Huawei Storage Certification Training

HCIA-Storage

Scenario-based Practice of Storage Fundamentals

(For Trainees)



HUAWEI TECHNOLOGIES CO., LTD.

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Huawei Certified ICT Associate-Storage (HCIA-Storage) is designed for Huawei engineers, students and ICT industry personnel. HCIA-Storage covers storage technology trends, basic storage technologies, common advanced storage technologies, business continuity solutions for storage and storage system O&M management.

The HCIA-Storage certificate introduces you to the storage industry and markets, helps you understand sector innovation, and makes sure you stand out among your industry peers.



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# References and Tools

## References

The commands and documents listed in this document are for reference only. Use the corresponding commands and documents based on the product version in the actual environment.

Huawei OceanStor Dorado V6 Product Documentation



Features supported by Huawei OceanStor Dorado vary with product models. For details, see the product documentation of the relevant model. You can log in to Huawei's technical support website (<https://support.huawei.com/enterprise/en/index.html>) and use the search box to find and download the desired document or tool.

## Software Tools

Huawei OceanStor UltraPath



You can log in to Huawei's technical support website (<https://support.huawei.com/enterprise/en/index.html>) and search for UltraPath to find and download the desired document or tool.

PuTTY



You are advised to use the open-source software PuTTY to log in to a terminal. You can visit its public website (**putty.org**) to find and download the desired document or tool.

## Version Description

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Version | Quantity | Remarks |
| Storage system | Huawei OceanStor Dorado V6 | 1 | Recommended version |
| Windows OS | Windows Server 2012 and Windows Server 2016 | - | Recommended version |
| Linux OS | SUSE, Red Hat, CentOS, and EulerOS | - | Recommended version |
| S5700 switch | - | 1 |  |
| Multipathing software | UltraPath 21.6.3 | - | Recommended version |

# Scenario-based Practice of Storage Fundamentals

## Course Overview

This course provides case study and scenario-based practices to help trainees consolidate their knowledge of initial configuration and basic service deployment and implementation of Huawei OceanStor storage.

## Objectives

To understand common networking modes for storage services

To plan and design networks

To complete the initial configuration of the storage system

To install UltraPath

To plan and configure block services

## Case Background



Cases in this document are examples only. The actual configurations may vary according to actual environments. For details, see the corresponding product documentation.

Company W needs a high-performance storage system to support new service lines. The planned upper-layer services are OLTP transactional databases. To meet service development requirements, Company W purchases a Huawei OceanStor all-flash storage system. To ensure the services run properly, two test servers are used. Server A runs Windows, server B runs Linux, and the storage devices provide block storage services for the two servers over an IP network.

As a storage engineer, you are responsible for network planning and design, initial configuration, and block service configuration of the storage system.

## Tasks

### Scenario 1: Requirement Analysis, Planning, and Design

Background

As a storage engineer, how do you plan networks?

Question

Please analyze the business requirements of Company W.

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What needs to be done to meet the requirements of Company W? (For example, what needs to be planned?)

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[Suggested Procedure]

For details, see **Install and Upgrade** > **Installation Guide** > **Installation Planning** in the desired product documentation.

What are the common networking modes for storage service networks? How can you prevent SPOFs?

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[Suggested Procedure]

For details, see **Install and Upgrade** > **Installation Guide** > **Installation Planning** in the desired product documentation.

Task 1: Obtaining Device User Information

Plan and record the IP address and user information of the storage device based on the actual lab environment.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Device Name** | **Management IP Address** | **Subnet Mask** | **Gateway** | **User Name** | **Password** |
| Storage001 |  |  |  |  |  |
| Host001 |  |  |  |  |  |
| Host002 |  |  |  |  |  |

[Suggested Procedure]

Follow certain principles when planning the IP address and user information of the storage device.

For details, see **Install and Upgrade** > **Installation Guide** > **Installation Planning** in the desired product documentation.



The following example is for reference only. The actual information may vary depending on lab environment.

Task 2: Designing the Network Topology

Draw the service network topology based on the case background.

|  |  |
| --- | --- |
|  |  |
| Huawei OceanStor all-flash storage | Linux server |
|  |  |
| Ethernet switch | Windows server |

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[Suggested Procedure]

For details, see **Install and Upgrade** > **Installation Guide** > **Installation Planning** in the desired product documentation.

[Extension]

To ensure the security and stability of Company W's services, you may use dual-switch networking to build the storage system. Draw the dual-switch networking topology.

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Task 3: Planning the Front-End Service Network

Plan the device connections for the front-end service network.

|  |  |
| --- | --- |
| **Device Name** | **Connection Diagram** |
| IP\_Switch001 |  |
| Host001 |  |
| Host002 |  |
| Storage001 |  |

[Suggested Procedure]

For details, see Huawei Storage Networking Assistant (<https://support.huawei.com/onlinetoolsweb/sna/#/home>).

Task 4: Planning Service IP Addresses

Plan front-end service IP addresses based on the network topology.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device Name** | **Port Location** | **IP Address** | **Subnet Mask** | **Gateway** |
| Storage001 |  |  |  |  |
| Host001 |  |  |  |  |
| Host002 |  |  |  |  |



The following example is for reference only. The actual information may vary depending on lab environment.

[Suggested Procedure]

For details, see **Install and Upgrade** > **Installation Guide** > **Installation Planning** in the desired product documentation.

### Scenario 2: Initial Configuration

Background

After the network planning and design are complete, perform initial configuration on the storage system.

Question

What information can be configured in the initial configuration wizard of the Huawei OceanStor all-flash storage system?

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Task 1: Initial configuration

After logging in to DeviceManager, perform the initial configuration on the storage system in the initial configuration wizard. This includes configuring basic information, creating a storage pool (excluding scanning for UltraPath hosts and allocating storage resources), and filling in the following form.



The initial configuration address is **https://***XXX.XXX.XXX.XXX:8088***/initialize**, where *XXX.XXX.XXX.XXX* indicates the IP address of the management network port of the storage system.

The following example is for reference only. The actual information may vary depending on lab environment.

|  |  |
| --- | --- |
| Basic Information | Result |
| Device name |  |
| Device location |  |
| Device time |  |
| Storage pool name, capacity alarm threshold, and capacity exhaustion alarm threshold |  |

[Suggested Procedure]

For details, see **Install and Upgrade** > **Initialization Guide** > **Logging In and Starting Initialization** > **Initially Configuring a Storage Device** in the desired product documentation.



A license file is a credential for using basic storage features or value-added features. Before practicing, check whether the license file is valid.

In this scenario, a license file has been imported and activated. You can manage the license in the initial configuration wizard.

Scenario 3: Basic Service Planning and Configuration

Background

After the tasks in scenarios 1 and 2 are complete, plan and configure block services.

Question

Plan the storage capacity and answer the following questions.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Storage Pool Name** | **Disk Type** | **Disk Quantity** | **Hot Spare Policy** | **RAID Policy** |
| StoragePool001 |  |  |  |  |
| **LUN Name** | **ID** | **Type** | **Capacity** | **/** |
| LUN001 |  |  |  |  |
| LUN002 |  |  |  |  |

What factors need to be considered during usable capacity planning?

How many RAID levels does Huawei OceanStor Dorado support?

Does Huawei OceanStor Dorado support thick LUNs?

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Planning Basic Storage Services** in the desired product documentation.



In this experiment environment, a single storage pool requires at least 8 normal member disks. If a storage pool spans multiple controller enclosures, the minimum number of disks required for creating the storage pool is calculated as follows: Minimum number of disks = 8 x Number of controller enclosures that the storage pool spans.

RAID 2.0+ allows all member disks in a storage pool to provide the hot spare capacity. For ease of understanding, the hot spare capacity is expressed in the number of hot spare disks on DeviceManager.

Differences between the nominal capacity of a single disk and the capacity displayed on the OS, hot spare capacity, and RAID usage. The evaluation results of eDesigner take precedence over the considerations of this section.

RAID 5, RAID 6, and RAID-TP

No

Task 1: Planning Mapping Views

Plan mapping views based on the case background.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Mapping View 1: to Windows Hosts** | | | | | |
| LUN Name | Owning Storage Pool | LUN Capacity | Host Name | OS | IQN |
|  |  |  |  |  |  |
| **Mapping View 2: to Linux Hosts** | | | | | |
| LUN Name | Owning Storage Pool | LUN Capacity | Host Name | OS | IQN |
|  |  |  |  |  |  |

Question

Provide key steps for the block service configuration process.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Configuring Basic Storage Services** > **Configuration Process** in the desired product documentation.

Task 2: Configuring Block Services

Based on the case background and planning, configure block services on the Windows and Linux servers. Then, use the storage space on the application server, such as by writing a test file named **test.txt** to the application server.

Create a storage pool.

To ensure that the application server can use the storage system's storage space, create a storage pool named **StoragePool001**.



During initial configuration, if you have specified that all disks are used to create a unique storage pool, skip this step.

If this step is performed, the capacity of the storage pool depends on the actual planning and experiment environment.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Configuring Basic Storage Services** > **Creating a Storage Pool** in the desired product documentation.

Create LUNs.

Create LUNs **LUN001** and **LUN002** and configure their capacities as planned.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Configuring Basic Storage Services** > **Creating a LUN** in the desired product documentation.

Create hosts.

On DeviceManager, create virtual hosts **Host001** and **Host002** running Windows and Linux, respectively, for the storage system.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Configuring Basic Storage Services** > **Creating a Host** in the desired product documentation.

Create mappings.

On DeviceManager, create mappings between the LUNs and hosts.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Configuring Basic Storage Services** > **Creating a Mapping** in the desired product documentation.

(Optional) Install UltraPath.



OceanStor UltraPath is the multipathing software supported by Huawei. It is installed on servers to control the access of application servers to the storage system. UltraPath selects the paths for application servers to access the storage server and manages the paths.

This step is optional. You are advised to install UltraPath before deploying HyperMetro. If UltraPath is installed and configured after LUNs are mapped to an application server, you must restart the application server for the multipathing policies to take effect.

Install UltraPath on both the Windows and Linux hosts. (Obtain the UltraPath installation package from the trainer.)

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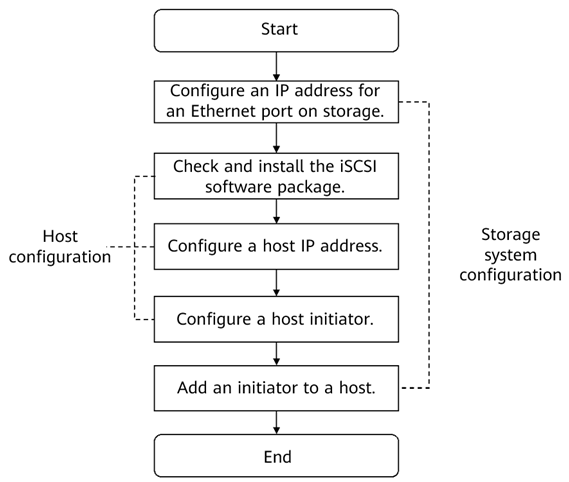
[Suggested Procedure]

For details, see **Installing UltraPath** in the UltraPath user guide of the corresponding OS.

Configure connectivity between hosts and the storage system.

Establish iSCSI connections.

Establish iSCSI connections between the Windows application server and storage system and between the Linux-based application server and storage system by complying the following configuration logic.



If switches are used, configure zones (for FC connections) or VLANs (for iSCSI connections) by referring to the official product documentation specific to the switch model and version.

The display of DeviceManager varies with different versions.

[Suggested Procedure]

For details, see **Configuring Connectivity** > **Establishing iSCSI Connections** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where *XXX* indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

Scan LUNs on a host.

Scan for disks on the Windows and Linux servers respectively to detect LUNs mapped by the storage system.

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[Suggested Procedure]

For details, see **Configuring Connectivity** > **Scanning LUNs on the Host** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where *XXX* indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

Use the storage space on an application server.

Manage volumes.

On the Windows and Linux servers, initialize, partition, and format the detected disks so that an application server can use the storage space.

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[Suggested Procedure]

For details, see **Appendix A Volume Management** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where *XXX* indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

Write a test file to verify the experiment result.

Write a test file to an application server to test whether the application server can properly use the storage space.

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[Suggested Procedure]

For details, see **Appendix A Volume Management** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where *XXX* indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

Question

Provide key steps for the service space reclamation process.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Managing Basic Storage Services** in the desired product documentation.

Task 3: Reclaiming Service Space

Disconnect iSCSI connections.

Disconnect iSCSI connections from a service host.

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[Suggested Procedure]

For details, see **Appendix A Volume Management** in *OceanStor Dorado V6 Host Connectivity Guide for XXX*, where *XXX* indicates the OS, such as Windows, SUSE, Red Hat, CentOS, and EulerOS.

Delete mappings.

Log in to DeviceManager and cancel mappings between the hosts and LUNs.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Managing Basic Storage Services** > **Managing Hosts** in the desired product documentation.

Delete the hosts and initiators.

Log in to DeviceManager and delete the hosts, initiators, and service IP addresses.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Managing Basic Storage Services** in the desired product documentation.

Delete LUNs.

Log in to DeviceManager and delete the LUNs to release storage space.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Managing Basic Storage Services** > **Managing LUNs** in the desired product documentation.

Delete the storage pool.

Log in to DeviceManager and delete the storage pool.

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[Suggested Procedure]

For details, see **Configure** > **Basic Storage Service Configuration Guide** > **Managing Basic Storage Services** > **Managing Storage Pools** in the desired product documentation.

Verify the result.

Verify that the service space has been reclaimed successfully.

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## Summary and Conclusion

My Opinion:

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