

## **Using SmartDedupe&SmartCompression of Huawei Dorado6000 V3 Storage in VMware Horizon (VDI) Environments**

VMware Horizon (formerly VMware Virtual Desktop Infrastructure) is a desktop virtualization solution provided by VMware. It migrates traditional desktops that depend on physical machines and require constant updates to ESX Servers, saving end users the trouble of upgrading physical machines. Furthermore, the VDI management system eases the burden of network management.

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# 1 About This Document

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## 1.1 Overview

Huawei OceanStor Dorado6000 V3 all flash storage systems (Dorado6000 V3 for short) use SmartDedupe&SmartCompression, a smart data deduplication and compression technology, to reduce storage space occupied by redundant data, improving data transfer, processing, and storage efficiencies of storage systems. This document introduces SmartDedupe&SmartCompression and explains how it can be leveraged in VMware Horizon desktop virtualization scenarios (VDI scenarios for short) to realize data reduction and save storage space.

## 1.2 Intended Audience

- Huawei employees
- Partners
- Customers

## 1.3 Customer Benefits

SmartDedupe&SmartCompression of Dorado6000 V3 maximizes storage efficiency by decreasing the amount of physical storage required to house VDI service data.

## 1.4 Key Components

Hardware:

- Huawei Dorado6000 V3 all flash storage systems V300R100C00
- Huawei E9000 blade servers

Software:

- VMware vSphere virtualization software and VMware Horizon desktop virtualization management software
- UltraPath for vSphere
- View Planner desktop virtualization test software

Operating system:

- Windows Server 2012 R2 x64
- Windows 7 Enterprise x64/x84
- VMware ESXi

## 1.5 Load Model

### 1.5.1 View Planner

VMware View Planner is a tool used to verify the desktop virtualization performance of servers and storage systems, specifically, the number of virtual desktops supported by servers and storage systems. This tool is based on the VMware View virtualization architecture and can simulate real-world user behavior, including start, login, daily operations, and deregistering. VMware VDI services feature random small I/Os. View Planner has three I/O models: boot storm, login storm, and steady state. A boot storm occurs when a large number of VMs are booted simultaneously. This is a read-intensive operation (read/ write ratio: 8:2). A login storm occurs when a large number of users attempt to log in to their desktops simultaneously. The shared storage will experience an explosively heavy load. This is a write-intensive operation (read/write ratio: 2:8). Steady state indicates a state with a small workload fluctuation when all users use their desktops simultaneously.

The workload of View Planner is contributed by the following applications:

- Microsoft Office 2007/2010 (including Word, Excel, PowerPoint, and Outlook)
- Microsoft Internet Explorer
- Document Browser
- Picture Album Browser
- Mozilla Firefox
- Adobe Acrobat Reader
- Archiving Software
- Video Playback Software
- Other User Customized Applications

## 1.6 Virtual Desktop Types

VDI services involve full clone and linked clone.

- Full clone: Virtual machines (VMs) are independent from each other and you can install software in the system disks or perform other modifications.
- Linked clone: A virtual desktop can be created faster using linked clones than full clones. Multiple desktops share a system disk (parent disk). You can configure automatic restoration to the status of the parent disk upon a shutdown.

# 2 Applicable Scenarios and Precautions

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## 2.1 Application Scenarios

This document applies to the following VDI scenarios. Test results vary with different scenarios and Huawei reserves the right of final interpretation.

- Huawei FusionAccess V100R003
- Huawei FusionAccess V100R005
- Huawei FusionAccess V100R006
- VMware Horizon View 6.x
- VMware Horizon View 7.0/7.1

## 2.2 Precautions

To ensure deduplication and compression effects without decreasing performance, meet the following requirements in actual configurations:

- Datastores created on Dorado6000 V3 only contain system disks of virtual desktops and do not have data disks.
- You are advised to configure one LUN for 50 virtual desktops (20 LUNs for 1000 users, and so forth).
- You are advised to distribute LUNs evenly on both controllers when creating LUNs.

Precautions for VMware scenarios:

- You are advised not to configure more than 8 hosts in a cluster.

Precautions for FusionAccess scenarios:

- When adding a datastore, you are advised to use virtualization.
- When creating a virtual desktop template, you are advised to choose thin provisioning disks.

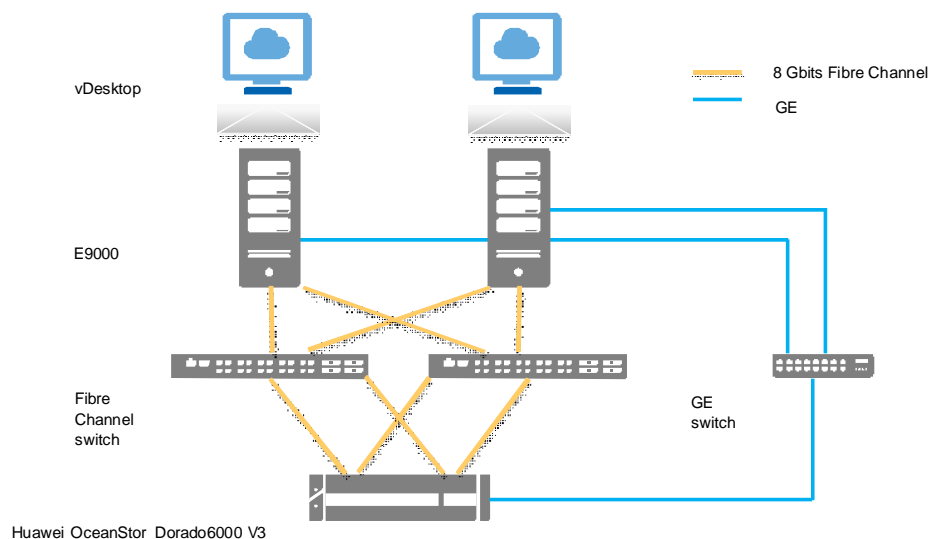
# 3 Feature Configuration in VDI Environments

## 3.1 Solution

### 3.1.1 Architecture

The solution uses two E9000 blade servers and two 16 Gbit/s Fibre Channel switches to build a dual-switch network. The test is executed to evaluate how SmartDedupe&SmartCompression of OceanStor Dorado6000 V3 storage reduces redundant service data and improves storage efficiency in a cluster of 20 nodes running VMware VDI.

**Figure 3-1** Architecture



### 3.1.2 Hardware Configuration

Table 3-1 describes hardware configuration:

**Table 3-1** Hardware configuration

Device	Component	Quantity
Server	E9000 (12 blades each blade enclosure) 256 GB memory	2 (24 blades in total)

Device	Component	Quantity
	2 x Intel(R) Xeon(R)E5-2660 CPUs 2 x Emulex 8 Gbit/s FC dual-port HBAs 1 x Intel 10 Gbit/s Ethernet HBA	
Storage	Dorado6000 V3 2 x controllers 1 x 2 U 25 slots disk enclosure 25 x 900 GB SSDs	1
Fibre Channel switch	SNS2224	2
1GE switch	S5700	1

### 3.1.3 Software Configuration

Table 3-2 describes software configuration:

**Table 3-2** Software configuration

Item	Software
Operating system	Windows Server 2012 R2, Windows 7 Enterprise 64-bit
Multipath software	Huawei UltraPath 8.06.063
Virtualization software	VMware vSphere 6.0.0 U2
VDI management software	VMware View 6.1
Test tool	View Planner 3.6
Dorado6000 V3	V003R100C00

### 3.1.4 Storage Configuration

Dorado6000 V3 is used as the storage and is configured as follows: creating one disk domain using the low hot spare policy, one storage pool in RAID 6 from the disk domain, and forty 20 TB thin LUNs. In VDI scenarios, system disks have a large amount of duplicate data and most read and write I/Os are 4 KB small I/Os, convenient for compression. Enabling SmartDedupe&SmartCompression in this situation can significantly reduce data amount. Table 3-3 is an example of configurations. You are not required to strictly follow the configurations but must enable the deduplication and compression functions.

**Table 3-3** Storage configuration

Item	Full Clone Configuration	Linked Clone Configuration
Storage pool	1 x 12 TB	1 x 12 TB

Item	Full Clone Configuration	Linked Clone Configuration
LUN	8 x 4 TB thin LUNs	16 x 2 TB thin LUNs
Deduplication	Enabled	Enabled
Compression	Enabled	Enabled

## 3.2 Verification Procedure

### 3.2.1 Procedure

**Table 3-4** Procedure

Task	Step	Description
<b>1</b>		<b>Prepare the physical environment (hardware and networking).</b>
<b>2</b>		<b>Install and configure the operating system.</b>
	2.1	Install ESXi 6.0 U2 on all E9000 blade servers.
	2.2	Configure management and service IP addresses.
	2.3	Configure host names.
	2.4	Configure path selection and I/O scheduling algorithms for UltraPath.
	2.5	Configure the NTP service.
	2.6	Install OceanStor UltraPath and reboot the system.
<b>3</b>		<b>Configure the storage system.</b>
	3.1	Import licenses for storage configuration.
	3.2	Configure storage resources (disk domains, storage pools, LUNs, and LUN groups).
	3.3	Create hosts, host groups, and mapping views.
	3.4	Scan for LUNs on the hosts.
<b>4</b>		<b>Install and configure a VMware vSphere cluster and VMware View.</b>
	4.1	Install AD, DNS, and DHCP services.
	4.2	Add vCenter hosts to the disk domain and install vCenter services.
	4.3	Add all ESXi hosts to the cluster.
	4.4	Install and configure VMware View components.
<b>5</b>		<b>Create full clone/linked clone virtual desktops and test them using</b>



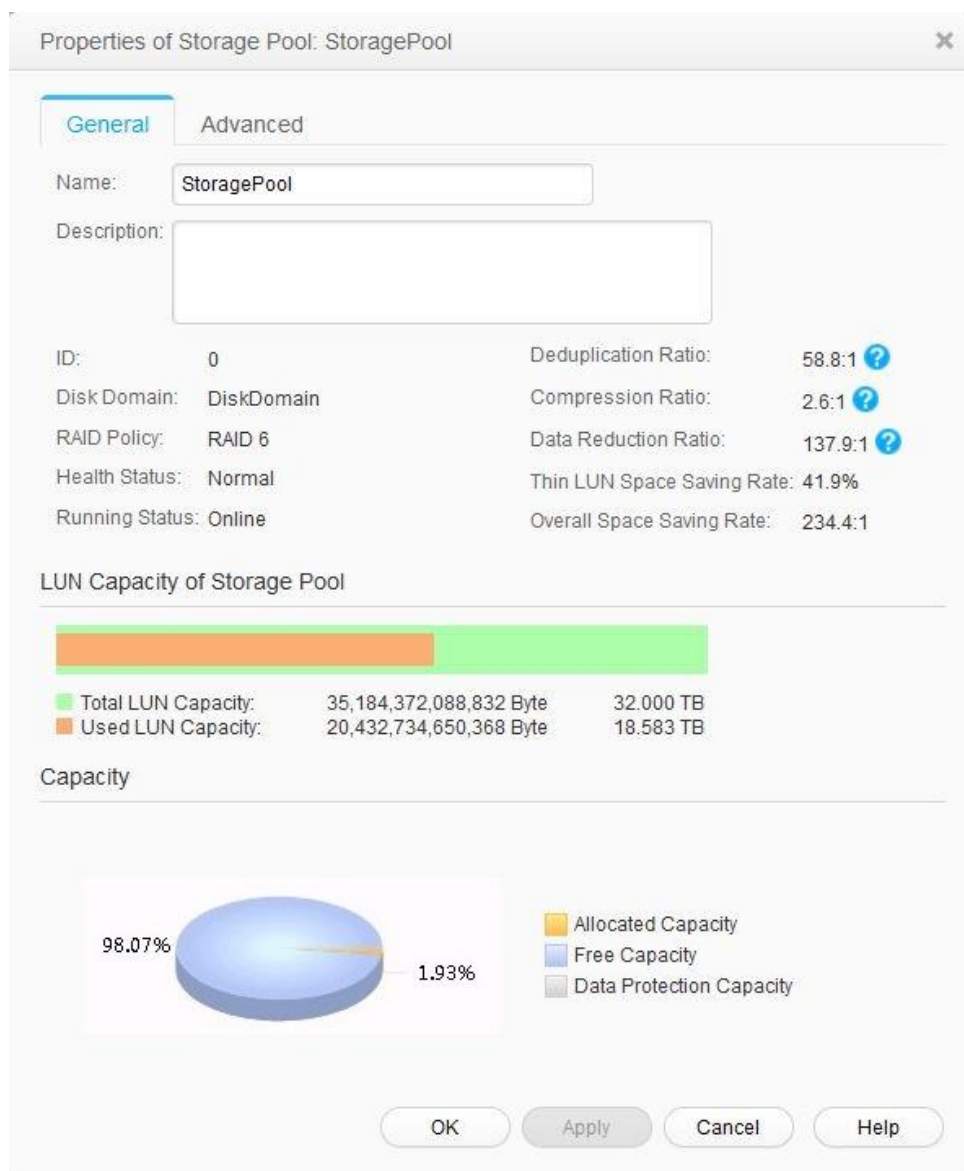
Task	Step	Description
		<b>View Planner.</b>
	5.1	Create full clone/linked clone VM templates.
	5.2	Allocate full clone/linked clone virtual desktop pools.
	5.3	Perform a test using View Planner.
	5.4	Check the deduplication/compression ratio.

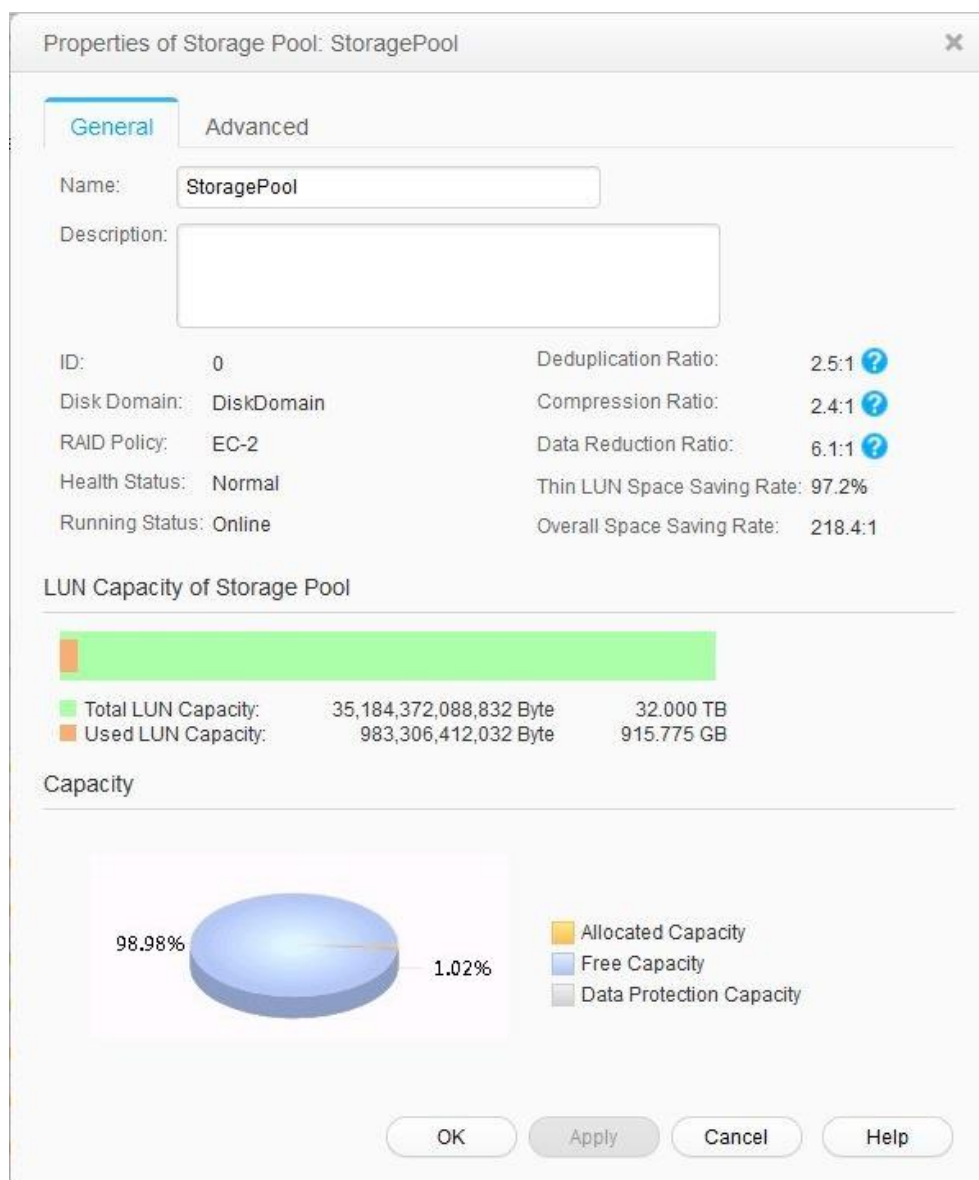
For details about deployment operations, see relevant Huawei user guides or VMware installation and configuration guides.

### 3.2.2 Deduplication and Compression Testing

The following figures show the View Planner test results for full clones (1000 VMs) and linked clones (1000 VMs).

**Figure 3-2** Full clones (1000 VMs)



**Figure 3-3** Linked clones (1000 VMs)

In VMware VDI scenarios, Dorado6000 V3 achieves a data reduction ratio of 3:1 when SmartDedupe&SmartCompression is enabled. The data reduction ratio reaches 137.9:1 for full clones. Table 3-5 provides the deduplication and compression effects.

**Table 3-5** Deduplication and compression effects

Test Module	Test Tool	Deduplication and Compression Ratio
Full clone (1000 VMs)	View Planner	137.9:1
Linked clone (1000 VMs)		6.1:1

# 4 Appendix

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## 4.1 Reference

HUAWEI OceanStor V3 Converged Storage Systems SmartDedupe and SmartCompression  
Technical White Paper

## 4.2 Terminology

**Table 4-1** Terminology

Terminology	Description
VMware vSphere	VMware virtualization product
VMware View	VMware desktop virtualization product
VDI	Desktop virtualization

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