Huawei OceanStor Dorado V3 with Huawei FusionAccess

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# Contents

1 Overview .......................................................................................................................... 1

2 Introduction to Solution Components ............................................................................ 3
  2.1 OceanStor Dorado V3 Series Storage Systems ............................................................. 3
  2.1.1 Product Overview ..................................................................................................... 3
  2.1.2 SmartDedupe and SmartCompression .................................................................... 4
  2.2 Huawei FusionCompute Virtualization Management Platform ...................................... 5
  2.2.1 Product Overview ..................................................................................................... 5
  2.2.2 Product Highlights ................................................................................................... 5
  2.3 Huawei FusionAccess Desktop Cloud Solution ............................................................. 6
  2.3.1 Solution Overview .................................................................................................... 6
  2.3.2 Solution Highlights ................................................................................................. 8
  2.4 Login VSI ..................................................................................................................... 8
  2.4.1 Login VSI Workload Model ..................................................................................... 9
  2.4.2 Resource Usage of Each Workload Model .............................................................. 10

3 Architecture and Configuration of Huawei Desktop Cloud Acceleration Solution .... 11
  3.1 Architecture ................................................................................................................. 11
  3.2 Virtual Desktop Specifications ..................................................................................... 12
  3.3 Software Configuration................................................................................................. 13
  3.4 Hardware Configuration .............................................................................................. 13
  3.4.1 Host Configuration ................................................................................................... 13
  3.4.2 Storage Configuration ............................................................................................. 14
  3.4.3 Network Configuration ........................................................................................... 16

4 Verification ....................................................................................................................... 17
  4.1 Test Items ..................................................................................................................... 17
  4.2 Test Result .................................................................................................................... 18
  4.2.1 Login VSI Test ......................................................................................................... 18
  4.2.2 Deduplication and Compression Ratio Test ............................................................ 23

5 Summary .......................................................................................................................... 25

6 Reference .......................................................................................................................... 26

7 Glossary ............................................................................................................................. 27
8 Acronyms and Abbreviations........................................................................................................................................28
Desktop cloud solutions centrally deploy computing and storage resources (including CPU, disk, and memory resources) in the cloud computing data center, and convert the physical resources into virtual resources using virtualization technology. Telecom carriers or enterprises combine the virtual resources into virtual machines (VMs) of different specifications based on user demands, and provide virtual desktop infrastructure (VDI) services to users.

Common VDI services go through several phases, including desktop provisioning, boot storm, login storm, steady state, idle state, and virus scan. With the growth of services and expansion of the virtual desktop scale, these phases have increasingly higher requirements on storage and computing resources, resulting in an urgent need for performance improvement. Under such circumstances, choosing suitable storage systems to enlarge the service scale, improve user experience, and reduce TCO is critical to the design and planning of the VDI service architecture.

OceanStor Dorado V3 series products (Dorado V3 for short) are Huawei's brand-new enterprise-level all-flash storage systems, which provide the following advancements to meet the key requirements of VDI services:

- **High performance**
  Two controllers can support up to 5000 desktops, providing ultra-high user experience.

- **High utilization**
  Dynamic RAID, thin provisioning, as well as inline deduplication and compression technologies reduce space consumption by 90% in VDI scenarios.

- **High reliability**
  Global garbage collection ensures the minimum number of erases; wear leveling and anti-wear leveling ensure minimum failure rates; and dynamic RAID ensures quick reconstruction. In addition, performance-lossless snapshots, active-active systems, and replication provide solution-level reliability.

- **Flexibility and ease of use**
  Individual storage pools simplify planning and configuration, and heterogeneous LUN migration simplifies data migration.

- **Ecosystem support**
  Mainstream desktop cloud platforms are supported, such as Huawei FusionAccess, VMware, Hyper-V, and Citrix.
This document describes Huawei's desktop cloud acceleration solution and reference architecture based on Dorado V3 series storage, and provides the test results for 5000 desktops by using the Login VSI tool.
2 Introduction to Solution Components

2.1 OceanStor Dorado V3 Series Storage Systems

2.1.1 Product Overview

Dorado V3 is an all-flash storage product designed for midtier-to-enterprise storage environments. It provides mass data storage, fast data access, high availability, and high utilization in the ease-of-use and energy saving form factor.

Dorado V3 offers comprehensive and superb solutions by using diverse efficiency boost mechanisms to provide industry-leading performance. Those solutions help customers maximize their return on investment (ROI) and meet the requirements of different application scenarios such as online transaction processing (OLTP), online analytical processing (OLAP), high-performance computing (HPC), server virtualization, and virtual desktop infrastructure (VDI).

Dorado V3 uses Huawei's FlashLink™ dedicated to flash media to achieve high performance at a low latency. Value-added services such as inline deduplication, inline compression, and snapshot will not increase the latency. The gateway-free HyperMetro feature provides an end-to-end active-active data center solution, which can smoothly evolve to the geo-redundant disaster recovery (DR) solution to achieve 99.9999% reliability.
2.1.2 SmartDedupe and SmartCompression

Deduplication and compression are commonly used data reduction technologies in the storage industry to reduce the storage space occupied by redundant data and improve the transmission, processing, and storage efficiency of storage systems. In addition, the number of data writes into SSDs is reduced, relieving SSD wearing and prolonging the service life of SSDs.

SmartDedupe and SmartCompression are Huawei’s data deduplication and compression technologies.

- **SmartDedupe**
  A data reduction technology. It eliminates redundant data blocks in storage systems and reduces the physical storage capacity for storing data. Dorado V3 series storage systems support inline deduplication.

- **SmartCompression**
  It reduces occupied storage space by compressing data without any data loss. It improves the efficiency in data storage, transfer, and processing. Dorado V3 series storage systems support inline compression.

In VDI scenarios, SmartDedupe and SmartCompression can effectively reduce redundant data, improve storage space utilization, and prolong the service life of SSDs, maximizing the return on investment.
2.2 Huawei FusionCompute Virtualization Management Platform

This test will use Huawei’s FusionCompute virtualization management platform. This section briefly introduces this platform and its highlights.

2.2.1 Product Overview

FusionCompute is a cloud operating system that virtualizes hardware resources and centrally manages virtual, service, and user resources. Fusion Compute virtualizes computing, storage, and network resources, and centrally schedules and manages these resources using unified interfaces. It reduces business operating costs, ensures system security and reliability, and helps carriers and enterprises build secure, green, and energy-saving cloud data centers.

2.2.2 Product Highlights

Unified Virtualization Platform

FusionCompute uses virtualization management software to divide computing resources into multiple VM resources and provide users with high-performance, operational, and manageable VMs. FusionCompute supports the following features:

- Allocates VM resources on demand.
- Supports multiple operating systems.
- Isolates VMs to ensure quality of service (QoS).

Support for Various Hardware Platforms

FusionCompute can be deployed on various types of x86 servers and is compatible with various types of storage devices. Carriers and enterprises can choose the servers and storage devices as required.

Large Cluster

A single cluster supports up to 128 hosts and 3000 VMs.

Automatic Scheduling

FusionCompute allows users to define service-level agreement (SLA) policies, fault diagnosis criteria, and fault rectification policies.

- FusionCompute implements centralized IT resource scheduling, heat management, and power consumption management, reducing maintenance costs.
- FusionCompute automatically detects the load of servers or services and intelligently schedules resources to achieve load balancing across servers and service systems, ensuring better user experience and optimal system response.

Comprehensive Rights Management

FusionCompute provides comprehensive rights management, allowing authorized users to manage system resources based on their roles and permissions.
Comprehensive O&M

FusionCompute provides various types of O&M tools to control and manage services, improving operation and maintenance efficiency. It supports the following:

- **Black box for rapid fault locating**
  FusionCompute enables users to rapidly locate faults by obtaining exception logs and program stacks. This reduces fault locating time.

- **Automatic health status check**
  FusionCompute checks the health status automatically and reports faults in a timely manner, facilitating VM operation and management.

- **Web GUI**
  FusionCompute provides a web GUI, which allows users to monitor and manage all hardware resources, virtual resources, and service provisioning on a browser.

Cloud Security

FusionCompute utilizes various security measures and policies and complies with local information security laws and regulations to provide end-to-end protection for user access, management and maintenance, data, networks, and virtualization.

2.3 Huawei FusionAccess Desktop Cloud Solution

This test uses Huawei's FusionAccess desktop cloud solution. This section describes this solution and its highlights.

2.3.1 Solution Overview

The HUAWEI CLOUD™ FusionAccess desktop solution is a virtual desktop application based on Huawei FusionSphere. In the HUAWEI CLOUD™ FusionAccess desktop solution, hardware and software are deployed on the cloud platform. Users can use a thin client (TC) or any other device that is connected to the network to access applications and their desktops. Figure 2-2 shows the HUAWEI CLOUD™ FusionAccess desktop solution.
The HUAWEI CLOUD™ FusionAccess desktop solution addresses the challenges, such as security, investment, and work efficiency issues, faced by PCs. It is an ideal choice for financial institutions, large- and medium-sized enterprises, government agencies, call centers, customer service centers, medical institutions, military agencies, and mobile offices.

FusionAccess is a desktop management system of the HUAWEI CLOUD™ FusionAccess desktop solution. This solution centrally deploys computing and storage resources (including CPU, disk, and memory resources) in the cloud computing data center, and converts the physical resources into virtual resources using virtualization technology. Telecom carriers or enterprises combine the virtual resources into virtual machines (VMs) of different specifications based on user demands, and provide virtual desktop infrastructure (VDI) services to users.

FusionAccess supports various types of terminals and peripherals. Users can access their VMs to achieve office automation (OA) wherever networks are available. Security authentication, security protocols, and encryption technologies are adopted to ensure access security and desktop transmission security for end users. VM isolation, management system hardening, as well as rights- and domain-based management of virtual desktops are implemented to ensure the security of users' information assets.

FusionAccess provides a GUI portal for administrators to quickly provision, maintain, and reclaim virtual desktops. This helps manage virtual resources flexibly, improve resource utilization, and reduce operational expenditure (OPEX).

FusionAccess also provides virtual application services based on user demands. End users can access the virtualization platform to use applications without the need to install the applications. Servers centrally store user data to enhance the application and data security.
2.3.2 Solution Highlights

High Security

The FusionAccess desktop solution ensures high security by using:

- Huawei Desktop Protocol (HDP) for accessing virtual desktops
- Encrypted remote access to the data center
- Centralized management of external storage devices
- Secure Sockets Layer (SSL) digital certificate authentication

Carrier-class Reliability

- The system uses carrier-class servers to deliver an average annual global VM availability of 99.9%.
- The system uses high availability (HA) mechanisms to ensure high system reliability.
- The system supports multiple-level data backups.

Better User Experience

- The system adopts end-to-end network QoS design to minimize the impact of network latency.
- The system uses an intelligent scheduling algorithm to achieve load balancing.

Efficient Management and Maintenance

The FusionAccess desktop solution implements efficient management and maintenance by using:

- Web-based remote management and maintenance
- Automatic fault diagnosis and recovery
- Fault information collection tool, health check tool, and black box
- Data consistency check

Multi-Service Integration

The FusionAccess desktop solution supports integration of voice, audio, and video services. It also supports traditional email services.

2.4 Login VSI

Login Virtual Session Indexer (Login VSI) is an industry standard benchmark tool for measuring the performance and scalability of a centralized desktop environment, such as VDI and SBC.

Login VSI consists of four main components: Login VSI Data Server (VSIshare), Active Directory (AD), Launcher(s), and Target.
The VSIsphere contains all Login VSI files, such as test files and log files. Configuration and analysis of tests are conducted in the VSIsphere.

The Launcher simulates a client to log in to the provisioned virtual desktop and perform tests.

The Target platform is the test VMs that the user logs in to. The software required by the Login VSI test must be installed on these VMs.

The AD is also an important role of Login VSI. You must create the user, OU, group policy, and Login script required by the Login VSI test in the AD.

### 2.4.1 Login VSI Workload Model

Login VSI provides four built-in workload models to simulate different user scenarios.

- **Task Worker**
  This is a light workload, which runs fewer applications and starts/stops them less frequently than the other workload models, resulting in lower CPU, RAM and I/O consumption.

- **Office Worker**
  This workload is used in environments that only have one (v)CPU. It consumes more resources than the Task Worker, but is lighter than the Knowledge Worker.

- **Knowledge Worker**
  This workload is used in environments with two (v)CPU. It is a balanced and intensive workload that stresses the system smoothly, resulting in high CPU, RAM, and I/O usage.

- **Power Worker**
  This workload is used in environments with more than two (v)CPU. It puts the maximum stress on the system, resulting in the highest CPU, RAM, and I/O usage.

This test uses the Knowledge and Power Workers.
2.4.2 Resource Usage of Each Workload Model

Table 2-1 lists the resource usage in different workloads. These indicators are for a single user or virtual desktop.

NOTE
These values vary with the hardware, VM optimization, and number of concurrent users.

<table>
<thead>
<tr>
<th>Workload Name</th>
<th>VSI Version</th>
<th>Apps Open</th>
<th>IOPS</th>
<th>RAM</th>
<th>(v)CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Worker</td>
<td>4.1.x</td>
<td>2-7</td>
<td>6</td>
<td>1 GB</td>
<td>1</td>
</tr>
<tr>
<td>Office Worker</td>
<td>4.1.x</td>
<td>5-8</td>
<td>8.1</td>
<td>1.5 GB</td>
<td>1</td>
</tr>
<tr>
<td>Knowledge Worker</td>
<td>4.1.x</td>
<td>5-9</td>
<td>8.5</td>
<td>1.5 GB</td>
<td>2</td>
</tr>
<tr>
<td>Power Worker</td>
<td>4.1.x</td>
<td>8-12</td>
<td>10.8</td>
<td>2 GB</td>
<td>2+</td>
</tr>
</tbody>
</table>
3 Architecture and Configuration of Huawei Desktop Cloud Acceleration Solution

3.1 Architecture

Huawei's desktop cloud acceleration solution uses OceanStor Dorado V3 all-flash storage systems. Figure 3-1 shows the architecture of the solution.

The servers in the solution include an infrastructure server and VDI service servers (VDI cluster). The infrastructure server is used to build the domain control server, DHCP, DNS, virtualization management platform, and virtual desktop management platform. The VDI service servers are used to provision virtual desktops. The Login VSI client cluster is used to deploy the Login VSI test environment. You do not need to configure it.

A GE management network must be configured for all servers and storage systems. A 10GE VDI service network must be configured between the infrastructure and VDI service servers.

FC SAN or IP SAN can be used between the VDI service servers and storage system. This test uses the IP SAN.
3.2 Virtual Desktop Specifications

Each virtual desktop is configured with two vCPUs, 2 GB memory, and a 50 GB system disk. No data disk is configured. The following table provides the detailed virtual desktop configuration.

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>vCPU</td>
<td>2</td>
</tr>
<tr>
<td>Memory</td>
<td>2 GB</td>
</tr>
<tr>
<td>Disk</td>
<td>50 GB</td>
</tr>
<tr>
<td>Operating System</td>
<td>Version</td>
</tr>
<tr>
<td>Windows</td>
<td>Windows 7 Enterprise SP1 x64</td>
</tr>
<tr>
<td>Software</td>
<td>Detail</td>
</tr>
<tr>
<td>Microsoft office 2010</td>
<td>64-bit: Word, Excel, PowerPoint, Outlook</td>
</tr>
<tr>
<td>Login VSI applications</td>
<td>Adobe Acrobat, Doro PDF writer, Freemind, Photo Viewer, Java</td>
</tr>
<tr>
<td>Others</td>
<td>Internet Explorer, Huawei Desktop Agent</td>
</tr>
</tbody>
</table>
3.3 Software Configuration

The following table lists the software used in this test.

<table>
<thead>
<tr>
<th>Software</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>OceanStor Dorado V3 V300R001C21</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>OS</td>
</tr>
<tr>
<td>AD/DHCP/DNS</td>
<td>Windows Server 2012 R2</td>
</tr>
<tr>
<td>CNA</td>
<td>SUSE</td>
</tr>
<tr>
<td>FusionCompute</td>
<td>-</td>
</tr>
<tr>
<td>FusionAccess</td>
<td>-</td>
</tr>
<tr>
<td>Login VSI</td>
<td>OS</td>
</tr>
<tr>
<td>Login VSI Server</td>
<td>Windows Server 2012 R2</td>
</tr>
<tr>
<td>Launcher x 200</td>
<td>Windows Server 2012 R2</td>
</tr>
</tbody>
</table>

3.4 Hardware Configuration

3.4.1 Host Configuration

Consider the following when planning servers:

- Number of CPUs, model, and memory size
- Rack or blade server
- Interface cards

This test uses the Huawei E9000 blade server. The blade model is CH121 V3, which has two E5-2698 V4 CPUs and 256 GB memory. CH121 V3 is a half-width compute node based on the new-generation Intel® Grantley processor platform. It provides intensive computing capability and large memory size for virtualization, cloud computing, HPC, and computing-intensive enterprise services. For details, see "E9000 Blade Server V100R001 Product Documentation."

In this test, 100 virtual desktops are provisioned on each blade. Another two blades are used for installing FusionAccess infrastructure. The following table lists the details.
Table 3-3 Server planning list

<table>
<thead>
<tr>
<th>Server and Component</th>
<th>Blade or Component Model</th>
<th>Quantity</th>
<th>CPU</th>
<th>Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>E9000</td>
<td>CH121 V3</td>
<td>16</td>
<td>E5-2698 V4 * 2</td>
<td>256 GB</td>
</tr>
<tr>
<td>E9000</td>
<td>CH121 V3</td>
<td>16</td>
<td>E5-2698 V4 * 2</td>
<td>256 GB</td>
</tr>
<tr>
<td>E9000</td>
<td>CH121 V3</td>
<td>16</td>
<td>E5-2698 V4 * 2</td>
<td>256 GB</td>
</tr>
<tr>
<td>E9000</td>
<td>CH121 V3</td>
<td>4</td>
<td>E5-2698 V4 * 2</td>
<td>256 GB</td>
</tr>
<tr>
<td>Ethernet switching board</td>
<td>CX310</td>
<td>10</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

In addition, you need another server to install the Launcher of Login VSI to simulate the client that logs in to virtual desktops. For details, go to the official website of Login VSI.

3.4.2 Storage Configuration

Before using an OceanStor Dorado V3 storage system, analyze application performance and capacity requirements and plan the number of disks to minimize O&M risks.

Consider the following aspects:

- Performance requirements (model, disk type, and disk quantity)
- Capacity requirements (hot spare policy and RAID level)
- Networking requirements (different interface modules for FC or IP SAN)
- Requirements for value-added features

This test uses OceanStor Dorado6000 V3 storage system with 33 x 3.84 TB SSDs. RAID 6 and high hot policy are configured, so the system provides 89.73 TB available capacity.

Disk Domain

A disk domain is a combination of multiple disks that provides storage resources for storage pools after reserving a certain amount of hot spare capacity.

The ratio of hot spare capacity in a disk domain depends on the hot spare policy and the disk type and quantity. The ratio is maintained by the storage system based on the reliability engineering method. The hot spare policy depends on the type of the upper-layer application system. In VDI scenarios, most I/Os are random small I/Os (4 KB or 8 KB), and the high hot spare policy is recommended.

In this test, a disk domain using the high hot spare policy is created.

Storage Pool

A storage pool, which is a container that stores storage resources, is created in a disk domain. A storage pool can dynamically allocate resources from a disk domain. The RAID policies of the storage pools must be properly planned for better storage utilization.
Dorado V3 uses dynamic RAID and supports RAID 5, RAID 6, and RAID-TP, which are distinguished by the number of parity bits in RAID groups. RAID 5, RAID 6, and RAID-TP can tolerate simultaneous failures of one, two, and three disks, respectively. Generally, RAID 5 or RAID 6 is used. RAID-TP is recommended if reliability takes precedence over performance. Table 3-4 lists the differences among RAID levels.

<table>
<thead>
<tr>
<th>RAID Level</th>
<th>Number of Failed Disks Allowed</th>
<th>Available Capacity</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAID 5</td>
<td>1 (low reliability)</td>
<td>Highest</td>
<td>Highest</td>
</tr>
<tr>
<td>RAID 6</td>
<td>2 (medium reliability)</td>
<td>Lower than RAID 5</td>
<td>Lower than RAID 5</td>
</tr>
<tr>
<td>RAID-TP</td>
<td>3 (high reliability)</td>
<td>Lower than RAID 6</td>
<td>Similar to RAID 6</td>
</tr>
</tbody>
</table>

To ensure performance and reliability, RAID 6 is used in this test.

LUN

Set appropriate LUN policies based on the data storage requirements of VDI services to achieve the optimal storage performance. The recommended configurations are as follows:

- Owner controller: It is recommended that you evenly allocate LUNs to controllers to ensure load balancing among these controllers.
- Deduplication and compression: Dorado V3 supports data deduplication and compression to reduce the actual space occupied by data and the number of write operations. You are advised to enable deduplication and compression in VDI scenarios.
- LUN capacity: It is recommended that each LUN should carry no more than 100 desktops and the capacity of each LUN should not exceed 16 TB.
- Application type: You can select an application type on Dorado V300R001C20 and later versions when creating a LUN. For VDI services, select FusionAccess_VDI, which uses 8 KB block size by default.
- LUN usage:
  - Common LUN: This is used in this test. It is a logical disk that can be accessed by a host. Dorado V3 uses thin provisioning when creating common LUNs.
  - Protocol Endpoint (PE) LUN: PE LUNs are only used by VVol in VMware software-defined storage. VVol provides storage space for VMs. A PE LUN is used as an I/O demultiplexer to simplify the connection between a VM and a VVol LUN. VM I/Os are sent to the corresponding VVol LUN through a PE LUN.

In this test, 51 LUNs are created. The detailed configurations are as follows.

<table>
<thead>
<tr>
<th>Size</th>
<th>Quantity</th>
<th>Thin Provisioning</th>
<th>Deduplication and Compression</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 TB</td>
<td>50</td>
<td>Enabled by default</td>
<td>Enabled by default</td>
<td>Deploying virtual desktops</td>
</tr>
<tr>
<td>500 GB</td>
<td>1</td>
<td>Enabled by default</td>
<td>Enabled by default</td>
<td>Storing desktop</td>
</tr>
</tbody>
</table>
Mapping View

A mapping view defines logical mappings among LUNs, array ports, and host ports. You are advised to create a mapping view based on the following rules:

- A LUN group is an object designed to facilitate LUN resource management. Typically, LUNs that serve the same service should be added to one LUN group.
- A host group is a collection of hosts that share storage resources. Each host contains multiple initiators (host ports). You are advised to create a host for each server and add all initiators of the server to the host. Generally, hosts in the same cluster are added to a host group.

3.4.3 Network Configuration

A GE management network must be configured for all servers and storage systems.

A 10GE VDI service network must be configured between the infrastructure and VDI service servers.

FC SAN or IP SAN can be used between the VDI service servers and storage system. This test uses the IP SAN.

Huawei CE6851 switches are used on the host storage network and service network. The S5700 switch is used on the management network.

<table>
<thead>
<tr>
<th>Hardware Type</th>
<th>Model</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet switch</td>
<td>CE6851</td>
<td>3</td>
</tr>
<tr>
<td>Ethernet switch</td>
<td>S5700</td>
<td>1</td>
</tr>
</tbody>
</table>
4 Verification

This test deploys the FusionAccess platform on Huawei OceanStor Dorado V3 storage system and provisions 5000 full copy desktops. The Login VSI tool is used to perform the load tests.

4.1 Test Items

In this test, 5000 full copy virtual desktops are provisioned on the FusionAccess platform deployed on Dorado6000 V3. The following tests are performed:

- Login VSI workload test
  The Knowledge Worker and Power Worker are used to test the number of users on the 5000 desktops and the performance of the storage system.

- Deduplication and compression ratio test
  After the virtual desktops have been provisioned and the workload test has been performed, record the deduplication and compression ratios of the storage system.

Before the test, 5000 desktops have been provisioned on the FusionAccess platform and are available.

**Figure 4-1 Desktops are available and ready**
4.2 Test Result

4.2.1 Login VSI Test

This section tests 5000 desktops using the Knowledge Worker and Power Worker workloads.

Knowledge Worker

The test is conducted by 200 Launchers in benchmark mode. The test result is as follows.

Figure 4-2 Knowledge Worker Test Results

According to the results, the baseline value is 814, the average value is 999, and the maximum value is 1815. \textbf{VSI}_{\text{max}}\) is not reached, indicating that 5000 users have not reached the limit of Dorado V3.

The storage performance during the test is as follows.
Figure 4-3 Storage latency

I/O response time

Figure 4-4 IOPS

IOPS
Figure 4-5 CPU usage

CPU usage

Figure 4-6 Bandwidth

Bandwidth

When 5000 users are delivering Knowledge Worker workload to Dorado6000 V3, the Login VSI test threshold is not reached and the storage latency is less than 1 ms. The performance and user experience are excellent.

Power Worker

The Power worker test uses 200 Launchers. Because the Power Worker does not exist in benchmark mode, you need to exit the benchmark mode before the test. The Launch Window is set to 2880s.
According to the results, the baseline value is 822, the average value is 1038, and the maximum value is 1823. **VSImax** is not reached, indicating that 5000 users have not reached the limit of Dorado V3.

The storage performance during the test is as follows.

**Figure 4-8 Storage latency**

![Storage latency graph]

**I/O response time**

- **VSImax** is not reached, indicating that 5000 users have not reached the limit of Dorado V3.
- The storage performance during the test is as follows.

![Storage latency graph]
Figure 4-9 IOPS

IOPS

Figure 4-10 CPU usage

CPU usage
When 5000 users are delivering Power Worker workload to Dorado6000 V3, the Login VSI test threshold is not reached and the storage latency is less than 1.5ms. This demonstrates that Dorado V3 is able to support Power Worker workload from 5000 users with stable performance and user experience.

### 4.2.2 Deduplication and Compression Ratio Test

After the 5000 full copy desktops are provisioned and the long-term stability test is performed, check the data reduction ratio of the Dorado V3 storage system.

**Figure 4-12 Deduplication and compression ratios after 5000 desktops are provisioned**
As shown in the preceding figure, after the long-term stability test, the data reduction ratio can reach 46:1. This demonstrates that the deduplication and compression features of Dorado V3 effectively reduce redundant data and greatly improve the space utilization.
Huawei OceanStor Dorado V3 provides high hardware specifications, all-flash software architecture, and various features to meet the requirements of FusionAccess VDI scenarios. It greatly improves storage performance and space utilization.

The test result shows that a Dorado6000 V3 with two controllers can support 5000 users smoothly at a low latency, providing optimal user experience. In addition, SmartDedupe and SmartCompression of Dorado V3 can effectively reduce redundant data, improve storage space utilization, and prolong the service life of SSDs, maximizing the return on investment.
OceanStor Dorado V3 Series V300R001 SmartDedupe and SmartCompression Feature Guide
OceanStor Dorado5000 V3 and Dorado6000 V3 Product Documentation
FusionSphere V100R006C10SPC600 Product Documentation
FusionCloud Desktop Solution V100R006C10 Windows Desktop Management Guide
FusionCloud Desktop Solution V100R006C10 Software Installation Guide
Login VSI Initial Installation Guide
E9000 Blade Server Product Documentation
### Table 7-1 Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>RAID level</td>
<td>The application of different redundant types to a logical drive. A RAID level improves the fault tolerance or performance of the logical drive but reduces the available capacity of the logical drive. Each logical drive must be specified a RAID level.</td>
</tr>
<tr>
<td>SmartCompression</td>
<td>Huawei-developed data compression feature.</td>
</tr>
<tr>
<td>SmartDedupe</td>
<td>Huawei-developed data deduplication feature.</td>
</tr>
<tr>
<td>Storage system</td>
<td>An integrated system that consists of the following parts: controller, storage array, host bus adapter, physical connection between storage units, and all control software.</td>
</tr>
<tr>
<td>Thin LUN</td>
<td>A logic disk that can be accessed by hosts. It dynamically allocates storage resources from the thin pool according to the actual capacity requirements of users.</td>
</tr>
</tbody>
</table>
## Acronyms and Abbreviations

<table>
<thead>
<tr>
<th>Acronym or Abbreviation</th>
<th>Full Spelling</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDI</td>
<td>Virtual Desktop Infrastructure</td>
</tr>
<tr>
<td>RAID</td>
<td>Redundant Array of Independent Disks</td>
</tr>
<tr>
<td>IOPS</td>
<td>Input/Output Operations Per Second</td>
</tr>
<tr>
<td>FC</td>
<td>Fibre Channel</td>
</tr>
<tr>
<td>SBC</td>
<td>Server-based Computing</td>
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