

Utilizing VMware vSphere Virtual Volumes (VVOL) with the FUJITSU Storage ETERNUS DX S3 series Reference Architecture for Virtual Platforms (15VM/iSCSI)

The ETERNUS DX S3 series now supports VMware vSphere Virtual Volumes (VVOL). This document provides an overview of VVOL and explains how to implement this function.



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Preface

Purpose of this document

This document shows a verified reference architecture for virtual platforms that are created with the FUJITSU Storage ETERNUS DX S3 series and FUJITSU Server PRIMERGY using VMware vSphere Virtual Volumes (hereinafter referred to as VVOL).

The following information is provided in this document:

- VVOL configuration procedure
- WOL operation procedure

Intended audience

This document is intended for personnel who have knowledge of VMware vSphere and are engaged in designing, configuring, or operating the system.

Therefore, basic information for creating WOLs such as the procedures from the installation to the setup of VMware ESXI and vCenter Server, and the setup procedure of vSphere HA is omitted here.

Other information

Note that because the procedures and screens that are used here are based on our verification machine, different operations may be necessary depending on the system configuration and the environment used.

October 2015

1 VVOL Overview and Implementation Requirements

This chapter provides an overview of VVOLs and the requirements for implementing VVOLs.

- 1.1 WOL Overview
- 1.1.1 What is WOL?

VMware Virtual Volume (VVOL) is a new storage management technology added to VMware vSphere 6.0.

Conventional storage operations using VMFS required complicated volume assignments and operations while taking into account resource allocations for virtual machines due to multiple VMDK (virtual disk) assignments to a single storage volume (LUN).

In storage operations using WOLs, a storage volume is assigned to each VMDK of the virtual machine to allow the storage system to manage the storage for each virtual machine.

By allowing the storage to be used by each virtual machine, functions such as backup and performance management that were previously performed only for storage volumes can be set for each virtual machine.

In addition, reducing the administrative workload that is caused by separating the storage administrators from the virtual machine administrators is possible.

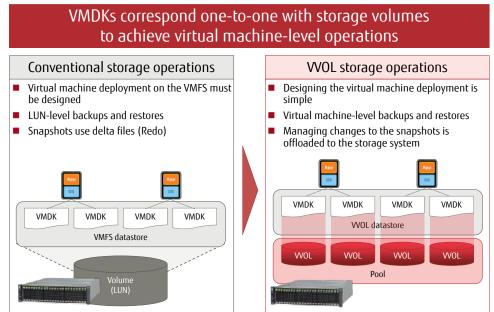


Figure-1 Storage operations with VVOLs

1.1.2 Main Features of the VVOLs that Fujitsu Provides

Fujitsu provides VVOL environments with the implementation of the ETERNUS DX S3 series (excluding the DX60 S3), ETERNUS SF, and ETERNUS VMware vSphere Storage APIs for Storage Awareness (VASA) Provider. The following figure shows the storage systems that support VVOLs.

ETERNUS DX S3 series (excluding the ETERNUS DX60 S3)

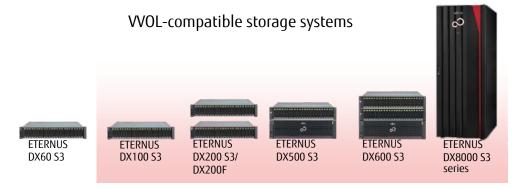


Figure-2 VVOL-compatible storage systems

ETERNUS SF

General name for Storage Software.

ETERNUS SF Storage Cruiser and ETERNUS SF AdvancedCopy Manager used for implementing WOLs are described below.

- ETERNUS SF Storage Cruiser

An integrated management software for storage systems. This software ensures stable operations of entire storage systems that are composed of the ETERNUS as the main device and other devices such as SAN network devices by managing the configuration, performance, and failures of the entire storage system.

ETERNUS SF Storage Cruiser can further reduce costs and provide more stable operation in combination with various optional features for different purposes; Automated Storage Tiering to optimize storage investments, Automated QoS to automatically adjust I/O resource allocations according to business requirements, guaranteeing data integrity between storage systems, and automatic switchovers of I/O access paths.

In WOL environments, WOL operations that are performed from vCenter Server are run via ETERNUS VASA Provider.

- ETERNUS SF AdvancedCopy Manager

This software allows high-speed backups/restores and replication operations using the Advanced Copy functions. In WOL environments, clone backups and snapshot backups can be performed.

ETERNUS VASA Provider

An API that enables vCenter Server to acquire device information by linking with the storage system. By installing ETERNUS VASA Provider in the operation management server for ETERNUS SF Storage Cruiser, the ETERNUS Disk storage system becomes VASA compatible, and virtual infrastructures of the storage can be integrated and operations can be managed.

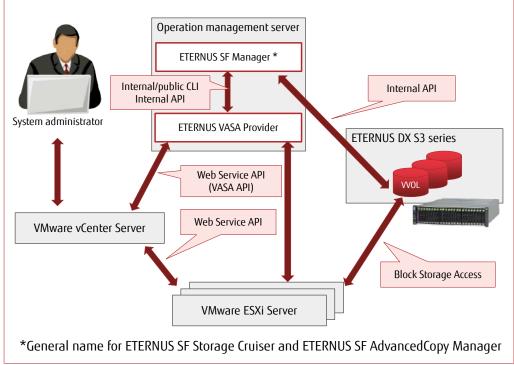


Figure-3 Structure for creating a VVOL environment

Implementation of WOLs can provide the following operational efficiencies:

Simple design and scalability

Multiple virtual machines with different operational requirements can be deployed in the same datastore. Volumes can be properly allocated from the datastore to easily add virtual machines without having to consider VMDK assignments. When creating virtual machines, the system administrator can also operate and manage the storage simply by operating vCenter Server.

Workload reduction during implementation

A complicated design to divide volumes is not necessary since the only requirement for implementing VVOLs is to create a pool. The man-hours are greatly reduced during the configuration since LUN masking only needs to be performed when a pool is created. Furthermore, the necessary system environment can be easily deployed just by configuring a storage policy while creating virtual machines from vCenter Server.

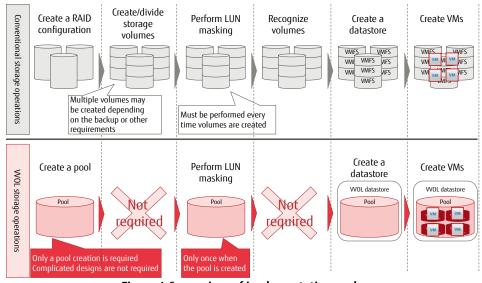


Figure-4 Comparison of implementation works

Simple operation from vCenter Server (storage policy)

The service level (such as performance, availability, and backup) that is required for the storage can be set as storage policies from the vCenter Server screens. Virtual machines can be created or volumes can be added simply by selecting storage policies and datastores from the vCenter Server screens.

Operations using storage policies substantially reduce time and effort in the design phase by automatically distributing resources among the virtual machines. In the operation phase, management of the virtual machines and the storage can be unified.

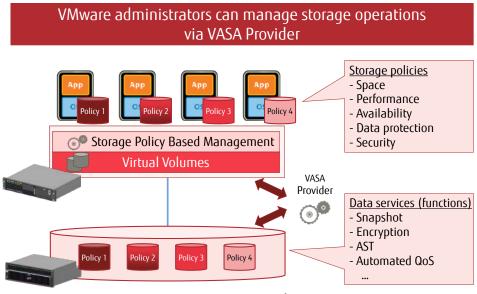


Figure-5 Storage policy

Easy, reliable virtual machine backups

In a WOL environment, backup operations are automatically performed by setting backup policies that define schedules and the number of generations.

By acquiring full clones, the system can be immediately recovered even in the unlikely event of a physical failure. With Fujitsu's original function, clone backups can be taken at the same time as snapshot backups.

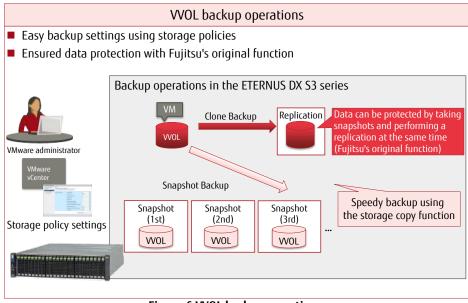


Figure-6 VVOL backup operations

Virtual machine-level/file-level restores

WOLs allow virtual machine-level restores because virtual disks (VMDK) have a one-to-one relationship with storage volumes. In addition, file-level restores are also supported by Fujitsu's original function.

For file-level restores, only the necessary files are restored from snapshots using temporary volumes.

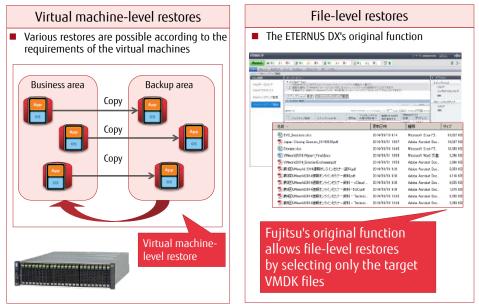


Figure-7 Virtual machine-level/file-level restores

Efficient operation using Fujitsu's original policy settings

Items related to storage operations such as backup policies and the priority level of Automated QoS can be easily set as policies from vCenter Server. Simply by applying policies when creating the virtual machines, the VMware administrator can easily assign datastores that match the requirements of the virtual machines without the need to coordinate with the storage administrator. In this way, operational efficiency can be improved.

In addition, with Fujitsu's original user-friendly policy setting screens, various storage functions can be easily set up.

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Figure-8 Storage policy setting screen

1.2 Requirements for Implementing WOLs Using the ETERNUS DX S3 series The following sections describe the requirements for implementing WOLs using the ETERNUS DX S3 series:

1.2.1 Configuration Requirements

The following configuration is required for implementing WOLs:

VMware ESXi host (physical server)

VMware vSphere 6.0 or later is required to use VVOLs. The Standard Edition or higher license is also required. Prepare the required number of physical servers that are compatible with VMware ESXi 6.0.

Disk storage system

Prepare the WOL-compatible ETERNUS DX S3 series or the ETERNUS DX200F.

Fibre Channel (FC) and iSCSI connections are supported. Fibre Channel switches are required for Fibre Channel environments.

- Management server
 - vCenter server

A server in which vCenter Server is installed. This server can also be installed in a virtual machine. With VMware vCenter Server Appliance, vCenter Server can be installed as pre-configured virtual machine.

- Operation management server

A Windows server in which ETERNUS SF Manager (ETERNUS SF Storage Cruiser) and ETERNUS VASA Provider are installed. This server can also be installed in a virtual machine.

Install ETERNUS VASA Provider and ETERNUS SF Manager in the same server. vCenter Server and ETERNUS VASA Provider cannot be installed in the same server.

- DNS server

This server is required for vCenter Server, VMware ESXi hosts, and the operation management server to check the FQDN of one another. An Active Directory server can be used as an alternative.

When using vCenter Appliance, the DNS must be able to resolve the vCenter Server's FQDN during the installation.

- NTP server

A server for synchronizing the clocks of vCenter Server, VMware ESXi hosts, the operation management server, and the ETERNUS DX S3 series using the NTP service.

1.2.2 Software Requirements

The following software is required for implementing WOLs:

- VMware vSphere 6.0 Standard or higher
- VMware vCenter Server 6.0 or vCenter Appliance 6.0
- ETERNUS SF Storage Cruiser (V16.2 or later)*
- ETERNUS VASA Provider (V2.0 or later)
 - * The ETERNUS SF Storage Cruiser Optimization Option is required for Automated Storage Tiering.
 - The ETERNUS SF Storage Cruiser QoS Management Option is required for Automated QoS.

The following software is also required to perform snapshot backups using storage policies and clone backups for the virtual machines: -ETERNUS SF AdvancedCopy Manager (V16.2 or later)

1.2.3 Licenses

The following software licenses are required for implementing WOLs:

- VMware vSphere 6.0 Standard or higher
- VMware vCenter Server 6.0 Foundation or Standard
- Windows Server 2012 Standard (for the operation management server)
- ETERNUS SF Storage Cruiser Standard Edition

The following software license is required to perform snapshot backups using storage policies and clone backups for the virtual machines: - ETERNUS SF AdvancedCopy Manager Standard Edition

Install the required number of licenses for VMware vSphere 6.0 and Windows Server 2012 according to the number of CPUs of the physical servers that are to be used.

(Separately install the licenses that are required for the business servers that operate as virtual machines.)

1.2.4 Points to Consider for Implementing WOLs

This section provides points to consider when implementing WOLs.

Management server

The vCenter server and the operation management server are necessary for the operation of the virtual machines that use VVOLs. In order to configure the vCenter server and the operation management server on the virtual machines, datastores must be created in VMFS volumes.

Storage operation

- Storage policy
 - The ETERNUS DX S3 series provides the following storage policies:
 - (1) Virtual machine backups (clone backups and snapshot backups)
 - (2) Automated QoS
 - (3) Automated Storage Tiering (AST)
 - (4) Cache (policy related to the Extreme Cache settings or the Extreme Cache Pool settings)
 - (5) Security (policy related to encryption)

Clone backups (1) and (2) to (5) are expansion functions. This document describes virtual machine backups (1).

- Volume management

When WOLs are used, the number of management volumes is included in the maximum number of volumes that can be created in the storage system. In addition, multiple WOLs are required for each virtual machine. Therefore, a design that does not exceed the maximum number of volumes is necessary.*

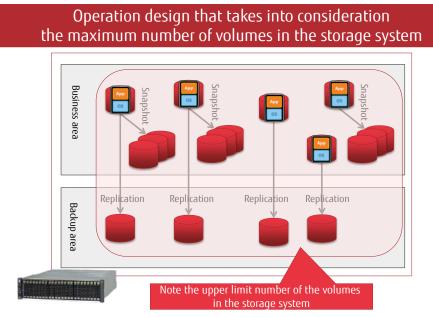


Figure-9 Operation design that takes into consideration the maximum number of volumes in the storage system

* For the number of volumes, refer to "4 Notes".

2 VVOL Configuration Workflow

This chapter describes the WOL configuration workflow and the procedures to operate WOLs based on the verified configuration.

2.1 Configuration Environment

For virtual machine operations that use WOLs, management servers are required. In this configuration, a vCenter server and an operation management server that are required for WOL operations are configured as virtual machines and redundancy is ensured using vSphere HA. Fifteen business servers are also configured on the same vSphere HA.

iSCSI is used to connect between the ESXi hosts and the storage system, and the SAN is configured in the IP network.

System overview

The procedures in this chapter are based on the following system configuration.

The contents in this document are described on the assumption that vCenter Server is installed using vCenter Server Appliance.

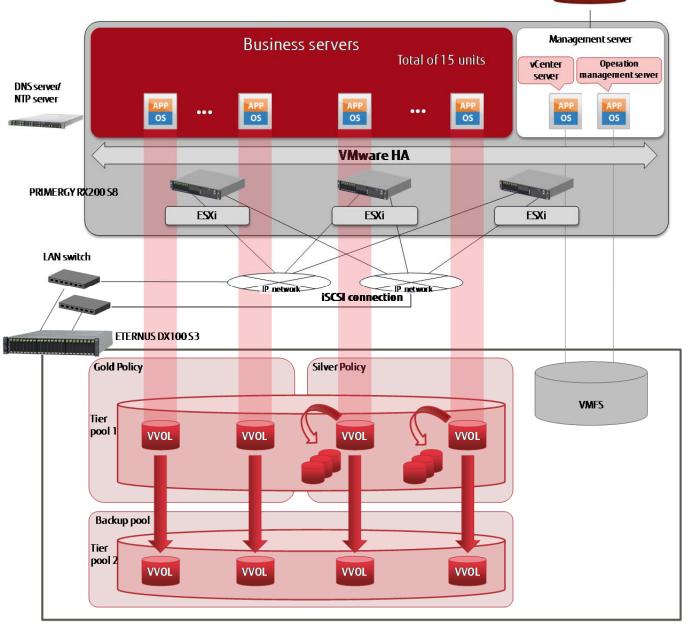


Figure-10 System overview

2.1.1 Component List

Hardware/software

- Hardware

- Disk storage system: ETERNUS DX100 S3 × 1
- Industry standard server: PRIMERGY RX200 S8 × 3
- Layer 2 switch × 8

- Software

- VMware vSphere 6.0 (ESXi)
- VMware vCenter Server Appliance 6.0
- Windows Server 2012 R2 (for the operation management server)
- ETERNUS SF Storage Cruiser V16.2
- ETERNUS VASA Provider V2.0
- ETERNUS SF AdvancedCopy Manager V16.2 (for clone backups of the virtual machines)
- Red Hat Enterprise Linux 7 (for the business server)
- Configuration information
 - Management servers and business servers (physical machines)

vSphere HA was configured with three PRIMERGY RX200 S8 servers and virtual machines were created with two management servers and 15 business servers.

The following table shows the physical configuration of each physical server.

CPU	Memory	Internal disk [RAID level]	LAN port
Intel [®] Xeon [®] processor	64GB	300GB × 2	1GB × 8 ports
2.40GHz 12 cores × 2 CPUs		[RAID1]	(Quad port LAN card × 2)

Table-1	Physical	configuration o	f each p	hysical server

- Management servers (virtual machines)

A vCenter server and an operation management server were created in a VMFS datastore.

Server type	Software	CPU	Memory	Disk	Remarks
vCenter server	VMware vCenter Server Appliance 6.0	2vCPU	8GB	120GB (thick)	Appliance size: minimal
Operation	Windows Server 2012 R2				
management	ETERNUS SF Storage Cruiser V16.2	4vCPU	5GB	50GB	
server	ETERNUS SF AdvancedCopy Manager V16.2	4000 500		3000	
Sciver	ETERNUS VASA Provider V2.0				

Table-2 Configuration of the management servers (virtual machines)

- Business servers* (virtual machines)

Fifteen business servers were created on VVOL datastores.

For the specifications of the business servers, the 15 virtual machines were configured based on the assumption that they have the standard specifications provided by the cloud service.

Red Hat Enterprise Linux was installed as the OS.

Server type	No. of units	Software	CPU	Memory	Disk	Snapshot backups	Clone backups
Business server with the Gold policy	5	Red Hat Enterprise Linux 7	2vCPU	4GB	140GB	Without	With
Business server with the Silver policy	10		ZVCPU	4UD	14000	With	With

Table-3 Configuration of the business servers (virtual machines)

* Although the above business server configuration is used in this document, depending on the virtual machine requirements to be used in actual operations, consider not only the configuration but also the physical resources.

- Disk storage system

Datastores for all the virtual machines (management servers and business servers) were placed in the ETERNUS DX100 S3. The management servers were placed in a VMFS datastore. (The management servers are necessary to operate the virtual machines on the VVOLs.)

This document assumes that two storage policies are available for the business servers.

- ✓ Gold policy stores systems such as database servers that have frequently updated data
- ✓ Silver policy stores systems such as AP servers that do not require storage performance

When a virtual machine is created, backup operations that use snapshot backups and clone backups are automatically set with a storage policy. Snapshot backups are created in the same Tier pool as the virtual machine. Clone backups require a Tier pool that is different from the Tier pool for VVOLs. Prepare a Tier pool for clone backups.

The following figure shows the disk configuration.

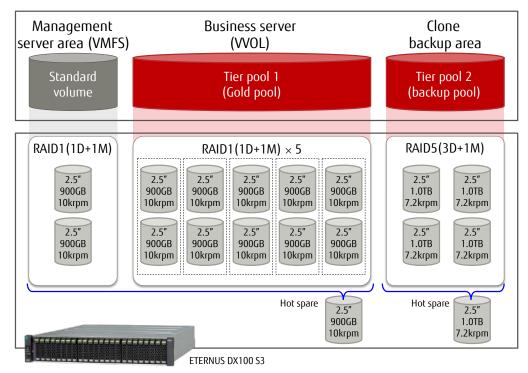


Figure-11 Configuration of the Disk storage system (disks)

Area	Virtual machine usage capacity	Required capacity	Disk	RAID configuration	Available area	Usage
Management server area (VMFS)	170GB	170GB	900GB/10krpm	RAID1(1D+1M)	900GB	vCenter Server, operation management server
Business server area (VVOL)	2,250GB	3,750GB	900GB/10krpm	RAID1(1D+1M) × 5 RAID groups		Business server, snapshots for the business server
Backup area (VVOL)	-	2,250GB	1,000GB/7.2krpm	RAID5(3D+1P)	3,000GB	Backup pool (for clone backups)

Table-4 Configuration of the storage system (disks)

- Switches

Network switches were used for iSCSI connections, management, business, and vMotion. Each network was redundantly configured.

Туре	Model name	Transmission speed / Number of ports	No. of units
Network switch	SR-X316T2	1Gbit/s / 16 ports	8

Table-5 List of switches

- Storage policies ETERNUS SF's virtual machine backup policies were used in this configuration.

Snapshot backups and clone backups are available as virtual machine backups and the following policies can be set.

ltem	Description
Operation Mode	 Select the operation mode that specifies how the virtual machine backup function should operate. - Auto: Enables the virtual machine backup function. Backups are automatically performed. - Manual: Enables the virtual machine backup function. Backups are only performed manually. - Disable: Disables the virtual machine backup function. Even if [Auto] or [Manual] is selected for this item, [Disable] is automatically set by the following property settings (or settings that do not take backups). - [0] is specified for [Number of Snapshot Backup Generations] and - [Disable] is specified for [Clone Backup]
Execution Period	 Select an interval to automatically perform backups. This item is enabled only when [Auto] is specified for [Operation Mode]. Hourly: Performs at the specified hourly intervals. If this interval is selected, [Execution Interval(Hour)] must also be set. Daily: Performs every day at the time specified for [Execution Start Time]. Weekly: Performs every week on the specified day. If this interval is selected, [Execution Week] must also be set. Monthly: Performs every month on the specified day. If this interval is selected, [Execution Day] must also be set.
Execution Interval (Hour)	When [Hourly] is specified for [Execution Period], select the hourly execution interval. The time interval that can be selected is 1, 2, 3, 4, 6, 8, or 12.
Execution Week	If [Weekly] is specified for [Execution Period], select an execution day of the week. Multiple days can be selected.
Execution Day	If [Monthly] is specified for [Execution Period], select an execution day. The selectable day is from [1] to [31] or [Last]. Only one day can be selected. When a day is selected from 1 to 31, a backup is performed on the specified day. For the months that do not have the selected day, a backup is not performed. When [Last] is selected, a backup is performed on the last day of the month.
Execution Start Time (Hour)	Select the time (hour) to start an automatic backup. The selectable value is from 0 to 23. This item is enabled only when [Auto] is specified for [Operation Mode].
Execution Start Time (Minute)	Select the time (minute) to start an automatic backup. The selectable value is from 0 to 55 (in 5 minute increments). This item is enabled only when [Auto] is specified for [Operation Mode].
Number of Snapshot Backup Generations	Select the number of generations of snapshot backups to store. The selectable generation number is from 0 to 28. When [0] is selected, snapshot backups are not saved. When using single item restore, snapshot backups are required. For this reason, select [1] or a larger number for this item. When performing only clone backups, specify [Enable] for [Clone Backup] and select [0] for this item. This item is enabled only when [Auto] or [Manual] is specified for [Operation Mode]. When performing a snapshot backup that exceeds the number of generations to store, the oldest generation is automatically deleted after the backup operation.
Quiesce guest file system	Select whether to maintain the integrity of the file system content when a backup is performed. This item is enabled only when [Auto] or [Manual] is specified for [Operation Mode]. - Enable: Maintains the integrity of the file system when a backup is performed. - Disable: Does not maintain the integrity of the file system when a backup is performed.
Snapshot the virtual machine's memory	Select whether to include the memory content when snapshot backups are taken. This item is enabled only when [Auto] or [Manual] is specified for [Operation Mode]. - Enable: Includes the memory content in the snapshot backups. - Disable: Does not include the memory content in the snapshot backups.
Clone Backup	Select whether to take a clone backup. This item is enabled only when [Auto] or [Manual] is specified for [Operation Mode]. - Enable: Takes a clone backup. - Disable: Does not take a clone backup.
	Table-6 Virtual machine backup policies

With virtual machine storage policies, backup operations for virtual machines can be set when the virtual machines are created. In this document, the Gold and Silver policies were created.

ltem	Settings for the Gold storage policy	Settings for the Silver storage policy
Operation Mode	Auto	Auto
Execution Period	Daily	Weekly
Execution Interval (Hour)		
Execution Week		Sun
Execution Day		
Execution Start Time (Hour)	22	1
Execution Start Time(Minute)	30	0
Number of Snapshot Backup Generations	0	1
Quiesce guest file system	Enable	Enable
Snapshot the virtual machine's memory	Enable	Enable
Clone Backup	Enable	Enable

Table-7 Created virtual machine storage policies

For Gold storage policies, clone backups are taken with the performance prioritized by setting 0 to the number of snapshot backup generations.

For Silver storage policies, clone backups are taken and snapshot backups that are available for quick recoveries and single item restores are also taken.

By creating multiple policies, the storage policies can satisfy various usages of virtual machines.

Physical connection diagram

The business LAN, the operation management LAN, and the LAN for vMotion were connected to all the ESXi hosts. The ETERNUS DX100 S3 was connected only to the operation management LAN.

A DNS server and an NTP server that were required for the ESXi hosts, the vCenter server, and the operation management server were connected to the operation management LAN.

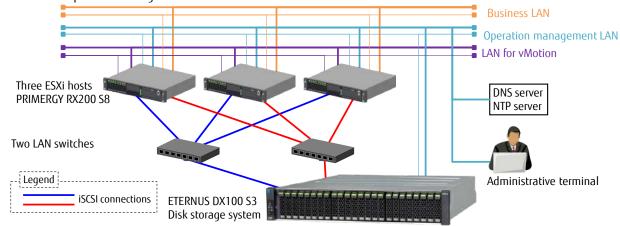


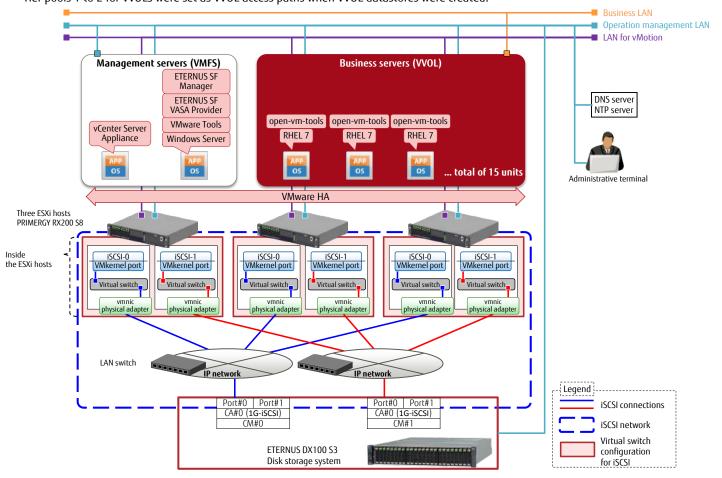
Figure-12 Physical connection diagram

Logical connection diagram

The two CMs of the Disk storage system and two NICs on each ESXi host were connected.

iSCSI for the ESXi hosts was connected using the IP address of the VMkernel adapter. A virtual switch was created for each path to be connected to the disk storage system and the VMkernel adapter was connected to the physical NIC.

For the host affinity settings between the management server area and the ESXi hosts, the ETERNUS SF was used normally. Tier pools 1 to 2 for WOLs were set as WOL access paths when WOL datastores were created.





2.2 Configuration Procedures

WOL configuration workflow

The procedures to configure a WOL environment are described according to the following workflow.

For details, refer to "FUJITSU Storage ETERNUS SF Storage Cruiser V16.2 / AdvancedCopy Manager V16.2 Operation Guide for VMware vSphere Virtual Volumes".

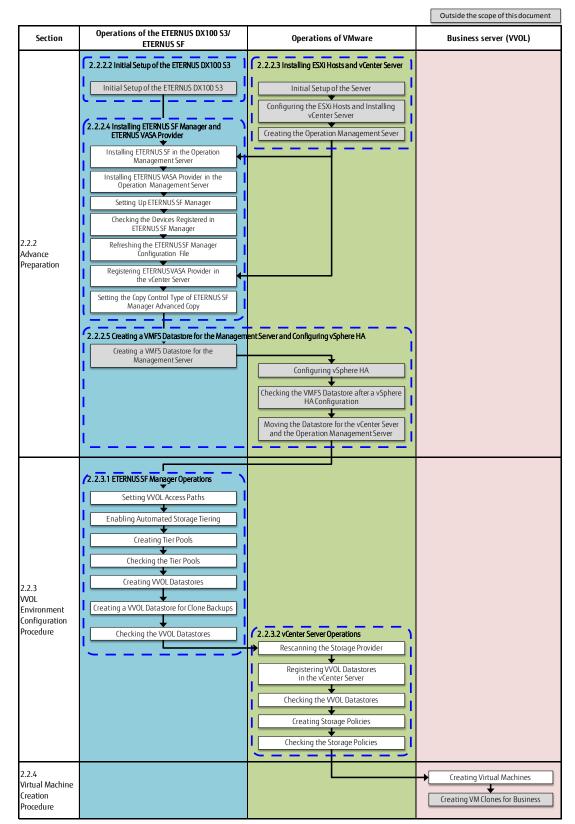


Figure-14 Configuration workflow

2.2.1 Description of ETERNUS SF Web Console

2.2.1.1 Web Console Screen Configuration The following figure shows the Web Console screen. This document uses the following screen elements to explain the operations.

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Main	Dashboard							Action
🖮 Dashboard	▼ Inform.co	n						storage:
	() status sun	mary of the registe	red resources.					+ Discover
								FC Switch:
	ardware Cor				Events			+ Discover
	the second second	Storage	Network	Server	() Information			Server:
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	Error	0	0	U	Network Port			Storage Conf.
	Storage Capa	city			NetworkPort	Number		Assign Volume
		Available (TB	¥7.	Total (TB)	E_Port	0		Backup Wizard
	Raw	0.00		12.62	F_Port	24		
	Configurad	0.00		6.41	FL_Port	0		for Exchange Server for SQL Server
	RAID0 RAID1	0.00		0.00	Total	24		
	RAID1+0	0.00		1.06				Restore Wizard
	RAIDS	0.00		5.08				for Exchange Server
	RAID5+0	0.00		0.00				for SQL Server
	RAI06	0.00		0.00				
(2)	RAID6-FR	0.00		0.00	(3)			(4)
(-/								
Job Status							`(5)	

Figure-15 Description of the ETERNUS SF Web Console screen

No.	ltem	Description
(1)	Global navigation	When a category is clicked in the global navigation tab, the top menu of the category is displayed on
	tab	the category pane.
(2)	Category pane	Displays a list of categories that can be selected.
		When each item is clicked, information for the item is displayed on the main pane.
(3)	Main pane	Menus and setting information are displayed.
		Details of the current main pane are displayed in the [Information] field.
(4)	Action pane	Displays a list of actions that can be performed for an item that is displayed on the main pane.
(5)	Job Status pane	Displays the processing status of the operation that is performed with ETERNUS SF Web Console and a
		dialog message starting with "The job has been submitted for processing." that can be checked.
		The bar expands or closes when clicked.

Table-8 Descriptions of the ETERNUS SF Web Console screen

2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations

The ETERNUS SF displays the message "The job has been submitted for processing." when settings are performed. Whether the setting is successful must be checked by a different operation.

Because this confirmation operation is common to almost all ETERNUS SF Web Consoles, refer to this chapter for the settings confirmation.

Points

Open the Job Status pane to check the result of the process that was performed with ETERNUS SF Web Console. Confirm that "Success" is displayed on the pane and proceed to the next steps.

After a while, the currently running processes are counted as successful or failed and are displayed on the operation status bar on the upper part of the screen.

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	RAID5	0.00		05				for SQL Server
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Figure-16 Opened Job Status pane

2.2.2 Advance Preparation

This section explains the required settings of the ETERNUS DX100 S3, ETERNUS SF, and VMware vSphere before starting the work related to VVOLs.

2.2.2.1 Checking Prior to Working

Before starting the work, check the following necessary environments.

- The NTP server is available.
- The host names of the ESXi hosts, vCenter server, operation management server (ETERNUS SF/ETERNUS VASA Provider) are compatible with the standard naming convention in RFC952/1123*.

(Windows DNS supports extended ASCII and Unicode characters, but the extended characters cannot be used for the ESXi hosts.)
*Standard naming convention in RFC952/1123: The characters that can be used are "0 to 9", "a to z", "A to Z", "- (hyphen)", and ". (period [only as domain delimiter])".

- The names of the ESXi hosts, the vCenter server, and the operation management server (ETERNUS SF/ETERNUS VASA Provider) can be
- resolved (with a forward and reverse mapping) using the DNS server.
- Initial setup for the Fibre Channel switches has been completed.

2.2.2.2 Initial Setup of the ETERNUS DX100 S3

Perform an initial setup so that the ETERNUS DX100 S3 can be operated from ETERNUS SF. To use VVOLs, the Thin Provisioning Pool function must be enabled.

In this document, the following settings are performed to use bidirectional CHAP.

1. On the [Connectivity] Category pane, click [Port Group] and then [iSCSI].

2. In the list of iSCSI ports, select the checkbox for the port to set CHAP authentication and click [Modify iSCSI Port Parameters] on the Action pane.

3. Set the security setting for CHAP to "ON" and specify the CHAP username and password of the server that is to be connected.

For details on the settings and procedures, refer to "Disk Array and All Flash Arrays" under "Environment Configuration" in "FUJITSU Storage ETERNUS SF Storage Cruiser V16.2 Operation Guide".

For details on the settings, refer to "FUJITSU Storage ETERNUS DX Configuration Guide (Web GUI)".

Points

The RAID groups and access paths that are used for the VVOLs must be created and managed with ETERNUS SF Manager. Therefore, volumes for VMFS that are used by the management server must also be created and managed with ETERNUS SF Manager. The creation and management of RAID groups and access paths are all performed from ETERNUS SF Manager. To use VVOLs, the Thin Provisioning Pool function of the ETERNUS DX100 S3 must be enabled.

Checklist

Confirm the following items before proceeding to the next procedure.

- The storage system name has been set.
- The network has been set.
- A user with the Software role has been created.
- The CHAP setting has been enabled and the CHAP user name and password have been set.

The following values will be required in "2.2.2.4.3 Setting Up ETERNUS SF Manager".

ltem	Parameter
IP address	(IP address of the management LAN)
SNMP community name	(Arbitrary)
User name	(Name of the user that has the Software role)
Password	(Password)
Table 0 In	tial cature of the ETERNIIC DV100 C2

Table-9 Initial setup of the ETERNUS DX100 S3

2.2.2.3 Installing ESXi Hosts and vCenter Server

Set the ETERNUS DX100 S3 using ETERNUS SF Storage Cruiser that is installed in the operation management server. Configure the operation management server and the vCenter server in the local disks of the ESXi hosts.

Points

The ETERNUS DX100 S3 must be set using ETERNUS SF Manager. Therefore, configure and set the virtual machines of the management server on the local disks of the ESXi hosts, and then move the virtual machines to the ETERNUS DX100 S3.

2.2.2.3.1 Configuring the ESXi Hosts and Installing vCenter Server

- Configure the ESXi hosts. Create a VMFS datastore in a local disk of a single ESXi host. Install vCenter Server Appliance in the created datastore.

- Register the ESXi host to the vCenter server. (For details on the procedure related to the ESXi hosts and vCenter Server, refer to the VMware vSphere 6.0 documents provided by VMware.)
- Check the LAN card for iSCSI connections.

Log in to vCenter Server from vSphere Web Client. Click [Hosts and Clusters] in the [Home] screen and select the target host on the left pane. Select the [Manage] tab - [Networking] - [Physical adapters] to confirm that the LAN card for iSCSI connections is recognized.

- Create virtual switches for iSCSI.

Add two virtual switches (vSwitch) for iSCSI to VMware ESX. Add one [vmnic] and one [VMkernel] for each vSwitch. Perform the following procedure for each vmnic that configures the iSCSI SAN. In this document, vSphere Standard Switch is used.

1. Log in to vSphere Web Client.

Click [Hosts and Clusters] in the [Home] screen and select the target host on the left pane.

2. Select the [Manage] tab - [Networking] - [Virtual switches].

3. Select [Add host networking] on the right pane.

- After the [Add Networking] pop-up screen is displayed, follow the instructions on the screen to add a network.
- (1) Select [VMkernel Network Adapter] and click [Next].
- (2) Select [New standard switch] and click [Next].
- (3) Click [Add adapters] of [Active adapters] on the right pane, select the target NIC, and then click [Next].
- (4) Set a port as necessary and click [Next].
- (5) Set an IP address and a subnetmask for [VMkernel] and click [Next].
- (6) Check the settings and click [Finish].
- 4. Repeat Step 3 to add Virtual Switch vSwitch2.

5. Check that Virtual Switch and VMkernel are set for a single vmnic.

- Enable the Software Initiator of the ESXi host.
 - 1. Log in to vSphere Web Client.

Click [Hosts and Clusters] in the [Home] screen and select the target host on the left pane.

- 2. Select the [Manage] tab [Storage] [Storage Adapters].
- 3. Select [iSCSI Software Adapter].
- 4. Check the iSCSI Name that is displayed in [Adapter Details]. If the iSCSI Name is not displayed, perform [Add new storage adapter].
- 5. Select the [Targets] tab of [Adapter Details].
- 6. Click [Add] of [Dynamic Discovery].

7. In [iSCSI Server], enter the IP address of the iSCSI port for the ETERNUS DX that is to be connected, check that the port is [3260] (default), and then click [OK].

8. Repeat Steps 6 and 7 to set the iSCSI ports of all the ETERNUS DX storage systems that are to be connected.

Checklist

Confirm the following items before proceeding to the next procedure.

- The ESXi host and vCenter Server can communicate with each other correctly.
- A name resolution can be performed correctly.
- The clock has been synchronized.
- The LAN card for iSCSI has been set correctly.

The following values will be required in "2.2.2.4.3 Setting Up ETERNUS SF Manager". In this document, root users of vCenter Server are assigned Administrator privileges.

ltem	IP address	Host name	User name with administrator privileges	Password	Web Client port number	Remarks
vCenter Server		vCenter	root (arbitrary)	*******		Record the Web
ESXi host 1	(IP address of	vvolesxi01	root (arbitrary)	******		Client port number
ESXi host 2	the management	vvolesxi02	root (arbitrary)	******		if it is changed.
ESXi host 3	LAN)	vvolesxi03	root (arbitrary)	******		Default value: 443

Table-10 ESXi and vCenter Server initial setup

2.2.2.3.2 Creating the Operation Management Sever

Configure a virtual machine for the operation management server in the local disk of the ESXi host.

Install Windows Server 2012 R2 in the virtual machine.

(For details on the procedure related to Windows Server 2012 R2, refer to the documents that are provided on the Microsoft website.)

2.2.2.4 Installing ETERNUS SF Manager and ETERNUS VASA Provider

This section provides the procedures that must be performed before creating WOLs.

2.2.2.4.1 Installing ETERNUS SF Manager in the Operation Management Server

Install ETERNUS SF Manager in the virtual machine of the operation management server that was configured on the ESXi host. For details, refer to "FUJITSU Storage ETERNUS SF Express V16.2 / Storage Cruiser V16.2 / AdvancedCopy Manager V16.2 Installation and Setup Guide".

- 1. Install ETERNUS SF Manager in the operation management server. Log in to the operation management server with a user that has Administrator privileges.
- 2. Read "ETERNUS SF SC/ACM/Express Mediapack for Windows Manager Program (1/2)".
- 3. The initial screen is displayed. Click [Manager installation].
- 4. The [Choose Setup Language] dialog box is displayed. Select the appropriate language and click the [OK] button. The language selected in this dialog box will be used during the installation.
- 5. In the [Welcome to the InstallShield Wizard for ETERNUS SF Manager] screen, click the [Next] button.
- 6. In the [License Agreement] screen, read the displayed terms and conditions. If the conditions are agreeable, select [I accept the terms of the license agreement], and then click the [Next] button.
- 7. In the [Install option] screen, select [ETERNUS SF Manager is installed.] and click the [Next] button.
- 8. In the [Start Copying Files] screen, check the settings. If the settings are correct, click the [Next] button. To change the settings, click the [Back] button.
- 9. When the [Installation Complete] screen is displayed, click the [Finish] button.

Checklist

Confirm the following item before proceeding to the next procedure.

- [ETERNUS SF Manager] is displayed in the [Programs and Features] screen of Control Panel.
- * To use the VVOL functions with FUJITSU Storage ETERNUS SF V16.2, patches must be applied. For details, contact your Fujitsu sales representative or the support division of your FUJITSU Storage ETERNUS SF V16.2 contract.

2.2.2.4.2 Installing ETERNUS VASA Provider

Install ETERNUS VASA Provider in the virtual machine for the operation management server that was configured on the ESXi host. For details, refer to "ETERNUS VASA Provider 2.0 User's Guide".

- 1. Install ETERNUS VASA Provider V2.0. Run the installer and click the [Next] button in the [Welcome to the InstallShield Wizard for ETERNUS VMware Support Package] screen.
- 2. In the [Setup Type] screen, select a setup type and click the [Next] button. [Complete] is selected in this document.
- 3. In the [License Agreement] screen, read the displayed terms and conditions. If the conditions are agreeable, click the [Yes] button.
- 4. In the [Create ETERNUS VASA Provider Account] screen, enter the items shown in the following table, and then click the [Next] button. The account information that is created here will be used to register ETERNUS VASA Provider in vCenter Server.

ltem	Information
Provider User name	Arbitrary
Provider Password	Arbitrary

Table-11 Account creation information

5. In the [Setup Server Certificate] screen, enter the items shown in the following table, and then click the [Next] button.

Information
Arbitrary (FQDN)
Arbitrary

Table-12 Server certificate creation

- 6. In the [Start Copying Files] screen, review the settings and click the [Install] button.
- 7. When the [InstallShield Wizard Complete] screen is displayed, click the [Finish] button.

Checklist

Confirm the following item before proceeding to the next procedure.

- [ETERNUS VMware Support Package] is displayed in the [Programs and Features] screen of Control Panel.

2.2.2.4.3 Setting Up ETERNUS SF Manager

- **Registration of the target storage system for management**
- 1. Log in to ETERNUS SF Manager of the operation management server.
- 2. Click the [Storage] tab on the global navigation tab. On the Action pane, click [Add].
- 3. Add an ETERNUS DX S3 series.

The ETERNUS DX S3 series can be added by searching a subnet or specifying an IP address. The IP address method is used in this document.

Register the ETERNUS DX100 S3 using the values that were specified in "2.2.2.2 Initial Setup of the ETERNUS DX100 S3". Select the [IP Address] radio button.

Enter the IP address and SNMP community name of the ETERNUS DX S3 series, and click the [Discover] button.

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Disk Array Information							_
Search on Subnet	Subnet Address *						
2 Searce on Subnet	CMMD Community Name *	ciditr.					
• IP Address	IP Address*	192.168.100.5					
	SNMP Community Name*	public					

Figure-17 ETERNUS DX S3 series detection

4. When the target ETERNUS DX S3 series is displayed, enter the necessary information and click the [Register] button on the lower right corner of the screen.

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▼ Information	palei oluraga	omm -							
		wered. Enter the St	orage User ID and Passw	rord for each device that you want to	register. Check the "SNMP	Trap Setting" option to e	mable trouble monitoring by	/ SNMP Trap	
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140, 169, 100, 5	Name dc100s3	Model ET103A	Sental No. 4501242012	SNMP Trap Setting	User ID* est_admin	Networks to the Arr	Password		
. Job Status							Seck Re	gister Ca	ncel

Figure-18 ETERNUS DX S3 series registration

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next step.

For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

The registration process may take several minutes to several tens of minutes depending on the storage system configuration. Wait for the registration process to finish before operating the ETERNUS DX.

5. Register licenses.

Click the [Storage] tab on the global navigation tab. On the Main pane, click the ETERNUS DX S3 series link under [Name].

ETERNUS SF					U	seriD:esf_admin <u>Loquut</u> FU <mark> TSU</mark>
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VVOL Management	-					Reload Cont.
	Selections: 0			Total 1 records	<< < 1/1 pages > >> 1 page Go Display 10	
	Namo	IP Address	Model	Status	Performance Monitoring Status	Storage Conf
	dc100s3	192.168.100.5	ET103A	Normal	(I) Stop	Assign Volume
 Job Status 						

Figure-19 Storage

6. On the Category pane, click [System].

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Configurad 0.00 7.48 RA109 0.00 0.60 RA107 0.00 4.60 RA107 0.00 0.60 RA107 0.00 0.60 RA105 0.00 0.60 RA105 0.00 0.60 RA105 0.00 0.40 RA105 0.00 0.60
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RAID5+0 0.00 0.00 RAID5+0 0.00 0.00
RAID6 0.00 0.00
RAID6-FR 0.00 0.00
Automated QoS
Status Stopped
Reporting
Status Stopped
Status Stopped

Figure-20 dx100s3

 Click [License Management] on the Category pane. A list of licenses that can be registered is displayed on the Main pane. Select the checkboxes for the licenses that are to be registered. On the Action pane, click [Register] under [License].

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$\underline{Slotage} > \underline{dv100s3} > \underline{System}$				
System	License Management on dx100s3	_	► Action	l
🔤 License Management	► Filter Setting		Ucense	Ì
Encryption ECO Mode		Filter	Clear + Register	
Extreme Cache				
	Selections: 2 Total 4 records << 1/1 pages > >> 1	pageGo Disp	lay 10 V records	
	- Name	Registration Date	Expiry Date	
	 ETERNUS SF Express 16 Tier1 (DX100S3) ✓ ETERNUS SF AdvancedCopy Manager Standard Editionライセンスパック 16 Tier1 (DX100S3) 		•	
(ETERNUS SF AdvancedCopy Manager 16 Software Upgrade Tier1 (DX10053)		· · ·	
	ETERNUS SF Storage Cruiser Standard Edition 16 Tier1 (DX10053)	÷.	+	
. Job Status				į
JOB Status				i.

Figure-21 System

The information input screen is displayed.

Enter the license keys, and then click [Register] on the lower right corner of the screen.

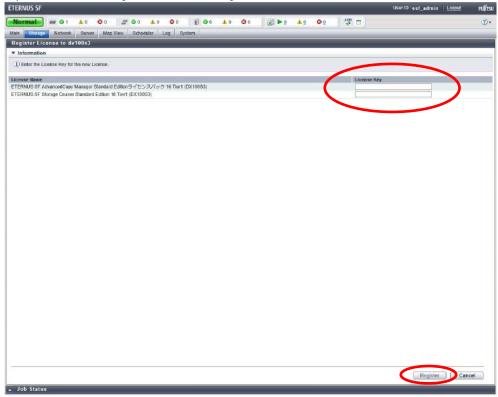


Figure-22 Register License

8. Register the VMware ESXi host.

Click the [Server] tab on the global navigation tab. On the Action pane, click [Register] to display the information input screen. Register the ESXi host using values that were specified in "2.2.2.3.1 Configuring the ESXi Hosts and Installing vCenter Server".

9. Select [Yes] for [VMware ESX].

A user ID and password can be entered in the VMware Options field. Enter the necessary information and click the [Next] button.

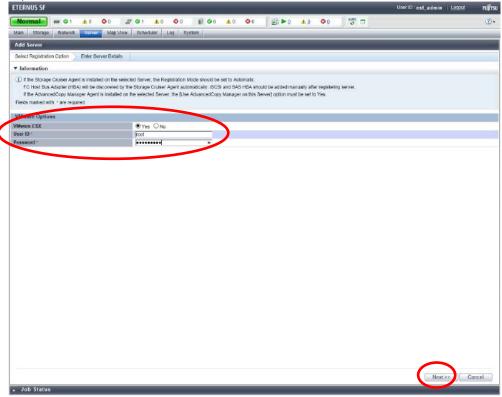


Figure-23 Input of information on VMware ESXi host server

10. Enter an IP address and click the [Register] button.

ETERNUS SF				-		Usar ID : esf_admin Loqout
			2 7 <u>1</u> 0 0 0	🖹 🌬 🧆	© 2 ⁴ ₩ □	
Main Storage Network	Server Map View Schedul	ler Log System	0			
Add Server						
Select Registration Option E	nter Server Details					
▼ Information						
The VMware Guests are regis	servers, enter the VMware Host I ered automatically Advanced Copy operations in the				Guest after the VMware Gue	st has been registered.
IP Address *		100.1				
IN YOOMBR.	192.168	100.1				
						< Back Register

Points

Figure-24 Registration of VMware ESXi host server

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next step. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

Wait for the registration process to finish before operating the server.

Repeat Steps 8 through 10 for every VMware ESXi host server.

- 11. Register vCenter Server.
 - Click the [Storage] tab on the global navigation tab, and then the link of the target ETERNUS DX S3 series under [Name].

ETERNUS SF					User ID :	est_admin <u>Loqout</u> FUÏITSU
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Storage	Overview	_	_	_		> Action
🔤 <mark>Disk Array</mark> 📴 Disk Array (Manual) 🎫 Tape Library 🎦 Tape Library (Manual)	▼ Information	Diek Array.				
	() List of Disk arra	Discover Delete				
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VVOL Management	-					Reload Conf. Wizant
	Selections: 0			Total 1 records	<< < 1/1 pages > >> 1 page Go Display 10 v rec	Storage Conf
	Name	IP Address	Model	Status	Performance Monitoring Status	Assign Volume
	<u>dc100s3</u>	192.168.100.5	ET103A	Normal	() Stop	-
. Job Status						

Figure-25 vCenter Server registration

12. On the Category pane, click [Correlation].

	Overview			+ Action
oniew	Hardware Components	The second	Call Interest Construction of the	Disk Airay
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	Model Name	ET103A		Stop
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mater storage Tiering	Box ID	ODETERMUSCILLOSET (D3A/WOWOHADO) 2	40018%	
	Firmware Version	V10L32-0000		Activate
Management age Cluster	SNMP Trop Setting	Setting up		Stop
	Raw Costigured RAID0 RAID1 RAID1+0 RAID5	Available (TB) 1.88 0.00 0.00 0.00 0.00 0.00 0.00	Total (TB) 16.43 7.44 0.00 4.80 0.00 2.68	
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1	Status	Stopped		

Figure-26 Correlation

13. On the Category pane, click [End to End View (VMware)].

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	<															>		

Figure-27 End to End View

14. On the Action pane, click [Register/Reload] under [VMware vCenter Sever].

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Storage > dc100s3 > Correlation			
Correlation	End to End View (VMware) (dx100s3)	→ Action	
End to End View End to End View (VMware)	VMware vCenter Server End to End View (VMware) - Raw Device Mapping End to End View (VMware) - Datastore	RegistenReload	
End to End View (Hyper-V)	▼ Information	X Delete	
	Register the VMiware vCenter Server to display the VMiware related information in the End to End View. The VMiware Hosts managed in VMiware vCenter Server must be registered before the VMiware vCenter Server is registered.		
	The VMware information is not updated automatically. If a configuration modification occurs, reload the VMware vCenter Server.		
	▶ Filter Setting		
	Filter Clear		
	Selections 0 Total 0 records << < 0/0 pages > >> 0 page Go Display 10 v records		
	IP Address Port		
	No data available in table		
CONTRACTOR OF AN ADDRESS			
_ Job Status			

Figure-28 End to End View (VMware)

15. Enter an IP address, user name, and password, and then click the [Confirm] button on the lower right corner of the screen.

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VMware vCenter Serv	ver Regist	ter/Reloa	d	nover an and Tallico			_	_		_	_				i.
▼ Information															
(1) Provide the access info Once registered, uses in To update the user info Register the VMware ho Fields marked with 4 are re	information is ormation, sele- lost that is ma	saved. ct "No" for [U	Jse saved :	access infor	nation] and	enter user r			igain.						
VMware vCenter Server	r Register/	Reload Opt	tion												
IP Address*				168.100.31											
Port*		(443												
User Nome*			toot												
Use saved access informat	ition*			es 🖲 No											
Password *															

Figure-29 Register/Reload option for the VMware vCenter server

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next procedure. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

2.2.2.4.4 Checking the Devices Registered in ETERNUS SF Manager

Check that all the devices are registered.

Network switches including the ones for iSCSI connections do not need to be registered in the storage system.

Devices to check	Confirmation screen	Devices to check	Check 🗹
ETERNUS DX100 S3	Click the [Storage] tab on the global navigation tab. Check that the registered ETERNUS DX S3 series is displayed on the Main pane.	dx100s3	
	Click the [Server] tab on the global navigation tab.	vvolesxi01	
ESXi host	Check that the registered ESXi hosts are displayed on	vvolesxi02	
	the Main pane.	vvolesxi03	
vCenter Serer	Check that the registered vCenter Server is displayed on the Main pane in the [End to End View (VMware)] screen.	vCenter	

Table-13 Checking the devices registered in ETERNUS SF Manager

After checking that the devices are registered, proceed to the next procedure.

2.2.2.4.5 Refreshing the ETERNUS SF Manager Config File

Enable the synchronization between ETERNUS VASA Provider and the device event information.

- 1. Log in to ETERNUS SF Manager of the operation management server.
- 2. Click the [System] tab on the global navigation tab. On the Category pane, click [System Settings].
- 3. On the Action pane, click [Refresh Config File].

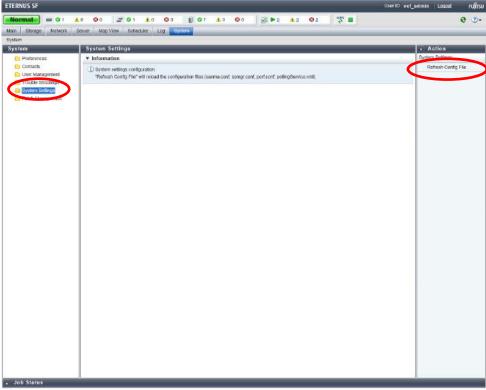


Figure-30 Refreshing the config file (system)

4. Check the [Information] screen and click the [Refresh] button.

n Stange Network Server Mag View Scheduler Log System FreshContligFile	ETERNUS SF												User ID: est_admin	Logat	FUITSU
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De System Settings retreat wit erkent (rekad) the system configuration litei. Atertion: Other users operation may be tempolary nated during the Retlean operation.	RefreshConfigF	ile				-		_	_					_	_
Attention: Other users operation may be temporary nated ouring the Retresis operation.	 Information 														
	(1) The System Set	ings refresh will	refresh (reio	ad) the syste	em configurati	ion files.									
	Attention: Other	users operation	may be temp	porary halted	during the Ro	efresh operation.									
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Figure-31 Refreshing the config file

5. Confirm that the "Refresh Config File successful" message is displayed and click the [OK] button.

- 2.2.2.4.6 Registering ETERNUS VASA Provider in vCenter Server
 - 1. Register ETERNUS VASA Provider in vCenter Server. Log in to vCenter Server from vSphere Web Client.
 - 2. Click [vCenter Inventory Lists] in the [Home] screen.

Home							All (0) New (0)) Acknowl
1								
vCerter Inventory Lists	Hosts and Clusters	VMs and Templates	Etorage	Q Natworking	Contant Literaries	VFReatize Orchestrator	Work in Progress	
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Administration		Operations Manager		Polcieš	Specification Manager			
2	-	2						
Roles	System Configuration	LEURING						
	Inventory Liots familtoring Task Conacia Administration	Inventor Lists Clusters Rentoring Task-Console Lineringto arten	Inventor Lists Clusters Templates ficentoring Task-Console Exert Console Control Administration Manager Manager	Inventor Lists Clusters Templates facultoring Task-Console Event Console Console Console Manager Manager Manager	Inventor Lists Citusters Templates Scalar Strain S	Interditor Lists Clusters Templates Libraries Exercicansis Task-Console Event Console Control Task-Console Event Console Control Annager A	Interditor Lists Closistis Templates Librarites Orchestrator Rendloring Task Console Event Console Orchestrator Task Console Event Console Orchestrator Manager Manager Manager	Interdity Lids Citaties Templates Likraies Orchestador tonitoria Task Console Event Console Opendance Warager Hest Prafiles Vill Decage Console Event Console Opendance Warager Hest Prafiles Vill Decage Section Section Warager Hest Prafiles Vill Decage Section Section Se

Figure-32 vSphere Web Client home

3. Click the [Manage] tab.

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Navigator I	🚱 vcenter.wol.test.local Actions -		🖸 Alarms 🛛 🕱 🛪
Nakajakor * * Scentar Inventory Lists * * Scentar New Yorks * * Scentar Venitablecal *	Cetting Started Burninary Mont Manual Multi a Cetting Starter I Multi a Cetting Starter I machines and starter I machines on them, backause these and starter and the starter and starter of the Barter arrives and starter and starter of the starter and the optimum the host and starter and Sphere HA. Multiple Voatile Bereir system a data and starter of shares with the Voter Barter and the starter of shares and sphere HA. Multiple Voatile Bereir system a data and the starter of shares and sphere shares and manual work one system a data and the starter of shares and sphere shares and manual works and a starter Barter agetames for which got have proleigies and final these data registed and sphere Hagetada and the starter data and the starter Beauter agetames for which got have proleigies and final these data registed and the starter Hegisted and Toulo in the	tinded Objects	Alarms
	Administration sociotio, vali sepsarin yaur innertario tink isht Beski Taska ≧ Create a folder È Create Datacenter	Explore Further Learn more about folders Learn about datacenters	

Figure-33 vCenter inventory list

4. Click [Storage Providers].

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Navigator I	📁 vcenter.wol.test.local 🛛 🗛	lions +		🖸 Alarms 🛛 🕹 🛪
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Figure-34 Manage

5. Click the [+] (register) button.

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	onnage Provides/Storage Option	Diatus Activis/Diandb		Last P	📝 Work in Progress
		This list is	empty.		
	4	- H			
	24			0 items 📋 =	
		No storage prov	iders selected		

Figure-35 Registering storage providers

6. Enter the items shown in the following table and click the [OK] button.

vcenter.vvol.test.lo	ocal - New Storage Provider	?
Name:		
URL:		
User name:		
Password:		
Use storage provid	ler certificate	
Certificate location:	Browse	
	OK Cancel)

Figure-36 New Storage Provider

ltem	Information
Name	Arbitrary
URL	https://"FQDN that was registered when installing ETERNUS VASA Provider":31443/vasa/version.xml
User name	The use name that was registered when installing ETERNUS VASA Provider
Password	The password that was registered when installing ETERNUS VASA Provider

Table-14 Settings for a new storage provider

Checklist

Confirm the following item before proceeding to the next procedure.

The ETERNUS VASA Provider that was registered is displayed in the [Storage Providers] screen.

vmware [,] vSphere Web Cli	ient n ≣								1 9 3	earth	
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	Supported vendor ID	ls	Provider name	etemus-vasa-provider							
	Certificate info		Provider status	Online							
			Active/stanciou status								
			Activation	Automatic	Automatic 11 https://ese-vasa.vvol.testlocal.31.443/vasa/version.xml						
			URL	https://esf							
			Provider version	2.0.0							
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Recent Tasks											¥.×
the state of the s	1.000	in the second second		10.000	1						**
Tate Rame Rename virtual machine	Target	Statur Com	cleted	initiator root			Stat Time 8(28/2015 9:15:02 PM	Completion Tar B/2B/2015 9		Server vcenter wolf	level local
The faile where intervine	The section form	· our	protein la	1001		22112	01102010 01001 1 0	www.wadita.a	TO BAT M	PLANE PPL	C.J. W. C.
MyTasks + Tasks Filter +											More Tasks
La real of the second second		_		_	_	_		_	_	_	Shee roots

Figure-37 Checking the registered storage provider

2.2.2.4.7 Setting the Copy Control Type of ETERNUS SF Manager Advanced Copy Configure the settings that are required to use ETERNUS SF AdvancedCopy Manager.

- 1. Set the copy control type of the Advanced Copy functions that is required to back up virtual machines. Click [Storage] on the global navigation tab of ETERNUS SF Web Console.
- 2. On the Main pane, click the ETERNUS DX S3 series link under [Name].

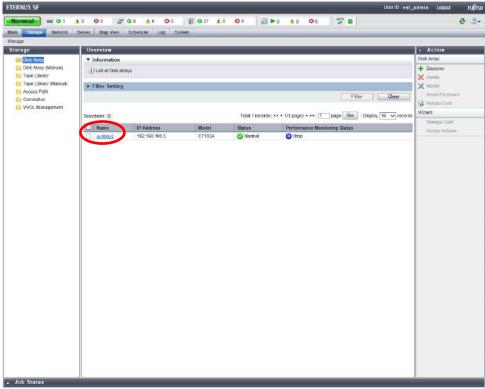


Figure-38 Storage

3. On the Category pane, click [Advanced Copy].

Storage Network S	erver Map View Scheduler	Log System		
02 > dx100s3	and the second second		a second distance in the second second	
0053	Overview	22 August 1997 August 1997 August 1997 August 1997 August 1997	and have been a state of the second second	+ Action
Ovarviaw	Hardware Components	and a stand of the second state	and the second second second second second second	Disk Array
Volume	Status	Control Modules	Diaka	× Delete
RAID Group	Available	2	18	X Modity
Thin Provisioning	t Warning	0	0	Reset Password
Advanced Copy	Error	0	0	Reload Cont
				(2)() (
Component	System Information			Automated GoS
System	Storage System Name	dx100s3		Actorate
Performance	Model Name	ET103A		Stop
Correlation	Senal No.	-INCICAIDED -		Reporting
Automated Storage Tiering	Box ID	DIETERMUSICXLSSET:03//////H45013450184/		Activate
n NAS Management	Ficeware Version	V10L32-0000		
a Storage Chuster	SNMP Trap Setting	Setting up	Stop	
	Storage Capacity		an multiple a state of the second state of the	
	(Date:	Available (TB)	Total (TB)	
	Raw Configured	1.68	16.43 7.48	
	RAIDO	0.00	0.00	
	RAID1	0.00	4.80	and the second
	RAID1+0	0.00	0.00	
	RAJES	0.00	2.65	TANKS STREET, STRE
	RAID5+0	0.00	0.00	
	RAIDS	0.00	0.00	THE PARTY OF
	RAID6-FR	0.00	0.00	Carlos and Carlos
	Automated QoS			
	Status	Slapped		Elless Assili
	Reporting	and the second		
	Status	Slopped		

Figure-39 Advanced Copy (storage)

4. On the Category pane, click [Configuration].

ETERNUS SF		User ID : e si	admin <u>Loquut</u> FUÏITSU
Normal	0 🔕 🖉 💁 🔺 0		ð 3.
Main Bisrage Network S	erver Map View Scheduler Lo	g Bystem	
Slorage > dr100s3 > Advanced (Copy		
Advanced Copy	Overview		Action
by Overview	▼ Information		Copy Group:
Copy Sessions			
Copy sessions	 Advanced Copy Information for th 	is selected Disk Array.	Create Copy Pair
Configuration			Configuration:
	Advanced Copy License	Registered	X Set Copy Control Type
Shap bata Pool	Remote Copy License		X Modify Copy Table Size
E REC Path	Advanced Copy Feature Enabled		
REC Butter	Copy Control Type	Unregistered	
	Access Volume (Device)	-	
	Advanced Copy Table Size(MB) Advanced Copy Table Resolution	128 x16	
	EC/OPC Priority	Automatic Priority	
	Session Count	Automatic Friday	
	Local Copy Session Count		
	EC Sessions		
	OPC Sessions		
	QuickOPC Sessions		
	SnapOPC+ Sessions		
	Estimate Sessions		
	Remote Copy Session Count		
	REC Sessions		
	Extended Copy Sessions		
	Offloaded Data Transfer Sessions		
	VVOL Sessions		
Indu Glastern	1		1

Figure-40 Advanced Copy (Advanced Copy)

5. On the Action pane, click [Set] under [Copy Control Type].

nced Copy	Configuration		+ Action
Overview	▼ Information		Copy Table Size
Copy Sessions	() Configuration information	for the selected Disk Array.	Se Modify
Copy Group Configuration	- Constants Pro-		Copy Control Mark
Snap Data Pool	 Copy Table Size Resolution 	×16	🔀 Set
REC Path	Table Size (MB)	128	Weard
REC Butter	▼ Copy Control Type		X Advanced Copy
	Copy Control Type	Unregistered	
	Access Volume		



6. Select [Access through network] and click the [Set] button on the lower right corner of the screen.

ETERNUS SF	User ID : esf_admin Loquut FUITS
Normal = 01 ±0 00 = 00 ±0 00 = 027 ±0 00 =	2 2
Main Blorage Network Server Map View Scheduler Log System	
Set Copy Control Type on dx100s3	
▼ Information	
(1) Set the Access Volume of the Storage. Filidis marked with * are required.	
Set Copy Control Type Information	
Capy Control Type+	
	Set Cancel
a Job Status	
Figure-42 Setting the copy co	ntrol type

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next procedure. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

Checklist

Points

Confirm the following item before proceeding to the next procedure.

- On the Main pane in the [Advanced Copy] screen, [Access through Network] is displayed for [Copy Control Type].

2.2.2.5 Creating a VMFS Datastore for the Management Server and Configuring vSphere HA Create a VMFS datastore where the management servers are assigned and configure vSphere HA. Because the following procedure describes general operations for standard volumes, only a brief explanation is provided here.

2.2.2.5.1 Creating a VMFS Datastore for the Management Server

Create a standard volume for the VMFS where the management servers are assigned.

Create a RAID group in the ETERNUS DX100 S3 using ETERNUS SF Manager and create a standard volume in the RAID group. Refer to "Create Volume" in "ETERNUS SF Web Console Guide" for the procedure to create volumes.

- Log in to ETERNUS SF Manager of the operation management server.
 - Click the [Storage] tab. On the Main pane where [Storage] is displayed, click the registered "dx100s3" storage system.

On the Category pane where [dx100s3] is displayed, click [RAID Group].

On the Action pane where [RAID Group] is displayed, click [Create].

In the [Create RAID Group] screen, create the following RAID group.

		Disk	Creation	RAID Group		RA	D grou	up setting:	5
Name	RAID Type	Туре	Mode	Capacity	Enclosure No.	Slot No.	Disk Type	Capacity	Speed (rpm)
rap001	Mirroring (RAID1)	Onling	Manual	810 5CB	-	0	SAS	900GB	10000
igpoor		Unine	Mariuai	019.90	-	1	SAS	900GB	10000

Table-15 RAID group for VMFS

- Click the [Storage] tab. On the Main pane where [Storage] is displayed, click the registered "dx100s3" storage system. On the Category pane where [dx100s3] is displayed, click [Volume].
 - On the Action pane where [Volume] is displayed, click [Create].

In the [Create Volume] screen, create the following volume.

Namo	Capacity	Туро	RAID) Group Setting
Name	capacity	Туре	RG Name	Number of Volumes
vol001	819.5GB	Standard	rgp001	1

Table-16 Volume for VMFS

- Set access paths for the ESXi host and the volume that was created using ETERNUS SF Manager. For details on the procedure, refer to "Assign ETERNUS Disk Storage System Volumes to Server" in "ETERNUS SF Web Console Guide".

- Perform settings for the iSCSI ports of the ETERNUS DX100 S3.
- Click the [Storage] tab. On the Main pane where [Storage] is displayed, click the registered "dx100s3" storage system.
- On the Category pane where [dx100s3] is displayed, click [Connectivity].
- On the Category pane where [Connectivity] is displayed, click [Port].
- On the Main pane where [Port] is displayed, click the number for ports for the iSCSI type.
- Select one iSCSI port on the Main pane where [iSCSI Port] is displayed and click [Modify iSCSI Port] on the Action pane.

In the [Set Port Parameters] screen, set the following values.

Port (display	y only)			Port (settings)						
Port	Туре	Mode	Host Affinity	iSCSI Name	IP Version	IP Address	Subnet Mask	Reset Scope	Release Reservation if Chip is Reset	
CM#0 CA#0 Port#0	:6(6)	64	Fachla	Arbitrary* (Use alphanumeric characters, "."	ID./	Ashibasa	Ashibasa		Diaskla	
CM#1 CA#0 Port#0	iscsi	CA	Enable	[period], ":" [colon], or "-" [hyhen] within 223 characters.)	IPv4	Arbitrary	Arbitrary	I_T_L	Disable	

Table-17 iSCSI port settings for the ETERNUS DX100 S3

* For iSCSI ports that configure multiple paths, set a unique iSCSI name between each iSCSI port.

If a duplicate iSCSI name is set, the multipath configuration may not be connected.

- Create an affinity group or a LUN group.
 - Click the [Storage] tab. On the Main pane where [Storage] is displayed, click the registered "dx100s3" storage system. On the Category pane where [dx100s3] is displayed, click [Connectivity].
 - On the Category pane where [Connectivity] is displayed, click [Affinity/LUN Group].
 - In the [Affinity/LUN Group] screen, click [Create] under [Affinity/LUN Group] on the Action pane.

In the [Create Affinity/LUN Group] screen, set the following values.

Name	Number of LUNs		Assi	gned Volu	mes	
Name	(display only)	LUN No.	Volume No.	Name	Туре	Capacity
kanri01	1	0	0	vol001	Standard	819.50 GB

Table-18 Creating a LUN group of the volume for VMFS

- Add the iSCSI interface as an HBA.

Click the [Server] tab. On the Main pane where [Server] is displayed, click the [vvolesxi01] ESXi host that was registered.

On the Action pane where [vvolesxi01] is displayed, click [Add] under [HBA].

In the screen where [Set HBA Information] is displayed, set the following values manually and click [Add]. Repeat this step for all the HBAs that are to be added.

Interface Type	Manua	l Input
ппенасе туре	iSCSI Name	IP Address
iSCSI	Arbitrary	Arbitrary
Table-	19 HBA settin	as

Table-19 HBA settings

Select the checkbox for the HBA that is to be added in [HBA Information] and click [Next]. In the screen where [Confirm] is displayed, check the settings and click [Add].

Perform the same procedure for vvolesxi02 and vvolesxi03.

- Set the access path.

Click the [Server] tab. On the Category pane where [Server] is displayed, click [Access Path]. On the Action pane, click [Add (ETERNUS)] under [Access Path]. In the [Create Access Path] screen, set the following values.

Select Server	Select HBA				Select Storage	Select Host	Response a	nd Port	Select Affinity Group	Affinity Group Details												
Name	Logical No.	Interface Type	iSCSI Name	IP Address	Name	Host Response	Por	t	Name	Name												
unalagu:01	vmhba1						CM#0 Port#0	CA#0														
vvolesxi01	vmhba2			(Check that the displayed value			CM#1 Port#0	CA#0														
	vmhba1		(Check that the displayed value		displayed value	displayed value	displayed value	displayed value	displayed value	displayed value	displayed value	displayed value	displayed value	displayed value	displayed value	displayed value	displayed value			CM#0 Port#0	CA#0	
vvolesxi02	vmhba2	iSCSI	matches the actual	matches the actual	Dx100s3	default	CM#1 Port#0	CA#0	kanri01	WOL001												
	vmhba1		connection.)	connection.)			CM#0 Port#0	CA#0														
vvolesxi03	vmhba2						CM#1 Port#0	CA#0														

Table-20 List of access path values for VMFS

- Check the LUNs.

This section provides the procedure to check whether the LUNs are recognized using vSphere Web Client. Log in to VMware ESX from vSphere Web Client and check the device.

1. Log in to vSphere Web Client.

Click [Hosts and Clusters] in the [Home] screen and select the target host on the left pane.

- 2. Select the [Manage] tab [Storage] [Storage Adapters].
- 3. Click the rescan button. When the rescan button is clicked, the LUNs are once again recognized to the ETERNUS DX from VMware ESX.
- 4. Select the iSCSI Software Adapter (example: vmhba34) in the [Storage Adapters] frame. The recognized device is displayed under the [Devices] tab in the [Adapter Details] frame.
- 5. Check [Path selection policy] for all the LUNs in the ETERNUS DX. When VMware ESX recognizes the LUNs, the operation path for each LUN is automatically set.

The default setting is [Most Recently Used (VMware)]. However, changing [Path selection policy] for all the LUNs to [Round Robin (VMware)] is recommended.

6. In multipath configurations, check that all the LUNs in the ETERNUS DX are configured to use multiple paths. When the LUNs are configured to use multiple paths, multiple runtime names and targets are displayed for [Paths].

- Set the CHAP authentication.

Log in to VMware ESX from vSphere Web Client, check the device, and then enable CHAP authentication. The procedure is provided below.

1. Log in to vSphere Web Client.

Click [Hosts and Clusters] in the [Home] screen and select the target host on the left pane.

- 2. Select the [Manage] tab [Storage] [Storage Adapters].
- 3. Select the target iSCSI Software Adapter.
- 4. Click [Edit] in [Authentication] at the bottom under the [Properties] tab in the [Adapter Details] frame.

- 5. Set the CHAP authentication. In this document, bidirectional CHAP is used. Select [Use bidirectional CHAP] for [Authentication Method], and set [Name] and [Secret] for [Outgoing CHAP Credentials] and [Incoming CHAP Credentials].
- 2.2.2.5.2 Configuring vSphere HA

In the vCenter server, configure a single vSphere HA in all the ESXi hosts.

- For details on the procedure, refer to the VMware vSphere manuals.
 - In vCenter Server, mount the created standard volume on the ESXi hosts as a VMFS datastore.
 - Check that the datastore can be referred to from all the ESXi servers.
 - In vCenter Server, configure all the ESXi hosts and the vSphere HA.
- 2.2.2.5.3 Checking the VMFS Datastore after a vSphere HA Configuration

After a vSphere HA configuration, check that the VMFS datastore that was created in the ETERNUS DX100 S3 can be used by all the ESXi hosts.

1. Confirm that all the ESXi hosts are synchronized with the NTP server clock by checking the following items;

- The NTP client of the ESXi host is started.
- The NTP client is set to synchronize with the host.
- The other NTP clients are set to start.

2. Check if VMware Tools is installed in the vCenter server and the operation management server that consist of virtual machines.

- 3. Check if the vCenter server and the operation management server that consist of virtual machines are synchronous with the NTP server's or the ESXi host's clock.
- 4. Create virtual machines for tests that use the VMFS datastore for the operation management server. Check that the created virtual machines can be moved to all the ESXi hosts (vvolesxi01 to vvolesxi03). After checking, delete the virtual machines that were created for the test.

In addition, perform a separate check of the vSphere HA configuration.

2.2.2.5.4 Moving the Datastore for the vCenter Sever and the Operation Management Server Move the virtual machines for the vCenter server and the operation management server that were created on the local disks of the ESXi host to the VMFS datastore that was created on the ETERNUS DX100 S3.

Assigning the virtual machines to the VMFS datastore that was created in the ETERNUS DX100 S3 provides redundancy with vSphere HA.

Checklist

Confirm the following items before proceeding to the next procedure.

- The operation management server and the vCenter sever are running on the VMFS datastore that was created in the ETERNUS DX100 S3's volume.
- vCenter Server and ETERNUS SF Manager are running normally.

2.2.3 WOL Environment Configuration Procedure

2.2.3.1 ETERNUS SF Manager Operations

2.2.3.1.1 Setting VVOL Access Paths

- 1. From ETERNUS SF Web Console, click [Storage] on the global navigation tab.
- 2. On the Category pane, click [VVOL Management].
- On the Category pane, click [VVOL Access Path].
 On the Action pane, click [Set] under [VVOL Access Path].

Network Server Management	00											
Management		201	<u>*</u> 0 ©	0 🗉 🖸	7 🔺 0	0	ED 🕨 D	4.0	<u>00</u>			
	K Map VH	ew Sched,	uler Log	System								
	VOL Acc			_	_	_	_	_	_	_		Action Vore Access Path:
	 Information 											X Set
No Management		VOL Access Pa		these successions of the		Carll and March service	s from VMware	u Tarrier Ta				X Leteta
hup History	vioc au	coso paorio a	consecuts per	unig required to	Circlateralaci	virual i ciario:	s com vivileare	Voentei oo	219121.			WOL Access Path St
	Filter Set	ting										Reloat
										Filter	Clear	
1												
Se	elections: 0					Total 0 /	190.0rds << < D	0 pages >	25 1 pg	ge Go De	apkay 10 💌 records	5
	4	Server (VM	ware Host)	Switch (See	rver Side)	Switch (Str	orage Side)	Storage	6			
	Stetus	Name	HBA	Name	Port	Name	Port	Name	Port Ho	it Response	VVOL Function	
N	No data avaita	able in table										-

Figure-43 VVOL Access Path

4. The Welcome screen of [VVOL Access Path Setting] is displayed. Click the [Next] button. 5. On the [Select Disk Array and Server] screen, select the ETERNUS DX S3 series and the server for setting the VVOL access path, and then click the [Next] button.

ETERNUS SF				UsarID esf_admin Logout	FUIÎTS
Normal	<u>10</u> 00 = 00	▲0 @0 🗐 @27 🔺0 @0	□ \$* 2 0 2 1		2.
Main Elbrage Network	Server Map View Sche	duler Log System			
VVOL Access Path Setting	9	Manual Constant Const			_
Welcome 📏 Select Disk Arr	ay and Server Select HBA an	d Port 🕥 Confirm			
▼ Information					
Note that only disk storage • Disk storage system the	is and servers (VMware hosts) systems and servers that meet the at supports the VVOL function more HBAs set and whose type is "	e kilowing conditions can be selected. VMware Host'			
Disk Array Information					
Belections 1					
allense .		Model	IP Address		
d:100s3		ET103A	192,168,100.5		
Server Information					
Selections 1					
Nati 116	IP Address	OS	Server Type	Number of HBA	į
vvolesxi01	192.168.100.1	VMware ESXI	VMware Host	4	_
O vvolesxi02	192.168.100.2	VMware ESX	Wherare Host	4	
O vvolesxi03	192.168.100.3	VNware EEXi	Wwware Host	4	

Figure-44 Select Disk Array and Server

Points

Check that the storage system and the ESXi hosts that were registered with "2.2.2.4.3 Setting Up ETERNUS SF Manager" are displayed.

Display area	Displayed device	Check 🗹
Disk Array Information	Dx100s3	
	vvolesxi01	
Server Information	vvolesxi02	
	vvolesxi03	

- 6. In the [Select HBA and Port] screen, perform the following settings.
 - For [Zoning Setting], select [No].
 - Select the [Set Access Path] checkbox of the HBA where the setting is performed.
 - For the other settings, enter the items shown in the following table.

After setting all the paths that are displayed on the screen, click the [Next] button.

		UteriD iesi_admin Logazi Rijiri
	0 1 <u>1</u> 0 0 0	
Main Storage	Network Server Map V	iew Schodular Log Bystam
VVOL Access Pat	h Setting	
Welcome Selec	t Disk Array and Server 📎 S	keloct HBA and Port 🔪 Confirm
▼ Information		
If two or more Hit However, make a Two or more HB	BAs exist on the VMware host, 1 sure that a multipath device has As whose interface type is differ	ct disk storage systems to servers. two or more HBA fields are displayed and multiple VVOL access paths can be set at one time. I been preconfigured on the Whense host. enthrom the others cannot be selected at the same time. To configure the VVOL access paths, execute this witzerd again on a per interface type basis. aft, execute Inhent Access Path or delete and reconfigure it.
• Connect HBA to	o Port	
Selected Disk Array		dk100s3
Selected Server		
Zoning Setting		CYes ® No
	Set Access Path	
	Interface type	FC
HBA#1	Logical Number	vmhba3
III CAREFT	WWPN	102002025F171E8
	Connected Port	Connect
	Host Response	C Default V
	Set Access Path	
	Interface type	FC
HBA#Z	Logical Number	vmhba4
IIICMATZ	WWPN	104024004 S8 1/ FLK
	Connected Port	Connect
	Host Response	
	Set Access Parts	
	Interior, type	1909
	Louical Number	
HBA#3	ISC SI Name	lign 1993 Oli com ministre welczki01 32024286
	IP Address	172 16.1.1
	Connected Port	CM#0 CA#0 Port#0 Connect
	Host Response	0.Dotash 🗸
	Set Access Path	
	Set Access Path Interface type	
	Set Access Path Interface type Logical Number	aca
HBAT4	Set Access Path Interface type Logical Number ISC SI Name	ADCBI - - - MIOSR OBLCOM, IMMANDMONDORIDI I ZBAZKINI B
HBAT4	Set Access Path Interface type Logical Number ISC SI Name	8001 - an 1986 01.com/wmaratmolecol01 82824208 172.16.2.1
HBAT4	Set Access Path Interface type Logical Number ISC SI Name	aloosi - - - Martina (St. com, immarchinolection i 200/4018

Figure-45 Select HBA and Port

Host name	ltem		Information
	HBA#1	Connected Port	CM#0 CA#0 Port#0
vvolesxi01	IDA#1	Host Response	0:Default
vvoleskiu i	HBA#2	Connected Port	CM#1 CA#0 Port#0
	NDA#Z	Host Response	0:Default
	HBA#1	Connected Port	CM#0 CA#0 Port#0
vvolesxi02	NDA# I	Host Response	0:Default
VVUIESXIUZ	HBA#2	Connected Port	CM#1 CA#0 Port#0
	NDA#Z	Host Response	0:Default
	HBA#1	Connected Port	CM#0 CA#0 Port#0
vvolesxi03	NDA# I	Host Response	0:Default
vvulesx105		Connected Port	CM#1 CA#0 Port#0
	NDA#2	Host Response	0:Default
	HBA#2		0:Default

Table-22 List of VVOL access path settings

7. The information confirmation screen is displayed. Confirm the information, and then click the [Set] button on the lower right corner of the screen.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next procedure. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

Repeat Steps 3 to 7 to set all the VVOL access paths.

Checklist

Confirm the following item before proceeding to the next procedure.

- On the Main pane of the [VVOL Access Path] screen, the WOL access paths for all the ESXi hosts are displayed.

2.2.3.1.2 Enabling Automated Storage Tiering

- 1. On the ETERNUS SF Web Console screen, click [Storage] in the global navigation tab.
- 2. On the Category pane, click [Automated Storage Tiering].

	Server Map View Scheduler	Log Bystem		
> dx100s3				
s3	Overview		and the second sec	+ Action
Workiew	Hardware Components	The second s	A DESCRIPTION OF THE OWNER OF THE OWNER OF THE	Disk Array.
olume	Status	Control Modules	Desks	X Delete
AID Group	Available	2	18	X Modify
hin Provisioning	(Warning			Reset Password
dvanced Copy	C Error	0	0	
onnectivity	Cille	and a second sec	0	Reload Conf.
amponent	System Information	The second s	and a second	Automated GoS
ystem	Storage System Name	er100s3		Activate
orformance	Model Name	ET103A		citing .
	Serial No.	000 00400000		Reporting
utomated Storage Tiering	Box is	ODETERNUSCILLOSET (CSA/PW/PH/D0/CS4C010W/		
ucomated Storage mening	Finware Version	V10L32-0000		Activate
twage Cluster	SNMP Trop Setting	Setting up		Stop
Ni dye Wilater	Contraction of the local division of the loc			the state of the s
	Storage Capacity			
	And the second s	Available (TB)	Total (TB)	
	Raw	1.88	16.43	
	Configured	0.00	7.48	
	RAIDO	0.00	0.00	
	RAID1	0.00	4.80	NO STORE
	RAID1+0	0.00	0.00	
	RAID5 RAID5+0	6.00	2.68	energe li
	RAID6	0.00	0.00	and the second
	RAID6-FR	0.00	0.00	CONTRACTOR OF THE OWNER
	KAID0-FK	0.00	0.00	
	Automated QoS	A Long the second s	and the second	NEW CONTRACTOR
	Status	Stopped		
	Reporting	the advantage of the second	1. Million of the second	
	Status	Stopped		

Figure-46 Automated Storage Tiering

3. On the Category pane, click [Setting]. On the Action pane, click [On].

ETERNUS SF					User ID: esf_admin Local	FUโกรม
Normal = @1 10 6	GD # G1 ±0	GO 🗐 🛛 🔺 O 😡 O	B) D 40 0	0 🖑 🔳		ð Ø.
Main Storage Network Server	Map View. Scheduler Log	system				
Storage > dr200s3 > Automated Storag		nin da da				
Automated Storage Tiering Set	tting				+ Action	3
Dvarvlew • In	nformation				9,00	
Tiering Policies	Automated Storage Tiering Status	is enabled.			On)
E Tier Pool						
	tomated Storage Tiering Infor	mation				
	omated Storage Tiering ported Status	Supported				
Auto	omated Storage Tiering Status	Of				
. Job Status					1972	

Figure-47 Enabling Automated Storage Tiering

2.2.3.1.3 Creating Tier Pools

- Create a Tier pool (gold) for VVOL datastores.
 On the ETERNUS SF Web Console screen, click [Storage] in the global navigation tab.
- 2. On the Category pane, click [WOL Management]. On the Action pane, click [Create (One Layer)].

						7	edmin Loost p
	0 🚳 0	2 01 4			B) D 10 00	199 •	9
Storage Network Se Se VVOL Management	arver Map Vie	w. scheduler	r Log System	n - Contraction			
OL Management	VVOL Data	riore	_				+ Action
WOL Estastore	• Informatio						Tier Pool:
WOL Access Path WOL Backup Management WOL Backup History	List of W A VVOL 5 VCenter 5	'OL Datastores Datastore consist Xerver.		er Pools. Create a VVOL Datas when Virtual Volumes are adde	tore first, and then specify it when created to the VVOL Datastore.	sting Virtual Volumes using Virtuare	Create (One Layer)
				ten using the Clone Backup fu checked from the Tier Pool so	nction. reen for Automated Storage Tiering.		Create/Modify
							for Clone Backup.
	 Filter Sett 	ong				Filter	Create/Modity
	Selections: 0			Tota	I month i se e 00 monte a sa 10	page Go Display 10 🗸 records	
	No.	Name	Status	VVOL Function	Total Capacity	Free Space	
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Figure-48 VVOL Management

3. The [Select Disk Array] screen is displayed. Select the ETERNUS DX S3 series for creating the Tier pool, and then click the [Next] button.

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bit A http://www.store.ord.com/multicle	Main Elszago Network Server M	ap View Schodular Log System		
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41993 ET103A 192.186.100.5		Model	IP Address	
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Job Status				
				Next>> Cancel
	Job Status			

Figure-49 Select Disk Array

4. The information input screen is displayed.

Enter the items shown in the following table, and then click [Next] on the lower right corner of the screen.

			OVER C 681_80mm Ladar	FUILISU
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► Advanced Configuration of	er Pool			
▼ Sub-Pool Information	Received 5			
Disk Selection	C to S Manual			

Figure-50 Specification of Tier Pool

ltem	Description	Value in this document
Tier Pool Name	Specify a unique pool name in the ETERNUS SF system. Any alphanumeric character (from 1 to 16 characters), a hyphen (-), an underscore (_), and a pound symbol (#) can be specified. The characters are case insensitive.	tier1_gold
Disk Selection	Specify the method for the selection of disks that configure the sub-pool. The default setting is [Auto] (automatic selection). When [Auto] is selected, the minimum required capacity for the Low sub-pool, Middle sub-pool, and High sub-pool must be specified in the screen to configure each of these sub-pools. When [Manual] is selected, the disks for configuring the Low sub-pool, Middle sub-pool, and High sub-pool must be specified in the screen to configure each of these sub-pools.	Manual

Table-23 Values for specifying a Tier pool (gold)

5. Enter the items shown in the following table, and then click [Create]. A RAID group is created.

 High Perfo High Capa 	RAID1): not specifiable Striping mance (RAID1+0): 64/128/256 city (RAID5) ~4D+1P: 64/128/2	/512/1024 255/512, ~8D+1P: 64/		128				
			128/256, ~15D+1P. 64	128				
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ub-Pool Inform	noite							
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C 2 2 3 5 6 7 8 9	Enclosure No. - - - - - - - -	2 3 4 5 6 7 8 9		SAS SAS SAS SAS SAS SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk	
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Figure-51 Specifying a sub-pool (gold)

ltem	Description	Information
FTSP Name	Specify a unique sub-pool name in the storage system. Any alphanumeric character (from 1 to 16 characters), a hyphen (-), an underscore (_), and a pound symbol (#) can be specified. The characters are case insensitive.	tier1_sub
Disk Type	Specify the type of disk that configures the sub-pool. Make a selection from the disk types (Online, Nearline, SSD, SED-SAS) that are displayed in the pull-down list.	Online

Reliability	Specify the RAID level of the sub-pool. Select one of the following options that are displayed in the pull-down list. - High Performance(RAID1+0) - High Capacity(RAID5) - High Reliability(RAID6) - High Reliability(RAID6-FR)	Mirroring(RAID1)
	- Mirroring(RAID1) - Striping(RAID0)	
Fast Recovery Configuration	Set this item when [High Reliability(RAID6-FR)] is selected for [Reliability]. A RAID group must be created based on the number of disks for the specified configuration. When a level other than [High Reliability(RAID6-FR)] is selected for [Reliability], specification is not necessary.	Unspecified
Disk No.	Number of the disk for configuring the sub-pool.	2 and 3

Table-24 Values for specifying a sub-pool (gold)

Points

Not all available combinations of the RAID levels and the number of member disks are supported for RAID groups that can be used as Tier pools.

For details, refer to "FUJITSU Storage ETERNUS SF Storage Cruiser V16.2 Operation Guide for Optimization Function".

6. Select the created RAID group, and then click [Next].

Discress Image: Strategy Network Server Create Ther Pool Specificate Strate Depth is as follows: - Manning (RADD) - - - Manning (RADD) - - - - Manning (RADD) - - - - - Manning (RADD) - <th>Map View Scheduler Striping (RA/D0): 64/128/25 88/256/512/1024 9/128/256/512, ~8D+1P: 6</th> <th>r Log System 6651211024 4/128/256, ~15D+1P, 64</th> <th>1128 1128 1128 1128 1128 1128 1128 1128</th> <th>Capacity Capacity 500.00 OB 500.00 OB 500.00 OB 500.00 OB 500.00 OB 500.00 OB</th> <th>Total 11 records (* Speed (rpm) 10000 10000 10000</th> <th>Usage Data Disk Data Disk Data Disk</th> <th>Fitter Clear = 1 pape Ge Display 10 m RAD Group Hamber - -</th>	Map View Scheduler Striping (RA/D0): 64/128/25 88/256/512/1024 9/128/256/512, ~8D+1P: 6	r Log System 6651211024 4/128/256, ~15D+1P, 64	1128 1128 1128 1128 1128 1128 1128 1128	Capacity Capacity 500.00 OB 500.00 OB 500.00 OB 500.00 OB 500.00 OB 500.00 OB	Total 11 records (* Speed (rpm) 10000 10000 10000	Usage Data Disk Data Disk Data Disk	Fitter Clear = 1 pape Ge Display 10 m RAD Group Hamber - -
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Figure-52 Disk No. for configuring the RAID group

7. The information confirmation screen is displayed. Confirm the information, and then click the [Create] button on the lower right corner of the screen.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next step. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

8. Add the RAID group to a Tier pool (gold) for the WOL datastores to expand the capacity. Click [Storage] on the global navigation tab.

Orage Overviow > Action Disk Artag Information Disk Artag Disk A	raga								
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9. On the Main pane, click the ETERNUS DX S3 series link under [Name].

Figure-53 Storage

10. On the Category pane, click [Automated Storage Tiering].

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RAID5+0 0.00 0.00 RAID5-0 6.00 2.56 RAID5-0 6.00 0.40 RAID5-10 6.00 0.40 RAID5-20 0.00 0.40 RAID5-3 0.00 0.40 RAID5-8 0.00 0.40 Automated QoS 5tapad 5tapad Status Stapad 5tapad	RAID1+0 0.00 0.00 RAID5+0 0.00 2.44 RAID5-0 0.00 0.40 RAID6 0.00 0.40 RAID6 0.00 0.40 RAID6-SR 0.00 0.40 Status Status Status Reporting					Construction of the second
RAIDS 0.00 2.64 RAIDS-00 0.00 0.00 RAIDS 0.00 9.00 RAIDS-FR 0.00 0.00 RAIDS-FR 0.00 0.00 Automated QoS 5 5 Status Etopoet 5	RA05 0.01 2.64 RA05-00 0.00 0.04 RA064 0.00 0.06 RA055 0.00 0.06					CALCULATION OF STREET
RA105+0 0.00 0.00 RA105 0.00 0.00 RA105.F.R 0.00 0.00 Automated QoS 5tatus Status Status Status Status	RAID5-0 0.00 9.06 RAID6 0.00 9.06 RAID6.FR 0.00 9.06 Automated QoS Status Etypool Reporting					CONTRACTOR OF THE OWNER
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			and the second se	Stopped		

Figure-54 dx100s3

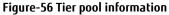
On the Category pane, click [Tier Pool].
 From the Tier pools that are displayed on the Main pane, click the pool number of Tier1_gold.

ETERNUS SF									Usar ID : esf	_admin <u>Loqout</u>	กปุกรบ
Normal = ©1 A	0 00 = 0	0 40 0	0 🗉 🕑 1	0 10 01	2	<u>10</u>	39 I	1) ()·
Main Storage Network S	ervar Map View	Scheduler Log	System								
Storage > dc100s3 > Automated											
Automated Storage Tierin	Tier Pool									Action	
Din Overview	▼ Information									Tier Pool	
THE POOL	(i) List of Tier pools									+ Create	
										Create (One Laye	r) _
C Setting	► Filter Setting									Modily	
								Filter	Clear	Modify Layer	
										Start Balancing	
	Selections: 0			Tota	al 1 records +< +	1/1 pages > >> [1	page G	o Disp	key 10 🗸 record	3 Stop Batancing	
	Pool Number	Tier Pool Name	Pool Status	Total Capacity	Policy Name	Operating Status	Balanc	ing	Assigned CM	Automated Storage Ti	ering:
		The Pool Name		Forai Calhacata	PORCY READE		Level	Status	Assigned CM	Start	
	1 0	tier1_gold	🕝 Available	819.49 GB	÷	Stop	High	Stop	Auto	Stop	
										Evaluation	
										Charls.	_
										Capacity Chart	
										Support Count	
- Job Status										1	

Figure-55 Tier pool list

12. On the Main pane, click the [Sub-Pool] tab.

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Network Server Map Vie			5 @
53 > Automated Storage Tiering			
	Deall-Hier1_g	old)	Action
			Tier Pool
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Holes Information	\sim		× Delete
D Tier pool i	nformation.		🔀 Modify
Tree Develop	for some setting to		Modify Layer
Tier Pool In	lormation		Sub-Pool
Pool Number		0	Expand Sob-Pool Capacit
Tier Pool Nam	.0	bart_pold	FTV:
Pool Status		Available 819.49 GB	+ Create Volume
Total Capacity Used Capacity		819.49 GB 0.00 MB	Automated Storage Tiering
Alarm Status		Normal	
Usage Propor	tion	0%	🙀 Status Update
Operating Sta		Stop	
	Level	High	
Balancing	Status	Stop	
	Progress		
100000000000000000000000000000000000000			
	Configuration o		
Warning Thre		90%	
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utomated Storage Tic										Action Tier Pool	
En Overview	Basics Sub	Pool Volu	me Hist	lory						X Delete	
Tier Pool	- Constant Constant										
E FTV	① Tier pool infor	() Ter pool information.									
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	► Filter Setting	Expand Sub-Pool Capaci									
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								Filter	Clear	+ Create Volume	
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	Selections 1				Total 1 records	s << < 1/1 pages >	>> 1_pag	e Go Disp	lay 10 V records	12 Status Update	
	FTSP	FTSP	Disk	Reliability	Fast Recovery	FTSP	Total	Used	Belencing		
	ornber	Name	Туре	NAME OF TAXABLE PARTY.	Configuration	Status	Capacity	Capacity	Level		
		ber1_sub	Online	Mirroring (RAID1)	+	Available	\$19.49 GB	0.00 MB	High		
	* RAID Group										
	* RAID Group										
	 RAID Group Filter Setting 								_		
			-					Filter	Clear		
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					Tetal 1 record	s) << < 1/1 pages >	>> (<u>1</u>) pag		()		
			RAID Gro	up Number	Tetal 1 record: Assigned CM	s) << < 1/1 pages > RAID Gro	0.000	e Go Disp	()	- 	
	► Filter Setting		RAID Grov	sp Number			up Status	e Go Disp	lay 10 V records		
	Filter Setting FTSP Number			up Number	Assigned CM	RAID Gro	up Status	e Go Disp Strip	lay 10 V records		
	Filter Setting FTSP Number			up Number	Assigned CM	RAID Gro	up Status	e Go Disp Strip	lay 10 V records		
	Filter Setting FTSP Number			up Number	Assigned CM	RAID Gro	up Status	e Go Disp Strip	lay 10 V records		
	Filter Setting FTSP Number			up Number	Assigned CM	RAID Gro	up Status	e Go Disp Strip	lay 10 V records		
	Filter Setting FTSP Number			up Number	Assigned CM	RAID Gro	up Status	e Go Disp Strip	lay 10 V records		
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	Filter Setting FTSP Number			up Number	Assigned CM	RAID Gro	up Status	e Go Disp Strip	lay 10 V records		
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	Filter Setting FTSP Number			sg Number	Assigned CM	RAID Gro	up Status	e Go Disp Strip	lay 10 🗸 records		

13. Select [tier1_sub] and click [Expand Sub-Pool Capacity].

Figure-57 Tier pool information (Sub-Pool)

14. In the [Confirm target Tier Pool] screen, select [Manual] for [Disk Selection] in [Sub-Pool Information] and click [Next].

ETERNUS SF			UsarID :esf_admin Loqout	FUIÎTSU
Normal	01 10 00	0 # 00 A0 00 B 010 A0 00 B 49 00 14 17		۰(2)
Main Eloraga	Network Server h	Aap View Schedulier Log System		
Expand Sub-Pool	Capacity dx100s3			_
Confirm target Tier F	ool Expand Sub-Po	d Capacity 💫 Confirm		
▼ Information				
(1) Expand sub-poo		actiled, Assigned CM can be added frem Advanced Configuration of Tier pool.		
Tier Pool Informa	tion			
Pool Number		0		
Tier Pool Name		tier1_gold		
Policy Name		Provide the second s		
Pool Status		Available		
Total Capacity		819.49 GB		
Used Capacity		0.00 MB		
Alarm Status		Normal		
Usage Proportion		0%		
Balancing	Level	High		
	Status	Stop		
 Sub-Pool Inform 	iguration of Tier Pool nation			
FTSP Number		0		
FTSP Name		fiert_sub		
Disk Type		Online		
Reliability		Minoring (RAID1)		
Total Capacity		819.49 GB		
Used Capacity		0.00 MB		
Balancing Level		Hgh		
Disk Selection		O Aut @ Manual		
🕳 Job Status			Nest>>	ancel

Figure-58 Confirm target Tier Pool

15. Enter the information that is provided in the following table and click [Create]. The RAID group is created.

								UsarID est_admin Logout
Main Blorage	■ ② 1 <u>▲</u> 0 ③ 0	# 00 A		10 🔔 0	© 0 👔 ► 0	₩0 00 vili		
		View Scheduler	Log System	_			_	
Expand Sub-Pool	Capacity dx100s3							
sub-Pool Informatio	on							
FTSP Mumber		0						
FTSP Name *	(tier1_sub		1				
Disk Type		Online						
Reliability		Mirroring (RA	VD1)					
Fast Recovery Confi	iguration	The second						
Total Capacity		819.49 GB						
Used Capacity		0.00 MB						
Balancing Level		High						
▼ Tier Pool Balan	cing Settings							
Balancing								
 Selection Disks 								
Disk No.	Enclosure No.	Slot No.	Status	Туре	Capacity	Speed (rpm)	Usage	RAID Group Number
4		4	O Present	SAS	900.00 GB		Data Disk	-
5		5	O Present	SAS	900.00 GB	10000	Data Disk	
	-	6	O Present	SAS	900.00 GB	10000	Data Disk	
		7	C Present	040			Data Disk	
			- Present	SAS	900.00 GB	10000		
		8	 Present 	SAS	900.00 GB 900.00 GB	10000		
8							Data Disk	
8 0 9		8	O Present	SAS	900.00 GB	10000	Data Disk	
8 9 10	-	8	 Present Present Present 	SAS SAS	900.00 GB 900.00 GB	10000	Data Disk Data Disk	2. 7
8 9 10	*	8 9 10	Present Present Present Present Present	SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB	10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
B 9 10 11 12		8 9 10 11	 Present Present Present 	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
8 9 10	*	8 9 10 11	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
8 9 10 11 12 Remove		8 9 10 11	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
B 9 10 11 12		8 9 10 11	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
8 9 10 11 12 Remove RAID Group		8 9 10 11	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
B 9 9 10 11 12 Remove ▼ RAID Group Relections 0		8 9 10 11	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
		8 9 10 11	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
		8 9 10 11	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
B 9 10 10 11 12 Remove Image: Composition of the second secon	- - - Create	8 9 10 11 12	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	
B 9 10 10 11 12 Remove Image: Composition of the second secon		8 9 10 11 12	Present Present Present Present Present	SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	10000 10000 10000 10000	Data Disk Data Disk Data Disk Data Disk	

Figure-59 Expand Sub-Pool Capacity (Creating a RAID group)

ltem	Description	Information
FTSP Name	Specify a unique name in the storage system. Any alphanumeric character (from 1 to 16 characters), a hyphen (-), an underscore (_), and a pound symbol (#) can be specified. The characters are case insensitive.	tier1_sub
Disk Type	The same disk types are displayed as when the sub-pool was created.	Online
Reliability	The same RAID levels are displayed as when the sub-pool was created.	Mirroring(RAID1)
Fast Recovery Configuration	Specification is not necessary.	-
Disk No.	Disk number that is used to expand the sub-pool	4 and 5

Table-25 Values for specifying a sub-pool (expansion)

16. Select the created RAID group and click [Next].

TERNUS SF								UsarID esf_admin Loqout	FU
Normal	aa 🕹 1 🔔 1 🚱 0	- 00 1	0 00 E	10 🔔 0	0 0 2 • 0	1×1 00 ×1			0
ain Elivrage	Network Server Ma	p View Scheduler	Log System						
Expand Sub-Po	ol Capacity dx100s3								
b-Pool Informe	tion	_		_			_		
ESP Number		0							
I SP Name *		bert sub		1					
isk Type		Online	1	1					
liability		Mirroring (R)	AID1)						
at Recovery Co	oficuration	-							
tel Capacity		819.49 GB							
ed Capacity		0.00 MB							
lancing Level		High							
San Color Son	ancing Settings								
lancing	ancing seconds								
Selection Dis	ks								
Filter Setting									
						Total 9 records 🛩	~ 1/1 pages > >		Clear
ections 0	Enclosure No.	Slot No.	Status	Туре	Capacity			v 1 page Go Display 10	
ections: 0 Disk No.	Enclosure No.	Slot No.	Status O Present	Type SAS	Capecity 900.00 GB	Speed (rpm)	< 1/1 pages > > Usage Data Disk		
ections: 0 Disk No.						Speed (rpm)	Usage	I page Go Display 10 RAID Group Number	
ections 0 Disk No. 4 5	-	4	Present	SAS	900.00 GB	Speed (rpm) 10000 10000	Usage Data Disk	RAID Group Number	
Clions 0 Disk No. 4 5 6	-	4	Present Present Present Present	SAS SAS	900.00 GB 900.00 GB	Speed (rpm) 10000 10000 10000	Usage Data Disk Data Disk	I page Go Display 10 RAID Group Number	
cclions 0 Disk No. 4 5 6 7	•	4 5 6 7	Present Present Present Present Present	SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB	Speed (rpm) 10000 10000 10000 10000	Usage Data Disk Data Disk Data Disk Data Disk	I page Go Display 10 RAID Group Number	
cclions 0 Disk No. 4 5 6 7 8	• • •	4 5 6 7 8	Present Present Present Present Present Present	SAS SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB	Speed (rpm) 10000 10000 10000 10000 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk	+ 1 page Ge Display 10 RAID Group Number - -	
ections: 0 Disk No. 4 5 8 7 8 9	- - - - -	4. 5 6 7 8 9	Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB	Speed (rpm) 10000 10000 10000 10000 10000 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) peps Go Display 16 (Comp Number (Comp Num Number (Comp Number (Comp Number (Comp Number (Com	
sctions: 0 Disk No. 4 5 8 7 8 9 10		4 5 6 7 8 9 10	Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB	Speed (rpm) 10000 10000 10000 10000 10000 10000 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk		
ections: 0 Disk Ne. 5 6 7 8 9 10 11	- - - - -	4. 5 6 7 8 9	Present Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) peps Go Display 16 (Comp Number (Comp Num Number (Comp Number (Comp Number (Comp Number (Com	
ections: 0 Disk No. 4 5 6 7 8 9 10 11 12		4 5 6 7 8 9 10 11	Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS SAS	900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB 900.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) page (Ge) Display 10 (BAUD Group Number (
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ections 0 Disk No. 4 5 6 7 8 9 10 11 12 Remove RAID Group		4 5 6 7 8 9 10 11	Present Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS SAS	\$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) page (Ge) Display 10 (BAUD Group Number (
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ections 0 Disk No. 4 5 8 9 10 11 12 Remove RAID Group ections 1		4 5 6 7 8 9 10 11	Present Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS SAS	\$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) page (Ge) Display 10 (BAUD Group Number (
actions 0 Disk No. 4 5 6 7 8 9 10 11 12 Remove RAID Group actions 1 Disk No. 2 7 8 9 9 10 10 11 12 2 10 10 10 10 10 10 10 10 10 10		4 5 6 7 8 9 10 11	Present Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS SAS	\$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) page (Ge) Display 10 (BAUD Group Number (
ections 0 1 Drsk No. 4 5 6 7 9 9 10 11 12 Remove RAID Group ections 1 1 Drsk No. 2 7		4 5 6 7 8 9 10 11	Present Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS SAS	\$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) page (Ge) Display 10 (BAUD Group Number (
lections: 0 Disk No. 5 6 7 8 9 10 11 12		4 5 6 7 8 9 10 11	Present Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS SAS	\$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) page (Ge) Display 10 (BAUD Group Number (
actions 0 Disk No. 4 5 6 7 8 9 10 11 12 Remove RAID Group actions 1 Disk No. 2 7		4 5 6 7 8 9 10 11	Present Present Present Present Present Present Present Present Present	SAS SAS SAS SAS SAS SAS SAS SAS	\$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB \$00.00 GB	Speed (rpm) 10000	Usage Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk Data Disk	(F) page (Ge) Display 10 (BAUD Group Number (

Figure-60 Expand Sub-Pool Capacity (adding a RAID group)

17. Check the settings and click [Expand].

ETERNUS SF						User ID 🗄 e s	f_admin <u>Loqout</u>	ศปุรีกรบ
Normal		# OO 🔺 O 😡 O	E 🗢 10 🔺 0	3 0 🛃 Þ0	A0 00	御日		2.
Main Bibrage	Network Server Maj	View Scheduler Log	Bystem					
Expand Sub-P	ool Capacity dx100s3			_	_		_	-
Confirm target Ti	er Pool 📎 Expend Sub-Pool	Capacity Confirm						
▼ Information								
① Confirm spec	ified data.							
▼ Advanced C	onfiguration of Tier Pool							
Assigned CM(Tie	r Pool)							
* Sub-Pool Inf	ormation							
FTSP Number		0						
FTSP Name		fiert sub						_
Disk Type		Online						
Reliability		Mirroring (RAID1)						
Fast Recovery C	onfiguration	animality (reactly						
Total Capacity	onoguiseen	\$19,49 GB						
Used Capacity		0.00 MB						
Disk Selection		Manual						
Balancing Level		High						
And a second second second second		1.90						
 Tier Pool Ba 	lancing Settings							
Balancing		or						
* RAID Group								
Disk No.								
and the second se								4
4,5								
▼ Selected Dis	ks							
Disk No.	Enclosure No.	Slot No.	Status	Туре	Capacity	Speed (rpm)	Usage	
4	*	4	Present	SAS	900.00 GB		10000	Data Disk
5	-	5	Present	SAS	900.00 GB		10000	Data Disk
▼ Advanced C	onfiguration of RAID Group							
Stripe Depth								
Assigned CM								
						<< Back	Expand	ancel
second second second second								
. Job Status								

Figure-61 Confirm

18. Repeat Steps 8 to 17 to add Disk No.6 to 11.

Item	Description	Information
FTSP Name	Specify a unique name in the storage system. Any alphanumeric character (from 1 to 16 characters), a hyphen (-), an underscore (_), and a pound symbol (#) can be specified. The characters are case insensitive.	tier1_sub
Disk Type	The same disk types are displayed as when the sub-pool was created.	Online
Reliability	The same RAID levels are displayed as when the sub-pool was created.	Mirroring(RAID1)
Fast Recovery Configuration	Specification is not necessary.	-
	Disk number that is used to expand the sub-pool.	6 and 7
Disk No.		8 and 9
		10 and 11

Table-26 Values for specifying a sub-pool (expansion)

19. Repeat Steps 1 to 7 to create a Tier pool (clone backup) for the VVOL datastores. For each setting, enter the items shown in the following table.

ltem	Information
Tier Pool Name	tier2_bkup
Disk Selection	Manual

Table-27 Values for specifying a Tier pool (backup)

ltem	Information
FTSP Name	tier2_sub
Disk Type	Nearline
Reliability	High Capacity(RAID5)
Fast Recovery Configuration	Unspecified
Disk No.	13, 14, 15, and 16

Table-28 Values for specifying a sub-pool (backup)

2.2.3.1.4 Checking the Tier Pools

Confirm that the Tier pools are created.

- In the global navigation tab, click [Storage].
 On the Main pane, click the ETERNUS DX S3 series link under [Name].

ETERNUS SF					User (est_admin <u>Loquut</u> FUIÎTSU
Normale av 01	0 00 =	0 10 00	🗐 🥥 27 🏦 0	00	± 2 40 00 2 40 00	ð Ø.
Main Storage Network 1	Server Map View	Schoduler Log Bys	tam			
Storage						
Storage	Overview					> Action
bisk Array	▼ Information					Disk Array
🚞 Disk Array (Manual)	1 List of Disk array	ns,				+ Discover
Tape Library Tape Library (Manual)						X Delete
Access Path	 Filter Setting 					X Modify
Correlation					Filter	
VVOL Management						Reload Cont.
	Selections: 0			Total 1 records	<< < 1/1 pages > >> 1 page Go Display 10 V	records Wizard.
	E Pan	IP Address	Model	Status	Performance Monitoring Status	Storage Conf.
	dc100s3	192.168.100.5	ET103A	Normal	(1) Stop	Acsign Volume
- Job Status						

Figure-62 Storage

3. On the Category pane, click [Automated Storage Tiering].

dx100s3		Log Bystem	A CONTRACTOR OF A CONTRACTOR OF A CONTRACT O	
0		and the second second second second second		and the second
	verview	sources of the second		+ Action
Ha	rdware Components	We want to the second state of the second stat		Disk Airay.
uma St	latus	Control Modules	Disks	X Delete
D Group	Available	2	18	X Modify
Provisioning	Warning	0		Resot Passwo
anced Copy	Error	0	0	Reload Conf.
nectivity				
onent 5	System Information			Automated QoS
m St	torage System Name	6:100s3		Activate
	lodel Name	ET103A		Stop
Second	enial No.	4860 8044 2880 TM		Reporting
ated Storege Tiering	OX ID	ODETERNUSCILOSETICS/V/W/WHHC0/1340	Diaw.	Activate
(an account of the second seco	irmware Version	V10L32-0000		
e Cluster	NMP Trop Setting	Setting up		Stop
				188 MIN
Sto	orage Capacity			IV STATE
100		Available (TB)	Total (TB)	
	aw	1.88	16.43	11350008.00
	berugined	0.00	7.48	PREPR
	AIDO	0.00	0.00	
	AID1 AID1+0	0.00	4.80	
	AID1+0 AID5	0.00	2.68	A REAL PROPERTY.
	AID5+0	0.00	2.66	
	AID6	0.00	0.00	Marcal Contractor of the
	AID6.FR	0,00	0.00	
10.50	HILL WE HE			- Total - Colors
1	Automated QoS	ALL STREET, SALES AND AND A SALES AND A	and the second of the second se	States and a state of the state
St	tatus	Stopped		
R	Reporting			
St	tatus	Stopped		I LL COLEEN

Figure-63 dx100s3

4. On the Category pane, click [Tier Pool]. The registered Tier pools are displayed on the Main pane.

ETERNUS SF		1 /								Usar ID : esf_	admin <u>Loquit</u> FU jîrs U
Normal	0	00 20	0 10 0	0 🗐 🔿 2	7 🛕 0 🤷 0	2 ► 0	<u>10</u>	30 I	i)		ð 0•
			Scheduler Log	Bystem							
Slorage > dc100s3 > Automated											
Automated Storage Tiering	Ti	er Pool									 Action
En Overvley De riseing Poisses		Information									Tier Poot
THE Pool	G) List of Tier pools									Create (One Layer)
E FIV	_		12								X Delete
Setting	P	Filter Setting									X Modily
									Filter	Clear	🔀 Modify Layer
								-			Start Balancing
	Sele	ctions: 0			Tot	al 2 records ** *	1/1 pages > >> [1	page G	o Disp	lay 10 🗸 records	
		Pool Number	Tier Pool Name	Pool Status	Total Capacity	Policy Name	Operating Status	Balanc	9.5	Assigned CM	Automated Storage Tiering:
		0	tier1_gold	Available	4.00 TB	-	Stop	Level High	Statue	Auto	Slop
			tier2_bkup	Available	2.68 TB	-	Stop	High	Stop	Auto	Evaluation
	-										🙀 Status Update
											Charls:
											Capacity Chart
- Job Status											

Figure-64 List of Tier pools

5. Check that the pools that were created in "2.2.3.1.3 Creating Tier Pools" are registered.

Tier Pool Name	Pool Status	Check 🗹
tier1_gold	Available	
tier2_bkup	Available	
	Could a second	J Time and

Table-29 Checklist for the created Tier pools

Check that all the Tier pools are created and that the status is [Available], and then proceed to the next procedure.

2.2.3.1.5 Creating WOL Datastores

- Create a VVOL datastore (gold).
 From ETERNUS SF Web Console, click [Storage] on the global navigation tab.
 On the Category pane, click [VVOL Management].
- 2. On the Action pane, click [Create/Modify] under [WOL Datastore].

ETERNUS SF						User ID es	Cadmin Local Fuins
Normal 📾 ©1 🔺	0 😳 0	2 01	0 00	B 07 AD 00	ED D 40 00		ð 🔊•
Main Storage Network Se	arver Map Vi	iew. Schedule	r Log Syste	m			
Storage > VVOL Management							
VVOL Management	VVOL Dat						Action
WOL Ententore	▼ Informati						Tier Pool:
VVOL Access Path VVOL Backup Management		/OL Datastores					Create Create (One Layer)
VVOL Elacitup History	VCenter		ts of one of more in	er Pools, create a VVOL Datasto	re first, and then specify it when cre	ating Virtual Volumes using VMware	WOL Datastere:
				when Virtual Volumes are added			Create/Modity
				tien using the Clone Backup fund a checked from the Tier Pool scre	tion. en for Automated Storage Tiering.		X
							for Clone Backup
	Filter Set	tting					Create/Modity
						Filter Clear) X Deleter
							-
	Selections: 0			Total	nacords << < 0/0 pages > >> 0	page Go Display 10 🗸 recon	18
	No.	Name	Status	VVOL Function	Total Capacity	Free Space	
	No data avait	able in table					
. Job Status	ð						

Figure-65 VVOL Management

3. Enter the items shown in the following table, and then click [Add].

Normal @ @1	10 00 20 10	©0 ∭ ©5 <u>∔</u> 0	So 💽 Þ <u>ö</u> 🔺 🖸 S	9 <u>0</u> 🐺 🗖		0
Main Storage Network	Server Map View Scheduler Log) System				
Create/Modify VVOL Datasto	ne					
Specify VVOL Datastore informat	lion Confirm					
 Information 						
Tier Pool can be shared with	ly created or modified on this screen. multiple VVOL Datastores or VVOL Datastor LETERNUS Disk storage systems cannot be					
 VVOL Datastore Information 	on					
Name *	igold de					
Total Capacity						
Free Space	0					
Tier Pool List						
Filter Setting						
					Filter	Clear
dr100s3	D teirt gold	Status	Total Capacity	Free Space 4.00 TB	4.02 TB	CM
dc100s3	0 teir1_gold	🕑 Available		4.00 TB	4.00 TB	Auto
D. D	tour_outh	Available		2.68 TB	2.68 TB	Auto
Remove Add						
 Tier Pool Configuration of 	W/OI Datastore					
Filter Setting	TTOL LUBBOR					
· rater setting						-
					Filter	Clear
			1	Fotal O records << < 010 pages > >> 0 p	age Go Displa	n/ 10 🗸 n
elections 0		Status	Total Capacity	Free Space		CM
Piections: 0 Disk Array	No. Name	512845	Total capacity			

Figure-66 Specify VVOL Datastore Information

	ltem	Information	
	Name	gold_ds	
	Tier Pool List	tier1_gold	
Table	30 Values for the "Spec	ify VVOL Datastore Information" setting	(gold)

4. Select the checkbox for the added Tier pool, and then click the [Next] button.

					User ID :	esf_admin <u>Loquut</u> FU j
Normal	<u>10</u> 0	# 00 A0 0	0 🗐 🕸 5 🔺 0 🚳 0	2 D 1 1 2 0 1	1 ⁴ 2 🗆	3
Main Bisraga Network	Server Map	View Scheduler Log	Bystem			
Create/Modify VVOL Data	astore					
Specify VVOL Datastere Info	mation 📏 Confirm					
▼ Information						
	eth multiple VVOL De	atastores or VVOL Datastores	for clone backup (up to 16). Ixed in a single VVOL datastore			
VVOL Datastore Inform	ation					
Name 1		gold ds				
Total Capacity		4.00 TB				
Free Space		4.00 TB				
▼ Tier Pool List						
► Filter Setting						
						Filter
Selections 0				Total 1	records << < 1/1 pages > >> 1	paga Go Display 10 🗸 rec
Disk Array	No;	Name	Status	Total Capacity	Free Space	CM
de100s3	1	tier2 bitup	Available		2.68 TB	2 68 TB Auto
[-		and the second se			
Remove Add						
 Tier Pool Configuration 	n of VVOL Datasto	re				
 Filter Setting 						
						Filter Clear
						Filter Clear
Selections: 1				Total 1	records << < 1/1 pages > >> 1	
Selections: 1	1901		Status	Total 1	records << < 1/1 pages > >> 1 Free Space	

Figure-67 Tier Pool Configuration of VVOL Datastore

5. The information confirmation screen is displayed. Confirm the information, and then click [Create / Modify] on the lower right corner of the screen.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next step. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

2.2.3.1.6 Creating a VVOL Datastore for Clone Backups

- Create a VVOL datastore for clone backups. On the ETERNUS SF Web Console screen, click [Storage] in the global navigation tab. On the Category pane, click [VVOL Management].
- 2. On the Action pane, click [Create/Modify] under [for Clone Backup].

ETERNUS SF						Usa	r ID 'esf_admin <u>Loqout</u> FUIT:
Normal . 01 A	0 📀 0	- 00 4	0 00 E	9 10 🔺 0 🚱 0 🔡	▶0 ▲ 9 ©1	्रेवा 🔳	0 (2)
	ever Map	New Scheduler	Log Bystem				
Slotece > VVOL Management VVOL Management	VVOL Da						
WOL Datastore	▼ Informa						Action TerPool
WOL Access Path							
VVOL Backup Management			s of one or more Tier Poo	xis. Create a VVOL Datastore first	and then specify if when crea	ting Virtual Volumes using Villwa	are Create (One Layer)
😑 WOL Backup History	vCente	r Senrer.					VVOL Detastore.
				Virtual Volumes are added to the ang the Clone Backup function	VVOL Datastore.		X Create/Modify
				ked from the Tier Pool screen for (Automated Storage Tiering		X Delete
	a Cheve						for Clone Backup:
	► Filter Se	atung				(CreateAlrost
						[Filter]C	lear X Delete
	Outraliana 0			Tatal 1 mon	ds << < 1/1 pages > >> 1	page Go Display 10	
	Selections: 0		1 month of the second				- incords
	No.	Name	Status	VVOL Function Disable	Total Capacity	Free Space 4.00 TB	4.00 TB
	1	gold_ds	Normal	Disaple		4.00 18	40018
. Job Status							

Figure-68 VVOL Management

3. Enter the items shown in the following table, and then click [Add].

ETERNUS SF					Usar ID : et	sf_admin <u>Loqout</u>	FUIN
Normal # 01	10 00	# 00 A0 00	E 🔿 10 🛕 0 🔞	00 👔 🌬 🔺 🛛 🕄	27 日		3
Main Storage Network	Server Map View	w Scheduler Log	Bystem				
Create/Modify VVOL Datas	store for Clone Bac	kup					
Specify VVOL Datastore Inform	ation for Clone Backup	p Confirm					
 Information 							
	for clone backup can be	reated or modified on this sc e created per disk storage sy stores or VVOL Datastores fo	ystem.				
 VVOL Datastore for Clor 	ne Backup Informat	don					
Name =		bioup_ds					
Total Capacity		-					
Free Space		9					
 Tier Pool List 							
 Filter Setting 							
						Filter	lear
elections 1				Tota	al 2 records << < 1/1 pages > >> 1 pages > >>	ge Go Display 10 •	v reco
Disk Array	No,	Name	Status	Total Capacity	Free Space	CM	
dv100x2		Head webd	🥝 Available		4.00 TB	atuA BT 00.4	
✓ dc100s3	1	Ber2_blup	nvailable 🧭		2.68 TB	2.68 TB Auto	
Remove Add							
* Tier Pool Configuration	of WOL Datastore	for Clone Backup					
Filter Setting							
						Filter	lear
				Tatz	al O records << < 0/0 pages > >> 0 pages	ige Go Display 10 v	reco
elections: 0							
elections: 0	No.	Name	Status	Total Capacity	Free Space	CM	

Figure-69 Specify VVOL Datastore Information for Clone Backup

ltem	Information
Name	bkup_ds
Tier Pool List	tier2_bkup

Table-31 Values for the "Specify WOL Datastore information for Clone Backup" setting

4. Select the checkbox for the added Tier pool, and then click the [Next] button.

						sf_admin <u>Loqout</u>	FUIIT
Normal == ©1	<u>10</u> 0	# ©0 ±0 ©	0 🗿 10 🔔 0 🚳 🗓	B ▶ 2 ▲ 2 ⊗ 1	*₩ □		Ì
Main Biorago Network	Server Map \	New Scheduler Log	Bystam				_
Create/Modify VVOL Datas	store for Clone B	ackup					
Specify VVOL Datastore Inform	nation for Clone Bad	kup Confirm					
 Information 							
	for clone backup car	be created per disk storage					
· VVOL Datastore for Clor	e Backup Inform	ation					
Name *		bkup_ds					
Total Capacity		2.68 TB					
Free Space		2.68 TB					
▼ Tier Pool List							
► Filter Setting							
						Filter	Clear
elections 0				Total	1 records << < 1/1 pages > >> 1 pages > >>	ga Go Display 10	✓ rei
Disk Array	No.	Name	Status	Total Capacity	Free Space	CM	
	No; 0	Name Berl_gold	Status Available	Total Capacity	Free Space 4.00 TB	CM 4.00 TB Auto	
dx100s3 Remove Add Tier Pool Configuration	0	ber1_gold		Total Capacity		4.00 TE Auto	
de100s3	0	ber1_gold		Total Capacity		4.00 TE Auto	Clear
dx100s3 Remove Add Tier Pool Configuration	0	ber1_gold				4.00 TB Auto	
de:100:3 Remove Add Tier Pool Configuration Filter Setting	0	ber1_gold			4.00 TB	4.00 TB Auto	

Figure-70 Tier Pool Configuration of VVOL Datastore for Clone Backup

5. The information confirmation screen is displayed. Confirm the information, and then click [Create / Modify] on the lower right corner of the screen.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next procedure. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

- 2.2.3.1.7 Checking the WOL Datastores Confirm that the WOL datastores are created.
 - 1. In the global navigation tab, click [Storage].
 - 2. On the Category pane, click [WOL Management]. The registered WOL datastores are displayed on the Main pane.

ETERNUS SF							Usar ID : esf_	admin <u>Loqout</u> FU jîrs U	
Normal # ©1 A	0	00	# 00 4	Lo ©0 II	◎ 10 ▲ 0 ② 0 👔 ►	0 🔺 9 🛛 1 🖓 🔳		ð 0.	
	erver	Map V	New Scheduler	r Log Bystem					
Slotage > VVOL Management	-								
VVOL Management	VVOL Datastore							Action Ter Poot	
VVOL Datastore								Create	
VVOL Backup Management	0		WOL Datastores. Datastore constal	is of one or more Tier P	nois Creste a W/Di Datastore first and	i then specify it when creating Virtual Vo	unes using Villager	Create (One Layer)	
📴 VVOL Backup History		vCenter				the second s	and an of a second	VVOL Detastore	
					n Virtual Volumes are added to the VVO using the Clone Backup function	L Datastore.		X Create/Modify	
		X Delete							
								for Clone Backup:	
								Create/Modify	
	Filter Clear >							X Delete	
	Selections: 0 Total 2 records +< < 1/1 page Go Deptay 10 V records								
		actions: 0							
	-	NO.	Mame	Status	VVOL Function	Total Capacity	Free Space		
		1 2	aold ds blage ds	Normal	Disable Enable(CloneBackup)	4.00 TE 2.68 TE			
	1	*	REPORT OF	- Horiba	chabelevoneparvobi	2.00 10	2.0616		
. Job Status									

Figure-71 List of VVOL datastores

3. Check that the WOL datastores that were created in "2.2.3.1.5 Creating WOL Datastores" are registered.

Name	Status	WOL Function	Check 🗹		
gold_ds	Normal	Enable(VVOL)			
bkup_ds	Normal	Enable(CloneBackup)			
Table-32 Checklist for the created VVOL datastores					

Check that all of the WOL datastores are created, and then proceed to the next procedure.

2.2.3.2 vCenter Server Operations

2.2.3.2.1 Rescanning the Storage Provider

1. Make the vCenter server recognize the VVOL datastores that were created in "2.2.3.1.5 Creating VVOL Datastores". Click the [Rescan] button on the [Storage Providers] screen.

lavigator	I G ucenter wolltest.local	Actions *					🖸 Alarn	ns I
vCenter Inventory L 🕕 😨	Getting Started Summa	ary Monitor Manage Rel	ated Objects				All (0)	New (0) Acknowl
VCenter Servers	Settings Scheduled Ta	sks Storage Providers Alam	Definitions Tag	s Permissions	Sessions			
vcenter.woltestlocal	>				[]			
	Storage Providers							
	+ 6 😐 🕯 🕯	d		oby: Storage		(Q. Filter	-	In Progress
	Storage Privile Privile Storage S			Prietty'	URL		Case Support	in erogense
	 eternus-vasa-provide 				https://esi-va	sa woltestlocat 31	BV28/201	
	dict 00 s3 (1rt online	9	Active	0				
	10.01							
	14 I				100	7.844	ь ца Ца =	
	-					2 690	o 146 -	
	Storage Provider Details		No.					
		General						
	Oeneral	General						
	Supported vendor IDs	Provider name	Provider name etemus-vasa-provider					
	Certificate info							
		Active/standoy statu						
		URL	Automatic Automatic URL https://eservectasticcet.31443/veee/version.xml					
				IS 8. WOLTBSTIDCE	01144314688/96	rsion ami		
		Provider version		20.0				
		WASA API version	2.0					
		Default namespace	com.fuitsu.e	sternus			•	
Recent Tasks	1							I
			1.1			Anno 1997 -		
llame		Statue	in Bater	Guar		Stat Time	Completion 7 me	Server
ame virtual machine	D vcenter_OLD	 Completed 	root		23 ms	8/28/2015 9:15:02 PM	B/2B/2015 9:15:02 PM	vcenterwoltesticcal

Figure-72 Storage Providers

2.2.3.2.2 Registering WOL Datastores

1. Register the VVOL datastore (gold) in the vCenter server. Click [Actions] - [Storage] - [New Datastore].

avigator X	Chatacenter 1	Actions *			🔁 Alarms	4.0
Datacenters F 🕤	Oatting Started	R Actions - datacenter1	1	- Arriterio	AI (II) New (0)	Acknowl
datacenter 1		1 Add Host.			The second second	
Top Level Objects	Scheduled Tasks	🕎 New Cluster	ork Protocal Prafiles			
🗘 Clusters 📰	To create a sof an object in the		 New Task drop-down menu from below a Ctrl. The clock icon that appears who 	w. You can also navigate to		
🗄 Hosts 📰 🗔	the actions the scheduling opt		 Snapshot, or Add Host. Select an actio 	n and configure the		
🔁 Virbuel Machines 📃		New Wald Yom Library		on and the set	Work In Progress	_
Q VM Templates in Folders	🔝 Schedule a N	🎲 Deploy OVF Template			· North Fingless	
🕷 wappis 📖	Task	Storage	New Datastore.	Next Rus		
Datastores		Edit Default VM Compatibility	Eg Personal and a state of the			
🗐 Datastore Clusters 🛛 🛄		🚓 Nigrale VM to Another Network	Rescan Storage			
😟 Netwarks 📃		Nave To				
a Distributed Bwitches		Bename				
A Distributed Port Groups		Таде				
		Add Permission				
		Alarms	,			
		X Delete				
		AllyRealize Orchestrator plugin Actions				
		An Archite Grent and an programmed and	1			
	86			0 items 🕞 -		
		No Ren	15 Selected.			

Figure-73 New Datastore

2. Confirm the location, and then click [Next].

ſ	🔠 New Datastor
---	----------------

🖺 New Datastore			? ₩
1 Location	Location:	🛐 datacenter1	
2 Туре			
3 Name and device selection			
4 Partition configuration			
5 Ready to complete			
		Back Next Fi	nish Cancel
		Data heat	- Cancer

Figure-74 Location

3.	Select	[VVOL].	and	then	click	[Next]	١.
۶.	Jereet		unu	uncin	CIICK	lucve	Ł

	2	New Datastore		? ⊮
L		1 Location 2 Type 3 Name and container selection 4 Select hosts accessibility 5 Ready to complete	UNFS Create a VMFS datastore on a stakULUN. NFS Dreate an NFS datastore on an NFS share over the network. VVOL O VVOL Oreate a Virtual Volumes datastore on a storage container connected to a storage provider.	
l			Back Next Finish Can	cel ja

Figure-75 Type

4. Type "g_datastore" for [Datastore name], select [gold_ds] in [Backing Storage Container], and then click [Next].

1	New Datastore						(?)	••
	1 Location	Datastore name. g. d	atastore]
	2 Type 3 Name and container selection	Backing Storage Conta	siner					
	4 Select hosts accessibility					(Q, Filter)
	5 Ready to complete	Name gold_ds		wol:60.00.00ef0d.28000.0-0	128.00 TB	Creitino Datatore		,
		84				1 item	s 🔒	
				PE LUNs need to be configure d without configuring PE LUN				
		Backing Storage Conta	ainer Details					
		Storage array(s)	dx100s3					
		Storage provider(s)	eternus-vasa	provider				
					Back	Next Finish	Cancel	D,

Figure-76 Name and container selection

5.

Select the hosts	s, and then click [Next].						
	1 New Datastore						(?)»
	 1 Location 	Selec	t the hosts that require access to the datas	tore.			
	 2 Type 3 Name and container selection 				Cluster	(Q Filter	•
	selection Solect hosts accessibility S Ready to complete		Not vole sxi01 wol test local vole sxi01 wol test local vole sxi03 wol test local vole sxi03 wol test local)	Cluster		
					Back	Next	Cancel
					Back	Next Finish	Cancel

Figure-77 Select hosts accessibility

6. Check the configuration values, and then click [Finish].

📋 New Datastore			•			
 1 Location 	General:					
🖌 2 Type	Name <u>g_</u> diataisto	Name <u>p_detsstore</u>				
3 Name and container selection	Type wol					
4 Select hosts accessibility 5 Ready to complete	Backing storage conta	ainer details:				
	Name	gald_ds				
	UUID	vto :500000:00d380000 00;	3800::000 000			
	Storage array(s)	dk100s3				
	Storage provider(s)	etemus-vasa-provider				
	Hosts that will have a	ccess to this datastore:				
	Host		Cluste)			
	woles:d01.wai.te		🗊 Cluster			
	wolessiD2.wol.te		🗐 Cluster			
	vvolesxiD3.vvol.te	stiocal	🗊 Cluster			
			Colline and the second s			
			Back Next Finish Cancel			

Figure-78 Ready to complete

For each setting, enter the items shown in the following table.

ltem	Information
Location	Datacenter1
Туре	VVOL
Datastore name	g_datastore
Backing Storage Container	gold_ds
Host	vvolesxi01 - vvolesxi03

Table-33 Values for registering VVOL datastores (gold)

2.2.3.2.3 Checking the VVOL Datastores

Confirm that the registered WOL datastores are mounted on all the ESXi hosts.

- 1. From Navigator, click [Hosts and Clusters].
- 2. From the Navigator tree, click an ESXi host.
- 3. For the ESXi host, select [Related Objects] [Datastores].

vmware vSphere Web	Client n≣					l Hep + I 🧿	l Bearth	•
Navigator	1	avoiesxi01.wol.test.local	Actions +			💷 💆 Ala	rms I	L X
(4 Home	10	Getting Started Summary	Monitor Manage Re	elated Objects		ALL	D New (0) Acknowl	
	2							
👻 😰 voenter vvol test local		Virtual Machines VM Templ	ates in Folders Network	S Distributed Switches	ratastores			
★ <u>m</u> Datacenter1 ★ <u>m</u> Output		3 # 0 C B 1	🚮 🛛 🧰 Actions 👻	10	It Q Filter	-		
all sweles till swel test lo		Name	1 . Steles	Type	Datastana Ch	aba		
Non-rest of the second		datastore1	O Normal	VMF55				
🗐 vuolessi03 vuol.test la	cal	erorastab_e	Normal	WOL				
📑 estvaca		VMF8_Datastore	Normal	VMF85				
👸 voanter								1
						in state	rk In Progress	*
		84			3 Oble	ots 🚽 •		. 1
-								- 1
🝸 Recent Tasks						1.00	I	X
Taxiname	Target	Statue	initiative.	Queset For	Stat Time	Completion Time	Sever	
Unregister virtual marhine	p test2-mei7_esx01		root		9/3/2015 6:57:57 PM	9/3/2015 6:57:57 PM		11
Unregister sidual machine	@ WinNewinstell	 Completed 	root		9/3/2015 8:57:41 PM	9/3/2015 6.67.41 PM		
Unrepister virtual machine	(i) test2-mei7_est01	 Completed 	root	31 ms	9(3/2015 6:57:34 PM	0/3/2015 6 57 34 PM		
Unregister virtual machine	di test2-rhei7-exx02	 Completed 	root	10 ms	9/3/2015 6:57:22 PM	9/3/2015 6 57:22 PM		
Initiate guest CS shutdown	B test2-mei7_esx01	 Completed 	root	10 ms	9/3/2015 6:57:14 PM	B/3/2015 6:57:14 Pk		
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Unregister virtual machine	D Template-RHEL-S	✓ Completed	root		9(3/2015 6:50:51 PM	9/3/2015 0:56:51 PA		
Unregister virtual machine	B Serven019	 Completed 	root	9 ms	9/3/2015 6:56:04 PM	8/3/2015 6:56:04 PM		
Unregister virtual machine	d wenter_Case1-3	 Completed 	root		9/3/2015 8:55:50 PM	9/3/2015 6:66:50 PM		
Wy Tasks * Tasks Filter *	Excerning Converting Co	and a second second	1999	11115	and a state of the second s	Contraction of the second of the	Nore Ta	
Ny rears * Table Filef *							MOCE. TR	22

Figure-79 Checking the created vCenter Server VVOL datastores

Check that the WOL datastores that were mounted on the ESXi hosts in "2.2.3.2.2 Registering WOL Datastores" are mounted on each ESXi host.

ESXi host	WOL datastore	Check 🗹
vvolesxi01	g_datastore	
vvolesxi02	g_datastore	
vvolesxi03	g_datastore	

Table-34 Checklist for the VVOL datastores mounted on the ESXi hosts

Check that the WOL datastores are mounted on all the ESXi hosts, and then proceed to the next procedure.

2.2.3.2.4 Creating Policies

1. Create a policy for gold.

In vSphere Web Client, click [VM Storage Policies] in [Home].

vmware [*] vSphere Web Client	: n =						glacalos - 1 Help	• I Q Bearth	•
Nædgator I	💮 Home							🖸 Alarms 🛛 🗸	×
🔍 History 🔰 🔊	Home							All (0) New (0) Acknowl.	
📶 Home	Invortorias								
Volas and Templates Vola and Templates Storage Networking	vCenter Inventory Lists	Hosts and Clusters	VMs and Templates	Storage	Siebwarking	Content Libraries	VRealize Orchestrator	📝 Work in Progress	
Rendering Policies and Profiles Of vRealize Orchestrator	Muniforing		\$ 20						
Administration >	Task Console	Event Console	vCenter Operations Manager	Host Profiles	VM Storage Policies	Customization Specification Manager			
The Events	Administration								
🥥 Tags	28	-	2						
Q New Downh >	Roles	Option Configuration	Ucensing						
	Uvatch How	ta Videos							

Figure-80 Home

2. Click the [Create New VM Storage Policy] icon.

vmware vSphere Web Client	CAE .		C roceans I G		Help + I 🔍 Search	
Navigator #	📑 VM Storage Policies				🖸 Alarms	1×
(Home)+ 🕥	Objects				AIL(0) New(0)	Arknowle_
🞼 YM Storage Policies 📃 🔛						
🗟 Virtual SAN Default Storage Policy		Deputption	Ng (Q Fiter			
📑 Wol No Requirements Policy	G Virtual BAN Default Storage	Storage policy used as default?.	😥 voenter.voi test incel			
	Wal No Requirements Policy	Allow the datastore to determine				
					The second second second	
					🥑 Work in Progress	*
	86	-	2 Objects	· [] •		
				18800088		

Figure-81 Creating a new virtual machine storage policy

3. In [Name and description], type "gold_policy" in [Name], and then click [Next].

🚰 Create New VM Storage Policy		€ §
 1 Name and description 2 Rule-Sets 2 a Rule-Set 1 3 Storage compatibility 4 Ready to complete 	Name and description Enter a name and (optional) description vCenter Server: veenter.wolitest.local v Name: gold_policy Description:	
	Back Next Finish Can	cel ,

Figure-82 Name and description

4. In [Rule-Sets], specifying [Rules based on data services] as [com.fujitsu.eternus] displays the [Add rule] pull-down list. Use this pull-down list to specify the values for the virtual machine backup settings. For each setting, enter the items shown in the following table.

After entering the information, click [Next].

1 Name and description 2 Rule-Sets	Rule-Set 1 Select rules specific for a datastore type. Rules can be be The VM storage policy will match datastores that satisfy a	ased on data services provided by datastore or based on tags. If the rules in at least one of the rule-sets.	
28 Rule-Set 1 3 Storage compatibility	Rules based on data services com.tujitsu eternus		
4 Ready to complete	Virtual Machine Backup		0
	Operation Mode 0	Auto	
	Execution Period	Deily	
	Execution Interval(Hour)	12	
	Execution Vveck 0	I Sun.	
		Mon.	
		Tue.	
		Vved.	1
	Execution Day 🚯	1	
	Execution Start Time(Hour) 🔞	22	L
	Execution Start Time(Minute) 0	30	
	Number of Bnapshot Backup 🚯 Generations	0	
	Guleace guest file system 🔞	Enable	
	Snapshot the virtual machine's 0 memory	Enable •	
	Clone Backup 🕕	Enable	
	«Add rule» 🔹		
	Rules based on tags		
	Add tag-based rule		
		Add another rule set Remove this rule	ile s
		Back Next Finish	Cano

Figure-83 Virtual machine backup policy (Rule-Set 1)

ltem	Information
Name	gold_policy
Operation Mode	Auto
Execution Period	Daily
Execution Start Time(Hour)	22
Execution Start Time(Minute)	30
Number of Snapshot Backup	0
Generations	U
Quiesce guest file system	Enable
Snapshot the virtual machine's	Enable
memory	LIIOUIE
Clone Backup	Enable

Table-35 Values for the virtual machine backup settings (gold)

5. In [Storage compatibility], [Compatible storage] displays the VVOL datastores that can fulfill the created policy. Select [g_datastore], and then click [Next].

1 Name and description	Storage compatibility As defined, this VM st		(is compatible with)	he following	1 storage:		
2 Rule-Sets	As defined, this wirst	lorage points	is comparise with	ne lanawing	y sionage.		
2a Rule-Set 1	C						
3 Storage compatibility	Storage Compatibility	Total Capa	city Virtual SA	N Capacity	Virtual Volumes Dap	VMFS Capaci	ty NES Capacity
4 Ready to complete	Compatible	4.00 TB	0.D0 B		4.00 TB	0.00 B	0.00 B
	Incompatible	1.44 TB	0.00 B		0.00 B	1.44 TB	0.00 B
	*	₽ •					Q Filter
	Compatible storage						
	Name		Datacenter	Туре	Free Space	Capacity	Warnings
	🗐 g_datastore		🛅 Datacenter1	WOL	4.00 TB	4.00 TB	

Figure-84 Storage compatibility

6. In [Ready to complete], click [Finish].

😚 Create New VM Storage Polic	y .					- (?) H
 1 Name and description 2 Rule-Sets 	Ready to complete Confirm that the informatio	n below is correct and clic	k Finish to create the VM st	torage policy.		
 2a Rule-Set 1 	General					
 3 Storage compatibility 	Name gol	1_policy				
4 Ready to complete	Description					
	vCenter Server Ivce	nter xvolite stilocal				
	Rule-Set 1: com.fujitsu.e	ternus				
	► Virtual Machine Bac	kup (Expand to	view property details)			
				Back Next	Finish	Cancel
k						

Figure-85 Ready to complete

7. Create a policy for silver.

For each setting, enter the items shown in the following table.

ltem	Information
Name	silver_policy
Operation Mode	Auto
Execution Period	Weekly
Execution Week	Sun.
Execution Start Time(Hour)	01
Execution Start Time(Minute)	00
Number of Snapshot Backup Generations	3
Quiesce guest file system	Enable
Snapshot the virtual machine's memory	Enable
Clone Backup	Enable

Table-36 Values for the virtual machine backup settings (silver)

2.2.3.2.5 Checking the Policies

Check that the virtual machine storage policies are registered correctly.

- 1. From Navigator, click [Home].
- 2. In [Home], click [VM Storage Policies] under [Monitoring].
- 3. Check that [VM Storage Policies] displays the created policies.

vmware [,] vSphere Web Client	As .		🕹 I romgicoalos + I	Help + I Q Search	
Navigator #	📑 VM Storage Policies			1 Alarms	1 × 1
(+ Home) + 🕤	Objects			AIL(0) New(0)	Arknowle_
📚 VM Storage Policies 📃	1000				
🕞 gold_policy	Rama	Deputption	YG (Q. Filter -)		
B silver_policy	Virtual BAN Default Storage	Storage policy used as default?.	womter.vol.test.incal		
🐼 Virtual SAVI Default Storage Policy	Wallie P	Now the datastore to determine			
📑 Wol No Requirements Policy	🔯 gold_policy		👩 voenter.wolitestional		_
	📑 silver_policy		wenter.wol.test.tot.al	Work in Progress	
				Work in Progress	*
	84		4 Objects 🕞 🔹		
				1	

Figure-86 Checking the virtual machine storage policy of vCenter Server

Check that the WOL datastores that were mounted on ESXi hosts in "2.2.3.2.2 Registering WOL Datastores" are mounted on each ESXi host.

Name	Check 🗹
gold_policy	
silver_policy	
7 Charlelian far hha wirk	und an a chùn a sha ra a

Table-37 Checklist for the virtual machine storage policies

Check that the virtual machine storage policies are created, and then proceed to the next procedure.

2.2.4 Virtual Machine Creation Procedure

Create virtual machines to be used as business servers. As an example, this procedure creates a virtual machine named "gyomu01".

1. Click [Actions] - [New Virtual Machine] - [New Virtual Machine].

	# 📑 datacenter 1	Actions #			3	±* 0	Alarms
Detacements detacontent detaconte	What is a Datace A datacenter is i invertory objects machines. From	Distributed Switch		Hual Machère()		-	All (0) New (0) Acknow
	add hosts, faide	 May Wepp from Ligrary. Deploy OVF Template. Storage Edit Default VM Compatibility 	к	Bost		1000	r Work to Progress New Virtual Nachune
	🔁 Add a dat	All (Realize Ortheshabir plu st cluster new virtual machine	Learn more ab	usters			
🛐 Abocenti Taska							
Record Tasks	Tayat	Strike	Instation	Queved Far	Stat Time Congi	stics Time	Gauer :

Figure-87 Creating a new virtual machine

2. In [Select a creation type], select [Create a new virtual machine], and then click [Next].

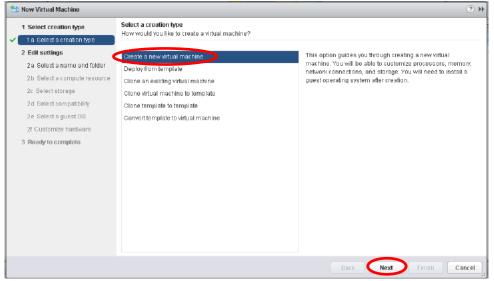


Figure-88 Select a creation type

3. In [Select a name and folder], type "gyomu01", and then click [Next].

🔁 New Virtual Machine	() H
 1 Select creation type 1 a Select a creation type 	Select a name and folder Specify a unique name and target location	
2 Edit settings	Enter a name for the virtual machine.	
2a Select a name and folder	gyamu01	
2b Select a compute resource	Virtual machine names can contain up to 80 characters and they must be unique within each vCenter Server VM folder.	
2c Select storage	Select a location for the virtual machine.	
2.d. Select compatibility	Q Search	
2e Selectia guest OS	v 🐻 vcenter wal test local	
2f Customize hardware	Gatacenter1	
3 Ready to complete	Select a distacenter or VM folder to create the new virtual machine in.	
	Back Next Finish Caned	9

Figure-89 Select a name and folder

4. In [Select a compute resource], select a host, and then click [Next].

😰 New Virtual Machine		⑦ ₩
 1 Select creation type ✓ 1 a Select a creation type 	Select a compute resource Select the destination compute resource for this operation	
 2 Edit settings 2a Select a name and folder 2b Select a consulta resource 2c Select storage 2d Select compatibility 2e Select a guest OS 2f Customize hardware 3 Ready to complete 	Search Search Select a cluster, host, vApp or resource pool to run this writual mischine. Select a cluster, host, vApp or resource pool to run this writual mischine.	
	Compatibility: Compatibility checks succeeded.	
	Back Next Finish Ca	ancel

Figure-90 Select a compute resource

5. In [Select storage], select the values shown in the following table, and then click [Next].

New Virtual Machine						(?
1 Select creation type 1 a Select a creation type	Select storage Select the datastore in which t	to store the configuration	n and disk files			
2 Edit settings	VM Storage Policy: gold_pol	icy				
2a Select a name and folder	The following data stores are		tination resource that	tyou selected. Select	the destination d	stastore for the
2b Select a compute resource	virtual machine configuration			1,00 0010000 0. 00100		34666767676767
2c Select storage	Name	Capacity	Provisioned	Free	Туре	Storage DR
2d Select compatibility	Compatible					
2e Select a guest OS	g_datastore	4.00 TB	1.52 GB	4.00 TB	WOL	
Zf Customize hardware	Incompatible					
3 Ready to complete	VMFS_Datastore	819.25 GB	722.52 GB	386.11 GB	VMFS 5	
	datastore1	128.75 GB	189.34 GB	80.35 GB	VMFS 5	
	4					
	Compatibility:					
	Compatibility checks su	cceeded.				
				Back		an Cante
				Back	Next Finis	Canci

Figure-91 Select storage

ltem	Information
VM Storage Policy	gold_policy
Datastore	g_datastore

Table-38 Values for the "Select storage" setting

6. In [Select compatibility], click [Next].

1 Select creation type Select compatibility 2 La Select a creation type Select compatibility for this virtual machine depending on the hosts in your environment 2 Edit settings The host or cluster supports more than one VMware wirtual machine version. Select a compatibility for the vortex of the host or cluster supports more than one VMware wirtual machine version. Select a compatibility for the compatibility for the vortex of the host or cluster supports more than one VMware wirtual machine version. Select a compatibility for the compatibility for the compatibility for the vortex of the compatibility for the vortex of the host or cluster supports more than one VMware wirtual machine version. Select a compatibility for the compatibility for the vortex of the	(?))
2a Selecta name and folder 2b Selecta computeresource 2c Select storage 2d Select compatibility 2e Select a guest OS 2f Customice hardware	
 2b Select a compute resource 2c Select storage 2d Select competibility 2d Select competibility 2d Select a guest OS 2f Customize hardware 	e virtual machine.
Customize hardware Customize hardware Customize hardware Customize hardware Customize hardware Customize hardware	•
21 Custombe hardware	
Back Nox	Finish Cancel

Figure-92 Select compatibility

7. In [Select a guest OS], enter the items shown in the following table, and then click [Next].

1	New Virtual Machine		- ? »
~	1 Select creation type 1 a Select a creation type 2 Edit settings	Select a guest OS Choose the guest OS that will be installed on the virtual machine Identifying the guest operating system here allows the wizard to provide the appropriate defaults for the operating system	
3 3 3 3 5 7	2a Select a name and folder 2b Select a compute resource 2c Select storage 2d Select compatibility 2e Select a guest OS 2f Customize hardware 3 Ready to complete	Installation. Guest OS Forms: Linux Guest OS Versito: Red Hat Enterprise Linux 7 (84-bit)	
		Compatibility: ESKi 6.0 and later (VM vers Back Next Finish (sion 11) Dancel

Figure-93 Select a guest OS

Information
Linux
Red Hat Enterprise Linux 7 (64-bit)

Table-39 Values for the "Select a guest OS" setting

8. In [Customize hardware], enter the items shown in the following table, and then click [Next].

1	New Virtual Machine		• •
~	1 Select creation type 1 a Select a creation type	Customize hardware Configure the virtual machine	a hardwara
	2 Edit settings	Virtual Hardware VM Ont	SDRS Rules
1	2a Select a name and folder	F 🗖 "CPU	
×	2b Select a compute resource		
~	2c Select storage	him Memory	4 GB T
~	2d Select compatibility	🔜 "New Hard disk	40 😴 GB 🔫
~	2e Select a guest OS	▶ 🖳 New SCSI controller	VMware Paravirtual
	2f Customize hardware	▶ Image New Network	VM Network
	3 Ready to complete	▶ 🛞 New CD/DVD Drive	Client Device
		🕨 📑 New Flappy árive	Client Device
		N 🔤 Video card	Specify custom settings
		► Qui VMCI device	
		▶ @ New SATA Controller	
		▶ Other Devices	•
		New device:	Select Add
			Compatibility ESXi 8.0 and later (VM version 11)
			Back Next Finish Cancel

Figure-94 Customize hardware

ltem	Information
CPU	2
Memory	4GB
New Hard disk	40GB (system area) 100GB (data area)

Table-40 Values for the "Customize hardware" setting

9. In [Ready to complete], click [Finish]. When a virtual machine is powered on, it is automatically registered to the ETERNUS SF system.

🔁 New Virtual Machine			
1 Select creation type	Provisioning type:	Create a new virtual machine	*
 1 a Select a creation type 	Virtual machine name:	gyomu01	
2 Edit settings	Folder:	Datacenter1	
 2a Selects name and folder 	Host:	wolesid01.woltest.local	
 2b Select a compute resource 	Diataistoire:	<u>q_datastore</u>	
 2c Select storage 	VM storage policy:	gold_policy	
 2d Select compatibility 	Guest OS name:	Red Hat Enterprise Linux 7 (54-bit)	
 2e Select a guest OS 	GPUS:	2	
 2f Customize hardware 	Memory:	4 GB	
✓ 3 Ready to complete	NICs:	1	
	NIC1 network:	VM Network	
	NIC 1 type:	VMXNET 3	
	SCSI controller 1:	VMware Paravirtual	
	Create hard disk 1:	New virtual disk	
	Capacity:	40.00 08	
	Datastore:	g_d atastore	
	VM storage policy.	gold_policy	*
		Compatibility, ESXI 6.0 and later (VM ver	sion 11)
		Back Next Finish	Cancel

Figure-95 Ready to complete

10. Install and set up Windows Server 2012 R2.

Create new virtual machines or clone the created virtual machine to prepare the required number of virtual machines.

Checklist

Confirm the following item.

- On vSphere Web Client, clicking [VMs and Templates] in [Home] displays the created virtual machines.

2.3 Operational Procedure

2.3.1 Virtual Machine Backup/Restore Procedure

- Backing up snapshots/clones
 - 1. On the virtual machine, create a file for confirming that a backup/restore has been successfully executed. For the Command Line User Interface (CUI), perform the following steps.

```
# touch <file for confirmation>
```

Example

```
# touch /data/test1.txt
# touch /data/test2.txt
# ls -1 /data
:
-rw- r-r-- .1 root root 0 ... test1.txt
-rw- r-r-- .1 root root 0 ... test2.txt
```

The following screenshot is a display example of the GUI.

		data				_ = >
< > C data	1			٩	= :	• •
Places	Name		~	Size	Туре	Modified
O Recent	test1.txt			0 bytes	Text	15:30
1 Home	test2.txt			0 bytes	Text	15:30
Documents						
Downloads						
dd Music						
Dictures						
🗏 Videos						
🔟 Trash						
Devices						
🖬 Floppy Disk						
Server01G						
Network						
🖵 Browse Network						
🖳 Connect to Server						

Figure-96 Creating files for confirmation

2. In the global navigation tab, click [Storage]. On the Category pane, click [WOL Management]. 3. On the Category pane, click [WOL Backup Management].

Management	VVOL Datastore			> Action
WOL Datastore	▼ Information		,	Tier Poot
VOL Backup Managen VOL Backup Managen	A WOL Datastores A WOL Datastore consists of vCenter Server. The WOL Function is automa Create a WOL Datastore for	f one or more Tier Poets. Create a VVDL Datastore to atcally enabled when Virtual Volumes are added to th clene backop when using the Clene Backop Junction is screan can be checked from the Tier Poet screen fit	e VVOL Datastore.	mes using Wilware
				for Clone Backup:
	► Filter Setting			Create/Modify
			[File	ar Clear X Detete
	1 aoki ds 2 bksp_ds	Normal Disable Normal Enable(CloneBackup)	4.00 TB 2.68 TB	4.00 TB 2.08 TB

Figure-97 VVOL Management

On the Main pane, select a virtual machine to back up.
 On the Action pane, click [Execute] under [Manual Execution].

					1000				Alexandra (George		
Management		up Manageme	nt			and the Real Property lies, in such that	the second second			- 10	Action Auto Execution
WOL Datastore WOL Access Path	▼ Informatio					-		-			C Enable
VOL Backup Manageme			p definitions for VM is screen when bec		on is enable	d in creating Vi	irtual Volume	and VMware	vCenter Server is register	od to	G Disable
WOL Backup History	ETERNUS	BF.									martial Exet up
	-Deckup ins	nory can be viewe	d and restored on a	acti vivierare Go	Net Ostali S	C1994					Execute
	► Filter Setti	ng	to inelation	W Williams		n shur	to the second	West Y	Sector and the sector of the		a showing the
									Filtor	Clear	Transfer Ive
					-			-	-		A Styleman
	Selections: 1					32 records <<	< 1/4 page	s 2 22 [1	paga Go Cisplay 1	ebroset 🔽 C	1.1
	VMwara G	ioest		Operation	Auto Ea	recution	Next		Number of Snapshot	Clone	Contraction of the
	Name	IP Address	Name	Mode	Status	Execution Period	Start	Last Result	Generations	Backup	
				Alexand and		The states	Time	Typeson	A TATAL TATA	Factble	
)	wolesxi03 wolesxi03	Manual Manual		Monthly				Enable	ACRI 19
											To at a lot of

Figure-98 VVOL Backup Management

5. The warning dialog box is displayed. Confirm that the backup operation will not cause a problem, and then click [OK].

6. A message is displayed to inform that the process has been accepted. Click the [Done] button.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next procedure. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

Checklist

Confirm the following items.

- On the Main pane of the [WOL Backup History] screen, the snapshot backup history list displays the snapshot backups.
- On the Main pane of the [VVOL Backup History] screen, clicking the [Clone Backup History] tab displays the clone backups in the clone backup history list.

ETERNUS SF		STRATE MILLION	AND DOWN	ad an interest of the	a son that the other states	User ID est	admin Lozaul Fujîrsu
Normal @ 01 A	0 00 201 4	o 💿 🗊 🛛	40 🔥 0	e 🗟 🖉 🛛	4.0 0.0 0.A		e
	erver Map View Scheduler	Log System		tel internet ser			and the second se
Storace > VVOL Management VVOL Management	VVOL Backup History						+ Action
WOL Datastore	Information	Street and s	the second second		a second s		Snapshot.
WOL Access Path							Restera
C 14 on eachup Marky event	① List of Snapehot backup at Even if any VMware guest						Single Item Restore
SVOL Backup History							X Dékile
	Snapshot Backup History	Clone Backup Histor	v				Clone Backup
	► Filter Setting					and the second secon	Restore
					Institution of the second	Filter Clear	X Delete
	Selections: 0			Total 2 records << <	1/1 pages > >>) 🚺 page 🔝	Ba Display 10 👽 records	
	The property of the second	These differentiation	Store States	-	a management of the	VMware Guest	
	Backup Date and	snapsnot Name	No.	system	machine's memory	Name	So Clamana
C						Address	
	CT 2015/07/14 14:58:57	ESF_20150714_1600	1	Enable	Enable	gyomu02 -	
• Job Status							

Figure-99 Snapshot Backup History

FUJITSU Storage ETERNUS DX S3 series

ETERNUS SF	DOCTOR OF THE OWNER WAS	Non-the Index	The State State	NO POINT OF	User ID (st_admin Loquul Fujitsu
Normal = 01 4	0 😳 0 🖉 🛛 🛓 0	😋 D 📄 🥥 40 🗼 D	00 🔊 🕨	<u>A</u> . 0 0 1	ense 4	e .
	erver Nap View Scheduler Lo	g System				In provident of Allinean Allin
Sicrace > VVOL Management	and the second					
VVOL Management	VVOL Backup History				1000 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100	Action
VVOL Datastore	▼ Information					Snapshot.
VVOL Access Path VVOL Backup Management	 List of Snapehot backup and Clorence 					Restere
WOL Backup History	Even if any YM ware guest has be	aen deleted, it can be restored usir	ng Its Clone backup.			Elingle Itom Restore
	Snapshot Backup History	ana Darkum History				Clone Backup
	► Filter Setting	one Backup History		er haster i die eine fallen is	NAME AND A DESCRIPTION	Restore
	- Third Section 9	and the second second second		and Control (Colored	Filter Clear	1 X Delete
	The second s				Cost Cost	
	Selections: 0		Total & records ex.e.	tit egose s ss I	page Ga Display 10 v reco	oto and a second second
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Figure-100 Clone Backup History

Restoring snapshots

1. On the virtual machine, delete the file created for confirmation in Step 1 of the "Backing Up Snapshots/Clones" procedure. For the CUI, perform the following steps.

```
# rm -f <file for confirmation>
```

Example

```
# rm -f /data/test2.txt
# ls -l /data
:
-rw- r-r-- .1 root root 0 ... test1.txt
```

The following screenshot is a display example of the GUI.

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Documents					
🕹 Downloads					
J Music					
Pictures					
岸 Videos					
🗇 Trash					
Devices					
🖬 Floppy Disk					
Server01G					
Network					
🛱 Browse Network					
🖳 Connect to Server					

Figure-101 Deleting the file for confirmation

In the global navigation tab, click [Storage].
 On the Category pane, click [WOL Management]. This changes the items of the Category pane to items related to WOL management.

On the Category pane, click [WOL Backup History].
 Select a snapshot backup to restore, and then click [Restore] under [Snapshot] on the Action pane.

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🔛 WOL Access Path	D List of Snapshot backup and	Clone backup histories	or VMware gue	318.				Restore	
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. Job Status									

Figure-102 Snapshot Backup History

- 4. The warning dialog box is displayed. Confirm that the backup operation will not cause a problem, and then click [OK].
- 5. A message is displayed to inform that the process has been accepted. Click the [Done] button.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next step. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

6. Check that the file for confirmation that was deleted on the virtual machine is restored.

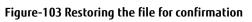
For the CUI, perform the following step.

```
# ls -l <directory of the files for confirmation>
```

```
Example
# ls -l /data
.
-rw- r-r-- .1 root root 0 ... test1.txt
-rw- r-r-- .1 root root 0 ... test2.txt
```

The

owing screenshot is a d	lisplay example of the GUI.	
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⊯ Videos		
🔟 Trash		
Devices		
🖬 Floppy Disk		
Server01G		
Network		
🖙 Browse Net	work	
🖳 Connect to :	Server	
10.250		



- Restoring clone backups
- 1. On the virtual machine, delete the file created for confirmation in Step 1 of the "Backing Up Snapshots/Clones" procedure. For the CUI, perform the following steps.

```
# rm -f <file for confirmation>
```

Example

```
# rm -f /data/test2.txt
# ls -l /data
:
-rw- r-r-- .1 root root 0 ... test1.txt
```

The following screenshot is a display example of the GUI.

		data			×
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Documents					
🕹 Downloads					
J Music					
Pictures					
🗏 Videos					
💮 Trash					
Devices					
🖫 Floppy Disk					
Server01G					
Network					
🗗 Browse Network					
🖸 Connect to Server					

Figure-104 Deleting the file for confirmation

- 2. Shut down the virtual machine and then on vCenter Web Client, make sure that the virtual machine to be restored is powered off.
- 3. In the global navigation tab, click [Storage]. Then, on the Category pane, click [VVOL Management].

4. On the Category pane, click [WOL Backup Management]. Then, on the Main pane, click the [Clone Backup History] tab.

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							-	
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Job Status						_		

Figure-105 VVOL Backup Management

5. In [Clone Backup History], select a clone backup to restore. Then, on the Action pane, click [Restore] under [Clone Backup].

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nagement	VVOL Backup History			_	_	Action
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	215/07/09 12:57:49	Glick Here	2	senrer07s	3	
	2015/07/03 17:13:06	Qlick Here	Qick Here	gyomu-db	-	
	2015/06/30 09:51:17	Click Here	Gick Here	gyomu02	-	

Figure-106 Clone Backup History

6. Enter the VMware guest name for the restore destination, and then click the [Restore] button.

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▼ Information									
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Clone Backup Information to Be Restored									
Backup Date and Time	2015/07/14 14:59:57								
Specify Restore Information									
Restore Destination VMware Guest Name *	gyonru02_cione	×							

Figure-107 Restore Clone Backup

7. A message is displayed to inform that the process has been accepted. Click the [Done] button.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next step. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations". 8. On vCenter Web Client, check the restored virtual machine.

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	63 server04g		
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est-vasa	👸 server06s		
gyomu01	🛐 server07s	21	
gromu02	jip server08s		
gromu02_clone	🚯 server09s		
server01g	🔂 serveri Os		
server02g	👸 severits		
server03g	👸 servert 2s		
serverD4g	11 👸 servert 3s		
server05g	🚓 servert 4s		
serverDEs	📴 server15s		
server07s	👸 servert 6s		
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server11s	👸 server20s		
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Figure-108 Checking the restored virtual machine

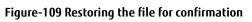
- 9. Check that the file for confirmation that was deleted on the virtual machine is restored.
- For the CUI, perform the following step.

```
# ls -l <directory of the files for confirmation>
```

```
Example
# ls -l /data
:
-rw- r-r-- .1 root root 0 ... test1.txt
-rw- r-r-- .1 root root 0 ... test2.txt
```

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	ft Home	test2.txt		0 bytes	Text	15:30
	Documents					
	Downloads					
	d Music					
	D Pictures					
	H Videos					
	m Trash					
	Devices					
	🖬 Floppy Disk					
	Server01G					
	Network					
	🗗 Browse Network					
	Connect to Server					



Restoring a single item

This section provides the procedure for restoring files that were created in the virtual disk of the data area. This procedure was performed using Red Hat Enterprise Linux 7.

1. On the virtual machine, delete the file created for confirmation in Step 1 of the "Backing Up Snapshots/Clones" procedure. For the CUI, perform the following steps.

```
# rm -f <file for confirmation>
Example
# rm -f /data/test2.txt
# ls -l /data
:
-rw- r-r-- .1 root root 0 ... test1.txt
```

The following screenshot is a display example of the GUI.

		data			
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Documents					
🕹 Downloads					
႕ Music					
Pictures					
🗏 Videos					
🗍 Trash					
Devices					
🖬 Floppy Disk					
Server01G					
Network					
🗗 Browse Network					

Figure-110 Deleting the file for confirmation

2. In the global navigation tab, click [Storage]. On the Category pane, click [WOL Management]. 3. On the Category pane, click [WOL Backup Management]. Select a snapshot backup to restore, and then click [Single Item Restore] under [Snapshot] on the Action pane.

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C VVOL Etatastore	▼ Information						Snapshot.	
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VVOL Backup Management WVOL Backup History	Even if any VM ware guest ha	as been deleted, it can b	e restored using	its Clone backup.			Single-Iten	n Restore
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	Time	Snapshot Name	No.	system	machine's memory	Name	IP Address	
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	2015/07/09 12:57:49	ESF_20150709_1257		Enable	Enable	server07s	-	
"Job Status								

Figure-111 Snapshot Backup History

4. Set [Allocation duration of temporary volume] to 24 and in the VMDK file list, select the VMDK file to restore. Then, click the [Restore] button.

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Single Item Restore [test2.rhel7]							
Information							
(i) Backups are restored to a temporary volum Specified VMDK files are copied to the tem The temporary volume is automatically dele Fields marked with * are required.	orary volume, which is automaticall			ed by viewing and o	peraling the temporary	volume from the VMware g	est
Restore Options	\frown						
Ulocation duration of temporary volume*	24 🗰 Hour(s)						
Specify VMDK Files							
Filter Setting							
						(FI	tor Clea
actions: 1				Total 2	records << < 1/1 pag	es > >> 1 page Go	Display 10 🗸
VMDK File Name						(c. <u>10 - 10 - 10 - 1</u>	
In 6000000000000000000000000000000000000		k					
		k					
		k					

Figure-112 Restore

5. A message is displayed to inform that the process has been accepted. Click the [Done] button.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next step.

6. In the virtual machine, rescan the disk and partition. For the CUI, perform the following step.

```
# sfdisk -R <device name of the temporary volume (/dev/sd*)>
```

Example

sfdisk -R dev/sdc

- 7. Mount the temporary volume on the virtual machine. For the CUI, perform the following steps.
 - For a single item restore, a disk is automatically added to the virtual machine.

Therefore, when a compatible device is used and the system is rebooted while the temporary volume exists, a device name mismatch may occur.

Using a device name that does not change is recommended. In this document, UUID is used.

```
# udevadm info -q symlink -n <compatible device name>
<by-path name> <by-uuid name>
```

mount <by-uuid name of the temporary volume> <mount point>

Example

```
# udevadm info -q symlink -n /dev/sdc1
disk/by-path/pci-0000: ... disk/by-uuid/8454c293...
```

```
# mount /dev/disk/by-uuid/8454c293.... /mnt
```

For the GUI, perform the following steps. Select [Applications] - [Utilities] - [Disks].

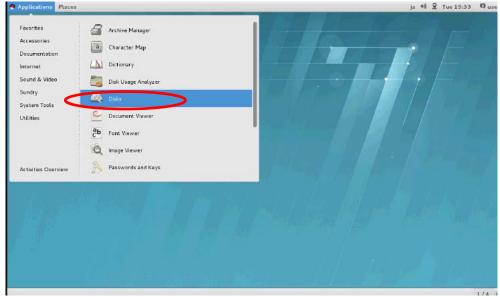


Figure-113 Desktop

Select the temporary volume from [Devices] and click the mount button. The temporary volume is mounted in "/mnt/<UUID>" by default.

	Disks	_ = ×
Devices Disk Drives 43 GB Hard Disk VMware Virtual disk Composed Prive Ploppy Drive Ploppy Drive CD/DVD Drive Planare virtual SAFA C Draw Base VMware Virtual disk VMware Virtual disk VMware Virtual disk	IOT GB Hard Disk /dev/sdc Model VMware Virtual disk (1.0) Size 107 GB (107,374,182,400 bytes) Partitioning GUID Partition Table Volumes Filesystem Partition 1 107 GB (std)	•
	Size 107 GB (107,373,116,416 bytes) Device /dev/sdc1 Partition Type Basic Data Contents Ext4 (version 1.0) – Not Mounted	

Figure-114 Disks

8. Check the mounted temporary volume. For the CUI, perform the following step.

<pre># ls -l <directory of="" temporary="" the="" volume=""></directory></pre>
Example # 1s -1 /mnt :
-rw- r-r1 root root 0 test1.txt
-rw- r-r1 root root 0 test2.txt

The following screenshot is a display example of the GUI.

	mnt			_ = ×
< > 🔍 mat		Q		•
Places	Name	∨ Size	Туре	Modified
Ø Recent	testl.txt	0 bytes	Text	19:05
ft Home	test2.txt	0 bytes	Text	29:05
Documents				
Downloads				
🖥 Music				
Pictures				
🖽 Videos				
🔟 Trash				
Devices				
🗊 Floppy Disk				
Computer				
Network				
🗗 Browse Network				
👤 Connect to Server				
	Figure-115 Checking the temporary volu	me		

9. Copy the file from the temporary volume to the restore destination. For the CUI, perform the following step.

for the configuration and for the former of
cp -p <target file="" restore="" to=""> <restore destination=""></restore></target>
Example # cp -p /mnt/test2.txt /data

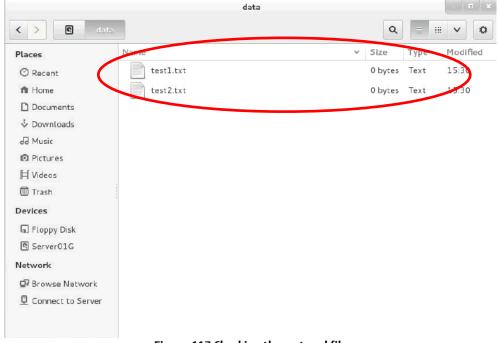
The following screenshot is a display example of the GUI.

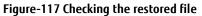
plications Places	lles			ja 🐠 🛱 Tue 20:05
		data	2 H N	
< > 🖻 data				
Places	Name	(n Pine Time Medidina mit	X
⊖ Recent ↑ Home	test1.txt			Q = = ¥ 0
D Documents		Places	Name	✓ Size Type Modified
Downloads		© Recent	Burney	5 Dynam Text 19:05
da Music		A Home	test2.txt	0 bytes Text 19:05
Pictures		Documente		
H Videos		Downloads		
🗊 Trash		JJ Music		
Devices		Pictures		
🖬 Floppy Disk		月 Videos		
Computer		Trash		
Network		Devices		
Browse Network		FLoppy Disk		
Connect to Server		Computer		
		Network		
		Browse Network		
		D Connect to Server		
		an entitle to server		
				"test2.txt" selected (0 bytes)
Disdeal	IIIII Front Date	12-shal7-+]	met Midata	1

Figure-116 Copying the file

10. Check that the restore is successfully completed. For the CUI, perform the following step.					
<pre># ls -1 <directory confirmation="" files="" for="" of="" the=""></directory></pre>					
Example # ls -l /data					
:					
-rw- r-r1 root root 0 test1.txt					
-rw- r-r1 root root 0 test2.txt					

The following screenshot is a display example of the GUI.





11. Unmount the temporary volume.

For the CUI, perform the following step.

umount <mount point of the temporary volume>

Example

umount /mnt

For the GUI, perform the following steps. Select [Applications] - [Utilities] - [Disks].

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Figure-118 Desktop

Select the temporary volume from [Devices] and click the unmount button.

	Disks	- • ×
Devices Disk Drives 43 GB Hard Disk Wware Virtual disk 107 GB Hard Disk Wware Virtual disk Floppy Drive Floppy Drive CD/DVD Drive Wwware Virtual SATA CDRW Drive	Model VMware Virtual disk (1.0) Size 107 GB (107,374,182,400 bytes) Partitioning GUID Partition Table Volumes	*
107 GB Hard Disk VMwareVirtual disk	Partifion 1 107 GB Esta Size 107 GB – 105 GB free (1.8% full) Device /dev/sdc1 Partition Type Basic Data Contents Ext4 (version 1.0) – Mounted at /mnt	

Figure-119 Disks

12. Delete the temporary volume.

In the global navigation tab, click [Scheduler].

On the Main pane, select a task. Then, on the Action pane, click [Execute immediately] under [Operation].

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	erver Map View School ter	Log System						_		
Scheduler Scheduler	Scheduler task			_	_	_	_		+ Action	
Scheduler task	▼ Information								Task:	
And a second second second second	D List of scheduler tasks.								+ Create	
	(T) cas or occupied store:								× Delete	
	 Filter Setting 								-peration:	
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	Selections: 1		Total 1 records	«« « 1/1 pa	gas > >> [1	page 🗌	Go Display 10 🔽	records	Q Enable	-
		0000		Host	10	Execution		Lest		
	🖓 Task name	Status	Туре	name	Address		Next start time	start		
· · · · · · · · · · · · · · · · · · ·	V File Restore Finish 201	150714155436590 🕑 Watter	VM File Rectrice Finish	ctup:tte07	100000000	Once	2015/07/15 15:54:00	time		
	<			1 is root				>		
. Job Status									_	-

Figure-120 Scheduler task

- 13. Check the operation to be executed, and then click the [Execute] button.
- 14. In the message notifying the immediate execution of the scheduler task, click the [Done] button.

Points

Check the Job Status pane and make sure that the result changes to [Success] before proceeding to the next procedure. For details on how to use the Job Status pane, refer to "2.2.1.2 Checking the Common Processes of the ETERNUS SF Web Console Operations".

Checklist

Confirm the following items.

- On the Main pane of the [Scheduler] screen, no scheduler tasks are displayed.
- The temporary volume is unmounted.

3 Verification of the VVOL Reference Architecture

A test was performed for environments configured using this reference architecture to determine whether they were able to secure the capacity for the virtual machines and support the operations of the various functions.

3.1 Confirming the Normal Operation of the Virtual Machines

A test was performed to check if the capacity required to run 15 business systems that operate as virtual machines and two management servers can be secured when two ESXi hosts are used.

Server type	No. of units	Software	CPU	Memory	Disk	Snapshot backups	Clone backups
vCenter server	1	VMware vCenter Server Appliance 6.0	2vCPU	8GB	120GB	_	-
Operation management server	1	Windows Server 2012 R2	4vCPU	5GB	50GB	_	-
Business server with the Gold policy	5	Red Hat Enterprise Linux 7	2vCPU	4GB	140GB	Without	With
Business server with the Silver policy	10		20070	400	14000	With	With

3.2 Confirming the Operation of VMware vSphere 6.0

VMware vSphere 6.0 was confirmed to operate without any problems in this configuration by checking the following items.

- Storage vMotion operations between VVOL and VMFS

Migrating virtual machines between different datastores formats, VVOL (volume) datastore and VMFS (file system) datastore, was tested. The following operations were tested and confirmed that Storage vMotion was executable between a VVOL datastore and a VMFS datastore.

Powered-off virtual machines:

: Cold migration from a VVOL datastore to a VMFS datastore*

Powered-on virtual machines:

Cold migration from a VMFS datastore to a VVOL datastore* Storage vMotion from a VVOL datastore to a VMFS datastore*

Storage vMotion from a VMFS datastore to a VVOL datastore*

* A "Datastore does not match current VM policy" message is displayed while migration is performed.

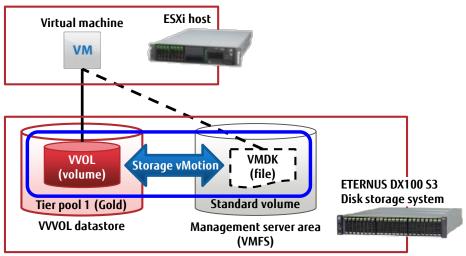


Figure-121 Confirmation of Storage vMotion

- Failover for the operation management server due to vSphere HA

The availability of redundancy provided by vSphere HA was tested for situations where an operation management server and a business server were installed on the same ESXi host.

An operation management server is necessary for virtual machine operations that use VVOLs. This is why an operation management server was placed on the VMFS.

These virtual machines were tested to determine whether they were started in different ESXi hosts when a failover was performed for the ESXi host that has business servers that are in a WOL and an operation management server.

The following items were tested and confirmed that vSphere HA was valid even in WOL environments.

- Whether a different ESXi host can start these virtual machines after a failover is performed for an ESXi host that runs a business server
- Whether a different ESXi host can start these virtual machines after a failover is performed for an ESXi host that runs the operation management server, the vCenter server, and a business server.

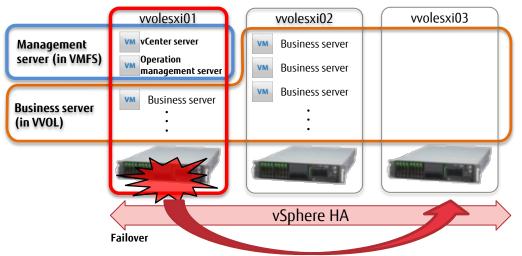


Figure-122 vSphere HA for the operation management server

4 Notes

1. Tier pools and volumes that can be used in the ETERNUS DX S3 series

- The following table shows the number of Tier pools that can be registered in each storage system model.

Storage system	Maximum number of Tier pools	Maximum number of sub-pools	Maximum pool capacity
ETERNUS DX100 S3	30	72	256TB
ETERNUS DX200 S3	30	132	256TB
ETERNUS DX500 S3	60	256	384TB
ETERNUS DX600 S3	64	256	768TB
ETERNUS DX8700 S3/DX8900 S3	64	256	1,024TB
ETERNUS DX200F	12	12	32TB

Table-41 Maximum numbers of Tier pools in a storage system

- The following table shows the number of volumes that can be created in each storage system model.

Storage system	Maximum number of volumes in the storage system	Number of available volumes* ¹	Recommended number of volumes for VVOLs* ¹	
ETERNUS DX100 S3	2,048	2,009	1,808	
ETERNUS DX200 S3	4,096	4,057	3,651	
ETERNUS DX500 S3	16.20/	16,313	14,681	
ETERNUS DX600 S3	16,384			
ETERNUS DX8700 S3/DX8900 S3* ²	65,535	65,464	58,917	
ETERNUS DX200F	1,536	1,497	1,347	
* Values when pools are configured with six DAID groups				

*¹ Values when pools are configured with six RAID groups.

*² For details on the support range and operation environment, contact your Fujitsu sales representative.

Table-42 Maximum numbers of volumes that can be created in a storage system

2. VMware vCenter Server Appliance

- By default, the password for a Single Sign On user is valid for 90 days. Change the default password policy according to the operational requirements.

Password policy setting item	Default value	
Maximum lifetime	Password must be changed every 90 days	
Restrict reuse	Users cannot reuse any previous 5 passwords	
Maximum length	20 characters	
Minimum length	8 characters	
Character requirements	At least 2 alphabetic characters	
	At least 1 special characters	
	At least 1 uppercase characters	
	At least 1 lowercase characters	
	At least 1 numeric characters	
	Identical adjacent characters:3	

Table-43 Password policy for VMware vCenter Server Appliance

- The clocks of each component of VMware ESXi Server must be synchronized.

For SSL communications between unsynchronized servers, SSL certificates that require time synchronization are recognized as disabled and services in VMware may fail to start.

3. ETERNUS SF Storage Cruiser

The Thin Provisioning function in the ETERNUS DX S3 series must be enabled to use VVOLs.
 Automated Storage Tiering must also be enabled with ETERNUS SF Manager.
 (One layer Tier pool of Automated Storage Tiering becomes available for ETERNUS SF Storage Cruiser.)

For more details, refer to "3.3 Activation of Automated Storage Tiering" in "FUJITSU Storage ETERNUS SF Storage Cruiser V16.2 Operation Guide for Optimization Function".

- In vSphere HA configurations, when a VVOL datastore is mounted on vCenter Server, management volumes are automatically created in the VVOL datastore of the ETERNUS DX S3 series.

When deleting a VVOL datastore from ETERNUS SF Web Console, the management volumes in vSphere HA must be deleted. In order to delete the management volumes of vSphere HA, unmount the VVOL datastore from vCenter Server, and then execute the following ETERNUS SF Manager command.

storageadm volume delete -ipaddr [IP_address_of_the_ETERNUS_DX_S3_series] -volume [volume_number]

5 Reference

- 1. Product information
 - Fujitsu's ETERNUS DX Disk storage systems http://www.fujitsu.com/eternus/
 - Disk Storage Systems > ETERNUS DX
 - Storage Foundation Software : FUJITSU Storage ETERNUS SF <u>http://www.fujitsu.com/eternus/</u> Storage software > ETERNUS SF
- 2. Software to download
 - ETERNUS VASA Provider 2.x
- 3. Related manuals
 - FUJITSU Storage ETERNUS DX100 S3/DX200 S3 Disk storage system Configuration Guide (Basic)
 - FUJITSU Storage ETERNUS DX Configuration Guide (Web GUI) FUJITSU Storage ETERNUS DX Configuration Guide -Server Connection- (iSCSI) for VMware® ESX
 - FUJITSU Storage ETERNUS SF Express V16.2 / Storage Cruiser V16.2 / AdvancedCopy Manager V16.2 Installation and Setup Guide FUJITSU Storage ETERNUS SF Express V16.2 / Storage Cruiser V16.2 / AdvancedCopy Manager V16.2 Web Console Guide
 - FUJITSU Storage ETERNUS SF Storage Cruiser V16.2 Operation Guide FUJITSU Storage ETERNUS SF Storage Cruiser V16.2 Operation Guide for VMware vSphere Virtual Volumes FUJITSU Storage ETERNUS SF Storage Cruiser V16.2 Operation Guide for Optimization Function
 - ETERNUS VASA Provider 2.x User's Guide

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