS, run the following command to install the ES3000 driver:

  esxcli software vib install -v *driver_package_path* --no-sig-check --maintenance-mode

  The following is an example:

  esxcli software vib install -v */hio-2.0.0.5.vib* --no-sig-check --maintenance-mode

NOTE

2.0.0.5 in the driver file name indicates the software version, and the actual version may be different.

Step 3 Restart the OS.

Step 4 Run the following command to check that the device is detected:

hio_info

----End

Driver Parameters

The following information describes the ES3000 driver parameter in VMware.

The command syntax is as follows:

esxcli system module parameters set -m hio -p *Parameter=Value*

NOTE

The new settings take effect after the ESX(i) restarts.

Table 3-3 describes the driver parameters.

Table 3-3 Driver parameter description

Parameter	Default Value	Description
dev_type	1	The options are as follows: ● **0**: block mode. Registered as a standard block device, which uses less system resources. ● **1**: SCSI mode. Simulated as a SCSI device, which improves the concurrent processing capability of the PCIe SSD.

Parameter	Default Value	Description
irq_type	1	Specifies the interrupt mode. The options are as follows: ● **0**: MSI interrupt ● **1**: MSIX interrupt ● **2**: legacy interrupt
log_level	2	Specifies the log level. The options are as follows: ● **0**: displays the system logs of the info level or higher. ● **1**: displays the system logs of the notice level or higher. ● **2**: displays the system logs of the warning level or higher. ● **3**: displays the system logs of the error level or higher.

3.7 Initial Configuration

This topic describes the initial configuration of an ES3000, primarily ES3000 formatting. Skip this topic if you need to use a raw device. 4 KB alignment is recommended for partitions.

3.7.1 Initial Configuring in Linux

Operation Scenarios

Before using a new SSD device, format it and use the **fstab** file to mount the SSD device automatically.

Preparations

Before the initial configuration, check that:

- An SSD device (such as **dev/hioa**) has been created for the ES3000.
- You have run the **hio_info** command to verify the mapping between the ES3000 and the SSD device.

Procedure

Format the SSD device.

1 Log in to the operating system (OS) as an administrator.

2 Run the following command to format the SSD device (**dev/hioa** is an SSD device example and **ex3** is a file system example):

mkfs.ext3 /dev/hioa

Configure automatic mounting.

NOTE

If you want to change the ES3000 capacity or delete data after mounting, run the **umount /dev/hioa** command first.

3 Run the following command to open the **fstab** file:

vi /etc/fstab

4 Press **i** to get into editing mode. Add the following information to the **fstab** file. Then the system automatically mounts the SSD device to **/mnt** after starting.

/dev/hioa /mnt auto noatime,nodiratime 0 0

5 Press **Esc**, and enter **:wq**.

Save and close the **fstab** file.

6 Restart the OS or run the following command to mount the SSD device:

mount /dev/hioa /mnt

7 Run the following command to check whether the SSD device is successfully mounted:

mount –l

If the following command output is displayed, the SSD device is successfully mounted.

```
/dev/hioa on /mnt type ext3 (rw)
```

----End

3.7.2 Initial Configuration in Windows

Operation Scenarios

You need to format a new ES3000 before using it.

Preparations

Before formatting an ES3000, check that:

- You have installed the ES3000 driver.
- You have verified the mapping between the ES3000 and the disk by using the **Disk Management** in **Computer Manager**.

Procedure

NOTE

The following information describes how to format an ES3000 in Windows 2008 R2 Enterprise Server.

Step 1 Choose **Start** > **All Programs** > **Administrative Tools** > **Server Manager**.

The **Server Manager** window is displayed.

Step 2 In the navigation tree, choose **Storage** > **Disk Management**.

The **Disk Management** pane is displayed on the right.

Step 3 Right-click the disk of the ES3000.

The shortcut menu is displayed, as shown in **Figure 3-10**.

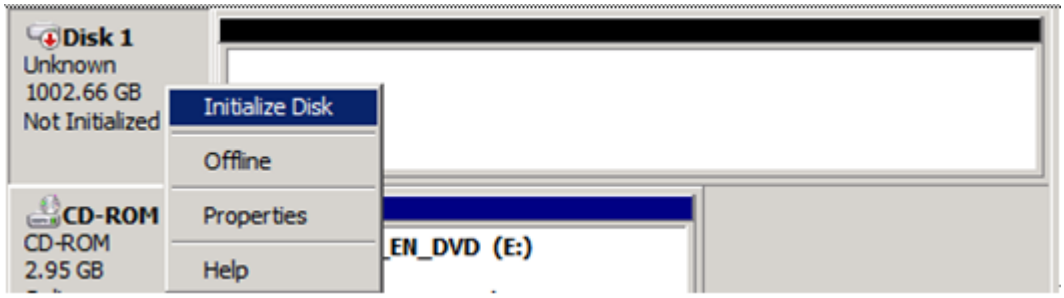
Figure 3-10 Online disks

Step 4 Choose **Online**.

Step 5 Right-click the disk of the ES3000.

The shortcut menu is displayed, as shown in **Figure 3-11**.

Figure 3-11 Initialize Disk

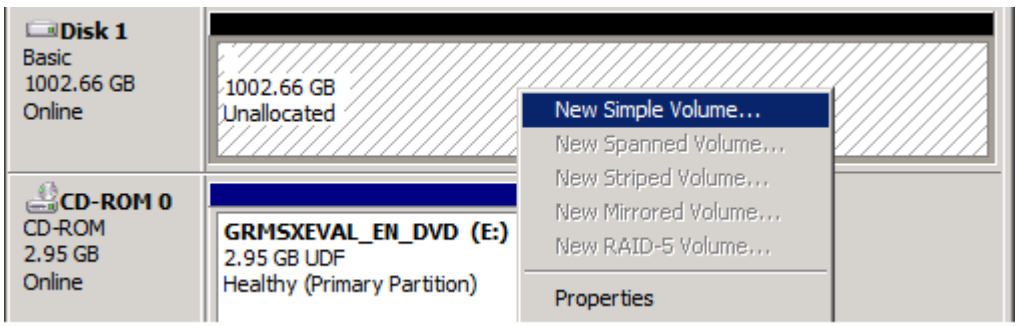


Step 6 Choose **Initialize Disk**.

Step 7 Right-click the disk of the ES3000.

The shortcut menu is displayed, as shown in **Figure 3-12**.

Figure 3-12 New Simple Volume



Step 8 Choose **New Simple Volume**.

The **Format F** window is displayed.

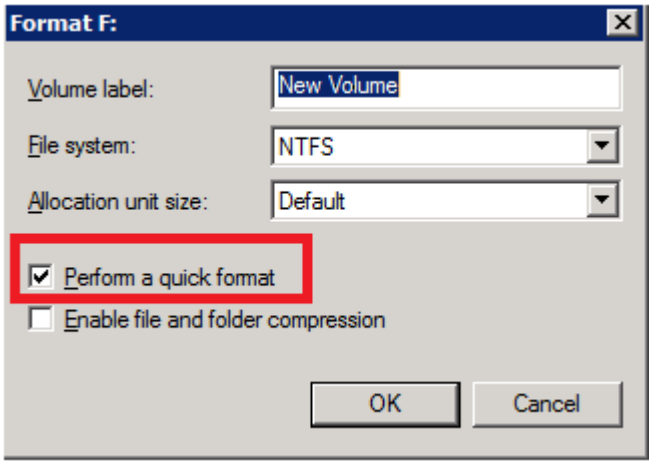
Step 9

NOTICE

It is recommended that you use the new technology file system (NTFS) but not the file allocation table (FAT) or FAT32 file system when formatting a disk. You are advised to select **Perform a quick format**; otherwise, formatting a disk takes a long time.

Set the parameters, as shown in **Figure 3-13**. Click **OK**. The system formats the disk.

Figure 3-13 Formatting the disk



Step 10 After the formatting is complete, close the **Server Manager** window.

----End

3.7.3 Initial Configuration in VMware

Operation Scenarios

You need to format a new ES3000 before using it.

Preparations

Before formatting an ES3000, check that:

- You have installed the ES3000 driver.

Procedure

NOTE

The following information describes how to format an ES3000 in VMware ESX 4.1.

Step 1 Log in to the vSphere Client and select the host from the Inventory panel.

Step 2 Click the **Configuration** tab.

Step 3 Click **Storage** in the Hardware panel.

Step 4 Click **Datastores** and click **Add Storage** in the upper right corner in the window.

The **Add Storage** dialog box is displayed.

Step 5 Select the **Disk/LUN** storage type and click **Next**.

The **Select Disk/LUN** window is displayed.

Step 6 Select an SSD device to use for your datastore and click **Next**.

The **File System Version** page is displayed.

Step 7 Click **Next**.

The **Current Disk Layout** page is displayed.

Step 8 Click **Next**.

The **Properties** window is displayed.

Step 9 In the **Properties** page, enter a datastore name such as hio1 and click **Next**.

The **Disk/LUN - format** page is displayed.

Step 10 If needed, adjust the file system and capacity values, and click **Next**

The **Ready to Complete** page is displayed.

Step 11 Review the datastore configuration information and click **Finish**.

----End

4 Common Operations

About This Chapter

This topic describes the common operations on an ES3000.

The ES3000 provides the functions such as query, statistics collection, and logging. By using these functions, you can know the running status of an ES3000.

4.1 Operation Description

This topic describes the precautions to be taken before you operate an ES3000.

4.1.1 Naming Rules and Conventions of an ES3000

- After you install the ES3000 driver in Linux, the system creates one SSD device for each ES3000. If you install multiple ES3000s in the server, the SSD devices are named **hioa** to **hioz**.
- After you install the ES3000 driver in Windows, the system detects each ES3000 as an independent disk.
- After you install the ES3000 driver in VMware, the system creates one character device for each ES3000. If you install multiple ES3000s in the server, the character devices are named **chioa** to **chioz**.

4.1.2 Operation Precautions

When using an ES3000, observe the following precautions:

- If you install multiple ES3000s in the server, identify the mapping between labels and ES3000s by **4.3.4 Setting E-Label Information**.
- If you install multiple ES3000s in a server, you need only to install the driver once.

4.2 Common Operations in Linux

This topic describes the common operations in Linux.

4.2.1 Querying SSD Device Information

Operation Scenarios

During routine maintenance, you can run a command to query SSD device information, including the version, type, bad block information, and wear status.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the information about an SSD device, for example, **dev/hioa**:

hio_info -d /dev/hioa

The following command output is an example:

```
hioa     Size(GB):           803
    Max size(GB):       803
    Serial number:      030PXT10C9000007
```

```
Driver version:     2.0.0.8
Bridge firmware version:    209
Controller firmware version:    209
Battery firmware version:    005
Battery  status:    OK
Run time (sec.):    241871
Total  IO  read:    2635580821
Total  IO write:    11958359432
Total  read(MB):    101904289
Total write(MB):    95061798
IO timeout:         0
R/W error:          0
Max bit flip:       6
Average EC:         303
Max bad block rate:    0.049%
Event status:       OK
Health:             OK
```

NOTE

You can run the **hio_info** command in any directories. After the command is executed, the system displays information about all SSD devices.

----End

4.2.2 Querying Logs

Operation Scenarios

You can query logs to know the running status of the SSD device.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the logs about an SSD device, for example, **dev/hioa**:

hio_log -d /dev/hioa -l 2

The following command output is an example:

```
2012-08-08 17:00:04 <0x74> /dev/hioa controller 0 flash 35 block 2035 page 622:
Need raid retry
2012-08-14 15:34:53 <0x3d> /dev/hioa controller 0 flash 32: Init: write pointer
mismatch
```

NOTE

You can run the **hio_log** command in any directories.

----End

4.2.3 Querying Version Information

Operation Scenarios

The SSD device version information includes the driver version, controller firmware versions, and device model. You can use an ES3000 effectively after knowing its SSD device information.

You also need to verify the ES3000 information before an upgrade.

NOTE

The version information about all ES3000s is stored in the **info** file in **/proc/hio**.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to view the SSD device version information in the **info** file in **/proc/hio**:

cat /proc/hio/info

The following command output is an example:

```
Driver          Version:        2.0.0.0
HIO 1             Size:         1201GB
HIO 1     Bridge FW VER:        200
HIO 1 Controller FW VER:        200
HIO 1           PCB VER:        .A
HIO 1     Upper PCB VER:        .A
HIO 1            Device:        hioa
```

----End

4.2.4 Querying Temperature Information

Operation Scenarios

You can find out the temperature of the SSD controllers by querying temperature information.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to view the temperature information of an SSD device, for example, **dev/hioa**:

hio_temperature -d /dev/hioa

The following command output is an example:

```
                  Max       Min   Current
Controller 0:    70.50     24.85     70.01
Controller 1:    51.55     25.59     51.06
Inlet:             NA        NA     36.50
```

----End

4.2.5 Querying E-Label Information

Operation Scenarios

The ES3000 e-label information includes the SSD device description, serial number, production date, and manufacturer. You can learn about the SSD device by querying e-label information.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the e-label information about an SSD device, for example, **dev/hioa**:

hio_label -d /dev/hioa

The following command output is an example:

```
DESCRIPTION:    CN21EDBCN01.A
SERIAL NUMBER:  030PWG0000000001
PART NUMBER:
OTHER:
PRODUCE DATE:   2012-07-13 13:43
MANUFACTURER:   Huawei Technologies Co., Ltd.
```

----End

4.2.6 Setting E-Label Information

Operation Scenarios

You can set the **OTHER** field in the e-label for ease of management.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to set the **OTHER** field. For example, set **OTHER** for the SSD device **/dev/hioa** to **HW0001**.

hio_label -d /dev/hioa -i HW0001

The command output is as follows:

```
Updating the device(hioa)'s label...OK
```

NOTE

The **OTHER** field value contains a maximum of 31 characters.

----End

4.2.7 Setting the ES3000 Capacity

Operation Scenarios

The ES3000 write performance, especially the random write input/output operations per second (IOPS) of small data blocks, depends on the capacity. A smaller capacity ensures a higher random write IOPS of small data blocks. You can set the ES3000 capacity within a specified range.

NOTICE

- The capacity setting operation cannot be interrupted. If the operation is interrupted, you need to set the capacity again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before setting the capacity. This is because all data on the ES3000 will be lost after the capacity is set. Use the command with caution.

Procedure

Step 1 Log in to the OS as an administrator.

Step 2 Set the capacity of SSD device **/dev/hioa** to **300 GB**.

hio_capacity -d /dev/hioa -c 300

The following command output is an example:

```
Warning: ALL DATA in the device will be LOST, backup before the change.

Note: please make sure the device is unmounted and unused.

The change may take several minutes, please wait before it completed.
Do you want to continue: yes or no?
```

Step 3 Enter **yes** to confirm the settings.

The following command output is an example:

```
Do you want to continue: yes or no? yes
Changing the device(hioa)'s capacity, please wait...OK
The new capacity is 299GB.
```

----End

4.2.8 Deleting All Data

Operation Scenarios

You can delete all data on an SSD device by this operation.

NOTICE

- The data deletion operation cannot be interrupted. If the operation is interrupted, you need to delete all data again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before this operation. This is because all data on the ES3000 will be lost after this operation. Use the command with caution.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to delete all user data on an SSD device, for example, **dev/hioa**:

hio_cleardata -d /dev/hioa

The following command output is an example:

```
Warning: ALL DATA in the device will be CLEARED, please backup the data firstly.

Note: please make sure the device is unmounted and unused.

The tool may take several minutes, please wait before completed.
Do you want to continue: yes or no?
```

Step 3 Enter **yes** to confirm the operation.

The following command output is an example:

```
Do you want to continue: yes or no? yes
Clearing hioa, please wait...OK
All data has been cleared.
```

----End

4.3 Common Operations in Windows

This topic describes the common operations in Windows.

A tool set is installed along with the ES3000 driver in Windows. You can use the tools to perform operations on the ES3000.

4.3.1 Querying Hardware Information

Operation Scenario

The ES3000 hardware information includes the driver version, controller firmware versions, and chip type. You can use an ES3000 effectively after knowing its basic information.

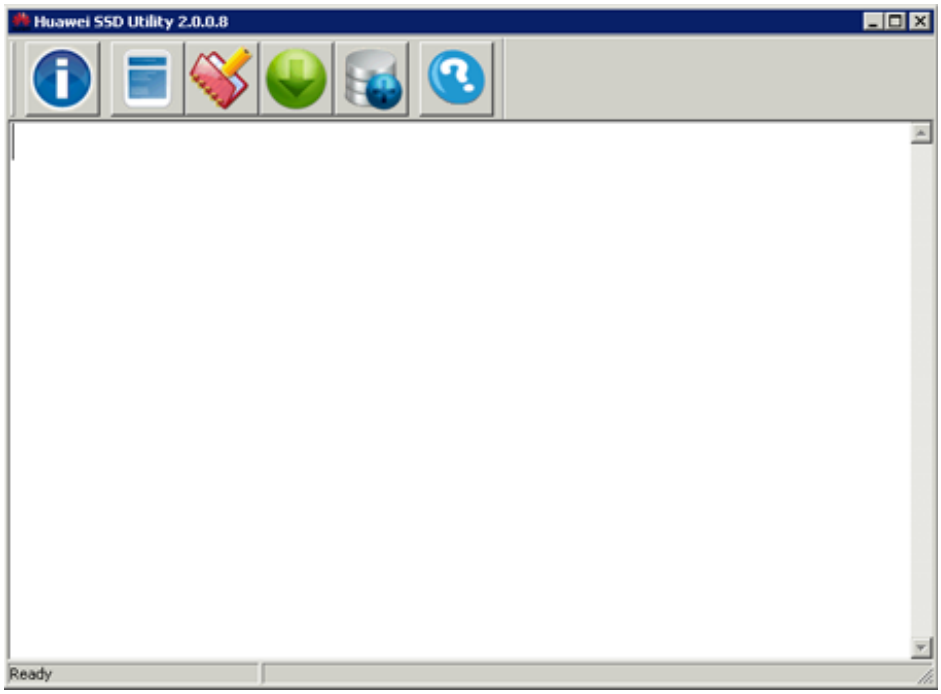
You also need to verify the ES3000 hardware information before an upgrade.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Choose **Start** > **All Programs** > **Huawei SSD** > **Utility** > **Huawei SSD Utility(GUI)**. The graphical user interface (GUI) is displayed, as shown in **Figure 4-1**.

Figure 4-1 ES3000 GUI



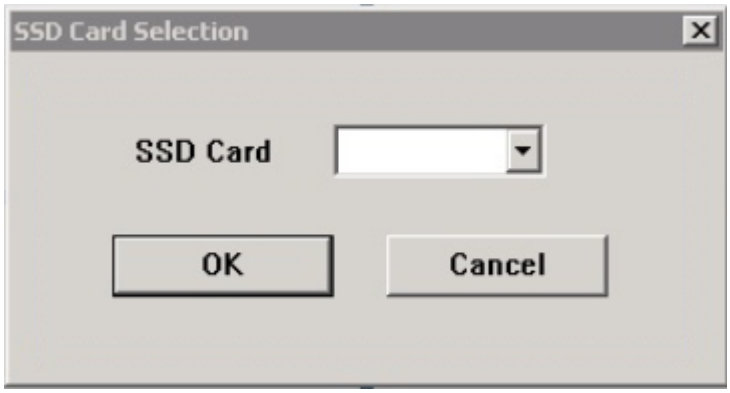
Step 3 Click  .

Step 4 Choose whether to display the **SSD Card Selection** dialog box.

- If yes, go to **Step 5**.
- If no, go to **Step 6**.

Step 5 In **SSD Card Selection**, select an ES3000, and click **OK**, as shown in **Figure 4-2**.

Figure 4-2 Selecting an ES3000



Step 6 The following output is an example:

```
==========================================
Huawei SSD #0 Information List
==========================================
Version information:
Driver version            2.0.0.11
PCB version            .B
Upper PCB version        .B
Bridge firmware version        213
Controller firmware version 213
Battery firmware version    102
==========================================
Device information:
SerialNo            030PXS10CB000073
Physical device size        1121GB
Current  device size        1121GB
Controller FPGA            3
==========================================
I/O information:
Run time (seconds)        90737
Total  I/O  read        8887795250
Total  I/O  write        3672571561
Total  I/O  read(MB)        44557404
Total  I/O  write(MB)        17492911
I/O timeout            0
R/W error            0
==========================================
Device health information:
Average erase count        19
Max badblock rate        0.049%
Max bit flip            7
Battery status            Warning
Event status            OK
Health status            Warning
==========================================
```

----End

4.3.2 Querying Logs

Operation Scenarios

You can learn about the ES3000 running status by querying logs.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Open the ES3000 graphical user interface (GUI). For details, see **Step 2** in **4.3.1 Querying Hardware Information**.

Step 3 Click  .

The following output is an example:

```
[2012-08-07 04:06:06] card #1 controller #1: <0x90> High temperature
[2012-08-17 15:44:58] card #0 controller #1: <0x3d> Flash 96 Init: write pointer
mismatch
```

----End

4.3.3 Querying Temperature Information

Operation Scenario

You can find out the temperature of the SSD controllers by querying temperature information.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Choose **Start** > **All Programs** > **Huawei SSD** > **Utility** > **Huawei SSD Utility(CMD)**.

The **HW SSD Utility(CMD)** command line window is displayed.

Step 3 Run the following command to query the temperature of the SSD:

HioTemperature.exe -d *number_of_SSD*

For example, query the temperature of number *0* SSD.

HioTemperature.exe -d *0*

```
                    Max       Min   Current
Controller 0:     70.50     24.85     70.01
Controller 1:     51.55     25.59     51.06
Inlet:              NA        NA     36.50
```

----End

4.3.4 Setting E-Label Information

Operation Scenarios

You can set different e-label information for multiple ES3000s for ease of management.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Open the ES3000 graphical user interface (GUI). For details, see **Step 2** in **4.3.1 Querying Hardware Information**.

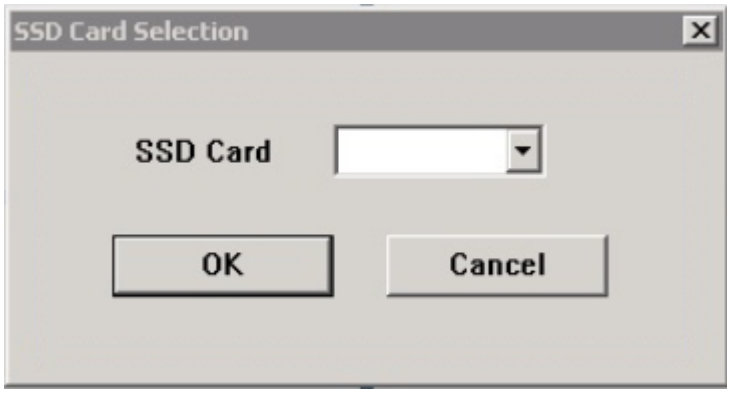
Step 3 Click  .

Step 4 Choose whether to display the **SSD Card Selection** dialog box.

- If yes, go to **Step 5**.
- If no, go to **Step 6**.

Step 5 In **SSD Card Selection**, select an ES3000, and click **OK**, as shown in **Figure 4-3**.

Figure 4-3 Selecting an ES3000

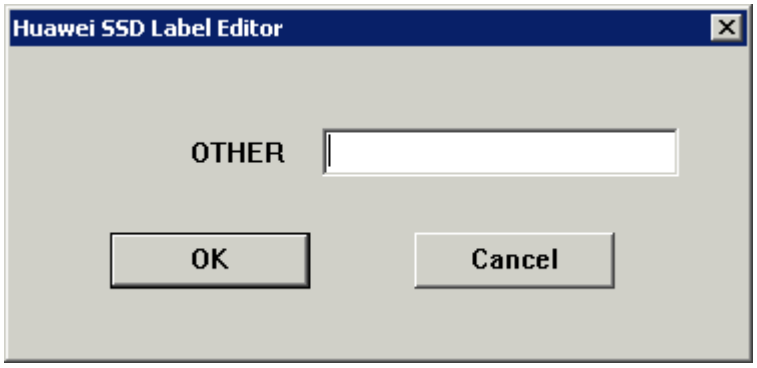


Step 6 The following output is an example:

```
============================================
Huawei SSD #0 Label Information
============================================
DESCRIPTION:    CN21EDBCN01.A
SERIAL NUMBER:  030PWG0000000001
PART NUMBER:
OTHER:
PRODUCE DATE:   2012-07-13 13:43
MANUFACTURER:   Huawei Technologies Co., Ltd.
============================================
```

Step 7 In the **Huawei SSD Label Editor** dialog box, set the asset information, and click **OK**, as shown in **Figure 4-4**.

Figure 4-4 Setting e-label information



NOTE

The **OTHER** field value contains a maximum of 31 characters.

----End

4.3.5 Setting the ES3000 Capacity

Operation Scenarios

The ES3000 write performance, especially the random write input/output operations per second (IOPS) of small data blocks, depends on the capacity. A smaller capacity ensures a higher random write IOPS of small data blocks. You can set the ES3000 capacity within a specified range.

NOTICE

- The capacity setting operation cannot be interrupted. If the operation is interrupted, you need to set the capacity again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before setting the capacity. This is because all data on the ES3000 will be lost after the capacity is set. Use the command with caution.

NOTE

The settings take effect after you restart the operating system (OS) or power off and then power on the server.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Open the ES3000 graphical user interface (GUI). For details, see **Step 2** in **4.3.1 Querying Hardware Information**.

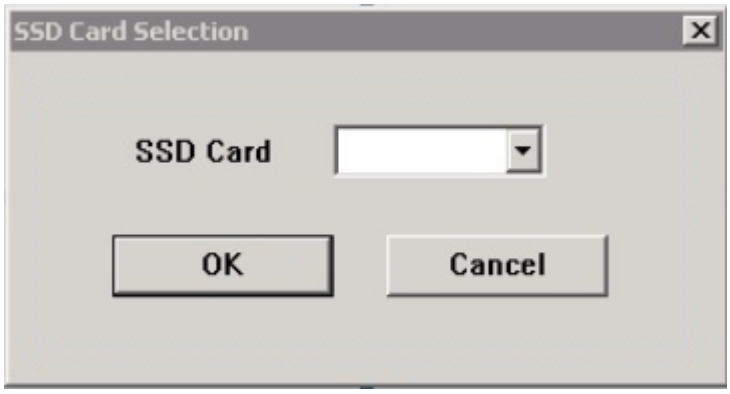
Step 3 Click  .

Step 4 Choose whether to display the **SSD Card Selection** dialog box.

- If yes, go to **Step 5**.
- If no, go to **Step 6**.

Step 5 In **SSD Card Selection**, select an ES3000, and click **OK**, as shown in **Figure 4-5**.

Figure 4-5 Selecting an ES3000

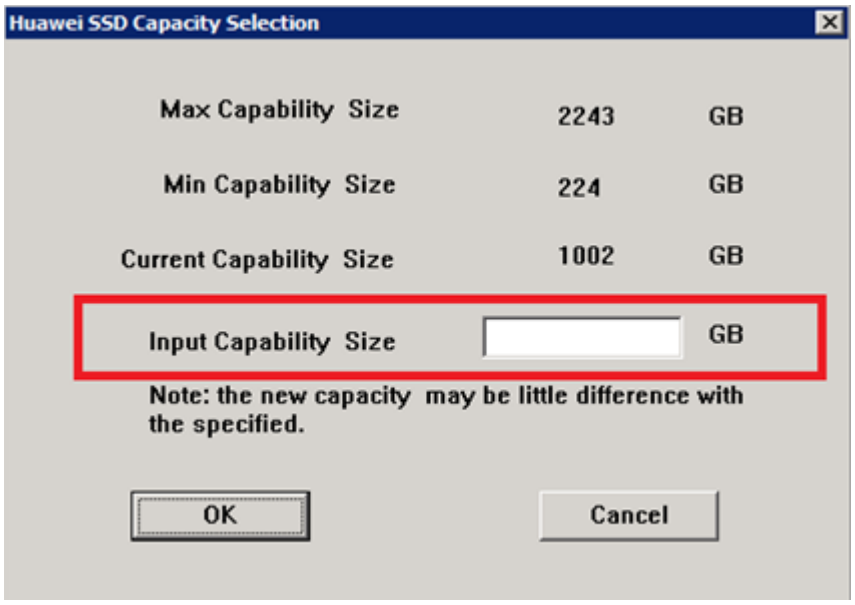


Step 6 In the **Warning** dialog box, click **OK**.

The **Huawei SSD Capacity Selection** dialog box is displayed.

Step 7 In **Huawei SSD Capacity Selection**, set **Input Capability Size**, as shown in **Figure 4-6**. Click **OK**.

Figure 4-6 Setting the capacity



After successful settings, **Information** shown in **Figure 4-7** is displayed.

Figure 4-7 Successful settings

----End

4.3.6 Deleting All Data

Operation Scenario

You can delete all data on an SSD device by this operation.

NOTICE

- The data deletion operation cannot be interrupted. If the operation is interrupted, you need to delete all data again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before this operation. This is because all data on the ES3000 will be lost after this operation. Use the command with caution.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Choose **Start** > **All Programs** > **Huawei SSD** > **Utility** > **Huawei SSD Utility(CMD)**.

The **HW SSD Utility(CMD)** command line window is displayed.

Step 3 Run the following command to delete all user data on an SSD device:

HioTemperature.exe -d *number_of_SSD*

For example, deleting all data on number *0* SSD.

HioTemperature.exe -d *0*

```
Warning: ALL DATA in the device will be CLEARED, please backup the data firstly.

Note: please make sure the device is unused.
The tool may take several minutes, please wait before completed.
Do you want to continue: yes or no?
```

Step 4 Enter **yes** to confirm the operation.

The following command output is an example:

```
Do you want to continue: yes or no? yes
Begin clean data in SSD #0, please wait a moment...
Erase SSD #0 successfully.Please reboot system.
```

Step 5 Restart the OS.

----End

4.4 Common Operations in VMware

This topic describes the common operations in VMware.

4.4.1 Querying SSD device Information

Operation Scenarios

During routine maintenance, you can run a command to query SSD device information, including the version, type, bad block information, and wear status.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the information about an SSD device, for example, **dev/chioa**:

hio_info -d /dev/chioa

The following command output is an example:

```
hioa     Size(GB):           803
    Max size(GB):       803
    Serial number:      030PXT10C9000007
    Driver version:     2.0.0.8
    Bridge firmware version:    209
    Controller firmware version:    209
    Battery firmware version:    005
    Battery  status:    OK
    Run time (sec.):    241871
    Total  IO  read:    2635580821
    Total  IO write:    11958359432
    Total  read(MB):    101904289
    Total write(MB):    95061798
    IO timeout:         0
    R/W error:          0
    Max bit flip:       6
    Average EC:         303
    Max bad block rate:    0.049%
    Event status:       OK
    Health:             OK
```

NOTE

You can run the **hio_info** command in any directories.

----End

4.4.2 Querying Logs

Operation Scenarios

You can query logs to know the running status of the SSD device.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the logs about an SSD device, for example, **dev/chioa**:

hio_log -d /dev/chioa -l 2

The following command output is an example:

```
2012-08-08 17:00:04 <0x74> /dev/hioa controller 0 flash 35 block 2035 page 622:
Need raid retry
2012-08-14 15:34:53 <0x3d> /dev/hioa controller 0 flash 32: Init: write pointer
mismatch
```

NOTE

You can run the **hio_log** command in any directories.

----End

4.4.3 Querying Version Information

Operation Scenarios

The SSD device version information includes the driver version, controller firmware versions, and device model. You can use an ES3000 effectively after knowing its SSD device information.

You also need to verify the ES3000 information before an upgrade.

NOTE

The version information about all ES3000s is stored in the **info** file in **/proc/hio**.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to view the version information of all SSD devices:

hio_info

The following command output is an example:

```
hioa     Size(GB):           803
    Max size(GB):       803
    Serial number:      030PXS10CB000062
    Driver version:     2.0.0.40
    Bridge firmware version:    326
    Controller firmware version:    NA
    Battery firmware version:    111
    Battery  status:    OK
    Run time (sec.):    858781
    Total  IO  read:    4010544002
    Total  IO write:    2609916620
    Total  read(MB):    53282383
    Total write(MB):    37119436
    IO timeout:         0
    R/W error:          0
    Max bit flip:       28
    Average EC:         149
    Max bad block rate:    0.089%
    Event log:          OK
    Health:             OK
```

----End

4.4.4 Querying Temperature Information

Operation Scenarios

You can find out the temperature of the SSD controllers by querying temperature information.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to view the temperature information of an SSD device, for example, **dev/chioa**:

hio_temperature -d /dev/chioa

The following command output is an example:

```
                  Max       Min   Current
Controller 0:   70.50     24.85     70.01
Controller 1:   51.55     25.59     51.06
Inlet:            NA        NA     36.50
```

----End

4.4.5 Querying E-Label Information

Operation Scenarios

The ES3000 e-label information includes the SSD device description, serial number, production date, and manufacturer. You can learn about the SSD device by querying e-label information.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the e-label information about an SSD device, for example, **dev/chioa**:

hio_label -d /dev/chioa

The following command output is an example:

```
DESCRIPTION:    CN21EDBCN01.A
SERIAL NUMBER:  030PWG0000000001
PART NUMBER:
OTHER:
PRODUCE DATE:   2012-07-13 13:43
MANUFACTURER:   Huawei Technologies Co., Ltd.
```

----End

4.4.6 Setting E-Label Information

Operation Scenarios

You can set the **OTHER** field in the e-label for ease of management.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to set the **OTHER** field. For example, set **OTHER** for the SSD device **/dev/chioa** to **HW0001**:

hio_label -d /dev/chioa -i HW0001

The following command output is an example:

```
Updating the device(hioa)'s label...OK
```

NOTE

The **OTHER** field value contains a maximum of 31 characters.

----End

4.4.7 Setting the ES3000 Capacity

Operation Scenarios

The ES3000 write performance, especially the random write input/output operations per second (IOPS) of small data blocks, depends on the capacity. A smaller capacity ensures a higher random write IOPS of small data blocks. You can set the ES3000 capacity within a specified range.

NOTICE

- The capacity setting operation cannot be interrupted. If the operation is interrupted, you need to set the capacity again. Otherwise, the SSD device cannot be properly used.
- Before setting the capacity, migrate all virtual machines from the ES3000 and ensure that no host is accessing the ES3000.
- Back up all required data before setting the capacity. This is because all data on the ES3000 will be lost after the capacity is set. Use the command with caution.

Procedure

Delete the SSD device.

1. Log in to the vSphere Client and select the host from the Inventory panel.
2. Click the **Configuration** tab.
3. Click **Storage** in the Hardware panel.
4. Click **Datastores**.
5. Right-click the SSD to delete and click **Delete**.
6. Confirm that you want to delete the SSD.

Set the capacity.

7. Log in to the operating system (OS) as an administrator.
8. Set the capacity of SSD device **/dev/chioa** to **300 GB**.

   hio_capacity -d /dev/chioa -c 300

   The following command output is an example:

   ```
   Warning: ALL DATA in the device will be LOST, backup before the change.

   Note: please make sure the device is unmounted and unused.
   ```

```
The change may take several minutes, please wait before it completed.
If there are IOs on the device. The tool will stop the IO and report errors on
the device.
Do you want to continue: yes or no?
```

9 Enter **yes** to confirm the settings.

The following command output is an example:

```
Do you want to continue: yes or no? yes
Changing the device(hioa)'s capacity, please wait...OK
The new capacity is 299GB.
The NEW setting will become effective AFTER reboot.
Please reboot!!!
```

10 Restart the OS.

NOTE

Do initial configuration again.

----End

4.4.8 Deleting All Data

Operation Scenarios

You can delete all data on an SSD device by this operation.

NOTICE

Before this operation, remove all virtual machines from the ES3000. Make sure that no other host is accessing the ES3000. Back up all the data; otherwise, the data on the ES3000 is lost. Use the command with caution.

Procedure

Delete an SSD device.

1 Log in to the vSphere Client and select the host from the Inventory panel.

2 Click the **Configuration** tab.

3 Click **Storage** in the Hardware panel.

4 Click **Datastores**.

5 Right-click the SSD device to be deleted and click **Delete**.

6 Confirm that you want to delete the SSD device.

Delete all data.

7 Log in to the operating system (OS) as an administrator.

8 Run the following command to delete all user data on an SSD device, for example, **dev/chioa**:

hio_cleardata -d /dev/chioa

The following command output is an example:

```
Warning: ALL DATA in the device will be CLEARED, please backup the data
firstly.

Note:
Please make sure the OS is in the maintenance mode.
Make sure the device is unmounted and unused.
The tool may take several minutes, please wait before completed.
Do you want to continue: yes or no?
```

9 Enter **yes** to confirm the operation.

The following command output is an example:

```
Do you want to continue: yes or no? yes
Clearing hioa, please wait...OK
All data has been cleared.
Hioa will become effective AFTER reboot.
Please reboot!!!
```

10 Restart the OS.

NOTE

Do initial configuration again.

----End

5 Maintenance and Upgrade

About This Chapter

This topic describes hardware maintenance, software upgrade, and troubleshooting.

5.1 Troubleshooting
This topic describes how to troubleshoot an ES3000.

5.2 Uninstalling the Driver
This topic describes how to uninstall the ES3000 driver in various operating systems (OSs).

5.3 Upgrading the ES3000 Driver
This topic describes how to upgrade the ES3000 driver in various operating systems (OSs).

5.4 Upgrading the Controller Firmware
This topic describes how to upgrade the ES3000 controller firmware in various operating systems (OSs).

5.5 Replacing an ES3000
This topic describes how to replace an ES3000.

5.1 Troubleshooting

This topic describes how to troubleshoot an ES3000.

Context

NOTE

You can run the **hio_info** command to view the health status of the ES3000. If the value of **Health** in the command output is not **OK**, contact Huawei Technical Support.

5.1.1 Failure to Install the ES3000 Driver

Symptom

When you install the driver, a message is displayed indicating a file collision. The driver fails to install.

Possible Causes

The ES3000 driver has been installed on the server.

Fault Identification

Uninstall the existing driver and reinstall the ES3000 driver. Check whether the driver is successfully installed.

Solution

The following solution is an example in Linux.

Step 1 Run the following command to uninstall the existing driver:

rpm -e hio

Step 2 Run the following command to install the ES3000 driver package:

rpm –ivh hio-2.0.0.5-2.6.32.12_0.7_default.x86_64.rpm

The command output is as follows:

```
Preparing... ########################################### [100%]
   1:hio     ########################################### [100%]
```

Step 3 Check whether the driver is successfully installed.

- If the driver is successfully installed, the problem is resolved.
- If the fault persists, contact Huawei Technical Support.

----End

Reference Information

For details about how to install and uninstall the driver, see **3.6 Installing Drivers** and **5.2 Uninstalling the Driver**.

5.1.2 Failure to Mount an SSD device

Symptom

The operating system (OS) fails to mount an SSD device because the SSD device cannot be found.

Possible Causes

- The ES3000 is not properly installed.
- The ES3000 fails.

Fault Identification

Reinstall the ES3000 to locate the fault.

Solution

Step 1 Run the following command and check whether the value of **Health** in the command output is **OK**:

hio_info

The following command output is an example:

```
hioa     Size(GB):           803
    Max size(GB):       803
    Serial number:      030PXS10CB000062
    Driver version:     2.0.0.40
    Bridge firmware version:    326
    Controller firmware version:    NA
    Battery firmware version:    111
    Battery  status:    OK
    Run time (sec.):    858781
    Total  IO  read:    4010544002
    Total  IO write:    2609916620
    Total  read(MB):    53282383
    Total write(MB):    37119436
    IO timeout:         0
    R/W error:          0
    Max bit flip:       28
    Average EC:         149
    Max bad block rate:    0.089%
    Event log:          OK
    Health:             OK
```

If the value of **Health** in the command output is **OK**, contact Huawei Technical Support.

Step 2 Log out of the operating system (OS) and turn off the power to the server.

Step 3 Remove the chassis cover.

Step 4 Remove and then reinstall the ES3000. For details on how to remove and install an ES3000, see **5.5 Replacing an ES3000** and **3 Installation and Configuration** respectively.

Step 5 Observe the ES3000 indicator.

- If the indicator status is abnormal, the ES3000 fails. Replace it with a new ES3000.
- If the indicator status is normal, the ES3000 hardware is running properly. Go to **Step 6**.

Step 6 Install the chassis cover.

Step 7 Turn on the power to the server and observe the mount process.

- If the ES3000 is successfully mounted, the problem is resolved.
- If the fault persists, contact Huawei Technical Support.

----End

Reference Information

None

5.1.3 Querying and Setting the Fan Speed (fanlevel)

This topic describes how to use the **fanlevel** command to query and set the fan speed.

Function

The **fanlevel** command is used to query and set the fan speed.

Format

ipmcget -d fanlevel

ipmcset -d fanlevel -v *percent*

Parameters

Parameter	Description	Value
percent	Indicates the percentage of the current fan speed to the full fan speed.	The value is an integer ranging from 38-100.

Usage Guidelines

The *percent* parameter is available only in manual mode.

Then the MMC sets the fan speed to the highest value sent from the iManas of all node servers.

Example

Run the following command to query the fan speed:

The following information is displayed when the fans are operating in automatic mode:

```
root@BMC:/#ipmcget -d fanlevel
Get fanlevel successfully!
Current mode: auto.
```

The following information is displayed when the fans are operating in manual mode:

```
root@BMC:/#ipmcget -d fanlevel
Get fanlevel successfully!
Current mode:manual,timeout 489 seconds.
Manual fan level:    50%
```

Run the following command to set the fan speed to 50% of the full fan speed in manual mode:

```
root@BMC:/#ipmcset -d fanlevel -v 50
Set fan level successfully.
Current Mode:        manual, timeout 490 seconds.
Manual Fan Level:    50%
```

Related Topics

5.1.4 Querying and Setting the Fan Mode (fanmode)

5.1.4 Querying and Setting the Fan Mode (fanmode)

This topic describes how to use the **fanmode** command to query and set the fan mode.

Function

The **fanmode** command is used to query and set the fan mode.

Format

ipmcget -d fanmode

ipmcset -d fanmode -v { **0** | **1** [*timeout*] }

Parameters

Parameter	Description	Value
timeout	Indicates the timeout duration for switching the manual mode to the automatic mode.	The value is an integer, in the unit of seconds. The value **0** indicates that timeout is not allowed. The default value is 30s.
0	Indicates the automatic mode, and the *timeout* parameter does not need to be set.	0
1	Indicates the manual mode, and the *timeout* parameter need to be set.	1

Usage Guidelines

None

Example

Run the following command to query the current fan mode:

```
root@BMC:/#ipmcget -d fanmode
Get fanmode successfully!
Current mode: auto
```

Run the following command to set the fan mode to the manual mode, and then the manual mode switches to the automatic mode in 60s:

```
root@BMC:/#ipmcset -d fanmode -v 1 60
```

```
Set fan mode successfully.
Current Mode:        manual, timeout 60 seconds.
Manual Fan Level:    60%45%30%
```

Run the following command to query the current fan mode after the setting operation:

```
root@BMC:/#ipmcget -d fanmode
Get fanmode successfully!
Current mode: manual,timeout 56 seconds.
Manual fan level is    60%45%30%
```

Related Topics

5.1.3 Querying and Setting the Fan Speed (fanlevel)

5.2 Uninstalling the Driver

This topic describes how to uninstall the ES3000 driver in various operating systems (OSs).

5.2.1 Uninstalling the ES3000 Driver in Linux

Operation Scenarios

If you want to stop using, replace, or upgrade an ES3000, uninstall the driver first.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Stop the programs or close files that access the ES3000.

Step 3 Run the following command to uninstall the ES3000 driver:

rpm -e hio

NOTE

After the preceding steps, run the **rmmod hio** command to manually delete the loaded driver. If the driver cannot be deleted, run the **init 6** command to restart the OS. Then the driver is deleted.

Step 4 Run the following command to check whether the uninstalling is successful:

rpm -qa hio

If no information is displayed after you run this command, the uninstalling is successful.

----End

5.2.2 Uninstalling the ES3000 Driver in Windows

Operation Scenarios

If you want to stop using, replace, or upgrade an ES3000, uninstall the driver first.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Stop the programs that access the ES3000.

Step 3 Choose **Start** > **Control Panel**.
The **Control Panel** window is displayed.

Step 4 Click **Uninstall a program**.
The **Programs and Features** window is displayed.

Step 5 Right-click the ES3000 driver.
The shortcut menu is displayed.

Step 6 Choose **Uninstall/Change**.
The **Huawei SSD driver Uninstall** dialog box is displayed.

Step 7 Click **Yes** to uninstall the ES3000 driver and its programs.

Step 8 After uninstalling the driver, click **Close** to close the **Huawei SSD driver Uninstall** window.

----End

5.2.3 Uninstalling the ES3000 Driver in VMware

Operation Scenarios

If you want to stop using, replace, or upgrade an ES3000, uninstall the driver first.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Stop the programs or close files that access the ES3000.

Step 3 Uninstall the ES3000 driver.

- If you use the ESX 4.1 OS, run the following command to uninstall the ES3000 driver:
  rpm -e hio
- If you use the ESXi 5.0 OS, run the following command to uninstall the ES3000 driver:
  esxcli software vib remove -n hio

Step 4 Restart the OS.

Step 5 Run the following command to check whether the uninstalling is successful:

rpm -qa hio

If no information is displayed after you run this command, the uninstalling is successful.

----End

5.3 Upgrading the ES3000 Driver

This topic describes how to upgrade the ES3000 driver in various operating systems (OSs).

5.3.1 Upgrading the ES3000 Driver in Linux

Operation Scenarios

You can upgrade the ES3000 driver after a later version is released.

Preparations

Before upgrading the driver, check that:

- You have downloaded the later driver software to the server.
- Check the driver version. For details, see **4.2.3 Querying Version Information**.

Procedure

Step 1 Uninstall the existing driver. For details, see **5.2.1 Uninstalling the ES3000 Driver in Linux**.

Step 2 Install the new driver. For details, see **3.6.1 Installing the ES3000 Driver in Linux**.

----End

5.3.2 Upgrading the ES3000 Driver in Windows

Operation Scenarios

You can upgrade the ES3000 driver after a later version is released.

Preparations

Before upgrading the driver, check that:

- You have downloaded the later driver software to the server.
- Check the driver version. For details, see **4.3.1 Querying Hardware Information**.

Procedure

Step 1 Uninstall the existing driver. For details, see **5.2.2 Uninstalling the ES3000 Driver in Windows**.

Step 2 Install the new driver. For details, see **3.6.2 Installing the ES3000 Driver in Windows**.

----End

5.3.3 Upgrading the ES3000 Driver in VMware

Operation Scenarios

You can upgrade the ES3000 driver after a later version is released.

Preparations

Before upgrading the driver, check that:

- You have downloaded the later driver software to the server.
- Check the driver version. For details, see **4.4.3 Querying Version Information**.

Procedure

Step 1 Uninstall the existing driver. For details, see **5.2.3 Uninstalling the ES3000 Driver in VMware**.

Step 2 Install the new driver. For details, see **3.6.3 Installing the ES3000 Driver in VMware**.

----End

5.4 Upgrading the Controller Firmware

This topic describes how to upgrade the ES3000 controller firmware in various operating systems (OSs).

5.4.1 Upgrading the Controller Firmware in Linux

Operation Scenarios

You can upgrade the controller firmware after a later version is released.

Preparations

Before upgrading the firmware, check that:

- You have stopped the applications or closed the files that access the ES3000.
- You have uploaded the controller firmware file **hio_fw** to the server.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the SSD device controller firmware version:

hio_info

The command output contains the following controller firmware version:

```
Controller firmware version: 200
```

Step 3 Navigate to the folder where the controller firmware is stored, for example, **/root/firmware**.

Step 4 Run the following command to upgrade the controller firmware of an SSD device (for example, **/dev/hioa**):

hio_firmware -d /dev/hioa -f /root/firmware/hio_fw

NOTICE

- The firmware of an earlier version may not support the data format of the firmware of a later version. A firmware upgrade may damage data on the SSD device. The system will ask you to confirm data deletion during the upgrade, enter **yes** only after you ensure that all required data has been backed up.
- If the OS crashes or the server powers off during the upgrade, upgrade the controller firmware again.

Step 5 Run the **reboot** command to restart the OS.

Step 6 Run the following command to check whether the upgrade is successful:

hio_info

The command output contains the following controller firmware version. If the version is of the target version, the upgrade is successful.

```
Controller firmware version: 209
```

----End

5.4.2 Upgrading the Controller Firmware in Windows

Operation Scenarios

You are advised to upgrade the controller firmware immediately after a later version is released.

Preparations

Before upgrading the firmware, check that:

- You have stopped the applications or closed the files that access the ES3000.
- You have downloaded the latest firmware file to the specific folder on the server over the network.
- You have upgraded the driver required by the firmware.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Open the ES3000 graphical user interface (GUI). For details, see **Step 2** in **4.3.1 Querying Hardware Information**.

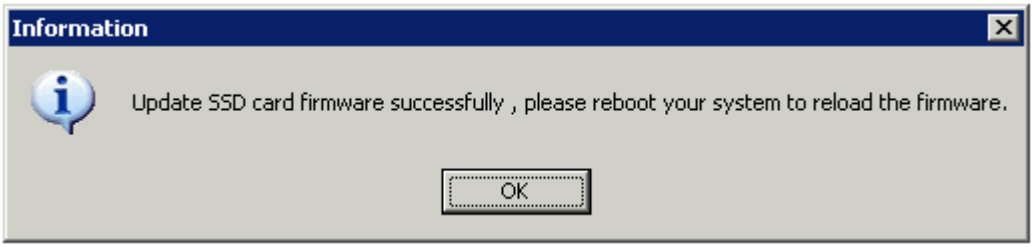
Step 3 Query the hardware controller firmware version. For details, see **4.3.1 Querying Hardware Information**.

Step 4 Click  .

Step 5 In the displayed window, select the latest firmware file, and click **Open**.

Step 6 After a successful upgrade, restart the OS, as shown in **Figure 5-1**.

Figure 5-1 Restarting the OS



----End

5.4.3 Upgrading the Controller Firmware in VMware

Operation Scenarios

You can upgrade the controller firmware after a later version is released.

Preparations

Before upgrading the firmware, check that:

- You have stopped the applications or closed the files that access the ES3000.
- You have uploaded the controller firmware file **hio_fw** to the server.

Procedure

Step 1 Log in to the operating system (OS) as an administrator.

Step 2 Run the following command to query the SSD device controller firmware version:

cat /proc/hio/info

The command output contains the following controller firmware version:

```
HIO 1 Controller FW VER:    200
```

NOTE

You can also run the **hio_info** command to query the firmware version.

Step 3 Navigate to the folder where the controller firmware is stored, for example, **/tmp**.

Step 4 Run the following command to upgrade the controller firmware of an SSD device (for example, **/dev/chioa**):

hio_firmware -d /dev/chioa -f /tmp/hio_fw

NOTICE

- The firmware of an earlier version may not support the data format of the firmware of a later version. A firmware upgrade may damage data on the SSD device. The system will ask you to confirm data deletion during the upgrade, enter **yes** only after you ensure that all required data has been backed up.
- If the OS crashes or the server powers off during the upgrade, upgrade the controller firmware again.

Step 5 Run the **reboot** command to restart the OS.

Step 6 Run the following command to check whether the SSD device controller firmware is upgraded:

cat /proc/hio/info

The command output contains the following controller firmware version. If the version is of the target version, upgrading firmware is successful.

```
HIO 1 Controller FW VER:    209
```

----End

5.5 Replacing an ES3000

This topic describes how to replace an ES3000.

The following two modes are supported:

- **5.5.1 Replacing an ES3000 on a Riser Card**
- **5.5.2 Replacing an ES3000 Directly in a Server**

5.5.1 Replacing an ES3000 on a Riser Card

Operation Scenarios

NOTICE

To ensure the safety of the human body and security of the equipment, only trained maintenance personnel can replace an ES3000.

You need to replace an ES3000 if:

- The ES3000 hardware fails.

Preparations

Before replacing an ES3000, check that:

- You have uninstalled the ES3000 driver.
- You have turned off the power to the server.

Procedure

Step 1 Wear electrostatic discharge (ESD) gloves.

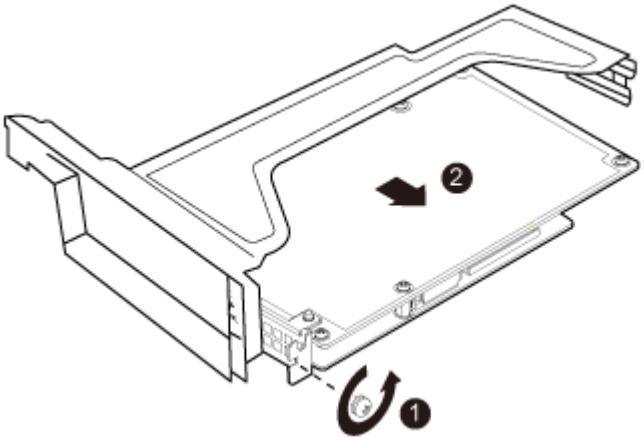
Step 2 Remove the chassis cover.

Step 3 Remove the riser card from the server.

Step 4 Use a screwdriver to unscrew the ES3000. See step (1) in **Figure 5-2**.

Step 5 Remove the ES3000 vertically from the riser card. See step (2) in **Figure 5-2**.

Figure 5-2 Removing the ES3000 from the riser card



Step 6 Place the removed ES3000 in an ESD bag.

Step 7 Install a new ES3000 in the server. For details, see **3.2 Installing an ES3000 on a Riser Card**.

----End

5.5.2 Replacing an ES3000 Directly in a Server

Operation Scenarios

You need to replace an ES3000 if:

- The ES3000 hardware fails.

NOTICE

To ensure the safety of the human body and security of the equipment, only trained maintenance personnel can replace an ES3000.

Preparations

Before replacing an ES3000, check that:

- You have uninstalled the ES3000 driver.
- You have turned off the power to the server.

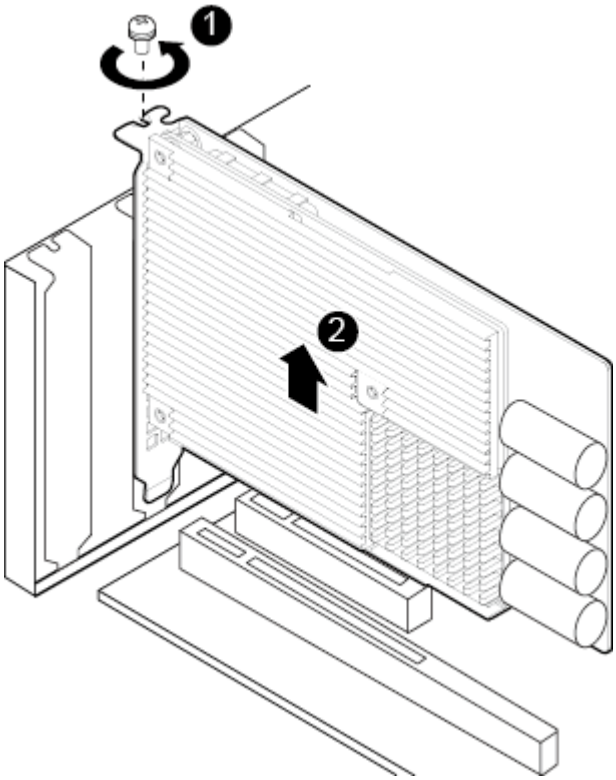
Procedure

Step 1 Wear electrostatic discharge (ESD) gloves.

Step 2 Use a screwdriver to unscrew the ES3000. See step (1) in **Figure 5-3**.

Step 3 Remove the ES3000 upwards from the server. See step (2) in **Figure 5-3**.

Figure 5-3 Removing the ES3000 from a server



Step 4 Place the removed ES3000 in an ESD bag.

Step 5 Install a new ES3000 in the server. For details, see **3.3 Installing an ES3000 Directly in a Server**.

----End

A Command Description

This topic describes the common commands of an ES3000.

A.1 Commands Used in Linux
This topic describes the ES3000 commands used in Linux.

A.2 Windows System Tools
This topic describes how to use the ES3000 tools in Windows.

A.3 Commands Used in VMware
This topic describes the ES3000 commands used in VMware.

A.1 Commands Used in Linux

This topic describes the ES3000 commands used in Linux.

After you install the ES3000 driver in Linux, common ES3000 commands are supported.

A.1.1 Querying General Information About an SSD Device (hio_info)

Function

The command is used to query general information about a specified solid-state drive (SSD) device, including the capacity, type, version, device name, and bad block.

NOTE

You can run the **hio_info** command in any directories.

Syntax

hio_info -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/hioa** or **/dev/hiob**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Query the general information about an SSD device, for example, **/dev/hioa**.

hio_info -d /dev/hioa

The following command output is an example:

```
hioa Size(GB):                 803
    Max size(GB):              803
    Serial number:             030PXT10C9000007
    Driver version:            2.0.0.8
    Bridge firmware version:          209
    Controller firmware version:    209
    Battery firmware version:          005
    Battery status:           OK
    Run time (sec.):           241871
    Total IO read:            2635580821
    Total IO write:           11958359432
```

```
Total read(MB):           101904289
Total write(MB):           95061798
IO timeout:                0
R/W error:                 0
Max bit flip:              6
Average EC:                303
Max bad block rate:          0.049%
Event status:              OK
Health:                    OK
```

Description of the hio_info command output

Parameter	Description
Size (GB)	Indicates the currently set capacity.
Max size (GB)	Indicates the maximum capacity that a user can set.
Serial number	Indicates the e-label for an SSD card.
Driver version	Indicates the driver version.
Bridge firmware version	Indicates the bridge controller firmware version.
Controller firmware version	Indicates the controller firmware version.
Battery firmware version	Indicates the version of the supercapacitor management chip firmware.
Battery status	Indicates supercapacitor status.
Run time (sec.)	Indicates SSD card operating duration.
Total IO read	Indicates the total number of read operations.
Total IO write	Indicates the total number of write operations.
Total read (MB)	Indicates the total amount of read data.
Total write (MB)	Indicates the total amount of written data.
IO timeout	Indicates the number of I/O command timeout errors.
R/W error	Indicates the number of I/O errors.
Max bit flip	Indicates the maximum number of flipped bits in the nand flash, in bits.
Average EC	Indicates the average number of data erasure times for the nand flash.
Max bad block rate	Indicates the bad block rate for the nand flash.
Event log	Indicates the status of SSD card log events.
Health	Indicates the overall health status of an SSD card.

A.1.2 Querying Logs (hio_log)

Function

The command is used to query logs of a specified SSD device on the server.

NOTE

You can run the **hio_log** command in any directories.

Syntax

hio_log -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/hioa** or **/dev/hiob**
l	Specifies the log level. ● **2**: warning & error logs ● **3** (default): error logs only	**2** or **3**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Query warning and error logs about the SSD device, for example, **/dev/hioa**.

hio_log -d /dev/hioa -l 2

The following command output is an example:

```
2012-08-08 17:00:04 <0x74> /dev/hioa controller 0 flash 35 block 2035 page 622:
Need raid retry
2012-08-14 15:34:53 <0x3d> /dev/hioa controller 0 flash 32: Init: write pointer
mismatch
```

A.1.3 Querying Temperature Information (hio_temperature)

Function

The command is used to query temperature information of the SSD controllers.

NOTE

You can run the **hio_temperature** command in any directories.

Syntax

hio_temperature -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/hioa** or **/dev/hiob**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Query the information about the temperature of an SSD device (for example, **/dev/hioa**).

hio_temperature -d /dev/hioa

The following command output is an example:

```
                  Max       Min   Current
Controller 0:   60.54     24.12     58.32
Controller 1:   49.09     26.45     47.00
Controller 2:   52.15     27.65     49.12
Inlet:            NA        NA     33.00
Nand Flash:       NA        NA     46.50
```

A.1.4 Querying and Setting the E-label (hio_label)

Function

The command is used to query and set the e-label of an ES3000.

Syntax

hio_label -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/hioa** or **/dev/hiob**

Parameter	Description	Value
i	Customizes the asset information by setting the **OTHER** field.	The **OTHER** field value contains a maximum of 31 characters.
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

- Set the asset information about SSD device, for example, **/dev/hioa**, to **HW0001**.

  hio_label -d /dev/hioa -i HW0001

  The command output is as follows:

  ```
  Updating the device(hioa)'s label...OK
  ```

- Query the e-label information about the SSD device, for example, **/dev/hioa**.

  hio_label -d /dev/hioa

  The following command output is an example:

  ```
  DESCRIPTION:    CN21EDBCN01.A
  SERIAL NUMBER:  030PWG0000000001
  PART NUMBER:
  OTHER:           HW0001
  PRODUCE DATE:   2012-07-13 13:43
  MANUFACTURER:   Huawei Technologies Co., Ltd.
  ```

A.1.5 Upgrading the Firmware (hio_firmware)

Function

This command is used to upgrade the ES3000 controller firmware.

NOTE

During the firmware upgrade, the system automatically generates a backup file **hio_fw.bak** for rollback.

NOTICE

You need to restart the system for the upgraded firmware to take effect.

Syntax

hio_firmware -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the ES3000 to be upgraded.	For example, **/dev/hioa** or **/dev/hiob**
f	Specifies the path where the upgrade file is stored.	Any self-defined paths, for example, **/root/firmware/hio_fw**
i	Does not back up the current firmware.	None
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Upgrade the controller firmware of SSD device **/dev/hioa**. The generated firmware upgrade file **hio_fw** is stored in **/root/firmware**.

hio_firmware -d /dev/hioa -f /root/firmware/hio_fw

The following command output is an example:

```
Checking the current firmware...OK
Backing up the current firmware to hio_fw.bak...OK
Updating the device's firmware...OK

Please REBOOT your system to load the new firmware
```

A.1.6 Setting the ES3000 Capacity (hio_capacity)

Function

The ES3000 write performance, especially the random write input/output operations per second (IOPS) of small data blocks, depends on the capacity. A smaller capacity ensures a higher random write IOPS of small data blocks. You can set the ES3000 capacity within a specified range.

NOTICE

- The capacity setting operation cannot be interrupted. If the operation is interrupted, you need to set the capacity again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before setting the capacity. This is because all data on the ES3000 will be lost after the capacity is set. Use the command with caution.

NOTE

A new capacity takes effect after you restart the operating system (OS).

Syntax

hio_capacity -***Parameter Value***

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/hioa** or **/dev/hiob**
c	Specifies the ES3000 capacity to be set.	The value is an integer in the unit of GB.
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Set the capacity of SSD device **/dev/hioa** to **300 GB**.

hio_capacity -d /dev/hioa -c 300

The following command output is an example:

```
Warning: all DATA in the device will be LOST, backup before the change.

Note: please make sure the device is unmounted and unused.

The change may take several minutes, please wait before it completed.
Do you want to continue: yes or no? yes
Changing the device(hioa)'s capacity, please wait...OK
The new capacity is 299GB.
```

A.1.7 Deleting All Data (hio_cleardata)

Function

The command is used to delete all data on an SSD device.

NOTICE

- The data deletion operation cannot be interrupted. If the operation is interrupted, you need to delete all data again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before this operation. This is because all data on the ES3000 will be lost after this operation. Use the command with caution.

Syntax

hio_cleardata -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/hioa** or **/dev/hiob**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Delete all data on an SSD device, for example, **dev/hioa**.

hio_cleardata -d /dev/hioa

The following command output is an example:

```
Warning: ALL DATA in the device will be CLEARED, please backup the data firstly.

Note: please make sure the device is unmounted and unused.

The tool may take several minutes, please wait before completed.
Do you want to continue: yes or no? yes
Clearing hioa, please wait...OK
All data has been cleared.
```

A.2 Windows System Tools

This topic describes how to use the ES3000 tools in Windows.

Huawei SSD Utility (GUI) tools are installed along with the ES3000 driver. You can use these tools to upgrade firmware and query hardware information.

A.2.1 Hardware Information Tool

Function

The tool is used to display the ES3000 hardware information, including the capacity, type, version, and device name.

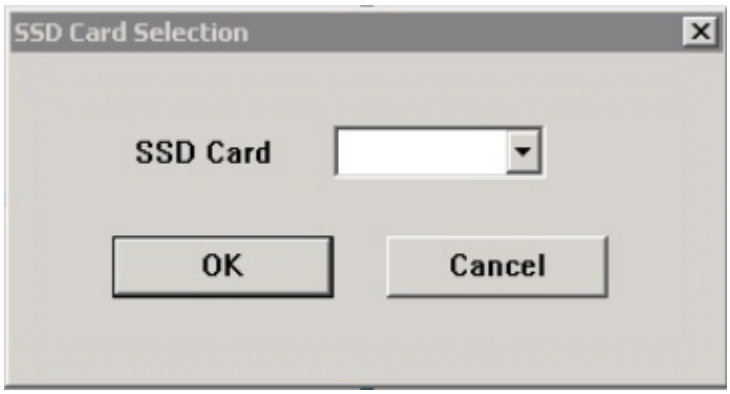
Icon

The icon of the tool for displaying hardware information is  .

Parameter Description

If you install multiple ES3000s in the server, a dialog box is displayed after you click the tool icon, asking you to select an ES3000, as shown in **Figure A-1**.

Figure A-1 Selecting an ES3000



Example

Query ES3000 hardware information.

Set parameters and click **OK**.

The following output is an example:

```
==========================================
Huawei SSD #0 Information List
==========================================
Version information:
Driver version            2.0.0.11
PCB version            .B
Upper PCB version        .B
Bridge firmware version        213
Controller firmware version 213
Battery firmware version    102
==========================================
Device information:
SerialNo            030PXS10CB000073
Physical device size        1121GB
Current  device size        1121GB
Controller FPGA            3
==========================================
I/O information:
Run time (seconds)        90737
Total  I/O  read        8887795250
Total  I/O  write        3672571561
Total  I/O  read(MB)        44557404
Total  I/O  write(MB)        17492911
I/O timeout            0
R/W error            0
==========================================
Device health information:
Average erase count        19
Max badblock rate        0.049%
Max bit flip            7
Battery status            Warning
Event status            OK
Health status            Warning
==========================================
```

A.2.2 Log Querying Tool

Function

The tool is used to query logs of all the ES3000s in the server.

Icon

The icon of the tool for querying logs is  .

Parameter Description

None

Example

Query ES3000 logs.

Click  .

The following output is an example:

```
[2012-08-07 04:06:06] card #1 controller #1: <0x90> High temperature
[2012-08-17 15:44:58] card #0 controller #1: <0x3d> Flash 96 Init: write pointer
mismatch
```

A.2.3 Querying Temperature Information

Function

The command is used to query temperature information of the SSD controllers.

Syntax

hio_temperature -***Parameter Value***

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **0** or **1**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Query the information about the temperature of an SSD device (for example, **0**).

HioTemperature.exe -d 0

The following command output is an example:

```
                Max       Min      Current
controller 0:   83.79     18.83      77.64
controller 1:   72.47     19.19      66.44
controller 2:   70.75     18.95      65.09
Inlet:          NA        NA       40.50
```

A.2.4 E-label Setting Tool

Function

The tool is used to set the e-label of an ES3000.

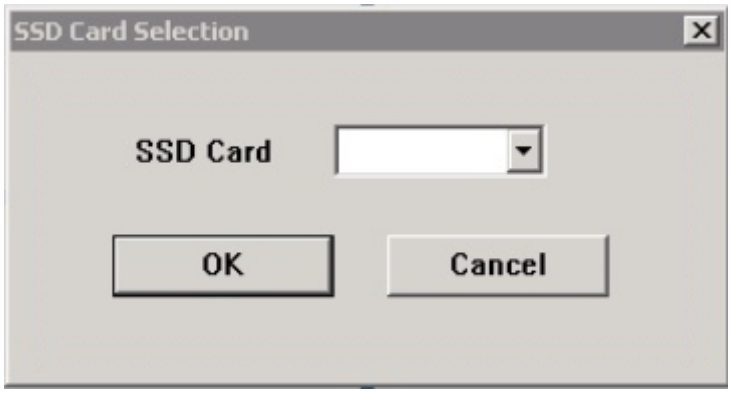
Icon

- The icon of the tool for setting e-labels is  .

Parameter Description

- If you install multiple ES3000s in the server, a dialog box is displayed after you click the tool icon, asking you to select an ES3000, as shown in **Figure A-2**.

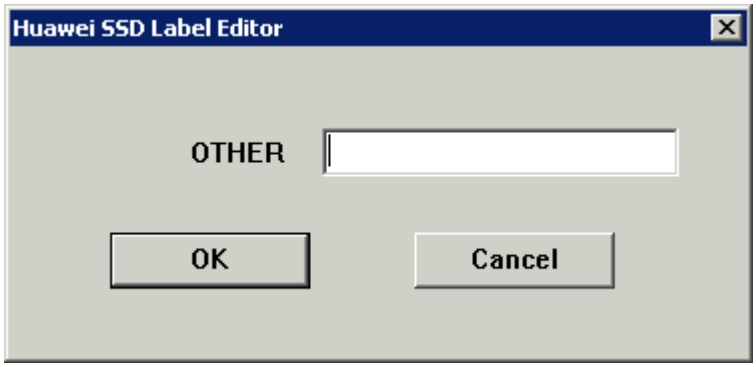
  Figure A-2 Selecting an ES3000

- If you install only one ES3000 in the server:

  A dialog box is displayed after you click the tool icon, asking you to set the **OTHER** field, as shown in **Figure A-3**. The **OTHER** field value contains a maximum of 31 characters.

  Figure A-3 Setting an e-label

A.2.5 Firmware Upgrade Tool

Function

The tool is used to upgrade the ES3000 firmware.

NOTICE

You need to restart the system for the upgraded firmware to take effect.

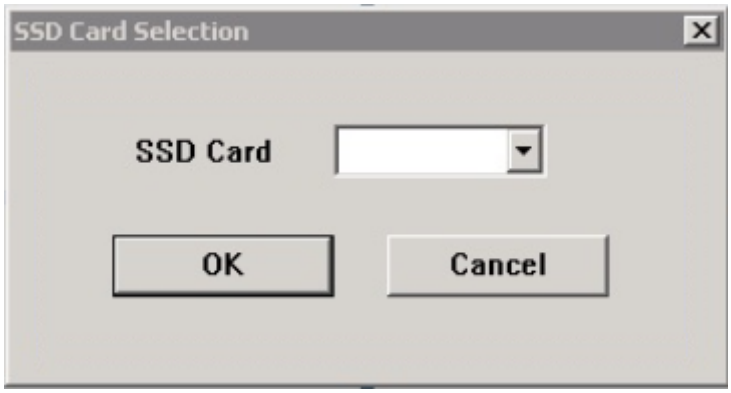
Icon

The icon of the tool for upgrading firmware is  .

Parameter Description

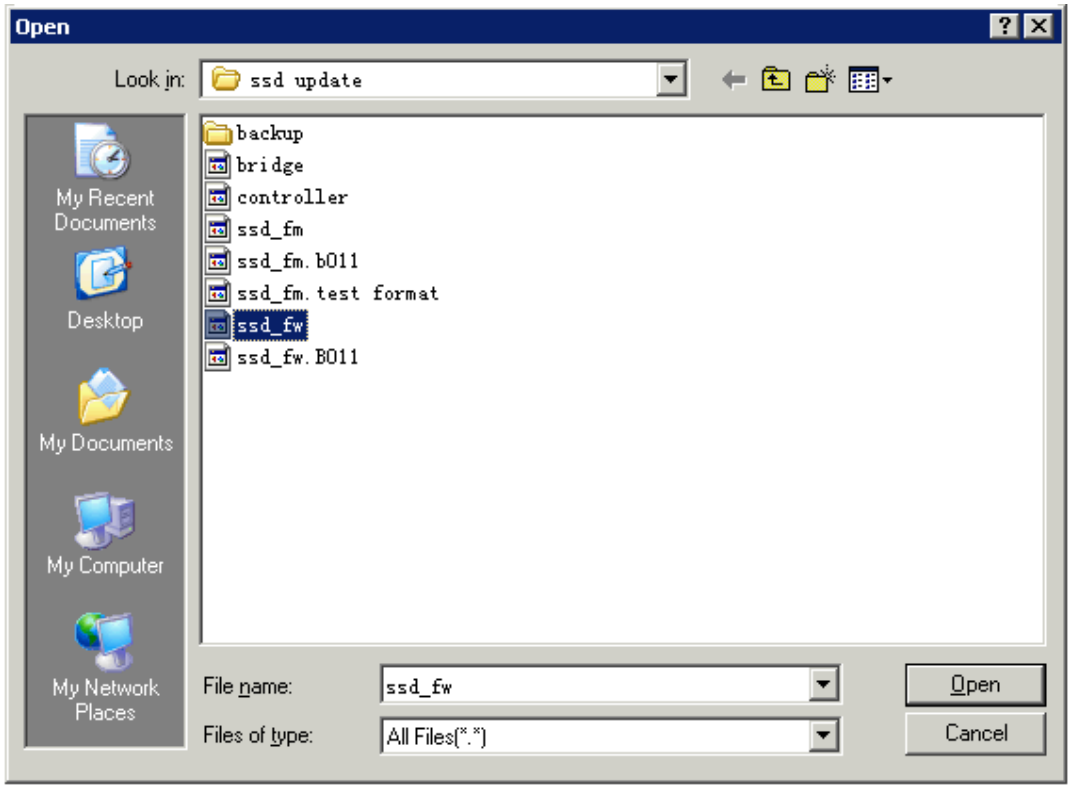
- If you install multiple ES3000s in the server, a dialog box is displayed after you click the tool icon, asking you to select an ES3000, as shown in **Figure A-4**.

  Figure A-4 Selecting an ES3000

- If you install only one ES3000 in the server, a dialog box is displayed after you click the icon, asking you to select the firmware ssd_fw, as shown in **Figure A-5**.

Figure A-5 Selecting the firmware



Example

Use the tool to upgrade the ES3000 firmware.

Set parameters and upgrade the firmware.

The following output is an example:

```
[INFO]    Updating firmware now, please wait a moment. Don't turn off power!!
[INFO]    Check firmware completed, file is ok.
[INFO]    Retrieving current firmware now...
[INFO]    Updating firmware now...
[INFO]    Update #0 firmware completed.
[INFO]    Update #1 firmware completed.
[INFO]    Update #2 firmware completed.
[INFO]    Update #3 firmware completed.
[INFO]    Update BM firmware completed.
[INFO]    Please power off and power on or reboot your system.
```

In the **Information** dialog box, click **OK**.

A.2.6 Capacity Setting Tool

Function

The ES3000 write performance, especially the random write input/output operations per second (IOPS) of small data blocks, depends on the capacity. A smaller capacity ensures a higher random write IOPS of small data blocks. You can set the ES3000 capacity within a specified range.

NOTICE

- The capacity setting operation cannot be interrupted. If the operation is interrupted, you need to set the capacity again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before setting the capacity. This is because all data on the ES3000 will be lost after the capacity is set. Use the command with caution.

NOTE

The settings take effect after you restart the operating system (OS) or power off and then power on the server.

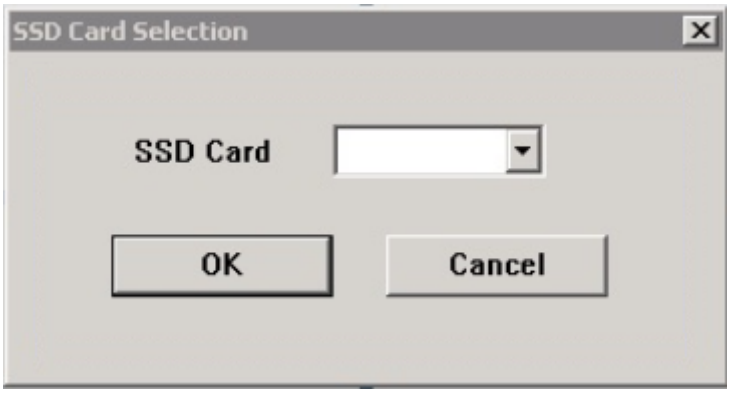
Icon

The icon of the tool for setting a capacity is  .

Parameter Description

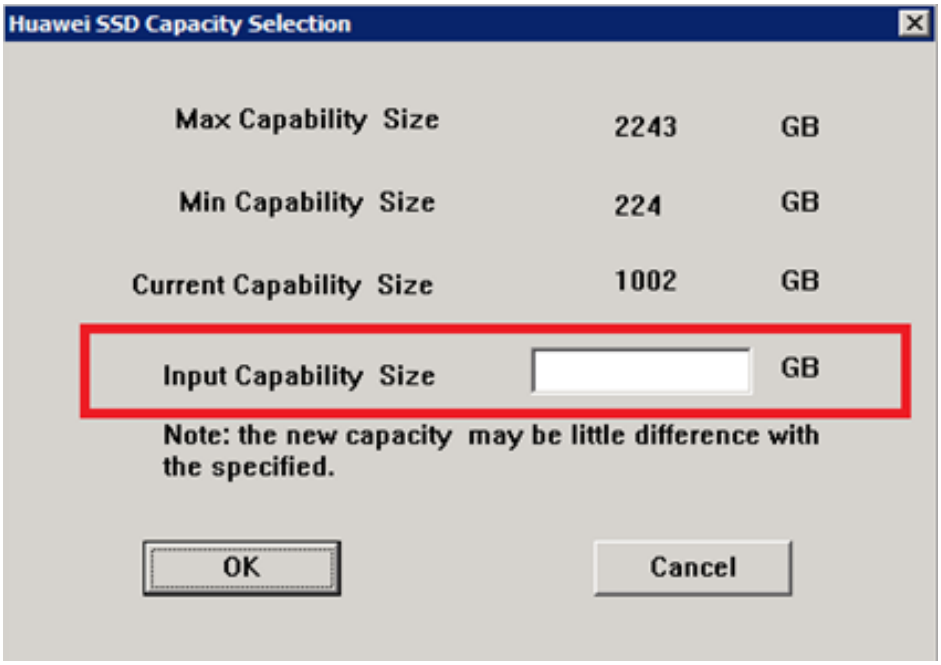
- If you install multiple ES3000s in the server, a dialog box is displayed after you click the tool icon, asking you to select an ES3000, as shown in **Figure A-6**.

Figure A-6 Selecting an ES3000



- If you install only one ES3000 in the server, a dialog box is displayed after you click the icon, asking you to set the capacity, as shown in **Figure A-7**.

Figure A-7 Setting the ES3000 capacity



Example

Set the ES3000 capacity.

Set parameters and click **OK**.

The following output is an example:

```
[INFO]    Set capacity now.This will take a few minutes.Don't access device from
now on.
[INFO]    Erase SSD now. Please wait a moment.
[INFO]    Erase SSD completed.
```

In the **Information** dialog box, click **OK**.

A.2.7 Deleting All Data

Function

The command is used to delete all data on an SSD device.

NOTICE

- The data deletion operation cannot be interrupted. If the operation is interrupted, you need to delete all data again. Otherwise, the SSD device cannot be properly used.
- Back up all required data before this operation. This is because all data on the ES3000 will be lost after this operation. Use the command with caution.

Syntax

HioCleareData.exe -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **0** or **1**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Delete all user data on an SSD device (for example, **0**).

HioCleareData.exe -d 0

The following command output is an example:

```
Warning: ALL DATA in the device will be CLEARED, please backup the data firstly.

Note: please make sure the device is unused.
The tool may take several minutes, please wait before completed.
Do you want to continue: yes or no? yes
Begin clean data in SSD #0, please wait a moment...
Erase SSD #0 successfully.Please reboot system.
```

Restart the OS.

A.3 Commands Used in VMware

This topic describes the ES3000 commands used in VMware.

After you install the ES3000 driver in VMware, common ES3000 commands are supported.

A.3.1 Querying General Information About HIO Devices (hio_info)

Function

The command is used to query general information about all HIO devices, including the capacity, type, version, device name, and bad block.

NOTE

You can run the **hio_info** command in any directories.

Syntax

hio_info -Parameter Value

Parameter Description

Parameter	Description	Value
d	Specifies the HIO device.	For example, **/dev/chioa** or **/dev/chiob**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Query the information about HIO device, for example, **/dev/chioa**.

hio_info -d /dev/chioa

The following command output is an example:

```
hioa     Size(GB):           803
    Max size(GB):       803
    Serial number:      030PXT10C9000007
    Driver version:     2.0.0.8
    Bridge firmware version:    209
    Controller firmware version:    209
    Battery firmware version:    005
    Battery  status:    OK
    Run time (sec.):    241871
    Total  IO  read:    2635580821
    Total  IO write:    11958359432
    Total  read(MB):    101904289
    Total write(MB):    95061798
    IO timeout:         0
    R/W error:          0
    Max bit flip:       6
    Average EC:         303
    Max bad block rate:    0.049%
    Event status:       OK
    Health:             OK
```

A.3.2 Querying Logs (hio_log)

Function

The command is used to query logs of a specified SSD device on the server.

NOTE

You can run the **hio_log** command in any directories.

Syntax

hio_log -Parameter Value

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, /**dev/chioa** or /**dev/chiob**
l	Specifies the log level. ● **2**: contains warning & error logs ● **3** (default): error logs only	**2** or **3**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Query the logs about SSD device, for example, **/dev/chioa**.

hio_log -d /dev/chioa

The following command output is an example:

```
2012-08-08 17:00:04 <0x74> /dev/hioa controller 0 flash 35 block 2035 page 622:
Need raid retry
2012-08-14 15:34:53 <0x3d> /dev/hioa controller 0 flash 32: Init: write pointer
mismatch
```

A.3.3 Querying Temperature Information (hio_temperature)

Function

The command is used to query temperature information of the SSD controllers.

NOTE

You can run the **hio_temperature** command in any directories.

Syntax

hio_temperature -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, /**dev/chioa** or /**dev/chiob**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Query the information about the temperature of an SSD device (for example, **/dev/chioa**).

hio_temperature -d /dev/chioa

The following command output is an example:

```
                  Max       Min   Current
Controller 0:   70.50     24.85     70.01
Controller 1:   51.55     25.59     51.06
Inlet:            NA        NA     36.50
```

A.3.4 Querying and Setting the E-label (hio_label)

Function

The command is used to query and set the e-label of an ES3000.

Syntax

hio_label -Parameter Value

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/chioa** or **/dev/chiob**
i	Sets the **OTHER** field to customize the e-label.	The **OTHER** field value contains a maximum of 31 characters.
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

- Set the **OTHER** field of SSD device **/dev/chioa** to **myHIO**.

  hio_label -d /dev/chioa -i myHIO

  The following command output is an example:

  ```
  Updating the device(hioa)'s label...OK
  ```

- Query the e-label information about SSD device **/dev/chioa** to **myHIO**.

  hio_label -d /dev/chioa

The following command output is an example:

```
DESCRIPTION:    CN21EDBCN01.A
SERIAL NUMBER:  030PWG0000000001
PART NUMBER:
OTHER:           myHIO
PRODUCE DATE:   2012-07-13 13:43
MANUFACTURER:   Huawei Technologies Co., Ltd.
```

A.3.5 Upgrading the Firmware (hio_firmware)

Function

This command is used to upgrade the ES3000 controller firmware.

NOTE

During the firmware upgrade, the system automatically generates a backup file **hio_fw.bak**.

NOTICE

- If the upgrade fails due to an unexpected power failure or another cause, restart the system and upgrade the firmware again.
- You need to restart the system for the upgraded firmware to take effect.

Syntax

hio_firmware -Parameter Value

Parameter Description

Parameter	Description	Value
d	Specifies the ES3000 to be upgraded.	For example, **/dev/chioa** or **/dev/chiob**
f	Specifies the path where the upgrade file is stored.	Any self-defined paths, for example, **/tmp/firmware/hio_fw**
i	Does not back up the current firmware.	None
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Upgrade the controller firmware of an SSD device, for example, **/dev/chioa**. The generated firmware upgrade file **hio_fw** is stored in **/tmp/firmware**.

hio_firmware -d /dev/chioa -f /tmp/firmware/hio_fw

The following command output is an example:

```
Checking the current firmware...OK
Backing up the current firmware to hio_fw.bak...OK
Updating the device's firmware...OK

Please REBOOT your system to load the new firmware
```

A.3.6 Setting the ES3000 Capacity (hio_capacity)

Function

The ES3000 write performance, especially the random write input/output operations per second (IOPS) of small data blocks, depends on the capacity. A smaller capacity ensures a higher random write IOPS of small data blocks. You can set the ES3000 capacity within a specified range.

NOTICE

- The capacity setting operation cannot be interrupted. If the operation is interrupted, you need to set the capacity again. Otherwise, the SSD device cannot be properly used.
- Before setting the capacity, migrate all virtual machines from the ES3000 and ensure that no host is accessing the ES3000.
- Back up all required data before setting the capacity. This is because all data on the ES3000 will be lost after the capacity is set. Use the command with caution.

NOTE

A new capacity takes effect after you restart the operating system (OS).

Syntax

hio_capacity -Parameter Value

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/chioa** or **/dev/chiob**
c	Specifies the ES3000 capacity to be set.	The value is an integer in the unit of GB.
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Set the capacity of SSD device **/dev/chioa** to **300 GB**.

hio_capacity -d /dev/chioa -c 300

The following command output is an example:

```
Warning: ALL DATA in the device will be LOST, backup before the change.

Note: please make sure the OS is in the maintenance mode and the device is unused.

The change may take several minutes, please wait before it completed.
If there are IOs on the device. The tool will stop the IO and report errors on the
device.
Do you want to continue: yes or no? yes
Changing the device(hioa)'s capacity, please wait...OK
The new capacity is 299GB.
The NEW setting will become effective AFTER reboot.
Please reboot!!!
```

Restart the OS.

A.3.7 Deleting All Data (hio_cleardata)

Function

The command is used to delete all data on an SSD device.

NOTICE

- The data deletion operation cannot be interrupted. If the operation is interrupted, you need to delete all data again. Otherwise, the SSD device cannot be properly used.
- Before deleting all data, migrate all virtual machines from the ES3000 and ensure that no host is accessing the ES3000.
- Back up all required data before deleting all data. This is because all data on the ES3000 will be lost after this operation. Use the command with caution.

Syntax

hio_cleardata -*Parameter Value*

Parameter Description

Parameter	Description	Value
d	Specifies the SSD device.	For example, **/dev/chioa** or **/dev/chiob**
h	Displays help information about the command.	None
V	Displays the command version.	None

Example

Delete all data on an SSD device, for example, **dev/chioa**.

hio_cleardata -d /dev/chioa

The following command output is an example:

```
Warning: ALL DATA in the device will be CLEARED, please backup the data firstly.

Note:
Please make sure the OS is in the maintenance mode.
Make sure the device is unmounted and unused.
The tool may take several minutes, please wait before completed.
Do you want to continue: yes or no? yes
Clearing hioa, please wait...OK
All data has been cleared.
Hioa will become effective AFTER reboot.
Please reboot!!!
```

Restart the OS.

B SNMP Function

This topic describes how to use the Simple Network Management Protocol (SNMP) function of the ES3000.

B.1 Overview
This topic describes the ES3000 Simple Network Management Protocol (SNMP) function.

B.2 Installing and Uninstalling hio_snmp
This topic describes how to install and uninstall hio_snmp in Linux.

B.3 hio_snmp Initial Configuration
This topic describes the initial configuration of the hio_snmp.

B.4 Querying hio_snmp Information
This topic describes the software for querying hio_snmp information and where to obtain the software.

B.5 SNMP OID
This topic describes the Simple Network Management Protocol (SNMP) object identifier (OID) defined by the ES3000.

B.1 Overview

This topic describes the ES3000 Simple Network Management Protocol (SNMP) function.

SNMP is a request/answer-based protocol used to transmission management information between an SNMP agent and an SNMP client. SNMP is a widely used protocol for monitoring the health and welfare of network equipment (for example, routers), computer equipment and even devices like uninterruptible power supplies (UPSs).

Net-SNMP is an open source code SNMP software. Net-SNMP is a suite of applications used to implement SNMP v1, SNMP v2c and SNMP v3 using both IPv4 and IPv6. The suite includes the source codes of the agent and multiple management tools and supports multiple extension modes.

The Linux operating system (OS) supported by the ES3000 contains the Net-SNMP software package. For details about how to install and use it, see **http://www.net-snmp.org**.

hio_snmp is the SNMP agent extension in Linux that Huawei has developed based on the Net-SNMP platform. hio_snmp defines the ES3000 management information base (MIB), and the SNMP client uses the hio_snmp to monitor ES3000 health status.

You can log in to **http://support.huawei.com/enterprise**, choose **Software Downloads** > **IT** > **Server** > **Accelerator** > **Tecal ES3000**, and download the required SNMP agent program.

B.2 Installing and Uninstalling hio_snmp

This topic describes how to install and uninstall hio_snmp in Linux.

Preparations

Before installing hio_snmp, check that:

- You have properly installed the ES3000 in the server.
- The Net-SNMP has been correctly installed in Linux.
- You have used the WinSCP to upload the hio_snmp software package to the server, **/root**.

Procedure

- Install the software.
  1. Log in to the operating system (OS) as the **root** user.
  2. Navigate to the directory storing the software package, for example, **/root**.
  3. Install the hio_snmp software package by running the following command:

     rpm -ivh hio_snmp-2.0-0.5.x86_64.rpm

     NOTE

     2.0-0.5 in the package name indicates the software version number. The actual version number may be different.

     The command output is as follows:

```
Preparing...                ########################################
[100%]
   1:hio_snmp               ########################################
[100%]
```

- Uninstall the software.
  1. Log in to the OS as the **root** user.
  2. Uninstall the ES3000 driver by running the following command:

     rpm -e hio_snmp

----End

B.3 hio_snmp Initial Configuration

This topic describes the initial configuration of the hio_snmp.

Scenario

Before using the SNMP function, configure and start it.

Preparations

Before the initial configuration, check that:

- The hio_snmp has been correctly installed.

Procedure

Set the SNMP function.

1 Log in to the operating system (OS) as the **root** user.

2 Open the **snmpd.conf** file by running the following command:

vi /etc/snmp/snmpd.conf

3 Press **i** to enter the editing mode and locate the following information in the **snmpd.conf** file:

trap2sink 127.0.0.1:162

4 Set **127.0.0.1** to the trap destination address. Then the SNMP agent sends traps to the destination SNMP manager.

trap2sink destination_ip:162

5 Press **Esc**, and enter **:wq**.

Save and close the **snmpd.conf** file.

Start the SNMP service.

6 Start the SNMP service by running the following command:

service snmpd start

----End

B.4 Querying hio_snmp Information

This topic describes the software for querying hio_snmp information and where to obtain the software.

Using the Net-SNMP Command Set

You need to install the net-snmp-utils before using Net-SNMP command set to query hio_snmp information. The ES3000 supports the net-snmp-utils contained in Linux.

For details about how to use the Net-SNMP command set, see **http://www.net-snmp.org**.

Using a MIB Browser

You can use a management information base (MIB) browser to query SNMP information. Multiple MIB browsers are available. The MG-SOFT MIB browser is recommended. The browser is a graphical user interface (GUI) tool with the trap receiving function.

For details about how to download and use the MG-SOFT MIB browser, see **http://software.informer.com**.

Common Problem

The SELinux limits some SNMP operations, and the hio_snmp may fail to operate properly. Therefore, disable the SELinux if unnecessary or change the SELinux rights.

B.5 SNMP OID

This topic describes the Simple Network Management Protocol (SNMP) object identifier (OID) defined by the ES3000.

The SNMP OID is a value defined in the management information base (MIB), used to identifying MIB members.

Table B-1 lists the ES3000 SNMP OID values.

Table B-1 Node OID

Node	Node OID	Description	Type	Permission
driverVersion	1.3.6.1.4.1.2011.2.269.1	Driver version	OCTET STRING	Read-only
hioCount	1.3.6.1.4.1.2011.2.269.4	Number of HIOs	Integer32	Read-only
hioIndex	1.3.6.1.4.1.2011.2.269.2.1.1	hio index	Unsigned32	Read-only

Node	Node OID	Description	Type	Permission
deviceName	1.3.6.1.4.1.2011.2.269.2.1.2	Device name	OCTET STRING	Read-only
capacity	1.3.6.1.4.1.2011.2.269.2.1.3	Current capacity	Integer32	Read-only
maxCapacity	1.3.6.1.4.1.2011.2.269.2.1.4	Maximum capacity	Integer32	Read-only
serial	1.3.6.1.4.1.2011.2.269.2.1.5	Serial number	OCTET STRING	Read-only
bridgeVersion	1.3.6.1.4.1.2011.2.269.2.1.6	Bridge logic version	OCTET STRING	Read-only
controllerVersion	1.3.6.1.4.1.2011.2.269.2.1.7	Controller logic version	OCTET STRING	Read-only
pcbVersion	1.3.6.1.4.1.2011.2.269.2.1.8	Baseboard printed circuit board (PCB) version	OCTET STRING	Read-only
upperPcbVersion	1.3.6.1.4.1.2011.2.269.2.1.9	Controller card PCB version	OCTET STRING	Read-only
maxBadBlockRate	1.3.6.1.4.1.2011.2.269.2.1.10	Maximum bad block rate	OCTET STRING	Read-only
averageEraseCount	1.3.6.1.4.1.2011.2.269.2.1.11	Average erase count	Integer32	Read-only
eccInfo	1.3.6.1.4.1.2011.2.269.2.1.12	Maximum bit flipping quantity	OCTET STRING	Read-only
batteryVersion	1.3.6.1.4.1.2011.2.269.2.1.13	Battery version	OCTET STRING	Read-only
batteryStatus	1.3.6.1.4.1.2011.2.269.2.1.14	Battery status	OCTET STRING	Read-only
eventStatus	1.3.6.1.4.1.2011.2.269.2.1.15	Log status	OCTET STRING	Read-only
health	1.3.6.1.4.1.2011.2.269.2.1.16	Health status	OCTET STRING	Read-only
ctrlr0Temp	1.3.6.1.4.1.2011.2.269.2.1.18	Maximum, minimum, and current bridge temperatures of controller 0	OCTET STRING	Read-only

Node	Node OID	Description	Type	Permission
ctrlr1Temp	1.3.6.1.4.1.2011.2.269.2.1.19	Maximum, minimum, and current bridge temperatures of controller 1	OCTET STRING	Read-only
ctrlr2Temp	1.3.6.1.4.1.2011.2.269.2.1.20	Maximum, minimum, and current bridge temperatures of controller 2	OCTET STRING	Read-only
runTime	1.3.6.1.4.1.2011.2.269.2.1.21	Run time	Counter64	Read-only
totalIORead	1.3.6.1.4.1.2011.2.269.2.1.22	Total IO reads	Counter64	Read-only
totalIOWrite	1.3.6.1.4.1.2011.2.269.2.1.23	Total IO writes	Counter64	Read-only
totalReadMB	1.3.6.1.4.1.2011.2.269.2.1.24	Total read (MB)	Counter64	Read-only
totalWriteMB	1.3.6.1.4.1.2011.2.269.2.1.25	Total write (MB)	Counter64	Read-only
ioTimeOut	1.3.6.1.4.1.2011.2.269.2.1.26	IO timeout count	Counter64	Read-only
rwError	1.3.6.1.4.1.2011.2.269.2.1.27	Read and write error count	Counter64	Read-only
userInfo	1.3.6.1.4.1.2011.2.269.2.1.28	User information	OCTET STRING	Read-write
alarmLed	1.3.6.1.4.1.2011.2.269.2.1.29	Alarm indicator status	Integer32	Read-write

NOTE

The SNMP system creates a table instance for each solid-state drive (SSD) device, and the table node OIDs are 1(iso).3(org).6(dod).1(internet).4(private).1(enterprises).2011(huawei).2 (products).269(hio).2 (hioCardTable).

C Standards Compliance

This topic describes the certifications that the product has passed and the standards that the product complies with.

C.1 FCC

This topic describes the Federal Communications Commission (FCC) standards that the product complies with.

The product has been tested and approved, and is compliant with the limits for a Class A digital product, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and radiates radio frequency energy. If it is not installed and used in accordance with the instructions, it may cause harmful interference to radio communications.

Operation of this product in a residential area is likely to cause harmful interference in which case users will be requested to correct the interference by taking protective measures.

If you make any changes to this product, which is explicitly prohibited by FCC regulations, you will be deprived of your right to operate the product.

C.2 CE

This topic describes the European Conformity (CE) standards that the product complies with.

European Union Notice: Products that bear the Conformity with European (CE) marking comply with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Union.

If this product is a piece of telecom equipment, the R&TTE Directive (1999/5/EC) that complies with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) implies conformity to the following European norms (the equivalent international standards and regulations are in parentheses):

- EN 55022 (CISPR 22)-Electromagnetic Interference
- EN 55024 (IEC 61000-4-2, 3, 4, 5, 6, 8, and 11)-Electromagnetic Immunity
- EN 60950 (IEC 60950)-Product Safety

C.3 RoHS

This topic describes the Restriction of Hazardous Substances Directive (RoHS) standards that the product complies with.

The products that have passed the RoHS certification and the contents of hazardous substances in the product comply with SJ/T-11363-2006 Requirements for concentration limits for certain hazardous substances in electronic information products.

C.4 WEEE

This topic describes the Waste Electrical and Electronic Equipment (WEEE) standards that the product complies with.

The product passes the Waste from Electric and Electronic Equipment (WEEE) certification.

The WEEE certificate is applicable to electric and electronic equipment. The prEN50419 standards define electric and electronic equipment as follows:

- The maximum rated operating voltage is 1000 V AC or 1500 V DC.
- It works properly with electric currents supplied or in an electromagnetic field.
- It generates, converts, or measures the current and electromagnetic field.

The WEEE standards also define the manufacturers as follows:

- Manufacturing and selling electric and electronic equipment of their own brands.
- Selling electric and electronic equipment labeled with their own brand but the equipment is manufactured by other manufacturers. If a product is labeled with the brand of its manufacturer, the seller of the product cannot be regarded as the manufacturer.
- Importing electric and electronic equipment in professional fields from or exporting them to other member countries.

C.5 REACH

This topic describes the Regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) standards that the product complies with.

REACH is EU standards. The product has obtained the REACH certification.

C.6 UL

This topic describes the Underwriters Laboratories Inc (UL) standard that the product complies with.

UL is a non-profitable product safety test and certification institute.

UL has its own certification system for the whole product, components, and materials. All electric products that are exported to the USA must pass the UL certification.

The UL safety certification is divided into the following methods:

- Labeling
- Classification
- Approval

Labeling

The UL labeling service is the best known service of the UL safety certification. The UL label on the product indicates that UL has tested the sample of the product according to the safety standards. The sample does not cause fire, leak of electricity, or other dangers if predictable.

Classification

UL tests products according to different features, in the specified danger range or under specific cases. In general, classified products are mostly construction materials or industrial instruments.

Classified products include industrial and commercial products. Some specified features must be tested, such as inflammability, hazardous performance, or government specifications.

Approval

UL tests parts of the product or unfinished product. These parts will be used in the UL-labeled product list. This service covers millions of plastics, wires, circuit boards, various finished products, and even some large components, such as motorcycles or power supplies.

C.7 KCC

This topic describes the Korea Communications Commission (KCC) standards that the product complies with.

The Ministry of Information and Communication (MIC) and Korea Broadcasting Commission (KBC) are merged to found the Korea Communications Commission (KCC), which is the highest-level broadcasting and communications regulation agency in Korea and functions like the Federal Communications Commission (FCC).

The certification for information communications equipment is a compulsory certification implemented based on the Korea electrical communication law and radio wave law. Any applicable information communications equipment must be certified during production, import, and sales, and labeled with a certification mark.

D How to Get Help

This topic describes how to contact Huawei for technical support if a fault persists during routine maintenance or troubleshooting.

D.1 Preparations Before Contacting Huawei

Before you get technical support from Huawei, collect fault information or prepare the commissioning environment.

If a fault persists during routine maintenance or troubleshooting, contact Huawei technical support.

To resolve the problem, make the following preparations before contacting Huawei:

- **D.1.1 Collecting Fault Information**
- **D.1.2 Making Debugging Preparations**

D.1.1 Collecting Fault Information

You need to collect the following information:

- Your company name and detailed address
- Name and telephone number of the contact person
- Time when the fault occurred
- Details of the fault
- Device type and software version
- Measures taken after the fault occurred and related results
- Fault severity and deadline for rectifying the fault

D.1.2 Making Debugging Preparations

When you seek for technical support, Huawei technical engineers may help you to perform some operations to further collect fault information or rectify the fault. Therefore, you need to make certain preparations before seeking for technical support. Prepare the things that may be used, such as the spare parts of each component, screwdrivers, screws, serial cables, and network cables.

D.2 Getting Help from Huawei Support Website

This topic describes how to get help from http://support.huawei.com/enterprise.

Huawei provides timely and efficient technical support through the regional offices, secondary technical support system, telephone technical support, remote technical support, and onsite technical support.

The technical support system of Huawei includes:

- Huawei headquarters technical support department
- Regional office technical support centers
- **http://support.huawei.com/enterprise**
- Customer service center

NOTE

Alternatively, you can quickly locate a product document by entering a keyword in the **Search** text box at the upper right corner at **http://support.huawei.com/enterprise**.

For details about server compatibility, see the **Compatibility List**.

E Acronym or Abbreviation

C	
CCC	China Compulsory Certification
E	
ECC	error checking and correcting
I	
IOPS	I/O operations per second
M	
MLC	multi-level cell
MTBF	mean time between failures
P	
PCIe	PCI Express
R	
RAID	redundant array of independent disks
RS	Reed-Solomon
S	
SSD	solid-state drive