

ServerView Resource Orchestrator Cloud Edition V3.1.1

A decorative graphic consisting of several overlapping, glowing blue and purple curved lines that create a sense of motion and depth, set against a dark background.

DR Option Instruction

Windows/Linux

J2X1-7735-03ENZ0(05)
August 2013

Preface

Purpose of This Document

This manual explains the overview, setup, and operation of DR Option (*1), an optional product of ServerView Resource Orchestrator Cloud Edition (hereinafter Resource Orchestrator).

*1: DR is the abbreviation of Disaster Recovery.

This manual focuses on explaining how to set up DR Option and make it available for use on systems where ServerView Resource Orchestrator Cloud Edition will be installed.

Therefore, for content that is explained in ServerView Resource Orchestrator Cloud Edition manuals, only items are listed in this manual.

Intended Readers

This manual is written for system administrators who will use Resource Orchestrator to operate the infrastructure in private cloud or data center environments.

When using NS Option, it is assumed that readers have basic knowledge about ServerView Resource Orchestrator Cloud Edition.

Structure of This Document

This manual is composed as follows:

[Chapter 1 Overview](#)

Provides an overview of Resource Orchestrator.

[Chapter 2 Design](#)

Explains how to design a Resource Orchestrator installation.

[Chapter 3 Installation](#)

Explains the setup necessary for using DR Option.

[Chapter 4 Operation](#)

Explains how to operate DR Option.

[Appendix A Commands](#)

Provides an overview of the commands available in DR Option. Please refer to it when necessary.

[Appendix B Messages](#)

Explains the messages that may be output when using Disaster Recovery.

[Appendix C Output Logs when Switchover Occurs because of Disaster Recovery](#)

Explains the logs output when switchover occurs due to Disaster Recovery.

[Appendix D Using the \[Templates\] and \[L-Platforms\] Tabs when Resources are Locked](#)

Explains how to use the [Templates] tab and the [L-Platforms] tab when resources are locked.

Document Conventions

The notation in this manual conforms to the following conventions.

- When there is different information for the different versions of Resource Orchestrator, it is indicated as follows:

[All Editions]	Sections relevant for all editions
[Cloud Edition]	Sections related to Cloud Edition
[Virtual Edition]	Sections related to Virtual Edition

- When using Resource Orchestrator and the functions necessary differ due to the necessary basic software (OS), it is indicated as follows:

[Windows Manager]	Sections related to Windows manager
[Linux Manager]	Sections related to Linux manager
[Windows]	Sections related to Windows
[Linux]	Sections related to Linux
[Solaris]	Sections related to Solaris
[VMware]	Sections related to VMware
[Hyper-V]	Sections related to Hyper-V
[Xen]	Sections related to RHEL5-Xen
[KVM]	Sections related to RHEL-KVM
[Solaris Zones]	Sections related to Solaris zones
[OVM for x86 2.2]	Sections related to Oracle VM Server for x86 2.2
[OVM for x86 3.2]	Sections related to Oracle VM Server for x86 3.2
[OVM for SPARC]	Sections related to Oracle VM Server for SPARC
[Citrix Xen]	Sections related to Citrix XenServer
[Physical Servers]	Sections related to physical servers

- Unless specified otherwise, the blade servers mentioned in this manual refer to PRIMERGY BX servers.
- Oracle Solaris may also be indicated as Solaris, Solaris Operating System, or Solaris OS.
- Oracle Solaris Zones may also be indicated as Solaris Containers or Solaris Container.
- Oracle VM Server for x86 may also be indicated as Oracle VM.
- In Resource Orchestrator the following servers are referred to as SPARC Enterprise.
 - SPARC Enterprise M3000/M4000/M5000/M8000/M9000
 - SPARC Enterprise T5120/T5140/T5220/T5240/T5440
- In Resource Orchestrator the following servers are referred to as Fujitsu M10.
 - FUJITSU M10-1/M10-4/M10-4S
- Fujitsu M10 is sold as SPARC M10 by Fujitsu in Japan. Fujitsu M10 and SPARC M10 are identical products.
- References and character strings or values requiring emphasis are indicated using double quotes (").
- Window names, dialog names, menu names, and tab names are shown enclosed by brackets ([]).
- Button names are shown enclosed by angle brackets (< >) or square brackets ([]).
- The order of selecting menus is indicated using []-[] .
- Text to be entered by the user is indicated using bold text.
- Variables are indicated using italic text and underscores.
- The ellipses ("...") in menu names, indicating settings and operation window startup, are not shown.
- The ">" used in Windows is included in usage examples. When using Linux, read ">" as meaning "#".
- If using Windows 8 or Windows Server 2012, please note the following:
Operations descriptions in this manual use examples assuming operating systems up to Windows 7 and Windows Server 2008 - if using this product with Windows 8 or Windows Server 2012, read instructions regarding the [Start] menu as if they were instructions

for the [Apps] page.

Display the [Apps] page by right-clicking in the [Start] screen, and then clicking on [All apps].

Menus in the ROR Console

Operations on the ROR console can be performed using either the menu bar or pop-up menus.

By convention, procedures described in this manual only refer to pop-up menus.

Regarding Installation Folder Paths

The installation folder path may be given as C:\Fujitsu\ROR in this manual.

Replace it as shown below.

- When using Windows 64-bit (x64)
C:\Program Files (x86)\Resource Orchestrator
- When using Windows 32-bit (x86)
C:\Program Files\Resource Orchestrator

Command Examples

The paths used in command examples are abbreviated. When executing commands, do so using the path given in "Name".

Web Site URLs

URLs provided as reference sources within the main text are correct as of August 2013.

Please understand that they are subject to change without notice.

Abbreviations

The following abbreviations are used in this manual:

Abbreviation	Products
Windows	Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition Microsoft(R) Windows Server(R) 2008 Standard Microsoft(R) Windows Server(R) 2008 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter Microsoft(R) Windows(R) XP Professional operating system Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate Windows(R) 7 Professional Windows(R) 7 Ultimate Windows(R) 8 Pro Windows(R) 8 Enterprise

Abbreviation	Products
Windows Server 2003	Microsoft(R) Windows Server(R) 2003 R2, Standard Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise Edition Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition
Windows 2003 x64 Edition	Microsoft(R) Windows Server(R) 2003 R2, Standard x64 Edition Microsoft(R) Windows Server(R) 2003 R2, Enterprise x64 Edition
Windows Server 2008	Microsoft(R) Windows Server(R) 2008 Standard Microsoft(R) Windows Server(R) 2008 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter
Windows 2008 x86 Edition	Microsoft(R) Windows Server(R) 2008 Standard (x86) Microsoft(R) Windows Server(R) 2008 Enterprise (x86)
Windows 2008 x64 Edition	Microsoft(R) Windows Server(R) 2008 Standard (x64) Microsoft(R) Windows Server(R) 2008 Enterprise (x64)
Windows Server 2012	Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter
Windows PE	Microsoft(R) Windows(R) Preinstallation Environment
Windows XP	Microsoft(R) Windows(R) XP Professional operating system
Windows Vista	Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate
Windows 7	Windows(R) 7 Professional Windows(R) 7 Ultimate
Windows 8	Windows(R) 8 Pro Windows(R) 8 Enterprise
Linux	Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.1 (for x86) Red Hat(R) Enterprise Linux(R) 5.1 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.2 (for x86) Red Hat(R) Enterprise Linux(R) 5.2 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.3 (for x86) Red Hat(R) Enterprise Linux(R) 5.3 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.4 (for x86) Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.5 (for x86) Red Hat(R) Enterprise Linux(R) 5.5 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.6 (for x86) Red Hat(R) Enterprise Linux(R) 5.6 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.7 (for x86) Red Hat(R) Enterprise Linux(R) 5.7 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.8 (for x86) Red Hat(R) Enterprise Linux(R) 5.8 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.2 (for x86) Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.3 (for x86) Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.4 (for x86) Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)

Abbreviation	Products
	SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T
Red Hat Enterprise Linux	Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.1 (for x86) Red Hat(R) Enterprise Linux(R) 5.1 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.2 (for x86) Red Hat(R) Enterprise Linux(R) 5.2 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.3 (for x86) Red Hat(R) Enterprise Linux(R) 5.3 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.4 (for x86) Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.5 (for x86) Red Hat(R) Enterprise Linux(R) 5.5 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.6 (for x86) Red Hat(R) Enterprise Linux(R) 5.6 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.7 (for x86) Red Hat(R) Enterprise Linux(R) 5.7 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.8 (for x86) Red Hat(R) Enterprise Linux(R) 5.8 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.2 (for x86) Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.3 (for x86) Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.4 (for x86) Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)
Red Hat Enterprise Linux 5	Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.1 (for x86) Red Hat(R) Enterprise Linux(R) 5.1 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.2 (for x86) Red Hat(R) Enterprise Linux(R) 5.2 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.3 (for x86) Red Hat(R) Enterprise Linux(R) 5.3 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.4 (for x86) Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.5 (for x86) Red Hat(R) Enterprise Linux(R) 5.5 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.6 (for x86) Red Hat(R) Enterprise Linux(R) 5.6 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.7 (for x86) Red Hat(R) Enterprise Linux(R) 5.7 (for Intel64) Red Hat(R) Enterprise Linux(R) 5.8 (for x86) Red Hat(R) Enterprise Linux(R) 5.8 (for Intel64)
Red Hat Enterprise Linux 6	Red Hat(R) Enterprise Linux(R) 6.2 (for x86) Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.3 (for x86) Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.4 (for x86) Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)
RHEL5-Xen	Red Hat(R) Enterprise Linux(R) 5.4 (for x86) Linux Virtual Machine Function Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64) Linux Virtual Machine Function
RHEL-KVM	Red Hat(R) Enterprise Linux(R) 6.2 (for x86) Virtual Machine Function Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64) Virtual Machine Function

Abbreviation	Products
	Red Hat(R) Enterprise Linux(R) 6.3 (for x86) Virtual Machine Function Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64) Virtual Machine Function Red Hat(R) Enterprise Linux(R) 6.4 (for x86) Virtual Machine Function Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64) Virtual Machine Function
DOS	Microsoft(R) MS-DOS(R) operating system, DR DOS(R)
SUSE Linux Enterprise Server	SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T
OVM for x86 2.2	Oracle(R) VM Server for x86 2.2
OVM for x86 3.2	Oracle(R) VM Server for x86 3.2
OVM for SPARC	Oracle(R) VM Server for SPARC
Oracle VM Manager	Oracle(R) VM Manager
Citrix XenServer	Citrix XenServer(R) 6.0 Citrix XenServer(R) 6.0.2 Citrix XenServer(R) 6.1.0
ESC	ETERNUS SF Storage Cruiser
GLS	PRIMECLUSTER GLS
Navisphere	EMC Navisphere Manager
Solutions Enabler	EMC Solutions Enabler
MSFC	Microsoft Failover Cluster
Solaris	Oracle Solaris10 05/09 (Update7) Media Pack Oracle Solaris11 11/11 Media Pack Oracle Solaris11.1 Media Pack
SCVMM	System Center Virtual Machine Manager 2008 R2 System Center 2012 Virtual Machine Manager
VMware	VMware vSphere(R) 4 VMware vSphere(R) 4.1 VMware vSphere(R) 5 VMware vSphere(R) 5.1
VMware ESX	VMware(R) ESX(R)
VMware ESX 4	VMware(R) ESX(R) 4
VMware ESXi	VMware(R) ESXi(TM)
VMware ESXi 5.0	VMware(R) ESXi(TM) 5.0
VMware ESXi 5.1	VMware(R) ESXi(TM) 5.1
VMware Tools	VMware(R) Tools
VMware vSphere 4.0	VMware vSphere(R) 4.0
VMware vSphere 4.1	VMware vSphere(R) 4.1
VMware vSphere 5	VMware vSphere(R) 5
VMware vSphere 5.1	VMware vSphere(R) 5.1
VMware vSphere Client	VMware vSphere(R) Client
VMware vCenter Server	VMware(R) vCenter(TM) Server
VMware vClient	VMware(R) vClient(TM)
VMware FT	VMware(R) Fault Tolerance
VMware DRS	VMware(R) Distributed Resource Scheduler

Abbreviation	Products
VMware DPM	VMware(R) Distributed Power Management
VMware vDS	VMware(R) vNetwork Distributed Switch
VMware Storage VMotion	VMware(R) Storage VMotion
VIOM	ServerView Virtual-IO Manager
BladeLogic	BMC BladeLogic Server Automation
Internet Explorer	Windows(R) Internet Explorer(R) 8 Windows(R) Internet Explorer(R) 9 Windows(R) Internet Explorer(R) 10
ServerView Agent	ServerView SNMP Agents for MS Windows (32bit-64bit) ServerView Agents Linux ServerView Agents VMware for VMware ESX Server
RCVE	ServerView Resource Coordinator VE
ROR	ServerView Resource Orchestrator
ROR VE	ServerView Resource Orchestrator Virtual Edition
ROR CE	ServerView Resource Orchestrator Cloud Edition
Resource Coordinator	Systemwalker Resource Coordinator Systemwalker Resource Coordinator Virtual server Edition

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Chapter 1 Overview

This chapter provides an overview of this product.

This product provides the disaster recovery function which allows you to continue your operations on a backup site when a disaster strikes a cloud environment which is managed using ServerView Resource Orchestrator Cloud Edition.

This product provides simple and highly reliable Disaster Recovery, by exporting the following information that Resource Orchestrator Cloud Edition manager handles from the primary site and importing it to the backup site.

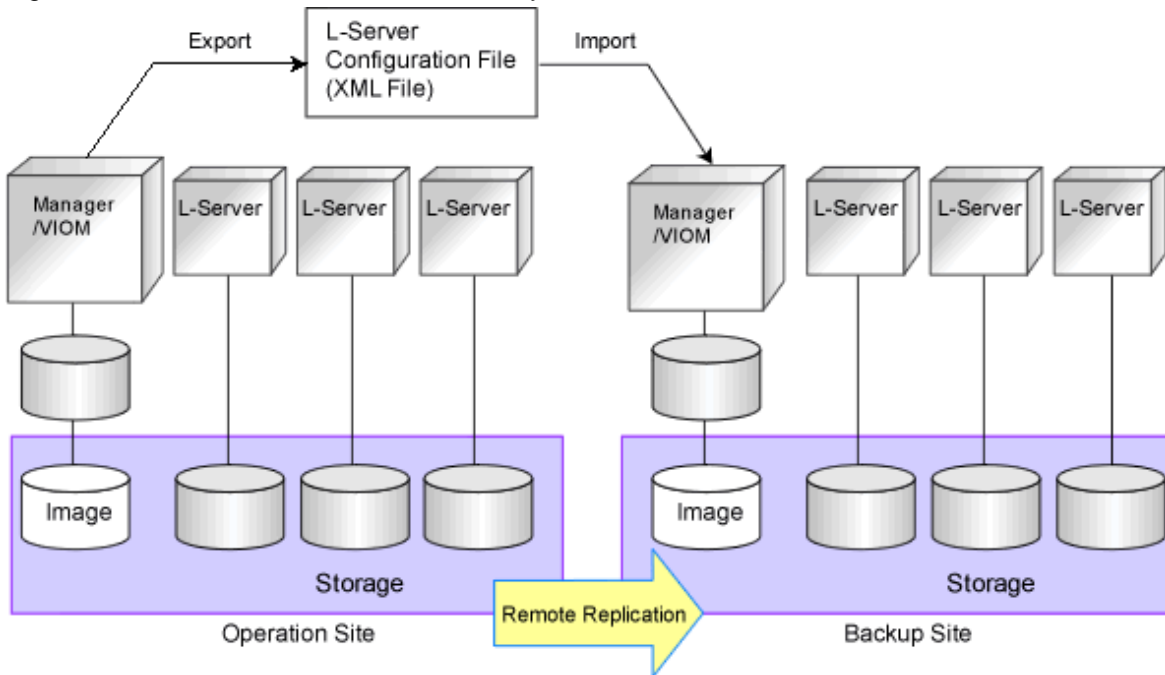
- L-Platform Templates
 - Software Information
 - Image Information
 - Segment Information
- L-Platform Configuration Information
- Resource Information
 - L-Servers
 - L-Server Templates
 - Tenants
 - Resource Folders
 - Image Resources
 - Users
 - User Groups
 - Network Resources
 - Address Set Resources
 - Resource Pools
 - Execution Information of Sample Scripts
- Accounting Information
- Metering Logs
- Usage Charges

In order to recover the cloud environment on the backup site, copy the primary site storage to the backup site, using the replication functions of the storage units.

Overview of the Disaster Recovery Environment

The overview of the Disaster Recovery environment is as given below.

Figure 1.1 Overview of the Disaster Recovery Environment



For details on the design of the Disaster Recovery environment, refer to "[Chapter 2 Design](#)".

For details on the installation of the Disaster Recovery environment, refer to "[Chapter 3 Installation](#)".

For details on the operation of the Disaster Recovery environment, refer to "[Chapter 4 Operation](#)".

Chapter 2 Design

This chapter explains how to design disaster recovery in Resource Orchestrator.

Main Items	Reference
Switchover method	Refer to " 2.1 Switchover Methods ".
Switchover levels	Refer to " 2.2 Switchover Levels ".
Limitation of switchover scopes	Refer to " 2.3 Limitation of Switchover Scopes ".
Configurations	Refer to " 2.4 Configuration of the Primary and Backup Sites ".
Licenses	Refer to " 2.5 Necessary Licenses ".
Space estimation	Refer to " 2.6 Estimation of Replication Disk Capacity ".
Advisory notes for Disaster Recovery environments	Refer to " 2.7 Advisory Notes for Disaster Recovery Environments ".
System configuration	Refer to " 2.8 Example of System Configuration ".

2.1 Switchover Methods

The following three switchover methods are supported:

Table 2.1 Switchover Methods

Description	Remarks	Reference
Physical L-Server switchover (physical OS)	-	Refer to " 2.1.1 Physical L-Server Switchover (Physical OS) ".
Physical/virtual L-Server switchover (VM host/VM guest)	This cannot be performed with virtual L-Server switchover (VM guest).	Refer to " 2.1.2 Physical/Virtual L-Server Switchover (VM Host/VM Guest) ".
Virtual L-Server switchover (VM guest)	This cannot be performed with physical/virtual L-Server switchover (VM host/VM guest)	Refer to " 2.1.3 Virtual L-Server Switchover (VM Guest) ".

A comparison of these methods is shown below.

Table 2.2 Comparison of Methods

		Physical L-Server Switchover (Physical OS)	Physical/Virtual L-Server Switchover (VM Host/VM Guest)	Virtual L-Server Switchover (VM Guest)
Switchover target	Physical OS	Yes	-	-
	VM host	-	Yes	-
	VM guest	-	Yes	Yes
Server type	Blade servers	Yes	Yes	Yes
	Rack mount servers	No	No	Yes
Storage connections	FC	Yes	Yes	Yes
	iSCSI	No	No	Yes
	NAS	No	No	Yes

		Physical L-Server Switchover (Physical OS)	Physical/Virtual L-Server Switchover (VM Host/VM Guest)	Virtual L-Server Switchover (VM Guest)
Server virtualization software	VMware	-	Yes	Yes (VMware ESXi 5.x)
	Hyper-V	-	Yes	No
Pre-installation of VM hosts in the backup site		-	Not necessary	Necessary
Recovery of a virtual L-Server linking with a configured virtual machine		-	No	Yes (L-Server for server/storage management)

Yes: Supported, No: Not supported, -: Not applicable

2.1.1 Physical L-Server Switchover (Physical OS)

Switch over of a physical L-Server in which a physical OS is installed.

Figure 2.1 Physical L-Server Switchover (Physical OS)

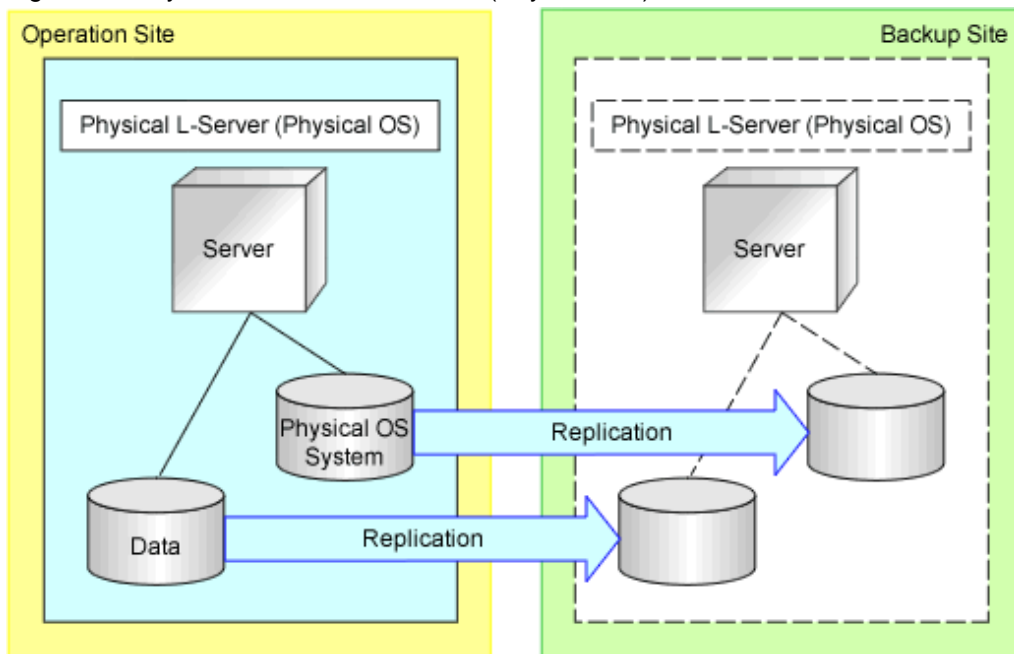


Table 2.3 Supported Configurations

Item	Description		Remarks
Manager OS	Windows		
Managed server type	PRIMERGY blade servers		
Storage connections	FC		
Physical L-Server disk allocation methods	LUNs created in advance, Dynamic LUN mirroring		
Managed switch blades	Connection Blade	Switch mode	IBP mode cannot be used.
		End host mode	
		Converged Fabric mode	

Point

Physical L-Server switchover can be performed with physical/virtual L-Server switchover (VM host/VM guest), or virtual L-Server switchover (VM guest) at the same time.

Note

Physical OS System Disks or Disks Storing Data Used by Physical OSs

Use the FC connection disks as the replication targets.

2.1.2 Physical/Virtual L-Server Switchover (VM Host/VM Guest)

Switch over of a physical L-Server in which a VM host is installed, or a virtual L-Server (VM) which operates on a VM host.

Figure 2.2 Physical/Virtual L-Server Switchover (VM Host/VM Guest)

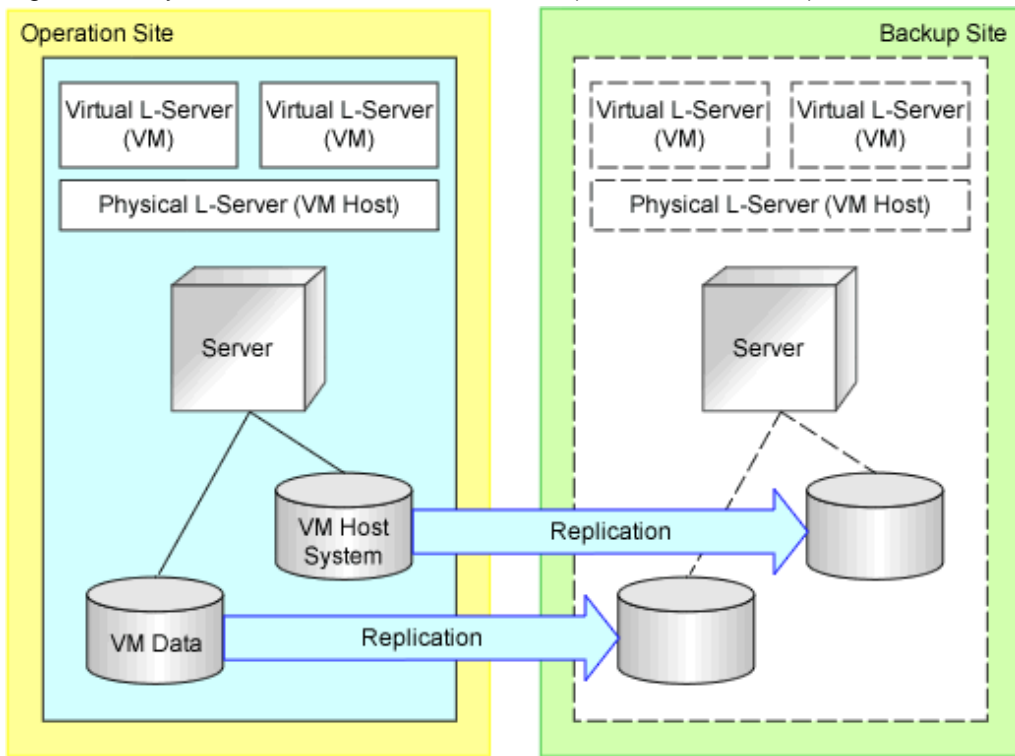


Table 2.4 Supported Configurations

Item	Description		Remarks
Manager OS	Windows		
Managed server type	PRIMERGY blade servers		
Storage connections	FC		
Physical L-Server disk allocation methods	LUNs created in advance, Dynamic LUN mirroring		
Managed switch blades	Connection Blade	Switch mode	IBP mode cannot be used
		End host mode	
		Converged Fabric mode	

Item	Description	Remarks
Server virtualization software/VM management software	VMware/VMware vCenter Server	Install VM management software on physical L-Servers, or on each site.
	Hyper-V/SCVMM	Install VM management software on physical L-Servers

Point

Can be performed with physical L-Server switchover (physical OS)

Cannot be performed with virtual L-Server switchover (VM guest)

When using this method, tenant switchover cannot be performed. For details on the tenant switchover, refer to "2.2 Switchover Levels".

Note

Regarding System Disks of VM Hosts, or Disks for Placing VM Data

Use the FC connection disks as the replication targets.

2.1.3 Virtual L-Server Switchover (VM Guest)

Create the VM host for each site, and only switch over a virtual L-Server operating on the VM host.

Figure 2.3 Virtual L-Server Switchover (VM Guest)

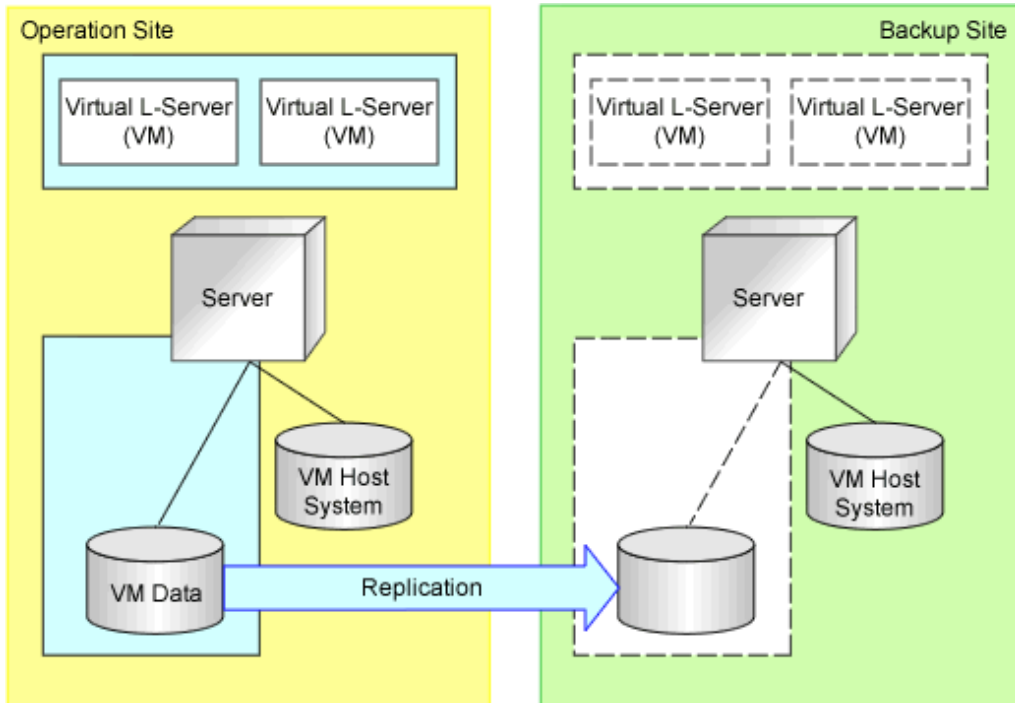


Table 2.5 Supported Configurations

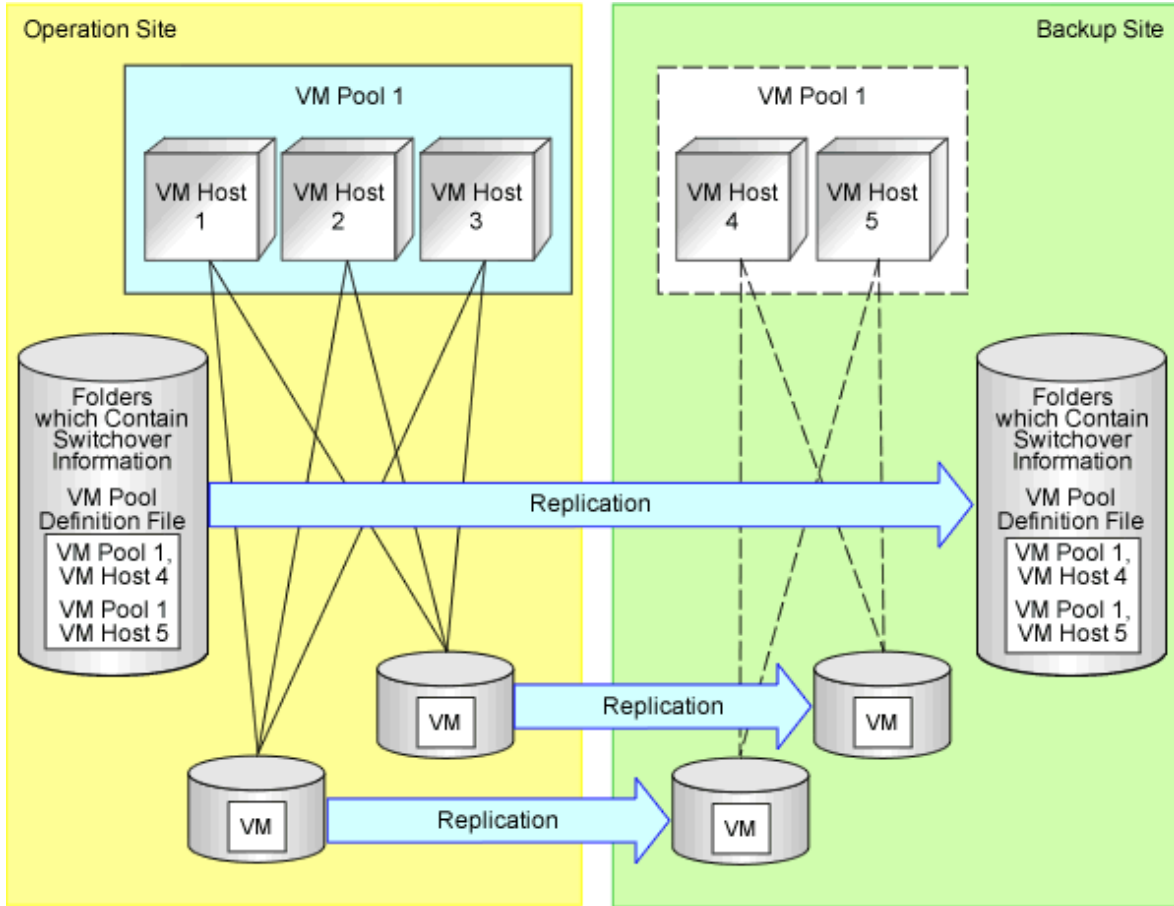
Item	Description	Remarks
Manager OS	Windows	
Managed server type	PRIMERGY blade servers	

Item	Description		Remarks
	PRIMERGY rack mount servers		
Storage connections	FC		
	iSCSI		
	NAS		
Managed switch blades	Connection Blade	Switch mode	IBP mode cannot be used
		End host mode	
		Converged Fabric mode	
Server virtualization software/VM management software	VMware/VMware vCenter Server		Only VMware ESXi 5.x is supported Configure VM management software for each site Install the VMware vSphere Command-Line Interface (vCLI) on the servers which can communicate with VM management software (such as admin servers) for each site

Note

- Using a VM pool definition file can reduce the number of VM hosts in the backup site. Refer to "[Figure 2.4 Settings to Reduce Number of VM Hosts Using a Backup Site](#)". For details on configuration, refer to "4. Create a VM pool definition file [Virtual L-Server switchover (VM guest)]" in "[3.6 Creating Files Used for Switchover](#)".
- It is necessary to install the VMware vSphere Command-Line Interface (vCLI) on the servers which can communicate with VMware vCenter Server (such as admin servers).
- Can be performed with physical L-Server switchover (physical OS)
- Cannot be performed with physical/virtual L-Server switchover (VM host/VM guest)
- Do not configure VM hosts on physical L-Servers.
- Disks containing VM data
Use FC, iSCSI or NAS connection disks as replication targets.
- Disks storing storage areas of VM hosts are not regarded as replication targets. Therefore, it is possible to locate the system areas of VM hosts on any disks. (Example: local boot)

Figure 2.4 Settings to Reduce Number of VM Hosts Using a Backup Site



2.2 Switchover Levels

The following levels of switchover are supported:

Item	Description	Remarks
Switchover levels	Site switchover	
	Tenant switchover	When the configuration is for performing physical/virtual L-Server switchover (for VM hosts or VM guests), tenant switchover cannot be performed.

Before performing tenant switchover, check the following advisory notes.

Note

- Advisory notes for using network devices are given below.
 - For each item for which switchover will be performed, prepare the network devices for both the primary site and the backup site.
 - For the network devices prepared for switchover targets, use the same resource name when registering them in the network resource tree of the primary and backup sites.
 - Do not use network devices prepared for switchover levels selecting from L-Platforms which belong to another switchover level.
- When performing physical/virtual L-Server switchover (VM host/VM guest), prepare VM management software for each level performing switchover at the same time.

- Perform design so as not to use the same virtual storage resources for tenants switched over separately.
- Configure the control item (copy group) for storage replication for each tenant being switched over simultaneously. Refer to "[Figure 2.5 Configuring Copy Groups](#)".
- Address set resources cannot be shared among tenants. Register the address set resources in the local pool for each tenant.
- To migrate global pool images to the switchover destination site at the same time as tenant switchover, perform tenant switchover after migrating the images to the local pool of the tenants.
- When creating the following resources, do not create resources with the same names in different sites.
 - Tenant resource folder name
 - Global Pool Name
 - Global L-Server Name
 - Virtual Storage Name
 - VM management software (physical/virtual L-Server switchover (VM host/VM guest))
 - Network device name
 - Network resource name
 - Name of the address set resource
- When creating network resources, do not use the same VLAN IDs in different sites.
- Before tenant switchover, lock the resources used by the target tenants to be switched over in the switchover source site. Locking resources prevents the overlapping use of the resource in multiple sites. Refer to "[Figure 2.6 Locking Resources](#)". For details on how to lock and unlock resources, refer to "[4.2 Switchover Operations between Sites Using the Disaster Recovery Function](#)".

Resource	Operations Restricted by Locking
Network resources	<ul style="list-style-type: none"> - Deployment using the relevant resources - Migration to another pool - Release of registered resources - Deletion of resources - Creation of an L-Server for which only the configuration definition has been created, that uses the relevant resources - Registration of physical servers of relevant subnets in the server tree
Address Set Resources	<ul style="list-style-type: none"> - Deployment using the relevant resources - Migration to another pool - Release of registered resources - Deletion of resources - Creation of an L-Server, consisting of an L-Server definition for which only the configuration definition has been created, that uses the relevant resources
Disk resources	<ul style="list-style-type: none"> - Deployment using the relevant resources - Migration to another pool - Unregistration from pools
Virtual storage resources	<ul style="list-style-type: none"> - Deployment using the relevant resources - Migration to another pool - Unregistration from pools

Resource	Operations Restricted by Locking
	- Starting of an L-Server for which only the configuration definition has been created, that uses the relevant resources
Pool resources	- Deletion of a storage pool where disk resources have been locked
L-Servers	- Configuration changes using locked resources (addition of NICs and attachment of disks) - Using virtual machines with locked resources as L-Servers

- Create image information of the L-Platform template for each tenant. In addition, use cloning images in the local pools of the tenant. When tenant switchover is performed, cloning images in global pools may not be included in the resources to be switched over. The image information becomes unavailable if the cloning image it references has not been switched over. After that, when the resources of the global pool that contains the cloning image are switched over, the image information becomes available again.
- An L-Platform template needs to have separate segment information for each tenant. The segment information becomes unavailable if the network resource it references has not been switched over. After that, when the resources of the global pool that contains the network resource are switched over, the segment information becomes available again.
- Create an L-Platform template for each tenant. For the image information and the segment information comprising an L-Platform template, use the information of the tenant or the information you decided to use for the tenant. An L-Platform template using the image information or the segment information that has become unavailable because the resource has not been switched over cannot be used for deployment. After the image and segment information become available again by a switchover of global pool resources, the L-Platform template can be used for deployment.



Figure 2.5 Configuring Copy Groups

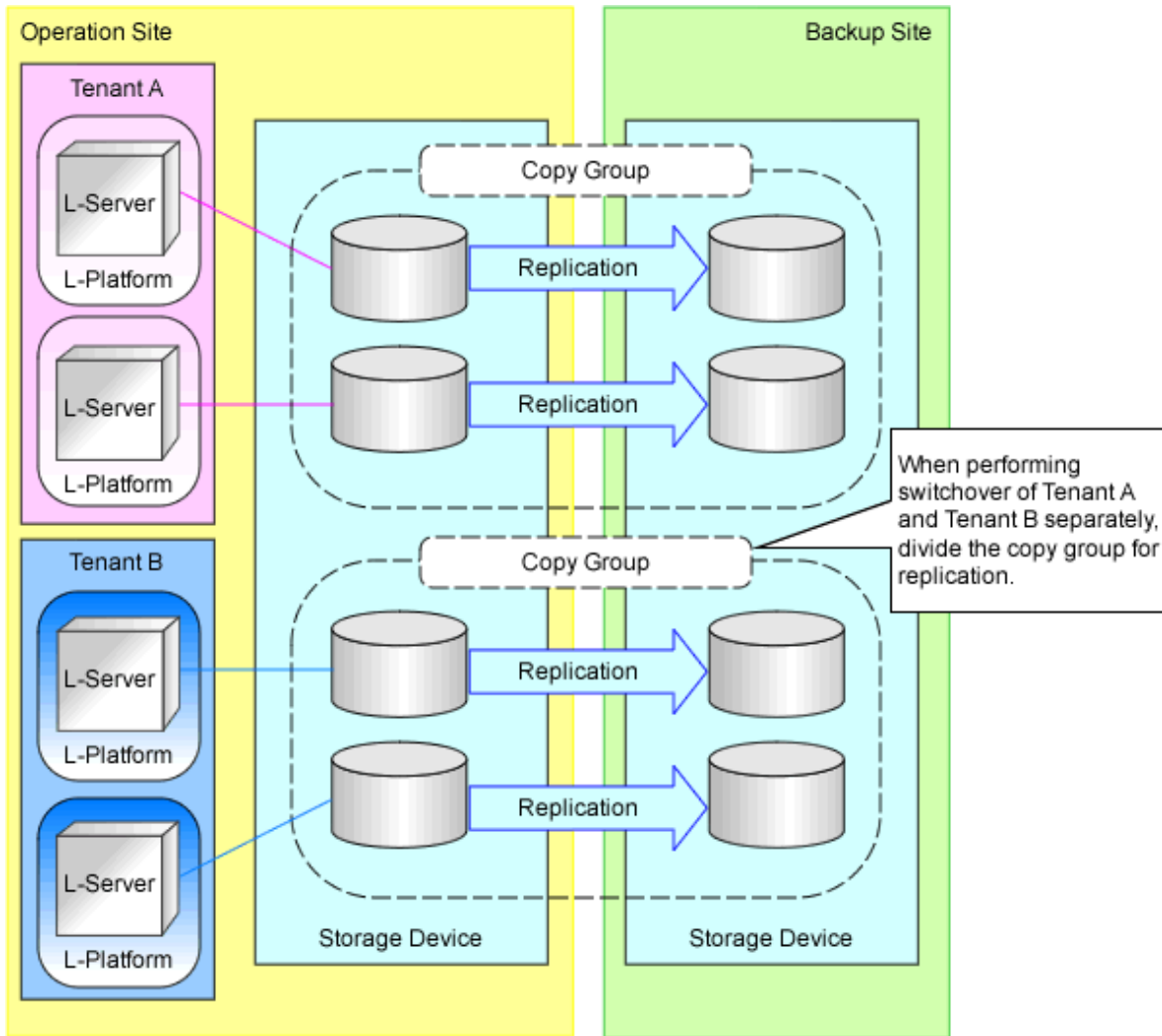
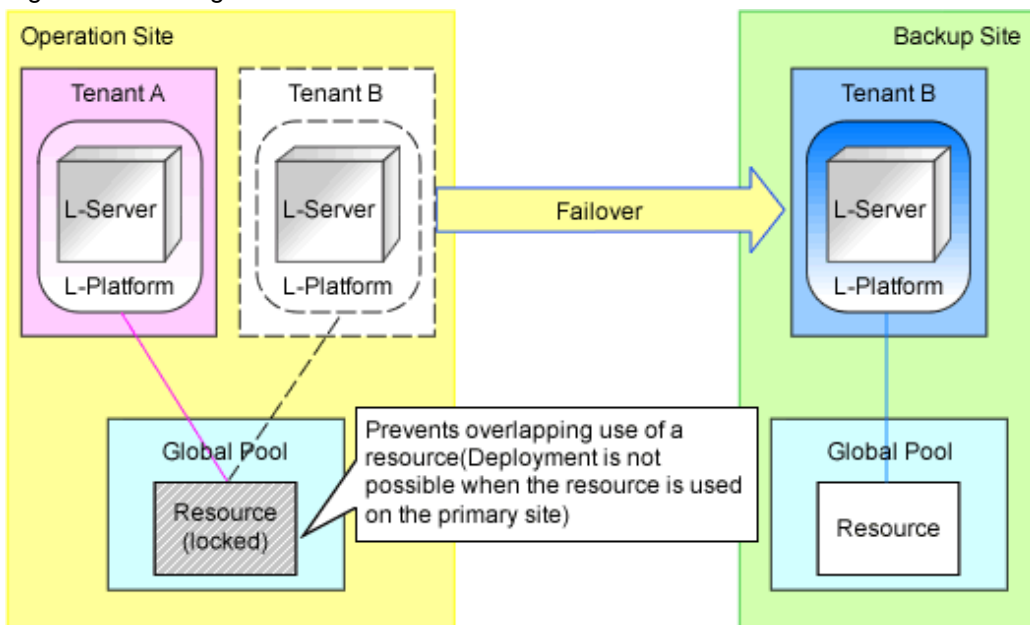


Figure 2.6 Locking Resources



2.3 Limitation of Switchover Scopes

Define whether switchover scopes are limited.

Item	Description	Remarks
Limitation of switchover scopes	Limited	Switchover scopes cannot be limited when using Hyper-V as server virtualization software.
	Not limited	

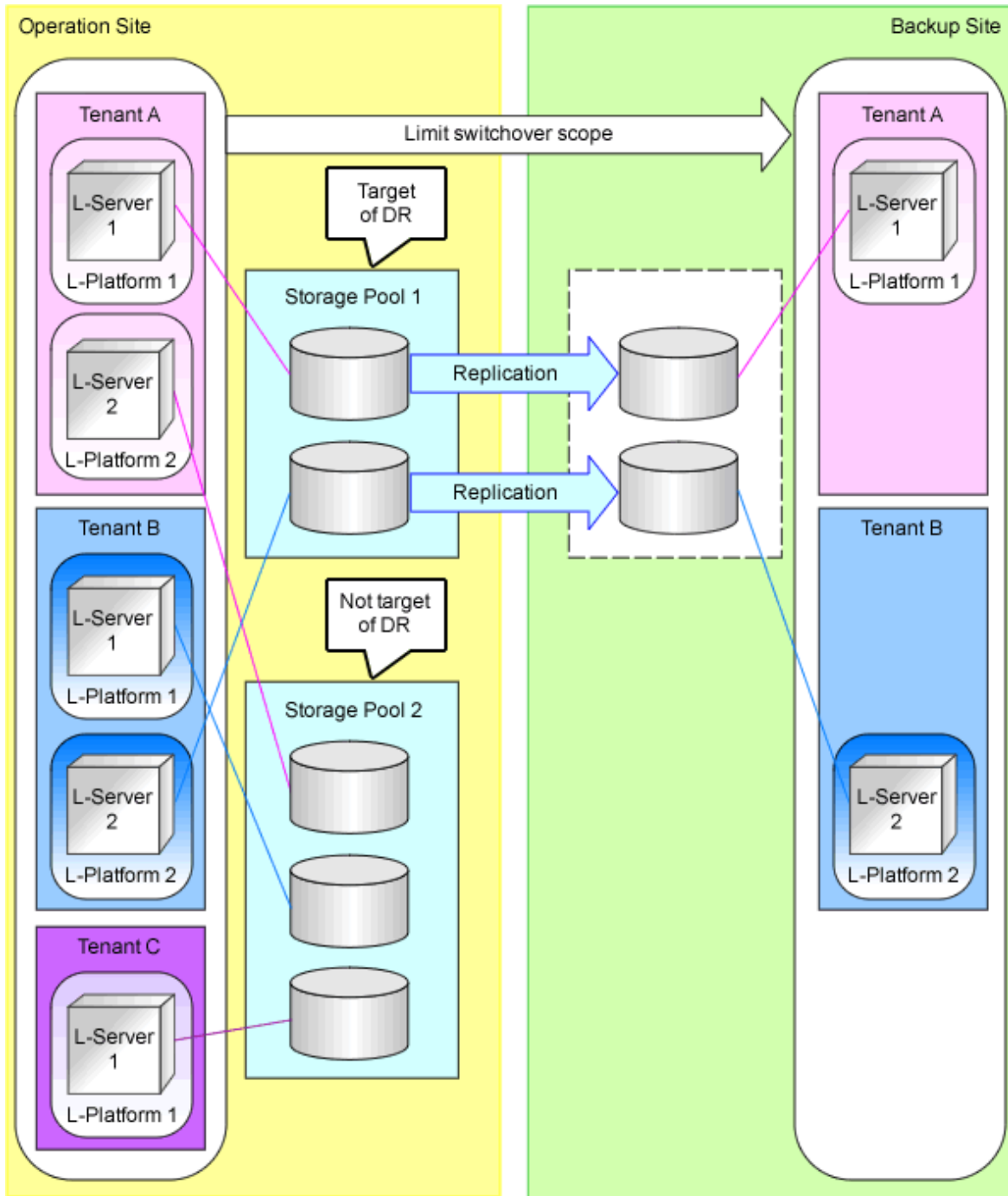
Information

Regarding Limitation of Switchover Scopes

- Specification of the target storage pools to replicate enables limitation of the scope to be recovered using the backup site. Refer to "[Figure 2.7 Limitation of Switchover Scopes](#)".
- When specifying the target storage pools to replicate, the following resources cannot be recovered to the backup site.
 1. Disk resources or virtual storage resources registered in the storage pools which are not specified
 2. L-Platforms using the storage in step 1
 3. Images using the storage used in step 1
 4. Tenants which are only related to the storage pools in step 1

For details on how to specify storage pools, refer to "[3.3 Manager Installation and Configuration](#)".

Figure 2.7 Limitation of Switchover Scopes



2.4 Configuration of the Primary and Backup Sites

Define the configurations of the primary and backup sites.

- [Configurations to Perform Site Switchover Transparently for ROR Console Users](#)
- [Items to be Matched between the Primary and Backup Sites](#)
- [Items to be Different between the Primary and Backup Sites](#)
- [Virtual Storage Resource Names and Disk Resource Names](#)
- [Configuration Files for Matching Details between the Primary and Backup Sites](#)
- [Customized Settings on the Primary Site](#)

Configurations to Perform Site Switchover Transparently for ROR Console Users

In order to perform site switchover transparently for ROR console users, when connecting to the admin server from the ROR console, perform either one of the following operations for the host name (FQDN) of the admin server to use.

- Assign the same IP address to the admin servers of the primary and backup sites, and make the FQDN of the admin servers the same

In order to avoid overlap of IP addresses, do not connect the admin servers on the primary site and the backup site to the same network at the same time.

- Assign different IP addresses to the admin servers of the primary and backup sites, and make the FQDN of the admin servers the same

Configure the IP address of the admin server on the primary site as the IP address to connect with the FQDN of the DNS server. Upon site switchover, modify the DNS server settings, and switch this IP address to the IP address of the admin server on the backup site.


These operations can only be performed when switching over the sites.

When switching over the tenants, connect to the network by specifying the FQDN of the admin server.

Items to be Matched between the Primary and Backup Sites

Match the following items between the primary and backup sites.

Switchover Method	Item	Description
Common	Levels and versions of ServerView Resource Orchestrator Cloud Edition managers	
	Installation folders of ServerView Resource Orchestrator Cloud Edition managers	
	Managed server configuration	<p>Check that the server trees are the same for each site.</p> <p>The server names on the server trees can be changed according to the site. Refer to "3.6 Creating Files Used for Switchover".</p> <p>For virtual L-Server switchover (VM guests), the number of servers of the VM hosts can be reduced by using VM pool definition files. For details on VM pool definition files, refer to "3.6 Creating Files Used for Switchover".</p>
	Network devices connected with managed servers	<p>Ensure that the network trees are the same for each site.</p> <p>For details on the network devices of the automatic configuration target (L2 switches, firewalls, Ethernet Fabric switches), configure the same settings of the network configuration information, and perform the same pre-configuration of the network devices.</p> <p>For details on how to configure network configuration information, refer to "9.4.8 When Registering Network Devices as Resources" in the "Design Guide CE".</p> <p>For details on the pre-configuration of network devices, refer to "9.2.8 Network Settings for Other Managed Hardware" in the "Design Guide CE".</p>

Switchover Method	Item	Description
	Configurations of network devices (blade configurations: CB, rack mount configurations: L2 switches)	Models, links, firmware, and account settings must be the same. For details on the L2 switches of automatic configuration targets, refer to "Network devices connected with managed servers" in "Item".
	External network settings (VLAN, CB uplink port settings)	The settings must be the same when performing manual network settings (L2, L3) in advance.
	SAN switch settings (zoning)	When the switchover method is physical L-Server switchover (physical OS) or physical/virtual L-Server switchover (VM host/VM guest), and when using ETERNUS, it is not necessary to configure the same settings.
	The user name of the dual-role administrator created when installing ServerView Resource Orchestrator Cloud Edition	
	The admin LAN IP address of the admin server	For virtual L-Server switchover, when there are no network resources of the admin LAN, the IP addresses do not need to be the same.
Virtual L-Server switchover (VM guest)	Port groups (names, VLAN settings)	The settings must be the same when performing manual network settings in advance. For details on how to manually configure the network settings, refer to "C.2.5 Manual Network Configuration" in the "Setup Guide CE".
	The name of VM management software on ServerView Resource Orchestrator Cloud Edition	When mapping definitions are prepared, different names can be used. For details on mapping definitions, refer to " 3.6 Creating Files Used for Switchover ".
	Configurations of VM management software (cluster L-Server deployment policy)	Configure the same L-Server deployment policy settings (such as VMware HA is available) with the switchover source cluster for the cluster to which the VM host described in the VM pool definition file belongs. For details on the VM pool definition files, refer to " 3.6 Creating Files Used for Switchover ". For details on the L-Server deployment policy settings, refer to "E.1.2 Preparations for Servers" in the "Design Guide CE".  Note Do not configure the same vCenter instance IDs of VMware vCenter Server for each site.

Items to be Different between the Primary and Backup Sites

For the following items, configure different values between the primary and backup sites.

Item	Switchover Method	Item	Description
Items to be Different between Sites	Common	The computer name of the admin server	For the computer name of the admin server, configure different names for the primary and backup sites. When re-installing the admin server due to a disaster, the computer names which have been used for the primary site or backup site before cannot be used.
		The IP addresses of storage units which are registered with the admin server	IP addresses of storage units are required for replication.
	Physical L-Server Switchover (Physical OS) or Physical/Virtual L-Server Switchover (VM Host/VM Guest)	The IP addresses of servers registered in the server tree	For the IP addresses configured in the servers registered in the server tree, the different IP addresses according to each site. For the IP addresses to specified for creating physical L-Servers, do not use IP addresses which have been configured for the servers when registering them in the server tree.

Virtual Storage Resource Names and Disk Resource Names

- For either of the following cases, users can configure arbitrary virtual storage resource names and disk resource names.
 - When using NetApp storage as the storage unit
 - When a storage unit is Netapp storage, and the formats of the virtual storage resource name and the disk resource name are the same format as the RAID group name and the alias name of LUNs respectively managed by ESC

In the case above, for physical L-Server switchover (physical OS) or physical/virtual L-Server switchover (VM host/VM guest), configure a virtual storage resource name and a disk resource name that satisfies either of the following.

- For all replicated virtual storage resources and disk resources, use the same names between the sites
- Do not use the same resource name between sites
- Ensure that numbers are not used in virtual storage resource names. If there are the virtual storage resource names including numbers, import may fail.

Information

Addition of Numbers to Virtual Storage Resource Names

For the virtual storage resource names of ServerView Resource Orchestrator Cloud Edition, the datastore name, Cluster Shared Volume name, or the RAID group name is used. If the names overlap, the overlap will be avoided by the addition of numbers to the end of resource names. Therefore, in order to prevent to the addition of numbers to the end of the virtual storage names, configure the datastore name, Cluster Shared Volume name, and the RAID group name not to overlap with the virtual storage resource names between sites.

Configuration Files for Matching Details between the Primary and Backup Sites

When changing the following files in the primary site, also change the files in the backup site.

* indicates arbitrary files in the folders.

Folder	File Name
<i>Installation_folder</i> \SVROR\Manager\etc\	trapop.bat
<i>Installation_folder</i> \SVROR\Manager\etc\l_server\	disable_check_num_of_cpu
	enable_control

Folder	File Name
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\	auto_replace.rcxprop
	cli_notlist_oc.rcxprop
	folder.rcxprop
	gui_config.rcxprop
	image_admin_hyperv.rcxprop
	image_admin_hyperv_user_group_name.rcxprop
	kb978336_scvmm.rcxprop
	l_server.rcxprop
	ldap_attr.rcxprop
	library_share_deny.conf
	library_share_user_group_name_deny.conf
	logctl_env.rcxprop
	manager_backup.rcxprop
	mwgui_config.rcxprop
	network_device_model.xml
	pool.rcxprop
	product_report.rcxprop
	rcx_base.rcxprop
	scvmm_mac_pool.rcxprop
	scvmm_mac_pool_tenant_name.rcxprop
	server_control.rcxprop
	server_spec.rcxprop
	spare_server_config.rcxprop
	storage.rcxprop
	tenant_config.xml
	tenant_move.rcxprop
	tenant_owner_admin.rcxprop
	unm_mon.rcxprop
	unm_provisioning.rcxprop
	use_image_data_disk
	vm.rcxprop
	vm_console.rcxprop
	vnetwork_excluded_vmware.rcxprop
	vnetwork_hyperv.rcxprop
vnetwork_oraclevm.rcxprop	
vnetwork_rhelkvm.rcxprop	
vnetwork_rhelxen.rcxprop	
vnetwork_vmware.rcxprop	
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\alive_monitoring\	Physical.rcxprop

Folder	File Name
	vm_Hyper-V.rcxprop
	vm_VMware.rcxprop
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\home_tab\	home_infra_mes.txt
	home_tenant_mes.txt
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\l_server\net\	*
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\net\	*
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\nicdefctl\host\	*
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\nicdefctl\model\	*
<i>Installation_folder</i> \SVROR\Manager\etc\customize_data\sysprep_guirunonce\	*
<i>Installation_folder</i> \SVROR\Manager\etc\event_handler\	*
<i>Installation_folder</i> \SVROR\Manager\etc\scripts\	*
<i>Installation_folder</i> \SVROR\Manager\etc\scripts\Exec_Script\	*
<i>Installation_folder</i> \SVROR\Manager\etc\scripts\network_resource\	Unm_network_setting.xml
<i>Installation_folder</i> \SVROR\Manager\etc\scripts\network_resource\ruleset_name\	*
<i>Installation_folder</i> \SVROR\Manager\etc\scripts\vendor_name\unit_name or model_name \common\	*
<i>Installation_folder</i> \SVROR\Manager\etc\scripts\vendor_name\unit_name or model_name \operations\ruleset_name\	*
<i>Installation_folder</i> \SVROR\Manager\etc\scripts\vendor_name\unit_name or model_name \rulesets\ruleset_name\	*
<i>Installation_folder</i> \SVROR\Manager\etc\user_scripts\	*
<i>Installation_folder</i> \SVROR\Manager\etc\vm\	register_ipmiless
	require_image_location
	snapshot_skip_reconfig
	vds_vc
<i>Installation_folder</i> \SVROR\Manager\rails\config\rcx\	vm_guest_params.rb
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\en\CloudEdition\	home.html
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\en\CloudEdition\css\	*
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\en\CloudEdition\img\	*
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\en\VirtualEdition\	home.html
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\en\VirtualEdition\css\	*
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\en\VirtualEdition\img\	*
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\ja\CloudEdition\	home.html
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\ja\CloudEdition\css\	*
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\ja\CloudEdition\img\	*
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\ja\VirtualEdition\	home.html
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\ja\VirtualEdition\css	*
<i>Installation_folder</i> \SVROR\Manager\rails\public\man\ja\VirtualEdition\img	*
<i>Installation_folder</i> \SVROR\Manager\sys\usm\etc\	emcpath.conf
	fspath.conf

Folder	File Name
<i>Installation_folder</i> \SVROR\ScwPro\tftp\rcbootimg\	awwn*.cfg

Customized Settings on the Primary Site

The following customizations of the primary site, which are performed according to "Chapter 18 Post-Installation Procedures" in the "Setup Guide CE", need to be reflected on the backup site before switchover. Configure the backup site while setting up the environment, or reflect the settings as a part of switchover.

- "18.1 Settings for Sending Email"
- "18.2.3 Setting Application process settings"
- "18.2.4 Setting Application process to be used"
- "18.3 Customizing the Dashboard"
- "18.4 Setting the Host Names for Virtual Servers"
- "18.5 Setting the Method for Setting Resource Names"
- "18.6 Settings for the Overcommit Function"
- "18.7 Editing the Environment Setup File for the L-Platform API"
- "18.9 System Disk Settings for Physical L-Servers"
- "18.12 Edit the License Agreement"
- "18.13 Editing the User Agreement when Registering a User"

Back up the following files if they have been modified.

- *Installation_folder*\RCXCFMG\config\command_config.xml
- *Installation_folder*\RCXCFMG\config\mail_config.xml
- *Installation_folder*\RCXCFMG\config\vsys_config.xml
- *Installation_folder*\RCXCTMG\Charging\conf\accounting.properties
- *Installation_folder*\RCXCTMG\MyPortal\config\application_process.properties
- *Installation_folder*\RCXCTMG\MyPortal\config\custom_config.xml
- *Installation_folder*\RCXCTMG\MyPortal\config\managerview_config.xml
- *Installation_folder*\RCXCTMG\MyPortal\config\license\create\default
- *Installation_folder*\RCXCTMG\MyPortal\config\license\reconfigure\default
- *Installation_folder*\RCXCTMG\MyPortal\config\license\return\default
- *Installation_folder*\RCXCTMG\SecurityManagement\conf\portal.properties
- *Installation_folder*\IAPS\F3FMihs\servers\FJapache\htdocs\sopdocs\pub\html\ja\cRegApply_agreement.forUse_ja.html

2.5 Necessary Licenses

For primary sites, the same number of DR Option licenses as the number of physical servers on which the switchover target L-Servers are operating.

Apply the licenses to both the primary site and backup site. Apply the same license to the backup site as that of the primary site.

2.6 Estimation of Replication Disk Capacity

In order to recover the ServerView Resource Orchestrator Cloud Edition environment of the primary site by using DR Option on the backup site, it is necessary to replicate disks storing the following information:

- Folder containing switchover information

Create this folder on the FC or iSCSI connection disks. NAS connection disks cannot be used.

This folder contains the following information:

- The image file storage folders of physical servers
 - The output of the rcxmgreexport command
 - The output of the rcxstorage command
 - User scripts and definition files
- Virtual storage resources and disk resources registered in the replication target storage pools

The disk resources used by the managed servers or images of the switchover target.

Considering the descriptions above, estimate the replication target disk capacity. For details on the switchover information folder and the target areas of replication, refer to "[3.1 Pre-setup Preparations](#)".

2.7 Advisory Notes for Disaster Recovery Environments

Manager OSs

Windows managers are supported. Linux managers are not supported.

For details on Windows managers and Linux managers, refer to "Chapter 2 Overview" in the "Design Guide CE".

Managed Servers

Managed servers of physical OSs (Windows, Linux), VMware, and Hyper-V are supported.

Physical OSs (Solaris), OVM for SPARC, and KVM are not supported.

L-Servers which cannot be Recovered

The following L-Servers cannot be recovered by Disaster Recovery.

L-Servers for which only the configuration definitions have been created

L-Servers linked with configured physical servers

Server Load Balancers (SLB)

L-Platform switchover including server load balancers (SLB) is not supported. When creating, editing or copying an L-Platform template, do not place SLBs in the L-Platform template. Instruct the tenant administrator not to create or release L-Platform templates including SLBs by accident.

VM Guests with VMware Fault Tolerance Enabled

VM guest switchover with VMware Fault Tolerance enabled is not supported. Do not use VMware Fault Tolerance.

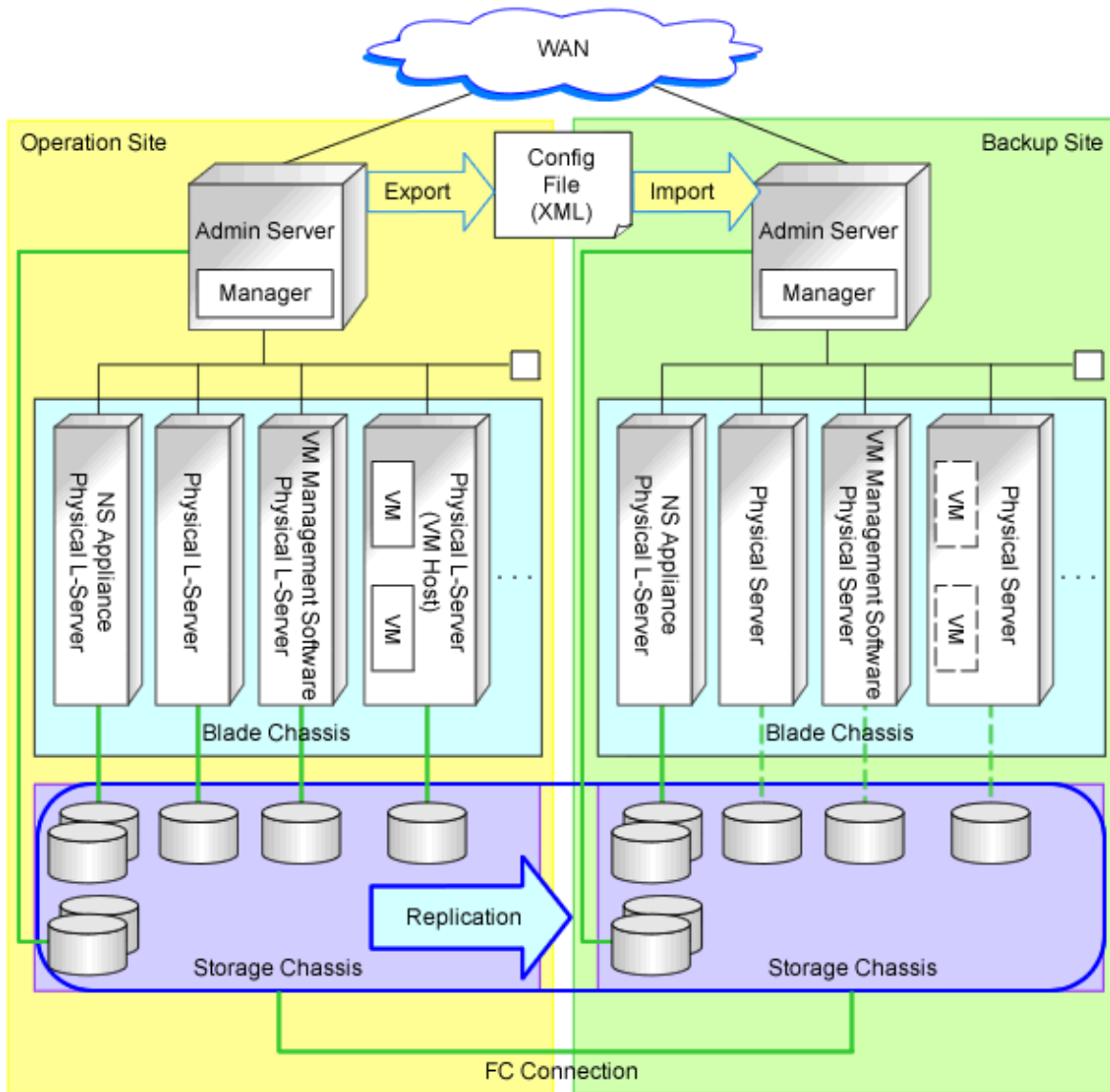
2.8 Example of System Configuration

An example of a Disaster Recovery environment system configuration is given below.

Example Disaster Recovery Environment System Configuration Containing both Physical L-Server Switchover (Physical OS) and Physical/Virtual L-Server Switchover (VM Host/VM Guest)

An example of a Disaster Recovery environment system configuration which contains both physical L-Server switchover (physical OS) and physical/virtual L-Server switchover (VM host/VM guest) is shown below:

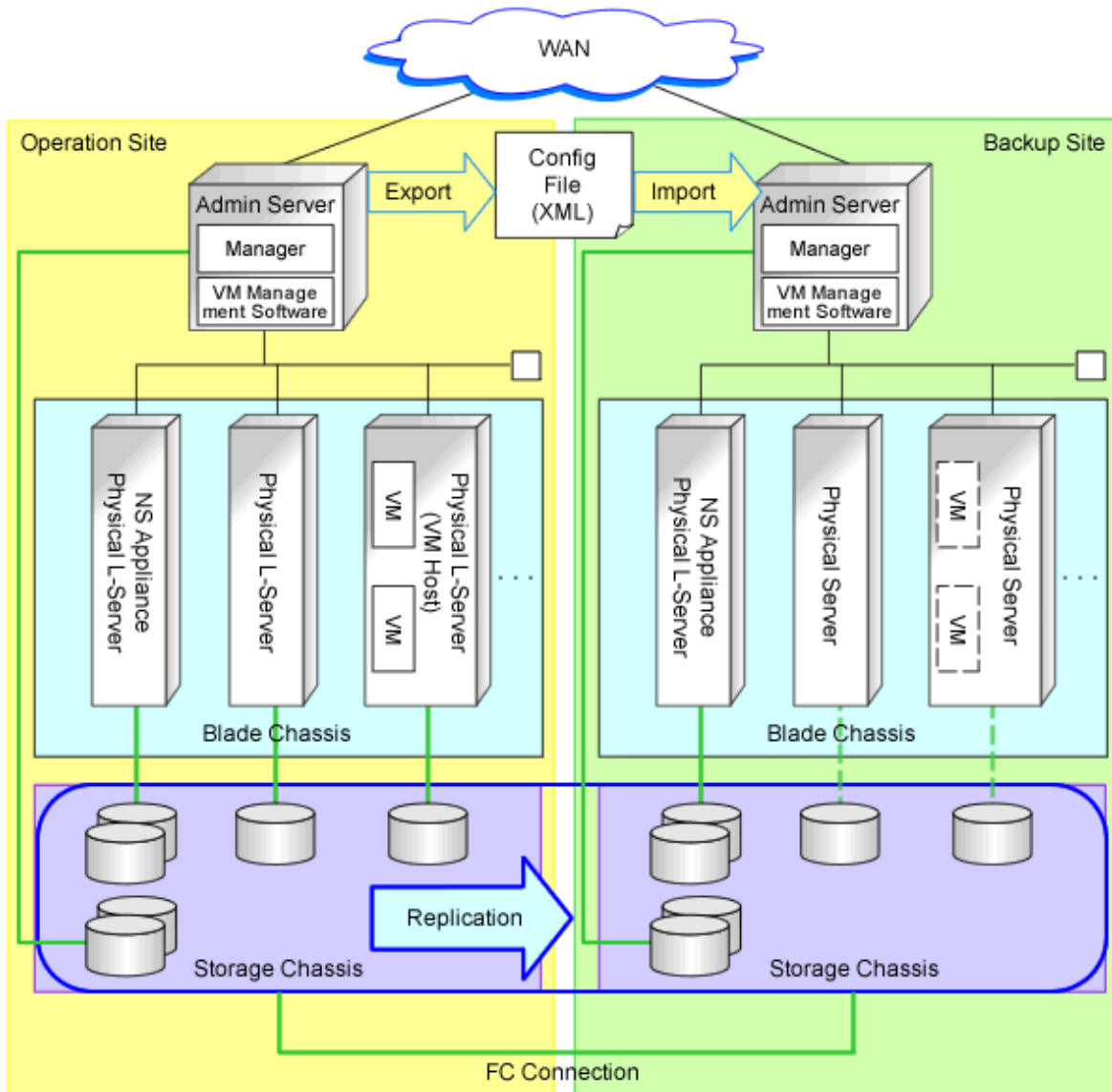
Figure 2.8 Example Disaster Recovery Environment Containing both Physical L-Server Switchover (Physical OS) and Physical/Virtual L-Server Switchover (VM Host/VM Guest)



Example of System Configuration Installing VM Management Software on the Admin Server

An example system configuration with VM management software installed on the admin server is shown below:

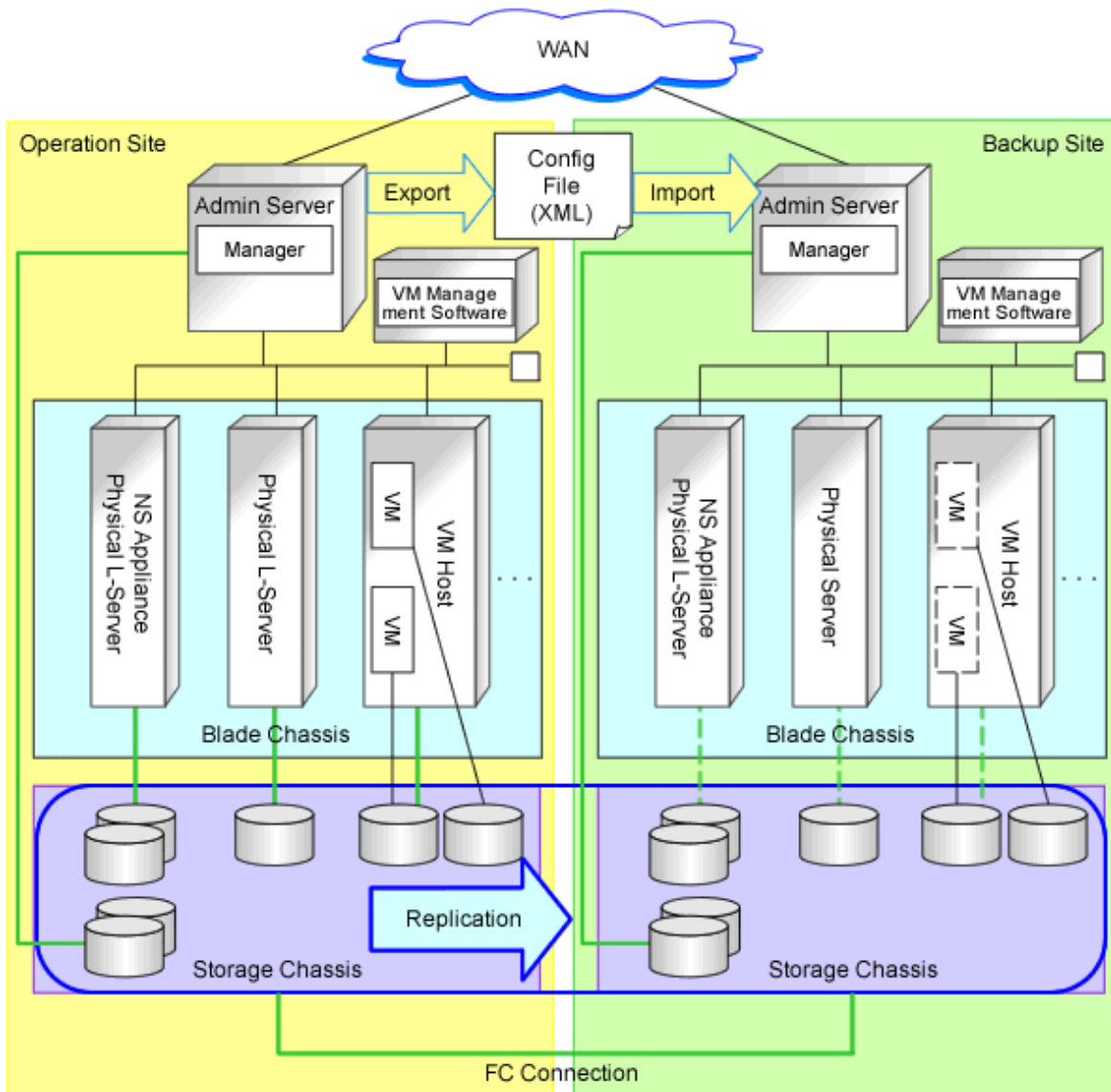
Figure 2.9 Example of VM Management Software Installation on the Admin Server in a Disaster Recovery Environment which Contains both Physical L-Server Switchover (Physical OS) and Physical/Virtual L-Server Switchover (VM Host/VM Guest)



Example Disaster Recovery Environment System Configuration which Contains both Physical L-Server Switchover (Physical OS) and Virtual L-Server Switchover (VM Guest)

An example of a Disaster Recovery environment system configuration which contains both physical L-Server switchover (physical OS) and virtual L-Server switchover (VM guest) is shown below:

Figure 2.10 Example Disaster Recovery Environment which Contains both Physical L-Server Switchover (Physical OS) and Virtual L-Server Switchover (VM Guest)



Chapter 3 Installation

This chapter explains how to configure a Disaster Recovery environment.

Configure a Disaster Recovery environment using the following flow.

1. [Pre-setup Preparations](#)
2. [Creating Switchover Information Folders](#)
3. [Manager Installation and Configuration](#)
4. [Configuring Managed Servers and Network Devices](#)
5. [Configuring Server NIC Definitions](#)
6. [Creating Files Used for Switchover](#)
7. [Configuring Automatic Switchover Information Collection Settings](#)

3.1 Pre-setup Preparations

Perform pre-setup preparations for the primary and backup sites.

- Storage unit replication

Replicate the primary site information to the backup site using the storage unit replication function.

The replication targets are the LUNs storing the following information. Refer to "[Table 3.1 Replication of Storage Units](#)".

Table 3.1 Replication of Storage Units

Replication Target Information	Type of LUNs to Store Information	Number of LUNs		Remarks
Folder containing switchover information	LUNs with FC or iSCSI connections	Primary site	2 (*1)	Refer to " 3.2 Creating Switchover Information Folders ". Perform interactive copy from the primary site to the backup site, and from the backup site to the primary site. Configure the replication control item (copy group) for each site.
		Backup site	2 (*2)	
Disk resources and virtual storage resources stored in the storage pools of the replication targets (*3)	LUNs with FC, iSCSI, or NAS connections (*4, *5)	Primary site	Number of LUNs used by the disk resources and the virtual storage resources stored in the storage pools of the replication targets.	Configure the control unit (copy group) of the replication targets for each unit to perform switchover.
		Backup site	Same number as the primary site (*6)	

*1: The following LUNs are necessary:

- LUNs for the switchover information folder of the primary site
- LUNs for the replication destination used for the switchover information folders of the backup site

*2: The following LUNs are necessary:

- LUNs for the switchover information folders of the backup site
- LUNs for the replication destination used for the switchover information folders of the primary site

*3: The tenants, L-Platforms, L-Servers for the infrastructure administrator, and images using the disk resources or virtual storage resources in the storage pool are the switchover targets on the backup site. Refer to "[2.3 Limitation of Switchover Scopes](#)".

*4: LUNs with iSCSI or NAS connections are only supported when used for virtual L-Server switchover (VM guests).

*5: For the LUNs used in the virtual L-Server switchover (VM guest) method, before starting replication, check that the replication destination LUNs are not regarded as the datastore on the switchover destination VM management software.

When the LUNs are regarded as the datastore, perform the following operations, and ensure that the LUNs are not regarded as the datastore.

- For the VMFS datastore

Delete the corresponding datastore on the arbitrary VM host.

Also, on the VM host which the datastore is shared, check that deletion of the datastore was detected. Example: Rescan the datastore on each VM host

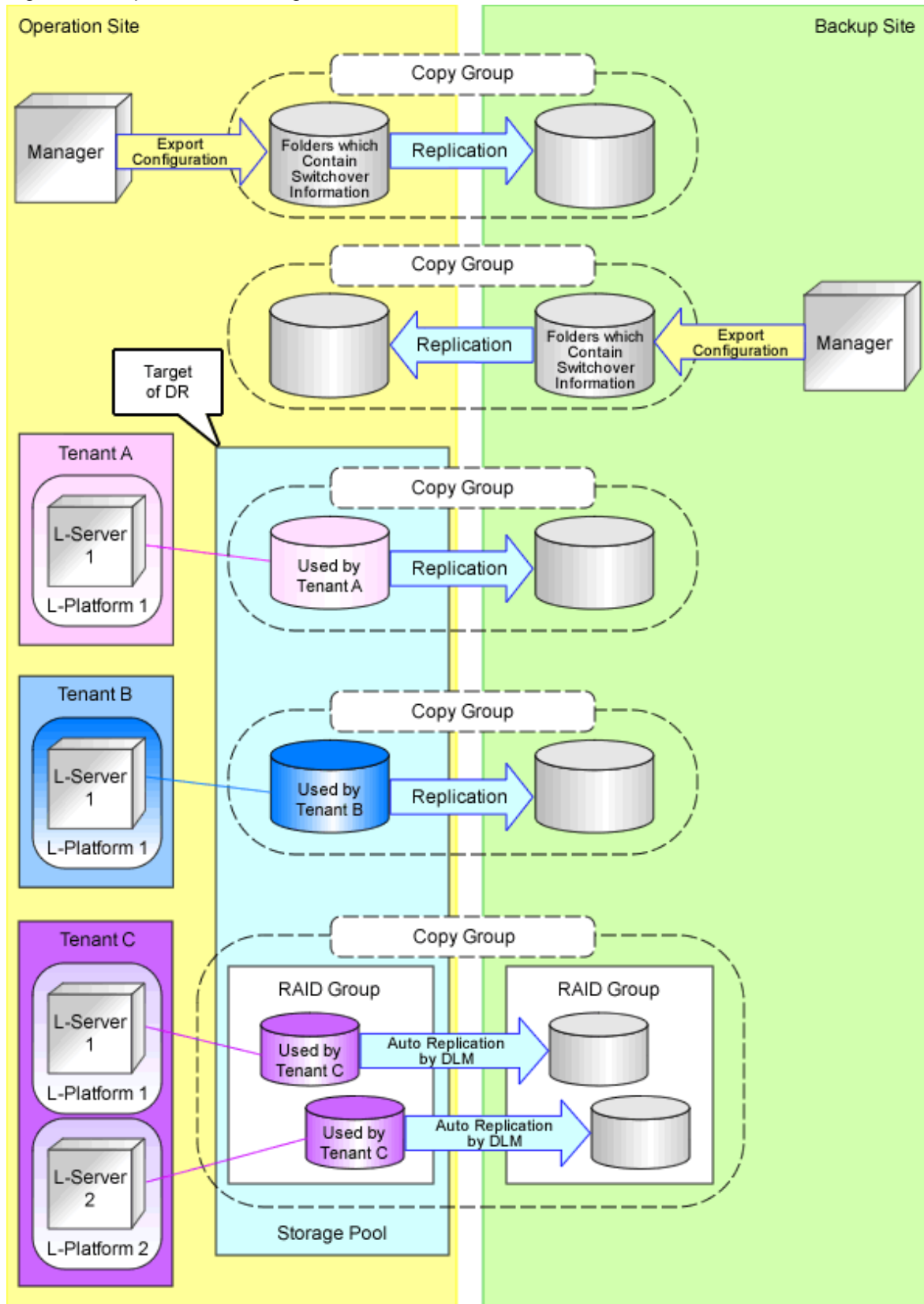
- For the NFS datastore

Unmount the corresponding datastore from each host.

For details of the operation, refer to the VMware manuals.

*6: Number of LUNs of the replication targets used by the disk resources and the virtual storage resources stored in the storage pools of the primary site replication targets.

Figure 3.1 Replication of Storage Units



For details on storage replication, refer to "17.1.3 High Availability for Storage Chassis" in the "Operation Guide CE".

Disaster Recovery can be operated on LUNs created beforehand or on dynamic LUN mirroring (DLM) storage of ETERNUS. For details on prerequisites for storage replication, refer to "7.2 Storage Chassis High Availability Design" in the "Design Guide CE".

For primary sites, it is not necessary for the disk resources for the backup site to have been detected. Therefore, it is not necessary to connect storage units for the backup site to the server for the primary site.

- When creating physical L-Servers

Refer to "Appendix D Preparations for Creating a Physical L-Server" in the "Design Guide CE".

- When creating virtual L-Servers using server virtualization software

Refer to "Appendix E Preparations for Creating a Virtual L-Server" in the "Design Guide CE". Installation of VM management software on the backup site is not necessary when it is installed on physical L-Servers on the primary site.

- When using VMware virtual L-Servers for physical/virtual L-Server switchover (VM host/VM guest)

Enter the following commands for the VM host and disable detection of the copied LUNs.

```
>esxcfg-advcfg -s 0 /LVM/DisallowSnapshotLUN <RETURN>
```

Note

LUNs which were created by ETERNUS dynamic LUN mirroring (DLM) are handled as LUNs created beforehand after a disaster recovery failover from the primary site to the backup site. Replication settings must be performed manually before future switchover operations because automatic replication setting is not available for LUNs created beforehand. For details about LUNs created by dynamic LUN mirroring (DLM) and LUNs created beforehand, refer to "D.3 Storage Preparations" in the "Design Guide CE".

- When using Hyper-V virtual L-Servers for physical/virtual L-Server switchover (VM host/VM guest)

It is necessary to also configure the remote management authentication settings on the admin server of the backup site.

For details, refer to "E.2.5 Pre-setup Preparations in Hyper-V Environments" in the "Design Guide CE".

3.2 Creating Switchover Information Folders

Create the switchover information folders in the admin servers of the primary and backup sites. In the LUNs for switchover information folders, create the folders in the following configurations:

```
Folder containing switchover information
Folder which contains switchover information\Image          - Folder to contain physical server image files
Folder which contains switchover information\ManagerExport  - Output directory of the rcxmgrexport command
Folder which contains switchover information\MAP            - Folder to contain the mapping file of physical server names or VM management software name
Folder which contains switchover information\OtherBackupFiles - Folder to contain definition files and user scripts
Folder which contains switchover information\vmmgr_file.txt - Definition files of VM management software [physical/virtual L-Server switchover (VM host/or VM guest)]
Folder which contains switchover information\vm_pool.csv    - VM pool definition files [virtual L-Server switchover (VM guest)]
```

Information

For details of the content of vmmgr_file.txt and vm_pool.csv, refer to "3.6 Creating Files Used for Switchover".

Example

```
D:\Export\  
D:\Export\Image  
D:\Export\ManagerExport  
D:\Export\MAP  
D:\Export\OtherBackupFiles  
D:\Export\vmmgr_file.txt  
D:\Export\vm_pool.csv
```

.....

Create the switchover information folders on the SAN connection or the iSCSI connection LUN, and make the folders targets of replication.

The information stored in each folder within the switchover information folder is as below.

- *Folders which contain switchover information*

Parent folder. The following folders must be created. Any folder name can be used.

- *Folder which contains switchover information\Image*

Stores physical server images. Create the folder when migrating physical server images.

- *Folder which contains switchover information\ManagerExport*

Folders to store the configuration information of the Resource Orchestrator manager. The following folders must be created.

- *Folder which contains switchover information\MAP*

Folders to store the mapping information of physical server names. Create the folder, when the physical server or VM management software names are different between sites.

- *Folder which contains switchover information\OtherBackupFiles*

Store files other than those described above. The following folders must be created.

3.3 Manager Installation and Configuration

Install the Resource Orchestrator manager on the admin servers of the primary and backup sites.

For details, refer to the following sections in the "Setup Guide CE".

- "Chapter 2 Installation"
- "Chapter 3 SSL Communication Environment Settings for the ROR Console"
- "Chapter 4 Login to the ROR Console"
- "Chapter 5 License Setup and Confirmation"
- "Chapter 6 Importing a Certificate to a Browser"

For Disaster Recovery environments, configure as follows.

- For details on the items to match or to be different, between the primary and backup sites, refer to "[Chapter 2 Design](#)".
- When the environment is configured so that disaster recovery is transparent to ROR console users, SVOM and VIOM need to be installed on the admin server of backup site under either of the following conditions. Once installation is complete, the conditions do not apply.
 - The admin server of primary site must be stopped
 - The network connecting to the primary site must be disconnected
- Specify the information of the *failover information folders* in the following definition files of the primary and backup sites.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

Example

Enter the following descriptions, when using the folder configurations described as examples in "3.2 Creating Switchover Information Folders", and when mounting the failover information folders replicated in the backup site on the E drive during switchover.

```
#rcxstorage_define
D:\Export
#rcxmgreexport_define
D:\Export\ManagerExport
#rcxrecovery_define
E:\Export
```

- When limiting the switchover scope, specify the storage pools of the replication targets in the primary and backup sites.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

Example

Enter the following descriptions when specifying the global pool StoragePool1 and the local pool StoragePool2 of tenantA as the storage pools that are the targets of replication. Specify the storage pool name using the full path (the path must start with "/"). When specifying multiple storage pools as the targets of replication, enter multiple lines of descriptions.

```
#dr_storagepool
storage_pool=/StoragePool1
storage_pool=/tenantA/StoragePool2
```

Note

- When the settings above are not configured, all resources on the sites become the targets of switchover, as all storage pools are regarded as the targets of replication. Perform replication of all disk resources and virtual storage resources.
 - Switchover scopes cannot be limited when using Hyper-V as server virtualization software.
- After installing the manager, set up SSL if necessary.

For details, refer to "Chapter 2 Installation" and "Chapter 3 SSL Communication Environment Settings for the ROR Console" in the "Setup Guide CE".

Note

The site certificate that was issued by the CA should be used for the Disaster Recovery environment.

When test certificates are used, certificates on the backup site also need to be imported to the browser during installation or after switchover.

For details, refer to "Chapter 6 Importing a Certificate to a Browser" in the "Setup Guide CE".

- When using Disaster Recovery, a license for the "DR option" is necessary.
After installing Resource Orchestrator, register the license for the "DR option" on the primary and backup sites.
For details on how to register the license, refer to "Chapter 5 License Setup and Confirmation" in the "Setup Guide CE".
- For the image storage location folders of physical servers, specify the image folders created in "3.2 Creating Switchover Information Folders".

- When performing virtual L-Server switchover (VM guest), install VMware vSphere Command-Line Interface (vCLI) corresponding to the VMware vCenter Server version on the servers (such as admin servers) which can communicate with VMware vCenter Server.
- When limiting switchover scope, use the disk resources or the virtual storage resources registered in the storage pools of the switchover targets for the tenants, L-Servers for the infrastructure administrator, and images.
- The following certificate files installed on both the primary and backup sites must be the same files. When installing a manager on the backup site, copy the files from the primary site. Perform this operation after stopping the manager.

When configuring a single backup site to inherit multiple primary sites, copy the following files of the manager on the primary site that is first created to the managers on the other primary sites.

- *Installation_folder*\SVROR\Manager\etc\opt\FJSSVssmgr\current\certificate
- *Installation_folder*\SVROR\Manager\etc\opt\FJSSVrcxdm\certificate
- *Installation_folder*\SVROR\Manager\sys\apache\conf\ssl.crt
- *Installation_folder*\SVROR\Manager\sys\apache\conf\ssl.key
- The following customizations of the primary site, which are performed according to "Chapter 18 Post-Installation Procedures" in the "Setup Guide CE", need to be reflected on the backup site before switchover.

Configure the backup site while setting up the environment, or reflect the settings as a part of switchover.

- "18.1 Settings for Sending Email"
- "18.2.3 Setting Application process settings"
- "18.2.4 Setting Application process to be used"
- "18.3 Customizing the Dashboard"
- "18.4 Setting the Host Names for Virtual Servers"
- "18.5 Setting the Method for Setting Resource Names"
- "18.6 Settings for the Overcommit Function"
- "18.7 Editing the Environment Setup File for the L-Platform API"
- "18.9 System Disk Settings for Physical L-Servers"
- "18.12 Edit the License Agreement"
- "18.13 Editing the User Agreement when Registering a User"

Back up the following files if they have been modified.

- *Installation_folder*\RCXCFMG\config\command_config.xml
- *Installation_folder*\RCXCFMG\config\mail_config.xml
- *Installation_folder*\RCXCFMG\config\vsys_config.xml
- *Installation_folder*\RCXCTMG\Charging\conf\accounting.properties
- *Installation_folder*\RCXCTMG\MyPortal\config\application_process.properties
- *Installation_folder*\RCXCTMG\MyPortal\config\custom_config.xml
- *Installation_folder*\RCXCTMG\MyPortal\config\managerview_config.xml
- *Installation_folder*\RCXCTMG\MyPortal\config\license\create\default
- *Installation_folder*\RCXCTMG\MyPortal\config\license\reconfigure\default
- *Installation_folder*\RCXCTMG\MyPortal\config\license\return\default
- *Installation_folder*\RCXCTMG\SecurityManagement\conf\portal.properties
- *Installation_folder*\IAPS\F3FMihs\servers\FJapache\htdocs\sopdocs\pub\html\ja\cRegApply_agreement.forUse_ja.html

3.4 Configuring Managed Servers and Network Devices

Configure the settings of managed servers and network devices for the primary and backup sites.

For details, refer to the following sections in the "Setup Guide CE".

- "Chapter 7 Registering Infrastructure Administrators"
- "Chapter 8 Creating Definition Files"
- "Chapter 9 Registering Resources with Resource Orchestrator"
- "Chapter 11 Installing Software and Registering Agents on VM Hosts"
- "Chapter 12 Registering Resources to the Global Pool"
- "Chapter 13 Creating L-Server Templates"
- "Chapter 14 Creating an L-Server for an Infrastructure Administrator"
- "Chapter 15 Collecting and Registering Cloning Images"
- "Chapter 16 Creating L-Platform Templates"

For Disaster Recovery environments, configure as follows.

Common Configurations

- For details on the items to match or to be different, between the primary and backup sites, refer to "[Chapter 2 Design](#)".
- Register servers on the server tree in advance on the backup site as well as on the primary site. It is also necessary to configure the BIOS settings on the registered server in advance. For details, refer to "8.2.7 Configuring BIOS Settings of Managed Servers" in the "Design Guide CE".
- As for pools, L-Platforms, users and user groups registered on the orchestration tree on the backup site, these do not need to be the same as those of the primary site. Register them depending on the operations that will be performed on the backup site before switchover.
- For network devices registered on the network tree, prepare identical devices and register them in advance on the backup site. When NS Appliance is used as a network device, also create an NS Appliance on the backup site and register it as a network device beforehand. For NS Appliance operation procedures refer to the "NS Option Instruction".
- When using the auto-configuration function for network devices

Copy the files and folders below to the backup site.

- *Installation_folder*\SVROR\Manager\etc\customize_data\network_device_model.xml
- *Installation_folder*\SVROR\Manager\etc\scripts\
- Regarding the following configurations, use information that satisfies the necessities of both the primary and backup site.
 - Under *Installation_folder*\SVROR\Manager\etc\storage\emc
 - *Installation_folder*\SVROR\Manager\etc\customize_data\storage_portset.rcxprop
 - Under *Installation_folder*\Manager\etc\customize_data\fc_connection_pattern
- Install the backup site before moving on to the phase to register it in the resource pool. When using the backup site for tasks with lower priority, proceed with the backup site installation before performing switchover.

Configurations when an L-Server Linked with a Configured Virtual Machine (VMware) is the Switchover Target

When L-Servers linked with configured virtual machines (VMware) are switchover targets, it is necessary to modify the configurations regarding the UUIDs of VM guests before performing switchover. Modify configurations following the descriptions in the VMware section in "Configuration Requirements for VM Guest Switchovers" in "D.2 Configuration Requirements" in the "Design Guide VE".

Configuration When Performing Virtual L-Server Switchover (VM Guest)

The advisory notes regarding performing virtual L-Server switchover (VM guest) are given below.

- Install VM hosts on the primary site and the backup site respectively.
- Do not configure VM hosts on physical L-Servers.
- Before performing switchover, perform the following preparations for the backup site in order to be able to mount the replicated LUNs on the correct VM hosts. It is necessary to mount the replicated LUNs on the VM host connected with the images stored in each VM host registered in the VM pool used by L-Servers in the LUNs, or in VM hosts connected with the images stored in the LUNs.

Note

Define the information of the VM hosts connected with the LUNs storing images in advance, since the information must be entered during the switchover procedure. Refer to "[4.2 Switchover Operations between Sites Using the Disaster Recovery Function](#)".

- When using FC or iSCSI connection disks

Configure the zoning and mapping settings so that the replicated LUNs can be referred to from the VM hosts.

- When using NAS connection disks
 - Operate the network links or the storage software so that the replicated LUNs can be mounted on the VM hosts.
 - Prepare the NFS connection information files which describe the information (NFS server addresses and NFS paths) for mounting each replicated LUN (datastore) in the following format. Use this file during the switchover procedure. Refer to "[4.2 Switchover Operations between Sites Using the Disaster Recovery Function](#)".

<i>Datastore name, IP address or FQDN, NFS path</i>

Example

storage_X,192.168.3.230,/nfs/data

- When using distributed virtual switches, the connections between the virtual machines and the port group of the distributed virtual switches in the switchover destination site cannot be restored. After switchover, configure the settings again.
- When editing the destination VM files of the virtual machines through direct operation of VM management software, edit all VM files to deploy on the datastore in which the system disks or data disks of the virtual machines are located.
- When editing the destination VM file through direct operation of VM management software, edit the VM file for a template (cloning image) to deploy in the datastore.
- Only a datastore used by the switchover target L-Servers or cloning images can be mounted in the VM host, during the switchover procedure. When mounting a replicated datastore other than the above, manually mount it after switchover.
- Once disks are deleted from a virtual machine in the switchover source site, any snapshot of the virtual machine taken before deletion of disks cannot be used on the switchover destination site. Therefore you should delete snapshots and take a new one after deleting disks from a virtual machine.

If snapshots taken before deletion of disks are not deleted, there will be following effects on the switchover destination site:

- Unavailable snapshots consume the disk resources.

- If the usage charge calculation function is enabled in the accounting settings, the usage charge for unavailable snapshots are calculated in the same way as other available snapshots.

3.5 Configuring Server NIC Definitions

When using a NIC other than one in the default configurations of network auto-configuration, create a server NIC definition, and reflect it on the manager.

Create the same server NIC definition for the backup site same as for the primary site in advance, and reflect it on the manager. Execute the `rcxadm nicdefctl commit` command, and reflect the created server NIC definition on the manager.

For details on server NIC definitions, refer to "15.11 Server NIC Definition" in the "Reference Guide (Command/XML) CE".

For details on the `rcxadm nicdefctl commit` command, refer to "5.15 rcxadm nicdefctl" in the "Reference Guide (Command/XML) CE".

3.6 Creating Files Used for Switchover

Create the following files on the primary and backup sites.

1. Create the mapping definitions of physical servers [Physical L-Server switchover (physical OS), Physical/Virtual L-Server switchover (VM host/VM guest)]

If you want to change the names of physical servers on the primary and backup sites, create a mapping definition.

This file must be located in the MAP folder under the switchover information folder and be a csv file which includes the following content.

```
#PhysicalServer
Server1-1,Server2-1
Server1-2,Server2-2
```

Server1-1 and *Server1-2* are the server names on the primary site.

Server2-1 and *Server2-2* are the corresponding server names on backup site.

For details on the physical server mapping definitions, refer to "[A.2 rcxrecovery](#)".

2. Create the mapping definitions of VM management software [Physical/virtual L-Server switchover (VM host/VM guest), virtual L-Server switchover (VM guest)]

If you want to change the names of VM management software on the primary and backup sites, create a mapping definition.

This file must be located in the MAP folder under the switchover information folder and be a csv file which includes the following content.

```
#VMManagementSoftware
VMM1-1,VMM2-1
VMM1-2,VMM2-2
```

VMM1-1 and VMM1-2 are the VM management software names on the primary site.

VMM2-1 and VMM2-2 are the corresponding VM management software names on the backup site.

For details on the mapping definitions of VM management software, refer to "[A.2 rcxrecovery](#)".

3. Create a definition file of VM management software [Physical/virtual L-Server switchover (VM host/VM guest)]

Create the following file under the switchover information folder. This file is used to register VM management software to Resource Orchestrator on the switchover destination site.

- vmmgr_file.txt

The format of the VM management software definition file is shown below. Note that the first line of the example below is to explain the content of the file, so do not include this line in the actual file.

For details on the VM management software definition file, refer to "[A.2 rcxrecovery](#)".

name	soft name	ip	user name	password	physical-lserver
vcenter,	vmware-vc,	192.168.1.24,	admin,	admin,	yes
scvmm,	ms-scvmm,	192.168.100.77,	root,	root,	no

Note

When using virtual L-Server switchover (VM guest), do not create this file.

4. Create a VM pool definition file [Virtual L-Server switchover (VM guest)]

Create the file defining VM hosts on which the switchover target virtual L-Server is operating under the switchover information folder using the following file name.

- vm_pool.csv

The format of the VM pool definition file is shown below. Specify the VM pool name of the switchover source site for `vm_pool_name`, and the VM host of the switchover destination site to register in the `vm_pool_name` in the switchover destination site for `vm_host_name`. When registering multiple VM hosts in a VM pool, enter multiple lines. For details on the pool definition files, refer to "[A.2 rcxrecovery](#)".

#vm_pool_name,vm_host_name
/VMHostPool,192.168.2.1
/VMHostPool,192.168.2.2
/tenant1/TenantVMHostPool,vmhost1.example.org
/tenant1/TenantVMHostPool,vmhost2.example.org
/tenant2/TenantVMHostPool,192.168.10.15

Note

When performing physical/virtual L-Server switchover (VM host/VM guest), do not create this file.

Information

By configuring the number of VM pools specified in the VM pool in the file above as one smaller than that of the switchover source site, the number of VM hosts can be reduced on the switchover destination site.

3.7 Configuring Automatic Switchover Information Collection Settings

Configure automatic switchover information collection settings on the primary and backup sites.

The portion of switchover information which is modified through operations by tenant users or tenant administrators, other than firewall setting information, can be collected automatically.

When configuring automatic failover information collection settings, select either of the following operations, and configure the selected settings.

- Operation collecting the information periodically

To start operations for switchover at regular intervals, perform the following operation:

[Windows Manager]

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexpport -interval minutes <RETURN>
```

For details on the rcxmgrexpport command, refer to "[A.1 rcxmgrexpport](#)".

Note

This command only executes rcxmgrexpport. When creating physical L-Servers or physical L-Platforms, or performing configuration changes of disks, manually execute the rcxrepdef or rcxstorage command, and collect the modified information. For details on the procedure for collection, refer to "[4.1 Normal Operation](#)".

- Operation collecting the configuration definition information after changes are made

Execute the following command to collect the information automatically when operations by tenant users or tenant administrators which change the switchover information are performed. Perform the operations described below.

After performing the operation, restart the manager using the rcxmgrctl command in order to enable the settings.

- When performing virtual L-Server switchover (VM guest), and not performing physical L-Server switchover (physical OS)

[Windows Manager]

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexpport -event on -base <RETURN>  
>Installation_folder\SVROR\Manager\bin\rcxmgrctl stop <RETURN>  
>Installation_folder\SVROR\Manager\bin\rcxmgrctl start <RETURN>
```

For details on the rcxmgrexpport command, refer to "[A.1 rcxmgrexpport](#)".

- In other cases

[Windows Manager]

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexpport -event on <RETURN>  
>Installation_folder\SVROR\Manager\bin\rcxmgrctl stop <RETURN>  
>Installation_folder\SVROR\Manager\bin\rcxmgrctl start <RETURN>
```

For details on the rcxmgrexpport command, refer to "[A.1 rcxmgrexpport](#)".

Note

- When collecting the switchover information using Disaster Recovery, the information for the entire system is collected. When collecting the information in environments with a high frequency of update, or with short time intervals configured, normal operations may be affected. Review the operation method, considering the impact on business.
- There is information necessary for disaster recovery switchover that is not collected by the automatic collection performed by "[3.7 Configuring Automatic Switchover Information Collection Settings](#)". Perform the operation described in "[4.1 Normal Operation](#)" to manually collect this failover information.

Chapter 4 Operation

This chapter explains operation of a Disaster Recovery environment using Resource Orchestrator.

4.1 Normal Operation

This section explains operations which need to be performed in order to be able to perform disaster recovery switchover.

If updating is performed on the primary site, such as resource configuration information to do with an L-Platform deployment, perform the following to collect the information for Disaster Recovery switchover. Collect information either automatically or periodically to ensure the latest configuration information is available.

1. Export the Required Information from the Primary Site

a. Export the required information

As a backup in case of failure of the primary site, and where an environment has been constructed on the backup site that can be used for recovery, export the information as explained below. When information is collected automatically, this information is not necessary.

- L-Platform Templates
- L-Platform Configuration Information
- Resource Information
- Execution Information of Sample Scripts
- Accounting Information
- Metering Logs
- Usage Charges

One of the following operations is recommended.

- When changing the configurations of managed servers, export the information first, and maintain the latest system information
- Export regularly, and update the data

Execute the command shown below to collect the information.

[Windows Manager]

```
>Installation_folde\SVROR\Manager\bin\rcxmgrexpport <RETURN>
```

For details on the rcxmgrexpport command, refer to "[A.1 rcxmgrexpport](#)".

b. Export Network Configuration Information

When you change the target network device configuration, keep the latest system configuration by exporting the information.

Execute the command shown below to collect the information.

[Windows Manager]

```
>Installation_folde\SVROR\Manager\bin\rcxadm netconfig export -file switchover_installation_folder\OtherBackupfiles\networkconfiginfo.xml <RETURN>
```

Specify the XML file of the output destination used as the -file option argument so that it will be stored in *switchover_information_folde\OtherBackupFiles*.

For details on the rcxadm netconfig command, refer to "3.7 rcxadm netconfig" in the "Reference Guide (Command/XML) CE".

Note

- Operations such as L-Platform deployment, cancellation, or configuration modifications which change various information, must not be performed during export of information.
- If the accounting setting is on, it is recommended to export switchover information every day.
This ensures the exported information of the primary site will be updated with the newest information.
- When using VMware as the server virtualization software, note the following regarding execution of rcxmgrepxport:
 - Do not execute rcxmgrepxport immediately after performing any operations which move the files of the virtual machines (e.g. VM migration involving changes of datastores, storage vMotion). Be sure to execute rcxmgrepxport after the information is reflected on ROR by a regular update.
 - When a virtual machine is moving a VM host (e.g. vMotion), do not execute rcxmgrepxport. Execute rcxmgrepxport after such operations are completed.

2. Confirm Switchover Scope

Perform this procedure when configuring the limitations of switchover scopes.

After executing rcxmgrepxport, execute the following commands to confirm that the switchover scope is correct.

```
rcxmgrepxport -drlist          : Displays the list of the resources that are switchover targets.
rcxmgrepxport -drlist -error   : Displays the list of resources which use both targeted storage
and non-targeted storage for Disaster Recovery, and therefore cannot be switched over.
```

Example

```
> rcxmgrepxport -drlist
TYPE          NAME
----          -
L-Server      /tenant_1/1-server_1
Image         /image_1
Image         /image_2

> rcxmgrepxport -drlist -error
TYPE          NAME
----          -
L-Server      /tenant_1/1-server_1
```

For details on the rcxmgrepxport command, refer to "[A.1 rcxmgrepxport](#)".

If the displayed switchover targets are not appropriate, check if the limitation of switchover scope is correctly configured. For details on the limitation of switchover scope, refer to "[3.3 Manager Installation and Configuration](#)".

3. Backup the Configuration Files of the Primary Site

Copy the configuration files of the primary site to the backup site, in case the contents of the configuration files are different between the primary and backup sites. Copy the files listed in "[Configuration Files for Matching Details between the Primary and Backup Sites](#)" in "[2.4 Configuration of the Primary and Backup Sites](#)" into the "OtherBackupFiles" folder in the switchover information folder.

4. Obtain the Storage Replication Information

Check the corresponding LUNs used to perform storage unit replication for the primary and backup sites.

When "[3.7 Configuring Automatic Switchover Information Collection Settings](#)" is performed, this operation is not necessary, because the information is collected automatically.

Create a replication definition file which describes LUN relations.

When using dynamic LUN mirroring storage of ETERNUS, as the target LUNs to be replicated are changed by the deployment or cancellation of L-Platforms, and the addition or removal of disks, create the replication definition file using the rcxrepdef command.

When using a LUN that was created in advance, if the replication definition is created, modified, or deleted by the storage management software, create a replication definition file using the rcxrepdef command.

Example

```
>Installation_folder\SVROR\Manager\bin\rcxrepdef ccm -local 192.168.0.X -remote 192.168.0.Y -file file1 <RETURN>
```

After creating the replication definition file, specify it and create the file to perform mapping of LUNs in the backup site resources from the relation lists during import.

To create this file, execute the rcxstorage command with the -recovery, -mode, and -outfile options specified. Specify "prepare" for the -mode option, and *switchover_information_folder*\storage_file for the -outfile option.

For details on the *switchover_information_folder*, refer to "3.2 Creating Switchover Information Folders".

Example

```
>Installation_folder\SVROR\Manager\bin\rcxstorage -recovery -mode prepare -file file1 -outfile D:\Export\storage_file <RETURN>
```

For details on replication definition files, refer to "Replication Definition Files" in "17.1.3 High Availability for Storage Chassis" in the "Operation Guide CE".

For details on the rcxrepdef command, refer to "5.22 rcxrepdef" in the "Reference Guide (Command/XML) CE".

For details on the rcxstorage command, refer to "5.23 rcxstorage" in the "Reference Guide (Command/XML) CE".

5. Back up Directory Service Information

Back up the directory service information. Back up the information, after performing operations such as registration, modification, or deletion of a user. For the backup procedure, refer to the manual for the directory service product being used.

6. Back up VM Management Software Information

When not configuring VM management software on a physical L-Server using the physical/virtual L-Server switchover (VM host/VM guest) method, it is necessary to restore the VM management software information during switchover. Therefore, back up the VM management software information as well. For details on how to back up and restore VM management software information, refer to the manual of each VM management software. It is necessary to collect the VM management software information when registering, modifying, or deleting an L-Platform on which a virtual L-Server is deployed.

7. Back up Firewall Configurations

When configuring a firewall automatically using the auto-configuration function for network devices, it is recommended to use the network device configuration backup command or the management software configuration backup function, and operate as follows:

- After configuring auto-configuration of the firewall, back up the configuration and collect the newest configuration.
- Back up firewall configurations regularly.

When backing up a firewall configuration regularly, collect the firewall configuration immediately after executing rcxmgrexpport, which exports configuration information of Resource Orchestrator, to synchronize the timing of configuration backup. Note that this operation is not necessary for NS appliance.

8. Reflect Changes of Settings and Back up Configuration Files

After a Disaster Recovery environment is configured, if the settings of the primary site are changed according to "Chapter 8 Changing Settings" in the "Operation Guide CE", the changes of the following settings need to be reflected in the backup site before switching.

- "8.2 Settings for Sending Email"

- "8.4 Editing Information in the Home Window"
- "8.5.1 Settings for Permissions to Change L-Platform Templates"
- "8.5.2 Subnet Settings at Segment Editing"
- "8.5.3 Settings for the Simplified Reconfiguration Function"
- "8.5.4 Distribution Ratio Settings"
- "8.5.5 Application Process Settings"
- "8.5.7 Edit the License Agreement"
- "8.5.9 Default Password Setting for Sent Emails"
- "8.5.10 Settings for the Maximum Number of Connections for the L-Platform Template"
- "8.6.1 Settings for Tenant Management and Account Management"
- "8.6.2 Editing the User Agreement when Registering a User"
- "8.7 Accounting Settings"
- "8.8 System Condition Server List Settings"
- "8.9 Settings for Event Log Output for CMDB Agent"

Back up the following files if they have been modified.

- *Installation_folder*\RCXCFMG\config\mail_config.xml
- *Installation_folder*\RCXCFMG\config\vsys_config.xml
- *Installation_folder*\RCXCTMG\Charging\conf\accounting.properties
- *Installation_folder*\RCXCTMG\Charging\conf\metering_log.properties
- *Installation_folder*\RCXCTMG\MyPortal\config\application_process.properties
- *Installation_folder*\RCXCTMG\MyPortal\config\custom_config.xml
- *Installation_folder*\RCXCTMG\MyPortal\config\managerview_config.xml
- *Installation_folder*\RCXCTMG\SecurityManagement\conf\portal.properties
- *Installation_folder*\SWRBAM\CMDB\FJSVcmdbm\axis2\WEB-INF\services\mdr_cfm\cmdb.properties
- *Installation_folder*\SWRBAM\CMDB\FJSVcmdbm\axis2\WB-INF\services\mdr_ror\cmdb.properties
- *Installation_folder*\SWRBAM\CMDB\FJSVcmdbm\CMDBConsole\WEB-INF\classes\viewlist_ja.xml
- *Installation_folder*\RCXCTMG\MyPortal\config\license\create\default
- *Installation_folder*\RCXCTMG\MyPortal\config\license\reconfigure\default
- *Installation_folder*\RCXCTMG\MyPortal\config\license\return\default
- *Installation_folder*\IAPS\F3FMihs\servers\FJapache\htdocs\sopdocs\pub\html\ja\cRegApply_agreement.forUse_en.html

4.2 Switchover Operations between Sites Using the Disaster Recovery Function

This section explains operations for disaster recovery switchover between sites.

Switchover Operations

For switchover operations, there are the two main operations described below.

- Site Switchover

Switches over the resources in all global pools operating on a site to the sites for individual tenants.

- Tenant Switchover

Switches over a tenant operating on a site to another site.

The Flow of the Switchover Procedure

The flow of the switchover procedure is as follows.

Table 4.1 The Flow of the Switchover Procedure

Number	Target Site	Item	Remarks
1	Switchover destination site	Stopping Automatic Collection of Switchover Information [Switchover Destination Site]	Perform when switchover information is automatically collected
2		Stopping Services and Cleaning Up [Switchover Destination Site]	
3	Switchover source site	Stopping the Resources that are Targets of Switchover [Switchover Source Site]	Perform when the switchover source site is operating
4		Locking the Resources and Exporting the Configuration Information [Switchover Source Site]	Perform when the switchover source site is operating
5	Switchover source site or the site for which the replication definitions have been created	Stopping Storage Replication [Switchover Source Site or the Site for Which Replication Definitions Have Been Created]	Not necessary when a site is stopped due to a disaster
6	Switchover destination site	Mounting the Switchover Information Folder [Switchover Destination Site]	
7		Copying the Physical L-Server Images [Switchover Destination Site]	Perform when physical L-Servers are included in the targets of switchover
8		Copying the Configurations of Target Firewalls for Switchover [Switchover Destination Site]	Perform when firewalls are included in the targets of switchover
9		Restoring the Configuration Files of the Switchover Source Site [Switchover Destination Site]	Perform when the configuration files do not match
10		Reflecting the Changes to the Settings of the Switchover Source Site [Switchover Destination Site]	
11		Mounting the Datastore to a VM Host [Switchover Destination Site]	Perform for virtual L-Server switchover (VM guest)
12		Switchover Using the Batch Command [Switchover Destination Site]	
13		Restoring Directory Service Information [Switchover Destination Site]	
14		Checking Imported L-Platforms [Switchover Destination Site]	
15		Recovery of Usage Charges [Switchover Destination Site]	
16		Changing the FQDN Settings [Switchover Destination Site]	Perform when performing site switchover and changing the IP address of FQDN

Number	Target Site	Item	Remarks
17		Initializing Internal Certificates [Switchover Destination Site]	
18		Updating the Access Rights that Were Customized [Switchover Destination Site]	
19		Exporting Configuration Information and Resuming Automatic Collection of Switchover Information [Switchover Destination Site]	
20	Switchover source site	Cleaning Up the Switchover Source Site	Perform when the switchover source site is operating
21	Switchover source site or the site for which the replication definitions have been created	Resuming Replication of the Disk with the Switchover Information Folder [Switchover Source Site or the Site for Which the Replication Definitions Have Been Created]	
22	Switchover destination site	Resuming Replication of the Disks Belonging to the Target Storage Pools for Replication [Switchover Destination Site]	Perform after recovery of the switchover source site

4.2.1 Stopping Automatic Collection of Switchover Information [Switchover Destination Site]

When switchover information is being automatically collected on the switchover destination site, execute the following command to stop the process.

After performing the operation, restart the manager using the rcxmgrctl command in order to enable the settings.

[Windows Manager]

- Operation collecting the information periodically

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexport -interval off <RETURN>
```

- Operation collecting the configuration definition information after changes are made

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexport -event off<RETURN>
>Installation_folder\SVROR\Manager\bin\rcxmgrctl stop <RETURN>
>Installation_folder\SVROR\Manager\bin\rcxmgrctl start <RETURN>
```

4.2.2 Stopping Services and Cleaning Up [Switchover Destination Site]

In the following cases, stop operation of the switchover destination site.

- When performing site switchover
- When performing tenant switchover for the first time

In addition, when performing tenant switchover for the first time, execute the following command to clean up the configuration information of the switchover destination site. When performing site switchover, a manual clean up operation is not necessary because it is automatically performed.

When executing the cleanup command (rcxadm config cleanup), add the -predr option and the -deluser option.

- Conditions for -predr Option Addition

Virtual L-Server Switchover (VM Guest)	-predr Option
Switched over	Added
Not switched over	Not added

- -deluser Option Conditions for Addition

Directory Service Information	-deluser Option
Shared among sites	Not added
Not shared among sites	Added

Example

- When performing physical/virtual L-Server switchover (VM host/VM guest), and the directory service information is not shared among sites

```
>Installation_folder\SVROR\Manager\bin\rxadm config cleanup -deluser <RETURN>
```

- When performing virtual L-Server switchover (VM guest), and the directory service information is shared among sites using ActiveDirectory

```
>Installation_folder\SVROR\Manager\bin\rxadm config cleanup -predr <RETURN>
```

4.2.3 Stopping the Resources that are Targets of Switchover [Switchover Source Site]

When the switchover source site is operating, stop the resources that are targets of switchover on that site.

- For Site Switchover
Stop all L-Servers operating on the switchover source site.
- For Tenant Switchover
Stop all L-Servers belonging to the switchover target tenants.

4.2.4 Locking the Resources and Exporting the Configuration Information [Switchover Source Site]

When performing tenant switchover and the switchover source site is operating, lock the resources being used by the tenants. For details, refer to "3.14 rxadm tenant" in the "Reference Guide (Command/XML) CE". When the global resources for the tenants are also used for other tenants, lock all the tenants.

- For Tenant Switchover (tenant1)

```
>Installation_folder\SVROR\Manager\bin\rxadm tenant lockrsc -name tenant1 <RETURN>
```

- For Tenant Switchover (tenant2, tenant3)

```
>Installation_folder\SVROR\Manager\bin\rxadm tenant lockrsc -name tenant2 <RETURN>
>Installation_folder\SVROR\Manager\bin\rxadm tenant lockrsc -name tenant3 <RETURN>
```

Example

Whether resources are locked can be checked by checking if "locked(DR)" is displayed for ATTRIBUTES when executing the following command:

```
>Installation_folder\SVROR\Manager\bin\rxadm {network|disk|vstorage} list -extend lock <RETURN>
>Installation_folder\SVROR\Manager\bin\rxadm {network|disk|vstorage} show -name name -extend lock
<RETURN>
```

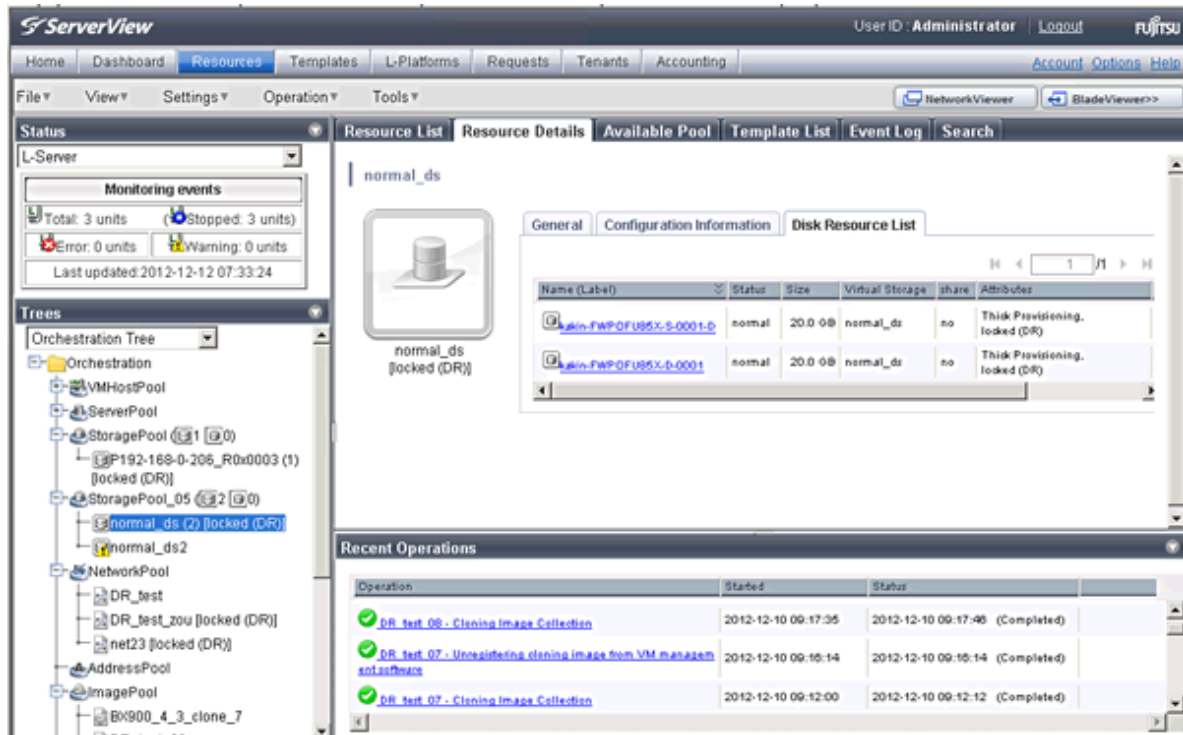
For details, refer to "3.3 rcxadm network", "3.9 rcxadm disk", and "3.15 rcxadm vstorage".

Whether resources are locked can also be checked on the [Resource] tab of the ROR console.

Resources which are locked are displayed as follows:

- "Locked(DR)" is displayed in the orchestration tree
- "Locked(DR)" is displayed in the [Attributes] column on the resource list

Figure 4.1 Locking Resources



When the switchover source site is operating, execute the rcxmglexport command to export the configuration information.

This export operation should be performed regardless of whether site switchover or tenant switchover is being performed.

For the specific procedures, refer to "a. Export the required information" in "1. Export the Required Information from the Primary Site" in "4.1 Normal Operation".

4.2.5 Stopping Storage Replication [Switchover Source Site or the Site for Which Replication Definitions Have Been Created]

Stop the replication from the switchover source site to the switchover destination site.

This operation is not necessary when a site is stopped due to a disaster.

Stop the replication of the disk containing the "switchover information folder".

- For Site Switchover

Also stop all replication processes of any other disks.

- For Tenant Switchover

Stop the replication of the replication control item (copy group) for each tenant that is the target of switchover.

For virtual L-Server switchover (VM guest), after stopping the replication, rescan the datastore from VMware vCenter Server on the switchover destination site.

4.2.6 Mounting the Switchover Information Folder [Switchover Destination Site]

On the switchover destination site, mount the disk of the "switchover information folder" which has been replicated from the switchover source site. (e.g. mount it as drive E)

4.2.7 Copying the Physical L-Server Images [Switchover Destination Site]

On the switchover destination site, add the images of the physical L-Servers from the replicated switchover source site to the image file storage folder on the switchover destination site.

1. Stop the manager.
2. Copy the images which were used on the primary site to the image file storage folder (e.g. D:\Export\Image).

The images used for the primary site can be found in the Image folder in the "switchover information storage folder" on the replicated switchover source site. (e.g.: E:\Export\Image)

3. Start the manager.

4.2.8 Copying the Configurations of Target Firewalls for Switchover [Switchover Destination Site]

When using the firewall auto-configuration function for network devices on the switchover destination site, copy the newest configuration from the source site to the firewall of the destination site.

4.2.9 Restoring the Configuration Files of the Switchover Source Site [Switchover Destination Site]

The contents of the configuration files on the switchover source and destination sites should be as similar as possible. If there are differences, make the files the same.

For the configuration files which must be the same on the switchover source and destination sites, refer to "[Configuration Files for Matching Details between the Primary and Backup Sites](#)" in "[2.4 Configuration of the Primary and Backup Sites](#)".

When performing this operation, restore the files from the backup (e.g. in E:\Export\OtherBackupfiles) saved in "[3. Backup the Configuration Files of the Primary Site](#)" in "[4.1 Normal Operation](#)", and manually restart the manager if necessary.



Automatic collection of switchover information may resume, when the configuration files match.

Check the automatic collection settings using the `rcxmgrexport -status` command, and stop automatic collection of switchover information using the procedure described in 4.2.1.

For details on the `rcxmgrexport -status` command, refer to "[A.1 rcxmgrexport](#)".

4.2.10 Reflecting the Changes to the Settings of the Switchover Source Site [Switchover Destination Site]

Reflect the following customization settings of the switchover source site, which are performed according to "[Chapter 18 Post-Installation Procedures](#)" in the "Setup Guide CE", on the backup site.

- "18.1 Settings for Sending Email"
- "18.2.3 Setting Application process settings"
- "18.2.4 Setting Application process to be used"
- "18.3 Customizing the Dashboard"
- "18.4 Setting the Host Names for Virtual Servers"

- "18.5 Setting the Method for Setting Resource Names"
- "18.6 Settings for the Overcommit Function"
- "18.7 Editing the Environment Setup File for the L-Platform API"
- "18.9 System Disk Settings for Physical L-Servers"
- "18.12 Edit the License Agreement"
- "18.13 Editing the User Agreement when Registering a User"

After a Disaster Recovery environment is configured, if the settings of the primary site are changed according to "Chapter 8 Changing Settings" in the "Operation Guide CE", reflect the changes of the following settings on the backup site.

- "8.2 Settings for Sending Email"
- "8.4 Editing Information in the Home Window"
- "8.5.1 Settings for Permissions to Change L-Platform Templates"
- "8.5.2 Subnet Settings at Segment Editing"
- "8.5.3 Settings for the Simplified Reconfiguration Function"
- "8.5.4 Distribution Ratio Settings"
- "8.5.5 Application Process Settings"
- "8.5.7 Edit the License Agreement"
- "8.5.9 Default Password Setting for Sent Emails"
- "8.5.10 Settings for the Maximum Number of Connections for the L-Platform Template"
- "8.6.1 Settings for Tenant Management and Account Management"
- "8.6.2 Editing the User Agreement when Registering a User"
- "8.7 Accounting Settings"
- "8.8 System Condition Server List Settings"
- "8.9 Settings for Event Log Output for CMDB Agent"

Check the details of the network device information (*switchover_information_folder\OtherBackupfiles\networkconfiginfo.xml*) collected in "1. Export the Required Information from the Primary Site" in "4.1 Normal Operation". In this case, if the type of the network device is "Firewall", reflect the difference on the backup site.

4.2.11 Mounting the Datastore to a VM Host [Switchover Destination Site]

For virtual L-Server switchover (VM guest), mount the datastore replicated on the switchover destination site to the VM host.

1. Output the information of the storage which is specified as the destination of the L-Servers and images, to a file. In the following example, the result is output to outfile.csv.

- For Site Switchover

```
>Installation_folder\SVROR\Manager\bin\rxcadm config vsfilter -outfile outfile.csv
<RETURN>
```

- For Tenant Switchover (tenant1)

```
>Installation_folder\SVROR\Manager\bin\rxcadm config vsfilter -tenant tenant1 -
outfile outfile.csv <RETURN>
```

- For Tenant Switchover (tenant2, tenant3)


```
>Installation_folder\SVROR\Manager\bin\rxadm config vsfilter -tenant
tenant2,tenant3 -outfile outfile.csv <RETURN>
```

Note

When specifying vsfilter for multiple tenants, or specifying -global simultaneously, configure the same specifications for -tenant and -global after this operation.

For details on the rxadm config vsfilter command, refer to "A.3 rxadm config".

Check the content of the file that was output (outfile.csv).

```
RCXVSFILTER_v1.0
[VMware]
#operation,type,vstorage_name,datastore_name,mountpath,vmhosts
mount,nfs,A,A,/vmfs/volumes/UUID4,
mount,vmfs,B,B,/vmfs/volumes/UUID1,VMhost1:VMhost2
```

On each line that has no entry in the last vmhosts column, enter either the IP address of the VM host on which the datastore is to be mounted or the name corresponding to that VM host on VMware vCenter Server, in the vmhost column. To specify multiple VM hosts, enter those VM hosts separated by colons (":"). For the VM hosts on which the datastore needs to be mounted, refer to "3.4 Configuring Managed Servers and Network Devices".

2. Perform mounting of the datastore using the file that was output in 1. as the input.

Execute this command using the command prompt from which the vCLI command can be executed.

When using Windows, the vCLI command prompt can be selected from the start menu in the OS on which vCLI is installed. For details, refer to the vCLI manuals.

If necessary, copy dsmount.pl and output.csv to the server where vCLI is installed.

- When a datastore using FC or iSCSI connection (vmfs) exists

Execute the following command to mount the datastore on the VM host:

```
>perl dsmount.pl -input output.csv -server IP_address_of_management_software -username user_name -type
vmfs <RETURN>
Enter password:password<RETURN>
```

- When a datastore using an NAS connection (nfs) exists

Execute the following command to mount the datastore on the VM host:

```
>perl dsmount.pl -input output.csv -server IP_address_of_management_software -username user_name -type
nfs -listfile file <RETURN>
Enter password:password<RETURN>
```

For the NFS connection information file, specify the file prepared in "3.4 Configuring Managed Servers and Network Devices".

For details on the dsmount.pl command, refer to "A.4 dsmount.pl".

3. Perform the update process after mounting the datastore, using the file that was output in 1. as the input.

Execute this command using the command prompt from which the vCLI command can be executed.

When using Windows, the vCLI command prompt can be selected from the start menu in the OS on which vCLI is installed. For details, refer to the vCLI manuals.

Copy vmfile_update.pl and output.csv to the server where vCLI is installed, if necessary.

```
>perl vmfile_update.pl -input output.csv -server IP_address_of_management_software -username user_name
<RETURN>
Enter password:password<RETURN>
```

Note

Do not perform read/write operations on the datastore while executing the above command.

For details on `vmfile_update.pl` command, refer to "[A.5 vmfile_update.pl](#)".

4. Rescan the datastore from VMware vCenter Server.

4.2.12 Switchover Using the Batch Command [Switchover Destination Site]

Perform switchover using a batch command.

- For Site Switchover

Execute the batch command on the switchover destination site to switch the site.

```
>Installation_folder\SVROR\Manager\bin\rcxrecovery <RETURN>
```

- For Tenant Switchover

Execute the batch command on the switchover destination site to switch over tenants.

Note

When performing the switchover of the last tenant which will remain on the switchover source site, specify the `-global` option in addition to the `-tenant` option.

- When switching over a tenant (tenant1) (The other tenants will remain on the switchover source site after the switchover operation)

```
>Installation_folder\SVROR\Manager\bin\rcxrecovery -tenant tenant1 <RETURN>
```

- When switching over tenants (tenant, tenant2) (No tenants will remain on the switchover source site after the switchover operation)

```
>Installation_folder\SVROR\Manager\bin\rcxrecovery -tenant tenant2,tenant3 -global -nocleanup <RETURN>
```

For details on the `rcxrecovery` command, refer to "[A.2 rcxrecovery](#)".

The `rcxrecovery` command displays messages which represent the status of the switchover process. In addition, the following operations require manual operations or decisions by an administrator. Respond to inquiries from the system to continue execution of the command.

- For virtual L-Server switchover (VM guest), the following messages are displayed.

It is necessary to manually delete the network settings on which cleanup is performed in the network settings "corresponding to network resources" configured on the switchover destination site beforehand. It is necessary to manually create the network (virtual switches, port groups) which has been configured on the switchover source site beforehand.

After the operation is complete, enter "y", and continue the command.

For network resources that have been cleaned up, clear their network configurations manually using VM management software or the network devices. Also, if you have manually configured the network on the primary site, configure the network for the backup site again.

Press [y] when the reconfiguration is complete. : y

- When the `-nocleanup` option is not specified and the backup site is to be cleaned up, an inquiry will be displayed to ask if you really want it to be cleaned up. Press "y" to approve the cleanup and continue the `rcxrecovery` command. If cleanup of the backup site cannot be performed, press "n" to quit the command.
- When VM management software is not configured on the physical L-Server, manual restoration of VM management software is necessary. The `rcxrecovery` command will show a prompt while waiting for the restoration of VM management software. In that case, continue the command after restoration of VM management software is completed.

- If VMware ESXi is installed on the server that is the target of switchover, the VM host must be registered in SVOM. After registration is complete, continue the command execution. The command will be postponed until registration is complete.

Information

The rcxrecovery command performs the following:

- Mapping of storage

Storage resource mapping is performed, based on the files defining the relations between the storage on the primary and backup sites.

- Division of import resources

Imported resources are divided using the following units:

- Resources in the global pool and resources belonging to individual tenants
- Physical L-Server resources and virtual L-Server resources

- Deletion of the backup site environment

Deletes the following environments used for backup site operations.

- L-Platform Templates
- L-Platform Configuration Information
- Resource Information
- Accounting Information
- Metering Logs
- Usage Charge

- Import the information

Imports the following information:

- L-Platform Templates
 - L-Platform Configuration Information
 - Resource Information
 - Accounting Information
 - Metering Logs
 - Usage Charge Files
-

Note

- Configured physical servers and linked L-Servers for which only configuration definition has been created are not covered by disaster recovery switchover.

Execute the rcxadm config command as follows to back up the information which is used to relate the configuration definition to L-Server again later.

[Windows Manager]

```
>Installation_folder\SVROR\Manager\bin\rcxadm config filter -convert -indir indir -outdir outdir <RETURN>
```

The following information will be output to *outdir*, using the file name convert.txt.

After completing the restoration procedure, perform creation of a link with an L-Server and setting the scope again as shown below:

```
[command]  
rcxadm lserver convert -with BX900_1 -name physical_lserver_1
```

```
rcxadm lserver convert -with BX900_3 -name physical_lserver_2 -to /tenant_1
rcxadm lserver convert -with BX900_6 -name physical_lserver_3 -label test_label3 -comment test_comment3 -to /folder_1
[user]
user_1, physical_lserver_1
user_1, /tenant_1/physical_lserver_2
user_2, /folder_1/physical_lserver_2
[usergroup]
usergroup_1, physical_lserver_1
usergroup_2, /folder_1/physical_lserver_3
```

- Storage using the ETERNUS dynamic LUN mirroring is switched to the LUN that was prepared on the backup site when the switchover operation is performed after a disaster. Operation may be different if the storage is not released even after deleting an L-Platform.
- Perform operation so that the import of the resource configuration information and user definition file (XML file) using the rcxrecovery command is not executed at the same time as modification of the resource configuration information or user definition file (XML file) due to L-Server creation, or export operations using the rcxmgreexport command.
- The RC console may not display the correct power status of L-Servers immediately after a disaster recovery switchover. Wait for about three minutes after the switchover to see the correct power status of L-Servers.
- As the performance information (the information displayed in the dashboard and in operational status displays) depends on the configuration of the primary site, this is not carried over to the backup site when switched over. The information on the backup site is displayed.
- Importing may fail when switchover is performed to the backup site, due to a VM guest switchover failure. In this case, perform the import again using the following procedure, but excluding the managed servers for which import failed. Disaster recovery switchover fails when configuration import fails. In this case, execute the failover command again after taking the corrective action for the cause of the import failure. When you execute the command again, the -nocleanup option needs to be specified if the previous command was executed without the -nocleanup option and configuration cleanup was performed and the "cleanup of resources" process ended in "completed".

The following shows an example of where the VM guest could not be restored during L-Server import.

1. An error occurs during import

```
>Installation_folder\SVROR\Manager\bin\rcxrecovery <RETURN>
FJSVrcx:ERROR:62569:/tenant1/l-platform1/l-server1:lserver:import was interrupted.
Message=:67154: VM Guest not found
```

2. The status of the relevant resources is displayed to help determine the cause of the error.

```
>Installation_folder\SVROR\Manager\bin\rcxadm config show -type lserver -name /
tenant1/l-platform1/l-server1 -dir dir1 -format xml<RETURN>
```

For -dir, specify the folder that was most recently exported in the folder below.

rcxrecovery -dir option, or the import folder specified in fa_dr.rcxprop\ManagerExport\RORexport_date

3. Delete the resource where the problem occurred from the export file.

```
>Installation_folder\SVROR\Manager\bin\rcxadm config filter -exclude lserver -name /
tenant1/l-platform1/l-server1 -indir dir1 -outdir dir2 <RETURN>
```

4. Use the export file output in 3) to overwrite the file in the folder specified for -dir in 2).

5. Import again.

```
>Installation_folder\SVROR\Manager\bin\rcxrecovery -nocleanup<RETURN>
```

4.2.13 Restoring Directory Service Information [Switchover Destination Site]

Restore the directory service information. For the restoration procedure, refer to the manuals of the directory service software.

4.2.14 Checking Imported L-Platforms [Switchover Destination Site]

If the switchover information is collected during L-Platform deployment or reconfiguration, it contains the L-Platform configuration information that does not reflect the actual resource status.

If the switchover information is imported using the `rcxrecovery` command, reflect the target resource status on the imported L-Platform configuration information.

Depending on the status when an L-Platform was imported, subsequent actions may be required.

The `rcxrecovery` command outputs a log for the L-Platform being processed and records the actions performed on the L-Platform.

Check the log output, and take appropriate action, if required.

Refer to "[Appendix C Output Logs when Switchover Occurs because of Disaster Recovery](#)" for information on the log output and actions.

4.2.15 Recovery of Usage Charges [Switchover Destination Site]

- Send usage charge files

Usage charge files for each tenant of the exported month will be recovered to the following directory on the primary site. Refer to "15.4.6 Sending Usage charges" in the "Operation Guide CE" for the format of the usage charge files.

- Usage Charge Files

Stored folder

```
Installation_folder\RCXCTMG\Charging\importdata\yyyyMMddHHmm
```

`yyyyMMddHHmm` indicates the date and time when the switchover operation was performed.

- File Name

- `yyyyMM_Tenant_name[_Deleted_date].zip`
- `yyyyMM` is the cutoff year and month of the tenant.
- `"_Deleted_date"` will be appended if the tenant is deleted.

These usage charge files will be needed for the accounts manager to determine the usage charges for each tenant on the month of the recovery.

Send these files to the accounts manager of each tenant based on the tenant information file. The tenant information file is a file describing the tenant and it holds information such as tenant name, cutoff date, accounting E-mail address and so on. The tenant information file is stored in the same directory as the usage charge files.

- Tenant Information File

Stored folder

```
Installation_folder\RCXCTMG\Charging\importdata\yyyyMMddHHmm
```

`yyyyMMddHHmm` indicates the date and time when the switchover operation was performed.

- File Name

`tenant_info.csv`

- Format

CSV file with "Tenant name", "Tenant display name", "Tenant deleted date", "Tenant last cutoff date", "Tenant next cutoff date", and "Accounting E-mail address" columns.

```
#TenantName,TenantDisplayName,TenantDeletedDate,TenantLastCutoffDate,TenantNextCutoffDate
,AccountingMailAddress
tenant01,tenant001,,2012-05-31,2012-06-30,tenant1@example.com
tenant02,tenant002,,2012-05-31,2012-06-30,tenant2@example.com
tenant03,tenant003,2012-05-27 16:48,2012-05-31,2012-06-30,tenant3@example.com
tenant04,tenant004,,2012-05-31,2012-06-30,tenant4@example.com
```

Send usage charge files to the accounts manager as follows.

- Operations to Perform Batch Switchover of All Resources

Send the recovered usage charge files of each tenant to the accounts manager. For each usage charge file, which tenant it corresponds to can be determined from the file name. Obtain the accounting E-mail addresses from the tenant information file and send the usage charge files.

- Operation Involving Resource Switchover by Tenant

Obtain the accounting E-mail addresses of the switchover tenant from the tenant information file and send the target usage charge files.

When sending the usage charge files, also notify the recipient of the following information.

- The usage files of the backup site will be sent separately on the day after the cutoff date.
- Usage charges for the month of the recovery have to be calculated with the usage charge files of the affected site and the backup site.

In cases such as when the accounting calculation is stopped due to the disaster on the day of the cutoff of the tenant or the tenant has already been deleted, there is no accumulated data on the backup site. Therefore, the usage charge files will not be sent from the backup site. Notify the accounts manager that those tenants can be charged only from the usage charge files from the primary site. The cutoff date of the tenant can be obtained from tenant information file.

- Notify the tenant administrator

In the Usage Charge window of the backup site, the usage charges are those of the backup up site only. Therefore, the infrastructure administrator has to inform tenant administrators of this fact, and if necessary, disclose the usage charge information of the primary site.



Note

Note that the calculation of the usage charge for the backup site will start the day following the recovery.

4.2.16 Changing the FQDN Settings [Switchover Destination Site]

When admin servers have different IP addresses between the primary and backup sites, and the FQDN needs to be taken over by the backup site, change the IP address for the FQDN registered in DNS server to the IP address of the admin server on the backup site after disaster recovery switchover is performed.

When the FQDN is taken over from the primary site to the backup site, clear the caches or temporary internet files of Web browsers which are used to connect to the ROR console on clients.

When test certificates are used, import the certificate of the backup site to the browser if the certificate was not imported during installation.

For details, refer to "Chapter 6 Importing a Certificate to a Browser" in the "Setup Guide CE".

4.2.17 Initializing Internal Certificates [Switchover Destination Site]

When importing physical L-Servers that were managed on the primary site to the backup site, initialize the certificates being used within the managed servers associated with the physical L-Servers.

1. Stop the Agent

Log in to the managed server and stop the agent.

For how to stop the agent, refer to "2.2 Starting and Stopping Agents" in the "Operation Guide CE".

2. Initialize the Internal Certificates

Initialize the certificate data used for SSL communications between the manager and agent.

For details on the initialization procedure, refer to "5.5 rcxadm certctl" in the "Reference Guide (Command/XML) CE".

3. Start the Agent

Log in to the managed server and start the agent.

For how to start the agent, refer to "2.2 Starting and Stopping Agents" in the "Operation Guide CE".

4.2.18 Updating the Access Rights that Were Customized [Switchover Destination Site]

The access rights that were modified on the primary site are not carried over to the backup site. Update them manually when the switchover is complete.

4.2.19 Exporting Configuration Information and Resuming Automatic Collection of Switchover Information [Switchover Destination Site]

Execute the `rcxmgrexpport` command to export the configuration information.

For the specific procedures, refer to "a. Export the required information" in "1. Export the Required Information from the Primary Site" in "4.1 Normal Operation".

When switchover information is being automatically collected, execute the following command to resume the process. After performing the operation, restart the manager using the `rcxmgrctl` command in order to enable the settings.

[Windows Manager]

- Operation collecting the information periodically

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexpport -interval minutes <RETURN>
```

- Operation collecting the configuration definition information after changes are made

- When performing virtual L-Server switchover (VM guest), and not performing physical L-Server switchover (physical OS)

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexpport -event on -base <RETURN>
>Installation_folder\SVROR\Manager\bin\rcxmgrctl stop <RETURN>
>Installation_folder\SVROR\Manager\bin\rcxmgrctl start <RETURN>
```

- In other cases

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexpport -event on <RETURN>
>Installation_folder\SVROR\Manager\bin\rcxmgrctl stop <RETURN>
>Installation_folder\SVROR\Manager\bin\rcxmgrctl start <RETURN>
```

4.2.20 Cleaning Up the Switchover Source Site

When the switchover source site is operating, clean up the configuration information of the switchover source site. It is not necessary to perform this procedure when the switchover source site is not operating due to a disaster, or reinstalling the manager in order to perform recovery.

When automatic collection of switchover information is being performed, stop automatic collection before executing cleanup.

For details on how to stop automatic collection, refer to "A.1 `rcxmgrexpport`".

- When the tenants are not operating on the switchover source site when performing the final tenant switchover for site switchover or tenant switchover, execute the `rcxadm config cleanup` command to clean up the entire site.
- When performing switchover other than the above, execute the `rcxadm config cleanup -tenant` command to clean up the resources corresponding to the tenants which were switched over.

When executing the cleanup command in the above cases, add the `-postdr` option and the `-deluser` option.

- `-postdr` Option Conditions for Addition

Virtual L-Server Switchover (VM Guest)	-postdr Option
Switched over	Added

Virtual L-Server Switchover (VM Guest)	-postdr Option
Not switched over	Not added

- -deluser Option Conditions for Addition

Directory Service Information	-deluser Option
Shared among sites	Not added
Not shared among sites	Added

Example

- After site switchover, when performing virtual L-Server switchover (VM guest), and directory service information is shared among sites

```
>Installation_folder\SVROR\Manager\bin\rxadm config cleanup -postdr <RETURN>
```

- When not performing virtual L-Server switchover (VM guest) in the tenant, and the directory service information is not shared among sites, after switchover of tenant (tenant1), which is not the last one

```
>Installation_folder\SVROR\Manager\bin\rxadm config cleanup -tenant tenant1 -deluser <RETURN>
```

4.2.21 Resuming Replication of the Disk with the Switchover Information Folder [Switchover Source Site or the Site for Which the Replication Definitions Have Been Created]

After the switchover source site is recovered, unmount the replicated "switchover information folder" (e.g. the E drive) of the destination site, and resume the replication of the disk containing the "switchover information folder" from the switchover source site to the switchover destination site, which was stopped in "4.2.5 Stopping Storage Replication [Switchover Source Site or the Site for Which Replication Definitions Have Been Created]".

4.2.22 Resuming Replication of the Disks Belonging to the Target Storage Pools for Replication [Switchover Destination Site]

When performing virtual L-Server switchover (VM guest), ensure that the datastore used by resources switched to the switchover destination site cannot be referred to by VM management software, after recovery of the switchover source site. For details, refer to "Table 3.1 Replication of Storage Units" in "3.1 Pre-setup Preparations".

For all switchover methods, resume the replication of the disk containing "the disk resources and virtual storage resources which are stored in the target storage pool for replication" from the switchover source site to the switchover destination site, which was stopped in "4.2.5 Stopping Storage Replication [Switchover Source Site or the Site for Which Replication Definitions Have Been Created]" **in the opposite direction**, in preparation for future switchovers.

4.3 Operation after Switchover

This section explains the differences in operations when switching to the backup site from the operations when switchover has not occurred.

When Performing Tenant Switchover while the Switchover Source Site is Operating

- There may be the same resources in the switchover source and destination sites. When modifying the settings of the corresponding resources, perform the same modifications for the resources of the two sites.

When the Accounts Manager Invoices Usage Charges

The procedure is as follows.

- Invoicing Usage Charges

The accounts manager receives two types of files, the usage charge files for the primary site for the month of the recovery sent from the infrastructure administrator and the usage charge files sent from the backup site. Use these files to calculate the usage charge for the tenants on the month of recovery and issue the invoice. The calculation procedure using the files mentioned above is as follows.

a. Extract usage charge detail files

Extract usage charge files from both the primary site and backup site, and obtain usage charge detail files for each L-Platform. The name format of the usage charge detail files is as follows.

For further information refer to "15.4.6.2 Usage charge Detail File" in the "Operation Guide CE".

File Name

yyyyMM_L-PlatformID.csv

b. Prevent duplicate charging for products charged monthly

For each L-Server in the usage charge detail file, if the UsageFrequency column for the image, CPU, and memory is set to "1 month", compare the values of the ItemAmount columns in the usage charge detail files from the primary site and the backup site and delete the row with the lower value. For the rows for the disks, delete only the rows with the same size and pool name from the primary site usage charge file. If there are multiple pairs of rows with the same size and pool name, delete only one for each pair. If there are no products being charged monthly, then this operation can be omitted.

c. Merge usage charge detail files

For each L-Platform, copy the rows after line 2 of the csv data of the backup site and add them to the end of the usage charge detail file from the primary site.

d. Calculate the usage charges of L-Platforms

Calculate the usage charges of L-Platforms. Total the values of the ItemAmount column of the usage charge detail file.

e. Calculate the usage charges of tenants

Perform steps b.-d. for every L-Platform and total the usage charges of L-Platforms to calculate the tenant usage charge.

When Tenant Switchover was Performed

The following limitations apply to L-Platform templates:

- Image information referencing a cloning image in a global pool may be unavailable.
- Segment information referencing a network resource in a global pool may be unavailable.
- Deployment fails if you subscribe to using an L-Platform template containing unavailable image or segment information.

This unavailable template information becomes available when the resources of all the global pools are switched over.

4.4 Failback After Recovery of the Primary Site

This section explains the failback operation from the backup site to the primary site after the hardware environment on primary site is recovered.

Failback can be performed with the same procedure as switchover, however, the following operations must be performed in advance.

1. Clear Management Software Information

When a disaster does not damage the entire primary site, it is possible that some management software information remains in hardware that has not been damaged in the disaster. Examples of such management software information are host affinity on ETERNUS and reserved DHCP addresses. In that case, clear any remaining management software information on the recovered primary site.

2. Install the Primary Site

Configure the environment on the primary site for failback. This environment needs to be prepared in the same way as the backup site was. For details on the installation procedure, refer to "[Chapter 3 Installation](#)".

3. Collect Failback Information

Collect failback information from the backup site. For details on how to collect the failback information, refer to "[4.1 Normal Operation](#)".

4. Start Replication from the Backup Site

Start storage unit replication from the backup site to the primary site.

4.5 Operation after Failback

This section explains the operation performed after failback that is different from the normal operation.

Invoice for Usage Charges

When switching back to the state before charging usage for the month when a disaster occurred using the backup site

The person responsible for billing calculates and invoices tenants for usage during the month when a disaster occurred based on the usage charge file for the month at the primary site sent by the infrastructure administrator, the usage charge file sent from the backup site, and the usage charge file sent from the primary site.

Refer to "[4.3 Operation after Switchover](#)" for information on how to calculate the usage charge.

Perform invoicing using the same procedure as the normal operation when a switchover occurred after usage has already been invoiced for the month when a disaster occurred.

Appendix A Commands

This appendix explains the commands used for disaster recovery in Resource Orchestrator.

A.1 rcxmgreexport

Name

[Windows Manager]

Installation_folder\SVROR\Manager\bin\rcxmgreexport - Collecting switchover information of Disaster Recovery

Format

```
rcxmgreexport -help
rcxmgreexport [-dir directory] [[-noretry] | [-timeout value]]
rcxmgreexport -interval minutes | off
rcxmgreexport -event on | off [-base]
rcxmgreexport -status
rcxmgreexport [-drlist [-error]] [-dir dir]
```

Description

rcxmgreexport is the command used to collect information necessary for switchover using DR (Disaster Recovery).

Subcommands

None.

Options

-help

Specify this option to display the instructions for using this command.

-dir *directory*

Specify the folder to store information necessary for switchover using Disaster Recovery. When omitted, the information is stored in the folder specified in the following file.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

-noretry

Use this option to return directly to the command prompt without waiting for the operation being executed on the admin server to complete its execution.

Export can only be performed when no other operation is being executed. If an operation is being executed, this command will return an error.

-timeout *value*

Use this option to wait the number of seconds specified in value for completion of the operation being performed on the admin server. If the operation is not completed within the specified time, this command will return an error.

If this option is omitted, the default value (3600 seconds) is set. When this option is specified, value can be specified between 1 and 172800 (2 days).

Use this option to return an error when the operation being executed on the admin server does not complete its execution after the expiration of the number of seconds specified in value.

Periodical export may not be able to start its process while the manager is executing a time-consuming operation such as L-Server

creation. Specify this option to cancel the operation after the specified number of seconds has elapsed.
The following message is output at a 600-second interval while the operation is running.
INFO:Manager operation is still running

-interval minutes | off

Specify this subcommand when periodically starting or stopping the operations to collect the information necessary for switchover to Disaster Recovery.

When starting the operation, specify the time interval for collection in minutes. Specify an integer between 1 and 1439.

The information is collected at the time interval specified in minutes. When stopping operations, specify "off".

The information necessary for switchover using Disaster Recovery is stored in the folder specified using default=directory in the following file.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

The operations to collect switchover information are the same type as operations with the -noretry option and the -timeout option omitted.

The following task will be registered in the Task Scheduler while switchover information is periodically collected.

The presence or absence of the task shows whether the operation has been enabled.

- SVROR_rcxmgrexport

When collecting logs periodically, you can find the collected logs in the following location.

[Windows Manager]

Installation_folder\SVROR\Manager\var\dr\rcxmgrexport_interval*

-event on | off

When starting or stopping operation, specify the information necessary for switchover to Disaster Recovery to collect the information at the timing of collection of configuration definition information.

When starting operations, specify "on". When stopping operations, specify "off".

Restart the manager to reflect the settings and enable or disable the operation.

When operation is started, rcxmgrexport, rcxrepdef, and rcxstorage are executed at the timing of information collection.

The information necessary for switchover using Disaster Recovery is stored in the folder specified in the following file.

Set values for rcxmgrexport, rcxrepdef, and rcxstorage.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

The timing of information collection is as follows.

- rcxmgrexport
 - L-Platform operations (creation, modification, deletion, starting, stopping)
- rcxrepdef
 - Registration of resources to a storage pool, Unregistration of resources from a storage pool
 - L-Server creation, L-Server deletion (when Dynamic LUN mirroring is used)
 - Attachment of disks to an L-Server, Detachment of disks from an L-Server (when Dynamic LUN mirroring is used)
- rcxstorage
 - L-Server creation, L-Server deletion
 - Attachment of disks to an L-Server, Detachment of disks from an L-Server

The range of the operations to collect switchover information using the rcxmgrexport command is the same as those with the -noretry option and the -timeout option omitted.

Before starting automatic switchover information collection, edit the following file to provide necessary argument information for the rcxrepdef command which is executed for information collection.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

The content of the file should be as follows.

```
#rcxrepdef_define
# (omit)
#
ccm, ,argument value for -local option, argument value for -remote option
snapmirror, ,argument value for -local option, argument value for -remote option
navisphere,argument value for -rhost option, argument value for -local option, argument value
for -remote option
solutionenabler,argument value for -rhost option, argument value for -local option, argument
value for -remote option
```

For details on the values to be set, refer to "5.22 rcxrepdef" in the "Reference Guide (Command/XML) CE".

The following file will be created when configuration definition information is updated. The presence or absence of the file shows whether the operation has been enabled.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\event_handler\03_lplatform

The log of switchover information collection which is performed during configuration changes can be found in the following location.

[Windows Manager]

*Installation_folder\SVROR\Manager\var\dr\rcxmgrexporth_event**



Note

The collection methods enabled with the `-interval` option and the `-event` option cannot be used simultaneously. When switching the methods, execute the command specifying "off" in the option to stop the present operation. After that, execute the other command to start the new operation.

-base

When operation is started with `-event` on also specified, only `rcxmgrexporth` is executed at the timing of information collection.

Specify this option when using "virtual L-Server switchover (VM guest)", not "physical L-Server switchover (physical OS)" as the switchover method.

-status

Displays whether the `-interval` and `-event` options are enabled or disabled.

-drlist

Use this option to display the following resource types of the DR target resources.

- Tenants
- L-Platforms
- L-Servers for infrastructure administrators
- Images

Also use this option to display the following resource types of the resources which use both DR target storage and non DR target storage, and cannot be switched.

- L-Platforms
- L-Servers for infrastructure administrators
- Images

-error

Specify this option to display the resources which use both targeted storage and non-targeted storage for Disaster Recovery and therefore cannot be switched over. When this operand is omitted, the resources which are switchover targets will be displayed.

-dir

Specify the folder to store information necessary for switchover using Disaster Recovery.

When specifying the -drlist or the -drlist -error option, specify the folder in which the exported data collected using the rcxmgrexpport command is stored.

When omitted, the information will be stored in the folder specified as the output destination of the rcxmgrexpport command in the following file:

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

Examples

```
> rcxmgrexpport -drlist <RETURN>
TYPE      NAME
----      -
L-Server  /tenant_1/1-server_1
Image     /image_1
Image     /image_2

> rcxmgrexpport -error <RETURN>
TYPE      NAME
----      -
L-Server  /tenant_1/1-server_1
```

A.2 rcxrecovery

Name

[Windows Manager]

Installation_folder\SVROR\Manager\bin\rcxrecovery - Disaster Recovery switchover

Format

```
rcxrecovery -help
rcxrecovery [-dir directory] [-map mapping_dir] [-mirror storage_file] [-vmmgr vmmgr_file]
            [-vm_pool pool_file] [-nocleanup] [-allon]
rcxrecovery [-dir directory] [-map mapping_dir] [-mirror storage_file] [-vmmgr vmmgr_file]
            [-vm_pool pool_file] [-nocleanup] [-allon] -global [-tenant tenant1[,tenant2,,,]]
rcxrecovery [-dir directory] [-map mapping_dir] [-mirror storage_file] [-vmmgr vmmgr_file]
            [-vm_pool pool_file] [-allon] -tenant tenant1[,tenant2,,,]
```

Description

rcxrecovery is the command to perform switch over using DR (Disaster Recovery).

Subcommands

None.

Options

-help

Specify this option to display the specifications for this command.

-dir *directory*

Specify the folder to store the information for the target of switchover due to Disaster Recovery. If omitted, the ManagerExport folder under the folder (hereinafter, import definition folder) specified for import=directory will be specified in the following folder.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

-map *mapping_dir*

Specify the folder in which to store the mapping files defining the relationships of the server names between the primary and backup sites.

If the -dir option and this option are omitted, the MAP folder under the import definition folder will be used. If there is no import definition folder, mapping of server names will not be performed.

When using different server names between the primary and backup sites, create a file under the MAP folder with the following content before executing the rcxrecovery command. Physical server names will be replaced when importing the primary configuration on the backup site.



Example

```
#PhysicalServer
Physical server name on primary site-1,Physical server name on backup site-1
Physical server name on primary site-2,Physical server name on backup site-2
:
:
#VMManagementSoftware
VM management software name on primary site-1,VM management software name on backup site-1
VM management software name on primary site-2,VM management software name on backup site-2
:
:
```

-vm_pool *vm_pool*

Specify the definition file that defines the VM pool to which the VM host belongs.

When this option is specified, the switchover operation is performed assuming that the VM host has been pre-configured.

If omitted, the vm_pool.csv file under the folder (hereinafter, import definition folder) specified for import=directory will be specified in the following folder.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\custmize_data\fa_dr.rcxprop



Example

```
#vmpool_name,vmhost_name
/VMHostPool,192.168.2.1
/VMHostPool,192.168.2.2
/tenant1/TenantVMHostPool,vmhost1.example.org
/tenant1/TenantVMHostPool,vmhost2.example.org
/tenant2/TenantVMHostPool,192.168.10.15
```

-mirror *storage_file*

Specify the intermediate files for output mapping using the -recovery option and -mode prepare option of the rcxstorage command on the primary site.

If the `-dir` option and this option are omitted, the `storage_file` under the import definition folders will be assigned. When there is no `storage_file` under the import definition folder, mapping of storage will not be performed.

`-vmmgr vmmgr_file`

Specify the VM management software definition file to register VM management software on the backup site.

If the `-dir` option and this option are omitted, the `vmmgr_file.txt` under the import definition folder will be assigned. When there is no `vmmgr_file.txt` under the import definition folder, VM management software cannot be registered.

The format of the VM management software definition file is shown below. The description in the first line is the explanation of detailed definitions, and the description is not included in `vmmgr_file.txt`.



Example

name	soft name	ip	user name	password	physical-lserver
vcenter,	vmware-vc,	192.168.1.24,	admin,	admin,	yes
scvmm,	ms-scvmm,	192.168.100.77,	root,	root,	no

Each item to specify is explained below. Use the information registered on the primary site.

name:

The name of VM management software to register in Resource Orchestrator.

soft name:

Specify the type of VM management software. The only specifiable values are `vmware-vc` (vCenter) and `ms-scvmm` (SCVMM).

ip:

Specify the IP address of VM management software.

user name:

Specify the user ID used when logging in to VM management software.

password:

Specify the password used when logging in to VM management software.

physical-lserver:

Specify "yes", when creating VM management software on a physical L-Server.

Specify "no", when not creating VM management software on a physical L-Server.

When "no" is specified, as messages to recover VM management software are output during command execution and the process is stopped, perform recovery while operations are stopped.

`-nocleanup`

Specify this option when not clearing the configuration definition information of a backup site during switchover when a disaster occurs. This option is valid during switchover including global environments.

When this option is omitted, the backup site environments will be cleared. When clearing environments, whether the environments must be deleted or not is confirmed during the command execution. When "y" is entered for an inquiry, backup site environments are cleared and the switchover operation continues. When "n" is entered, the switchover operation is aborted.

`-allon`

After switchover, specify this option when powering on all L-Servers.

When this option is omitted, L-Servers will be powered on based on their startup status when the switchover information was obtained.

`-global`

Specify this option when switching over resources in the global pool.

When this option and the `-tenant` option are omitted, all resources on the primary site will be switched over. When this option is specified, configuration definition information on the backup site will be cleared.

-tenant tenant1

Specify the tenant for switchover.

When this operand is omitted by specifying the global option, the resources included in the tenant cannot be switched over.

When this option is specified and -global option is omitted, configuration definition information on the backup site will not be cleared.

Note

- When there are many imported L-Platforms or L-Servers, the information for L-Platforms or L-Servers may not be displayed in the [Usage Condition] tab. After a while, confirm the information in the [Usage Condition] tab again.
- When an error occurs while using this command, an error cause message is displayed. Take corrective action based on the displayed message, then execute the command again. If the previous command was executed with the option that clears the configuration definition information of the backup site and "cleanup of resources" ended with "completed", then specify the -nocleanup option when you execute the command again. This option will skip unnecessary configuration cleanup of the backup site that has already been performed.

Examples

```
>rcxrecovery <RETURN>
-----
The following administrative information that exists on the
manager will be deleted.
- L-Platform templates
- L-Platform configuration information
- Resource information
  - L-Servers
  - L-Server templates
  - Tenants
  - Resource folders
  - Image resources
  - Users
  - User groups
  - Network resources
  - Address resources
  - Resource pools
    * Resources registered in pools will be unregistered.
- Accounting information
- Metering logs
Please specify the "-nocleanup"option when you do not want
to delete the administrative information.
Caution: In the following case, reply "n" to this prompt to
quit the command and rerun the command with "-nocleanup"
option.
- rcxrecovery had been executed to failover the whole site
  or global resources, and
- "-nocleanup" had not been specified, and
- rcxrecovery had exited with some error after the 2nd
  process "cleanup of resources" had completed, and
- rcxrecovery has rerun after the error had been recovered.
-----
Press [y] to continue rcxrecovery, or [n] to cancel
rcxrecovery. : y
[xx:xx:xx] (1/10)check of input data           : completed
[xx:xx:xx] (2/10)cleanup of resources        : completed
[xx:xx:xx] (3/10)copy of definition files    : completed
[xx:xx:xx] (4/10)import physical resources (global) : completed
[xx:xx:xx] (5/10)import physical resources (tenant) : completed
-----
When migrating the VM management software (vCenter/SCVMM) on
a primary site using DR, if replication is not used, and VM
```

management software is prepared on the backup site, after DR there are cases where VM hosts may not be recognized by the VM management software on the backup site. Please perform recovery manually so that the VM management software on the backup site recognizes the VM hosts. After the recovery is complete, press Y to continue.

However, when VM management software has been installed on a physical L-Server of Resource Orchestrator, as the same VM management software as the primary site will be started on the backup site, this procedure is unnecessary. In such cases, press Y.

Press [y] when recovery is complete. : y

```
[xx:xx:xx] (6/10) register/refresh VM management software : completed
[xx:xx:xx] (7/10)import virtual resources (global)       : completed
[xx:xx:xx] (8/10)import virtual resources (tenant)      : completed
[xx:xx:xx] (9/10)import middleware information          : completed
[xx:xx:xx] (10/10)start l-platform                      : completed
[xx:xx:xx] rcxrecovery finished
```

A.3 rcxadm config

Name

[Windows Manager]

Installation_folder\SVROR\Manager\bin\rcxadm config - import and export of configuration information

Format

```
rcxadm config map -file resource_map_file -dir directory
rcxadm config filter {-tenant tenant_name|-global|-type vm|-exclude vm |-exclude type -name name |-
convert} -indir indir -outdir outdir
rcxadm config show -type type -name name -dir directory -format xml
rcxadm config cleanup [-tenant tenant_name] [-deluser] [[-predr]|[-postdr]]
rcxadm config vsfilter [-tenant tenant1[,tenant2[,...]]] [-global] [-dir dir] [-vm_pool vm_pool] -
outfile file.csv
```

Description

rcxadm config is the command to import or export configuration information, when executing DR (Disaster Recovery).

Subcommands

map

Links exported configurations of Resource Orchestrator with resources of the backup site.

filter

Perform filtering in order to divide and import exported configurations of Resource Orchestrator.

show

Displays the detailed information of exported configurations of Resource Orchestrator.

cleanup

Deletes the resource management information of the manager.

vsfiler

Outputs the information of the storage in which the virtual disks for cloning images/L-Servers in the scope specified by `-tenant` or `-global` have been deployed and the information of the VM host on which such storage is mounted to a file.

The types of the storage for extraction and the virtual storage information to be extracted are as follow:

VMware

Datastore

The file which is output is used as the input for the script which mounts multiple storage units in a batch to the VM host (`dsmount.pl`).

When executing this command, specify all tenants and `global` in which cloning images/L-Servers for which the virtual storage to be extracted is specified as the disk deployment destination have been registered, at the same time. If the specification is insufficient, a command error will occur.

Options

`-dir directory`

Specify the folders to store configuration information for linking with resources.

`-file resource_map_file`

Specify XML files which describe storage links.

`-tenant tenant_name`

Specify the names of the tenants to performing filtering for.

`-global`

Specify when performing filtering of resources commonly used among tenants.

`-type vm`

Specify when performing filtering of resources related to virtual L-Servers.

`-exclude vm`

Specify when performing filtering of resources other than those related to virtual L-Servers.

`-exclude type`

Specify the resource types to perform filtering of. The following types can be selected:

`lserver`

`lplatform`

`-name name`

Specify the names of the resources to perform filtering for or display details of.

`-convert`

The information that links a configured physical server with an L-Server is created in `outdir`.

`-indir indir`

Specify the folders for storing the configuration information of filtering targets.

`-outdir outdir`

Specify the folders for storing filtered configuration information.

`-type type`

Specify the type of resources to display details of. The following types can be selected:

`lserver`

`network`

`-format xml`

Specify the xml format to use when displaying details.

Example

convert.txt

```
[command]
rcxadm lserver convert -with BX900_1 -name physical_lserver_1
rcxadm lserver convert -with BX900_3 -name physical_lserver_2 -to /tenant_1
rcxadm lserver convert -with BX900_6 -name physical_lserver_3 -label test_label3 -comment test_comment3 -to /folder_1
[user]
user_1, physical_lserver_1
user_1, /tenant_1/physical_lserver_2
user_2, /folder_1/physical_lserver_2
[usergroup]
usergroup_1, physical_lserver_1
usergroup_2, /folder_1/physical_lserver_3
```

-tenant *tenant_name*

- For the vsfiler Subcommand

Extracts the images/L-Servers in the tenant specified for *tenant_name*.

- For the config Subcommand

For *tenant name*, specify the information of the tenant which the resources to be deleted belong to (the value specified using rcxrecovery -tenant when performing failback using DR).

-deluser

Deletes the user information associated with the resource management information which was deleted from the manager, from the user management software.

-predr

Unregisters the VM guest information associated with the resource management information which was deleted from the manager, from the VM management software.

-postdr

Unregisters the VM guest information and VM image information which are associated with the resource management information which was deleted from the manager, from the VM management software.

-global

Extracts the storage information of the images registered in the global pool and L-Servers from tenants.

When this option and the -tenant option are omitted, all storage information of all cloning images/L-Servers in the configuration definitions will be extracted.

-dir *dir*

Specify the folder to store the information for the target of switchover due to Disaster Recovery. If omitted, the ManagerExport folder under the folder (hereinafter, import definition folder) specified for import=directory will be specified in the following folder.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

-vm_pool *vm_pool*

Specify the definition file that defines the VM pool to which the VM host belongs. For details on the content to include in the file, refer to "A.2 rcxrecovery".

If omitted, the vm_pool.csv file under the folder (hereinafter, an import definition folder) specified for import=directory will be specified in the following folder.

[Windows Manager]

Installation_folder\SVROR\Manager\etc\customize_data\fa_dr.rcxprop

-outfile

Use this option to specify the name of the file to which the extracted virtual storage information is output.

For each virtual storage, the following information is stored in CSV format:

- Virtual storage type (vmfs, nfs)
- Device path name on the VM host
- The list of the VM hosts to which the storage will be mounted

The information is extracted from the VM pool definition file. The target of extraction is the definition file of the VM pool in which the VM hosts with L-Servers deployed were registered.

Specify a relative or absolute path.

Output Example

```
RCXVSFILTER_v1.0
[VMware]
#operation,type,vstorage_name,datastore_name,mountpath,vmhosts
mount,vmfs,storage_A,storage_A,/vmfs/volumes/UUID1,vmhost1.example.org:vmhost2.example.org
mount,vmfs,storage_B,storage_B,/vmfs/volumes/UUID2,vmhost1.example.org:vmhost2.example.org
mount,vmfs,storage_E,storage_E,/vmfs/volumes/UUID3,192.168.10.1
mount,nfs,storage_X,storage_X,/vmfs/volumes/UUID4,192.168.10.2:192.168.10.3
```

A.4 dsmount.pl

Name

[Windows Manager]

Installation_folder\SVROR\Manager\sys\dr_vmware_script\dsmount.pl - mounting of a datastore to a VM host

Format

```
perl dsmount.pl -input file [-server soft_ip] [-username username] [-password password] {-type vmfs
| -type nfs -listfile file [-unmount]}
```

Description

This command mounts the VMFS/NFS datastore for which mount is specified for the operation in the specified storage information file to a VM host.

When an error occurs, in addition to the item name for which the error occurred, the line in which the error occurred in the storage information file specified using -input may be output. In this case, the processing of preceding lines has been completed for the corresponding items.

To execute the script, it is necessary to install VMware: vCLI (an external tool that controls VM software) on a server which can communicate with the VM management software beforehand.

When executing the script, it operates according to the settings of vCLI Connection Options. For details on vCLI Connection Options, refer to the VMware manual.

```
URL: http://pubs.vmware.com/vsphere-50/topic/com.vmware.ICbase/PDF/vsphere-esxi-vcenter-server-50-command-line-interface-solutions-and-examples-guide.pdf
```

Options

-server soft_ip

Specify the IP address of VMware vCenter Server.

When omitted, the same operation as when "- -server" is omitted in vCLI Connection Options will be performed.

-username username

Enter the name of a VIOM vCenter Server user account.

Specify a user with administrative privileges.

When omitted, the same operation as when "- -username" is omitted in vCLI Connection Options will be performed.

-password password

Enter the password of the VIOM vCenter Server user account.

When omitted, the same operation as when "- -password" is omitted in vCLI Connection Options will be performed.

-input input

Specify a storage information file.

For details on the file creation procedure, refer to "A.3 rcxadm config".

Specify the file using a relative or absolute path.

-type nfs

Performs mounting of a NFS datastore

-type vmfs

Performs resignaturing of the VMFS datastore. After resignaturing, the datastore name will be restored to its original name.

Point

Resignaturing is performed to make the VMFS database copy recognizable by ESX or ESXi because it is not otherwise recognized as a datastore.

When resignaturing is performed, the datastore is temporarily renamed to "*snap-snapID-oldLabel*" but it is renamed again to "*oldLabel*" before the completion of the script.

Be sure the prerequisites for resignaturing have been satisfied before executing the script.

For details on resignaturing and prerequisites, refer to "Resignature a VMFS Datastore Copy" in the VMware manual available at:

URL: <http://pubs.vmware.com/vsphere-50/topic/com.vmware.ICbase/PDF/vsphere-esxi-vcenter-server-50-storage-guide.pdf>

-unmount

Performs unmounting instead of the mounting operation.

-listfile

Specify the CSV file which contains NFS connection information.

Specification format of the CSV is as follows:

Datastore name,IP address or domain name,NFS path

Example

storage_X,192.168.3.230,/nfs/data

Examples

```
>perl dsmount.pl -input out.csv -type vmfs -username Administrator <RETURN>
Enter password:
```

A.5 vmfile_update.pl

Name

[Windows Manager]

Installation_folder\SVROR\Manager\sys\dr_vmware_script\vmfile_update.pl - updating of virtual machine files

Format

```
perl vmfile_update.pl -input file [-server soft_ip] [-username username] [-password password]
```

Description

This command updates virtual machine files for the datastore for which mount is specified for the operation in the specified storage information file.

To execute the script, it is necessary to install VMware: vCLI (an external tool that controls VM software) on a server which can communicate with the VM management software beforehand.

When executing the script, it operates according to the settings of vCLI Connection Options. For details on vCLI Connection Options, refer to the VMware manual.

Options

-server soft_ip

Specify the IP address of VMware vCenter Server

When omitted, the same operation as when "- -server" is omitted in vCLI Connection Options will be performed.

-username username

Enter the name of a VIOM vCenter Server user account.

Specify a user with administrative privileges.

When omitted, the same operation as when "- -username" is omitted in vCLI Connection Options will be performed.

-password password

Enter the password of the user account.

When omitted, the same operation as when "- -password" is omitted in vCLI Connection Options will be performed.

-input input

Specify a storage information file.

For details on the file creation procedure, refer to "[A.3 rxcadm config](#)".

Specify a relative or absolute path.

Examples

```
>perl vmfile_update.pl -input out.csv -username Administrator <RETURN>  
Enter password:
```


Appendix B Messages

This appendix explains the messages that are output when using Disaster Recovery.

For messages other than those explained below, refer to the "Messages".

B.1 Error Messages Regarding dsmount.pl

This section explains error messages regarding dsmount.pl.

Option *option* requires an argument.

usage: *usage*

Description

No parameter value has been specified on the command line.

Corrective Action

Enter the required parameter value on the command line.

Required command option *option* not specified.

usage: *usage*

Description

The required *option* has not been specified on the command line.

Corrective Action

Check if the parameter on the command line is correct.

Option unmount should not have an argument.

usage: *usage*

Description

The command line option -unmount contains a parameter value.

Corrective Action

Delete the parameter value for the -unmount option.

unknown option: *option*

usage: *usage*

Description

An invalid option has been included on the command line.

Corrective Action

Delete the invalid option.

Error connecting to server at *server*. Perhaps host is not a vCenter or ESX server

Description

There is an error in the connected VMware vCenter Server or VMware ESX.

Corrective Action

Modify the parameter value for *server* which has been entered on the command line to VMware vCenter Server or VMware ESX.

Error: Cannot complete login due to an incorrect user name or password.

Description

There is an error in the user name or password entered on the command line.

Corrective Action

Correct the user name or password entered on the command line.

Option type's argument must be vmfs or nfs.

usage: *usage*

Description

The command line option -type does not exist or there is an error in the parameter value.

Corrective Action

Specify vmfs or nfs for the -type option on the command line.

Fail to open file: *file*

Description

The specified file cannot be opened.

Corrective Action

Check that the specified file exists and is readable.

file format must be: #operation, type, vstorage_name, datastore_name,mountpath,vmhosts, line number in *input* file

Detail: *line*

Description

There is an error in the format of the "mount" line in the *input* file.

Corrective Action

Modify the format of the line containing the error as follows:

```
#operation,type, vstorage_name, datastore_name,mountpath,vmhosts
```

datastore type must be nfs or vmfs, line number in *input* file

Description

There is an error in the type of the datastore which requires resignaturing in the input file.

Corrective Action

Specify vmfs or nfs for the type of the datastore which requires resignaturing in the input file.

line number in *listfile*, file format must be: #datastore_name,server_name,sharepath";

Detail : *line*

Description

There is an error in the format of the *listfile* file.

Corrective Action

Modify the content of each line in the *input* file as follows:

```
operation,type, vstorage_name, datastore_name,mountpath,vmhosts
```

listfile does not exist datastore name, line number in input**Description**

The nfs datastore name specified in the *input* file does not exist in the *listfile* file.

Corrective Action

Check if the datastore name on the corresponding line of the *input* file is correct.

Check also if the content of the *listfile* file is correct.

Fail to find any host in server server**Description**

There are no hosts on the ESX server.

Corrective Action

Check if there is a host on the ESX server. If there is not, add the necessary host.

Fail to find datastore datastore snapshot in all hosts, line number in input file**Description**

There is no snapshot corresponding to *datastore* on any of the hosts.

Corrective Action

Check the state and snapshot information of the corresponding datastore, and then execute the command again.

Fail to find datastore datastore snapshot in host host, line number in input file**Description**

There is no datastore snapshot for a host.

Corrective Action

Check the states of the corresponding datastore and host, and then execute the command again.

Fail to resignature datastore to host host, line number in input file***Detail: vcli_detail*****Description**

An error occurred during resignaturing of the datastore.

Corrective Action

Check the content of the *input* file and the state of the datastore, and then execute the command again.

Fail to find resignatured datastore name, line number in input file**Description**

After resignaturing of the datastore, the resignatured datastore cannot be found.

Corrective Action

Manually update the host, check the state of the datastore, and then execute the command again.

Fail to add nfs datastore to host host, line number in input file.***Detail: detail*****Description**

An error has occurred during mounting of an NFS datastore.

Corrective Action

Check the state of the datastore and the content of the *listfile* file and the input file, and then execute the command again.

Fail to remove nfs datastore *name* on host *host*, line *number* in *input* file.

Detail: *vcli_detail*

Description

An error has occurred during unmounting of an NFS datastore.

Corrective Action

Check the state of the datastore and then execute the command again.

B.2 Error Messages Regarding *vmfile_update.pl*

Option *option* requires an argument.

Description

A parameter has not been specified.

Corrective Action

Check if the parameter on the command line is correct.

Required command option *option* not specified.

usage: *usage*

Description

The required option has not been specified on the command line.

Corrective Action

Ensure that the correct command line option has been specified.

Error connecting to server at *server*: Perhaps host is not a vCenter or ESX server

Description

There is an error in the connected vCenter or ESX server.

Corrective Action

Modify the parameter value for *server* which has been entered on the command line to vCenter or ESX.

Error: Cannot complete login due to an incorrect user name or password.

Description

There is an error in the user name or password entered on the command line.

Corrective Action

Correct the user name or password entered on the command line.

Fail to open file: *file*

Description

The specified file cannot be opened.

Corrective Action

Check that the specified file exists and is readable.

file format must be: #operation, type, vstorage_name, datastore_name,mountpath,vmhosts, line number in input file

Detail: line

Description

There is an error in the format of the "mount" line in the input file.

Corrective Action

Modify the format of the line containing the error as follows:

```
#operation,type, vstorage_name, datastore_name,mountpath,vmhosts
```

datastore type must be nfs or vmfs, line number in input file

Description

There is an error in the type of the datastore which requires updating in the input file.

Corrective Action

Specify vmfs or nfs for the type of the datastore which requires updating in the input file.

Fail to find datastore name in datacenter

Description

There is no datastore for the input file on the server.

Corrective Action

Check the datastore information in the input file and then execute the command again.

Fail to update datastore datastore, line number in input file

Detail: vcli_detail

Description

An error has occurred during the updating of datastore information.

Corrective Action

Check the datastore information and the state of the datastore in the error line, and then execute the command again.

Appendix C Output Logs when Switchover Occurs because of Disaster Recovery

This appendix explains the logs output when switchover occurs due to Disaster Recovery.

Information relating to the export or import process for L-Platform templates and L-Platform configurations is output to the following log when information is collected for Disaster Recovery switching, or when switching due to the occurrence of a disaster.

Log Output Destination

[Windows Manager]

Installation_folder\RCXCFMG\logs\vsys_dr_log

[Linux Manager]

/var/opt/FJSVcfmg/logs/vsys_dr_log

Log Output Format

The contents are output in one of the following formats:

- Format 1: date error-level message
- Format 2: date error-level message-ID message

When an error has occurred, the log is output in the format 2 with the error level "ERROR".

C.1 Logs of L-Platforms being Processed during Disaster Recovery Switchover Information Collection

If switchover information is collected during L-Platform deployment or reconfiguration, it contains L-Platform configuration management information that does not reflect the actual resource status. Information on the L-Platform that was being processed is logged in the format described in this section.

For these L-Platforms, the process to automatically reflect the actual resource status in L-Platform configuration management information is performed at switchover (refer to "[C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform](#)" for information on the logs output at this time).

- Log output format

Format 1

- Error level

WARN

- Message

Detailed information is output as the message.

```
item_1 = [content_1], item_2 = [content_2], ... item_n = [content_n]
```

The following items are output.

Item name	Content
Processing	Details of the processing that was in progress during export One of the following is output: <ul style="list-style-type: none">- "SUBSCRIBING": Deploying- "RECONFIGURING": Reconfiguring- "UNSUBSCRIBING": Unsubscribing

Item name	Content
	<ul style="list-style-type: none"> - "TAKING SNAPSHOT": Taking a snapshot (virtual server), Backing up (physical server) - "RESTORING": Restoring - "CLONING": Collecting an image - "APPLYING UNSUBSCRIPTION": Applying an unsubscription - "APPLYING SUBSCRIPTION": Applying a subscription - "SAVING NEW CONFIGURATION": Saving a configuration of a new system - "APPLYING RECONFIGURE": Applying a reconfiguration - "SAVING RECONFIGURATION": Saving a configuration of a reconfiguration
L-Platform ID	The ID of the L-Platform that was being processed
System name	The L-Platform name
Tenant	The tenant of the L-Platform
User	The owner of the L-Platform
Template ID	The ID of the template the L-Platform uses
Server ID	The ID of the server being processed (It is output only when processing on a server.)
Server name	The name of the server being processed (It is output only when processing on a server.)
Date	The date and time of the processing

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform

For L-Platforms being processed while collecting the switchover information, the automatic processing for reflecting the actual resource status is performed.

The type of automatic processing varies depending on the L-Platform configuration and status. Automatic processing will be logged in the following format:

- Log output format

Format 1

- Error level

INFO or WARN

- Message

Detailed information is output as the message.

```
item_1 = [content_1], item_2 = [content_2], ... item_n = [content_n]
```

The common items given below will be output irrespective of the type of automatic processing.

Item name	Content
Action	Details of the processing that was in progress during automatic processing One of the following is output: <ul style="list-style-type: none"> - "DELETED L-PLATFORM": Removed the L-Platform configuration information

Item name	Content
	<ul style="list-style-type: none"> - "DELETED SERVER": Removed a server from the L-Platform configuration information - "DELETED DISK": Removed an extended disk from the L-Platform configuration information - "DELETED NIC": Removed an NIC from the L-Platform configuration information - "ADDED NIC": Added an NIC to the L-Platform configuration information - "ADDED SNAPSHOT INFORMATION": Added snapshot information - "DELETED SNAPSHOT INFORMATION": Removed snapshot information - "SET NETWORK DEVICE RESOURCE-ID": Configured a firewall resource ID - "SET DISK RESOURCE-ID": Configured a disk resource ID - "SET IP ADDRESS": Configured an IP address - "SET SERVER SPEC": Configured server specifications - "SET SCOPE OF L-PLATFORM": Configured owner's operation permission on the L-Platform - "CLEAR FLOW STATUS": Initialized the processing status of the application process - "LIST NETWORK DEVICE PARAMS": Output changes to firewall settings (*)
L-Platform ID	ID of the L-Platform to be automatically processed
System name	The L-Platform name
Tenant	The tenant of the L-Platform
User	The owner of the L-Platform

* Note: Parameter information set in the firewall device is not automatically reflected in L-Platform configuration information. You must confirm that the settings requested in the parameter changes are reflected in the firewall device. Automatic processing performed for a firewall is explained later in this section.

When automatic processing is performed for a server in an L-Platform, the following items will be output.

Item name	Content
Server ID	ID of the server to be processed
Server name	Name of the server to be processed
Server spec	<p>Server specs containing the resource status reflected by automatic processing This item is output when the "Action" item is "SET SERVER SPEC". Setting items changed by automatic processing are output in the following format:</p> <p>Format</p> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <pre>Server spec = [setting_item_1 = [setting_1], setting_item_2 = [setting_2], . . .]</pre> </div> <p>Setting items</p> <ul style="list-style-type: none"> - "Number of CPUs": Number of CPUs - "CPU performance": CPU performance - "CPU reserved": Reserved CPU performance - "CPU shares": CPU shares - "Memory size": Memory capacity - "Memory reserved": Reserved memory capacity

Item name	Content
	<ul style="list-style-type: none"> - "Memory shares": Memory shares - "Priority": Boot priority

When automatic processing is performed for a disk attached to a server, the following items will be output.

Item name	Content
Disk ID	ID of the disk to be processed
Disk index	Index of the disk to be processed

When automatic processing is performed for an NIC attached to a server, the following items will be output.

Item name	Content
NIC group index	Index of the NIC group to be processed (*1)
NIC NO	Serial number of the NIC to be processed (*2)
IP address	IP address (*3)

*1: For a grouped NIC

*2: For an NIC that is not grouped

*3: If an IP address has been set

When automatic processing is performed for a firewall, the following items will be output.

Item name	Content
LNetDev name	Name of firewall to be processed
LNetDev ruleset	<p>Details of parameter changes Details of changes made by the user are output in the following format:</p> <p>Format</p> <pre>LNetDev ruleset = [{output_item_1 = [content_1], output_item_2 = [content_2], ...}, ...]</pre> <p>Output items</p> <ul style="list-style-type: none"> - "name": Parameter name - "request value": Value specified by the user when changing the setting - "value": Setting prior to the change. This value is automatically changed to the requested value.
LNetDev parameter group list	<p>List of parameter groups added or deleted, and their content. This item is output when a firewall setting is changed without the use of a ruleset. The content of a parameter group operated by the user is output in the following format:</p> <p>Format</p> <pre>LNetDev parameter group list = [{output_item_1 = [content_1], output_item_2 = [content_2], ...}, ...]</pre> <p>Output items</p> <ul style="list-style-type: none"> - "group name": Parameter group name - "group id": Parameter group ID - "operation": Operation performed by the user when changing the setting. "ADD" is output if a parameter group was added, and "DEL" is output if a parameter group was deleted.

Item name	Content
	<ul style="list-style-type: none"> - "Parameters": Parameters added or deleted by the operation is output in the following format: <ul style="list-style-type: none"> Format <pre>parameters = [{output_item_1 = [content_1], output_item_2 = [content_2]}, ...]</pre> Output items <ul style="list-style-type: none"> - "name": Parameter name - "value": Parameter setting

Automatic processing corrects management information for a firewall being reset, so it may look as if the setting was changed successfully even when it failed. Perform a switchover and check if the details output in the log are reflected in the device - if they are not, then enter the settings to the device.

C.3 Logs of L-Platforms Excluded from Recovery

When switchover scopes are limited, L-Platforms not included in the scopes are not recovered on the backup site.

This section describes the format of information regarding L-Platform not recovered because they are not in switchover scopes even though they are in switchover information.

Refer to "2.3 Limitation of Switchover Scopes" for information on limitation of switchover scopes.

No action is required for these logs.

- Log output format

Format 1

- Error level

INFO

- Message

Detailed information is output as the message.

```
EXCLUDE the L-Platform: item_1 = [content_1], item_2 = [content_2]... item_n = [content_n]
```

The following items are output.

Item name	Content
L-Platform ID	The ID of the L-Platform excluded from recovery
System name	The L-Platform name
Tenant	The tenant of the L-Platform
User	The owner of the L-Platform

C.4 Actions after performing Disaster Recovery

After performing Disaster Recovery, check vsys_dr_log to see if the logs shown in "C.1 Logs of L-Platforms being Processed during Disaster Recovery Switchover Information Collection" and "C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform" are output.

This section explains the log output according to the processes described for the "Processing" item in "C.1 Logs of L-Platforms being Processed during Disaster Recovery Switchover Information Collection".

a. SUBSCRIBING

The L-Platform was being deployed by subscription or by importing L-Servers when it was exported.

- Pattern 1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	<ul style="list-style-type: none"> - SET NETWORK DEVICE RESOURCE-ID - SET DISK RESOURCE-ID - SET IP ADDRESS - SET SCOPE OF L-PLATFORM
Condition	The L-Platform has been deployed successfully after being exported, and the resources exist. The resource status has been reflected in the L-Platform configuration information.	
Action	The L-Platform can be operated as is. No action required.	

- Pattern 2

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	DELETED L-PLATFORM
Condition	The L-Platform was exported when its subscription was being processed, but the deployment failed, or it was exported when an L-Server was being imported as an L-Platform, but the processing was not completed. The L-Platform configuration information was deleted because the resources do not exist.	
Action	<ul style="list-style-type: none"> - If the subscription was not successfully processed, process it again. - If the import of an L-Server as a new L-Platform has not been completed, check the status of the orchestration tree on the [Resource] tab and take the following actions. <ol style="list-style-type: none"> 1. Check if the tenant contains the L-Platform ID name folder (*1). Perform step 3 if it does not contain folders. If it contains a folder, check if the folder also contains an L-Server to be imported. Perform steps 2 and 3 if the folder does not contain any L-Server. If the folder contains an L-Server, perform steps 2 and 3 after moving the target L-Server to a location where they can be imported, such as immediately below the tenant or root. 2. Delete the L-Platform ID name folder (*) in the tenant. 3. Import the L-Server again. 	

*1: The folder name can be specified according to "18.5 Setting the Method for Setting Resource Names" in the "Setup Guide CE". The default is L-Platform ID.

b. RECONFIGURING

The L-Platform was during a reconfiguration such as adding or deleting servers, disks or NICs, or changing server details when it was exported.

- Pattern 1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	<ul style="list-style-type: none"> - SET DISK RESOURCE-ID - SET IP ADDRESS

Condition	After the L-Platform has been exported while a server was being added by reconfiguration, the server was successfully added. The resource status has been reflected in the L-Platform configuration information.
Action	The L-Platform can be operated as is. No action required.

- Pattern2

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	DELETED SERVER
Condition	After the L-Platform has been exported while a server was being removed by reconfiguration, the server has been successfully removed, or after the L-Platform has been exported while a server was being added by reconfiguration, the server was not successfully added. The server was removed from the L-Platform configuration information because the resources do not exist.	
Action	If the L-Platform does not contain the required server, reconfigure it to add the server. If it contains segments to which no server or NIC is connected, reconfigure it to delete the segments.	

- Pattern3

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	SET DISK RESOURCE-ID
Condition	After the L-Platform has been exported while adding an extended disk by reconfiguration, the disk has been successfully added. The resource status has been reflected in the L-Platform configuration information.	
Action	The L-Platform can be operated as is. No action required.	

- Pattern4

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	DELETED DISK
Condition	After the L-Platform has been exported while removing an extended disk by reconfiguration, the disk has been successfully removed, or after the L-Platform has been exported while adding an extended disk by reconfiguration, the disk was not successfully added. The extended disk was removed from the L-Platform configuration information because the resource does not exist.	
Action	If the L-Platform does not contain required disks, reconfigure it to add an extension disk.	

- Pattern5

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	ADDED NIC
Condition	After the L-Platform has been exported while adding an NIC by reconfiguration, the NIC has been successfully added and the resource exists. An NIC has been added to the L-Platform configuration information based on the resource status.	

Action	The L-Platform can be operated as is. No action required.
--------	---

- Pattern6

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	DELETED NIC
Condition	After the L-Platform has been exported while removing an NIC by reconfiguration, the NIC has been successfully removed. The NIC was removed from the L-Platform configuration information because the resource does not exist.	
Action	If it contains segments to which no server or NIC is connected, reconfigure it to remove the segments.	

- Pattern7

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	SET SERVER SPEC
Condition	After the L-Platform has been exported while the server specification was being changed by reconfiguration, the specification change has been successfully processed. The resource status has been reflected in the L-Platform configuration information.	
Action	The L-Platform can be operated as is. No action required.	

- Pattern8

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	WARN
	Action item	LIST NETWORK DEVICE PARAMS
Condition	L-Platform was exported while the firewall setting was being changed during a reconfiguration.	
Action	Reflect the setting in the firewall device as required.	

- Pattern9

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	<p>The L-Platform has been exported while reconfiguring, but the automatic processing was not performed because no difference has been identified between the L-Platform configuration information and the resource status at switchover. The possible scenarios are as follows:</p> <ul style="list-style-type: none"> - The L-Platform has been exported while the server was being removed, but the server was not successfully removed. - The L-Platform has been exported while the disk was being removed, but the disk was not successfully removed. - The L-Platform has been exported while the NIC was being removed, but the NIC was not successfully removed. - The L-Platform has been exported while the server specification was being changed, but the specification was not successfully changed. 	

	<ul style="list-style-type: none"> - The L-Platform has been exported while importing an L-Server to an existing L-Platform, and it was successfully imported. - The L-Platform has been exported while releasing an L-Server from an L-Platform, and the L-Sever was not successfully released.
Action	Reconfigure, if required.

c. UNSUBSCRIBING

The L-Platform was being unsubscribed when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	DELETED L-PLATFORM
Condition	After the L-Platform has been exported while it was being unsubscribed, it was successfully unsubscribed. The L-Platform configuration information was deleted because the resources do not exist.	
Action	No action required.	

- Pattern2

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	After the L-Platform has been exported while it was being unsubscribed, it was not successfully unsubscribed.	
Action	Unsubscribe it again.	

d. TAKING SNAPSHOT

The L-Platform that contains the virtual L-Server that the user was taking a snapshot of, or the physical L-Server that was being backed up, when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	ADDED SNAPSHOT INFORMATION
Condition	After the virtual L-Server has been exported while taking a snapshot, it successfully took a snapshot, or after the physical L-Server has been exported while it was performing a backup, backup completed successfully. The snapshot/backup information was added in accordance with the status of resources.	
Action	No action required.	

- Pattern2

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	DELETED SNAPSHOT INFORMATION
Condition	After the virtual L-Server has been exported while taking a snapshot, it successfully took a snapshot, or after the physical L-Server has been exported while it was performing a backup, backup completed successfully. At this time, any old	

	snapshots/backup data exceeding the maximum number of snapshot image versions were automatically deleted. The snapshot/backup information was deleted in accordance with the status of resources.
Action	No action required.

- Pattern3

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	After the virtual L-Server has been exported while taking a snapshot, it failed to take a snapshot, or after the physical L-Server has been exported while it was performing a backup, backup failed. Note that the end date in the snapshot/backup history will be blank and the status will display as an error.	
Action	Take another snapshot or perform another backup as required.	

e. RESTORING

The L-Platform contains servers that were being restored when it was exported.

Redo the operation as needed.

In the history of snapshots or backups, the ending date is displayed as a blank and the status as an error.

f. CLONING

The L-Platform contains servers that were being collected images of when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	The L-Platform has been exported while collecting an image. If it is successfully collected, the orchestration tree on the [Resource] tab contains a cloning image that matches.	
Action	If it contains a cloning image, you can create the corresponding image information and use it for operation. If it does not, collect it again.	

g. APPLYING UNSUBSCRIPTION

The L-Platform was in an application process of an unsubscription when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	DELETED L-PLATFORM
Condition	After the L-Platform has been exported while it was being unsubscribed, the unsubscription has been accepted and it was successfully unsubscribed. The L-Platform configuration information was deleted because the resources do not exist.	
Action	No action required.	

- Pattern2

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	INFO
	Action item	CLEAR FLOW STATUS
Condition	After the L-Platform has been exported while it was being unsubscribed, the unsubscription has not been processed because it has not been accepted, it was rejected, or the unsubscription was unsuccessful. The application status has been initialized because the resources exist.	
Action	If there is any unnecessary L-Platform, unsubscribe it again.	

h. APPLYING SUBSCRIPTION

The L-Platform was in an application process of a subscription when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	The L-Platform has been exported while subscribing to it.	
Action	Subscribe to it again, if required. If the orchestration tree on the [Resource] tab contains any L-Platform that matches, the L-Platform cannot be appropriately managed by this product. After saving necessary job data, migrate the data to the newly subscribed and deployed L-Platform. Use the <code>cfmg_deletelplatform</code> command to remove unnecessary L-Platforms only found on the [Resource] tab. Refer to "10.1 <code>cfmg_deletelplatform</code> (Delete L-Platform)" in the "Reference Guide (Command/XML) CE".	

i. SAVING NEW CONFIGURATION

The configuration of the L-Platform was saved when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	The L-Platform has been exported while its configuration was being saved.	
Action	Subscribe to it again, if required. If the orchestration tree on the [Resource] tab contains any L-Platform that matches, the L-Platform cannot be appropriately managed by this product. After saving necessary job data, migrate the data to the newly subscribed and deployed L-Platform. Use the <code>cfmg_deletelplatform</code> command to remove unnecessary L-Platforms only found on the [Resource] tab. Refer to "10.1 <code>cfmg_deletelplatform</code> (Delete L-Platform)" in the "Reference Guide (Command/XML) CE".	

j. APPLYING RECONFIGURE

The L-Platform was in an application process of a reconfiguration when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	The L-Platform has been exported while its reconfiguration was being applied.	
Action	Check the status of the L-Platform and its resources. Reconfigure, if required.	

k. SAVING RECONFIGURATION

The configuration of a reconfiguration of the L-Platform was saved when it was exported.

- Pattern1

C.2 Logs that Reflect the Resource Status due to Automatic Processing of L-Platform	Error level	None.
	Action item	None.
Condition	The L-Platform has been exported while its configuration was saved.	
Action	Check the status of the L-Platform and its resources. Reconfigure, if required.	

Appendix D Using the [Templates] and [L-Platforms] Tabs when Resources are Locked

This appendix explains how to use the [Templates] tab and the [L-Platforms] tab when resources are locked.

Point

.....
The information provided here is necessary for tenant administrators to create or edit L-Platform templates, and for tenant administrators or tenant users to subscribe or reconfigure L-Platforms.

Ensure that this information is provided with sufficient explanation to tenant administrators and tenant users.
.....

D.1 [Templates] Tab

Locked resources are treated as follows in the [Templates] tab of the [L-Platform Template] window:

- You cannot start using locked resources.
- If a resource specified in a template is locked, the template cannot be edited unless the resource is deleted from the L-Platform template.

Locking resources affects operations on segment information and template information.

The following sections describe the tabs used to manage this information.

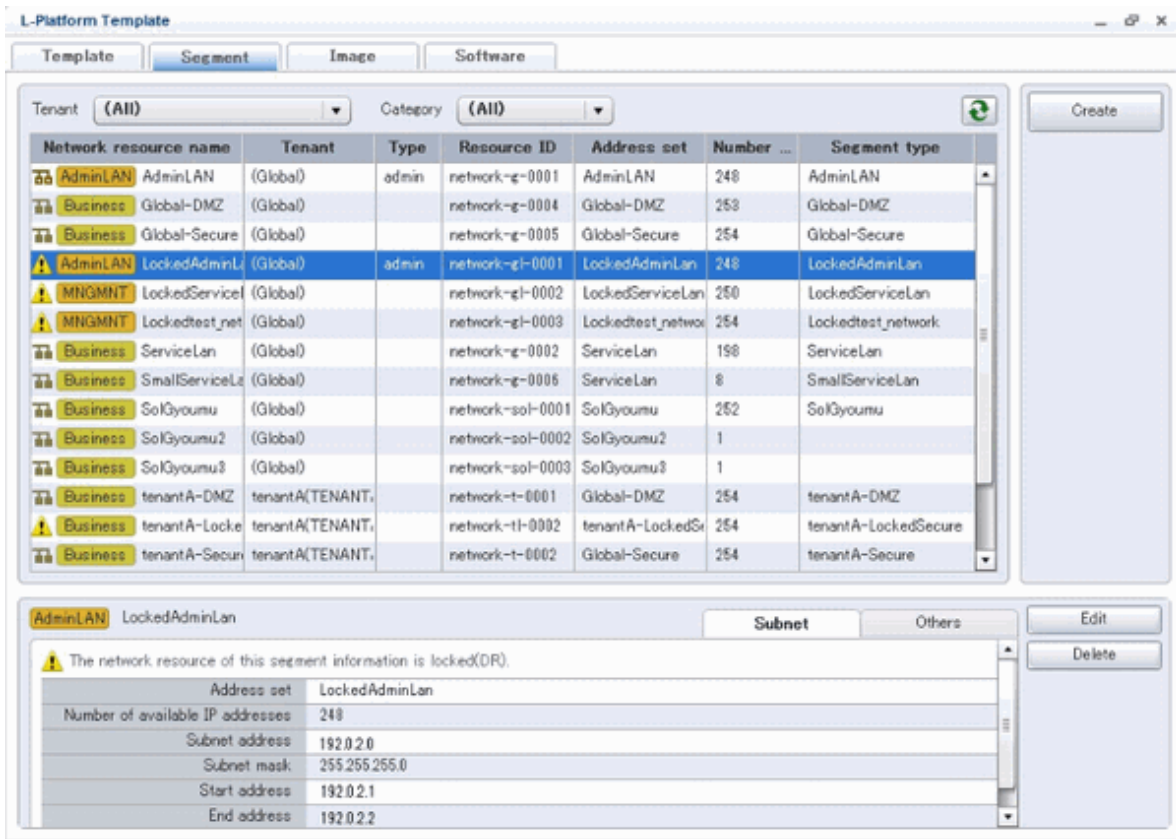
D.1.1 [Segment] Tab

This section describes how segment information that uses locked network resources is treated in the [Segment] tab of the [L-Platform Template] window for each of the following items.

- Table component of the [Segment] tab
- [Create New Segment] area
- [Edit Segment] area

Table Component of the [Segment] Tab

During a failback, segment information that uses locked network resources is displayed with a warning icon at the left side of the list. When the segment information is selected, a warning icon and a message indicating that the network resource is locked are displayed in the details area at the lower part of the window.



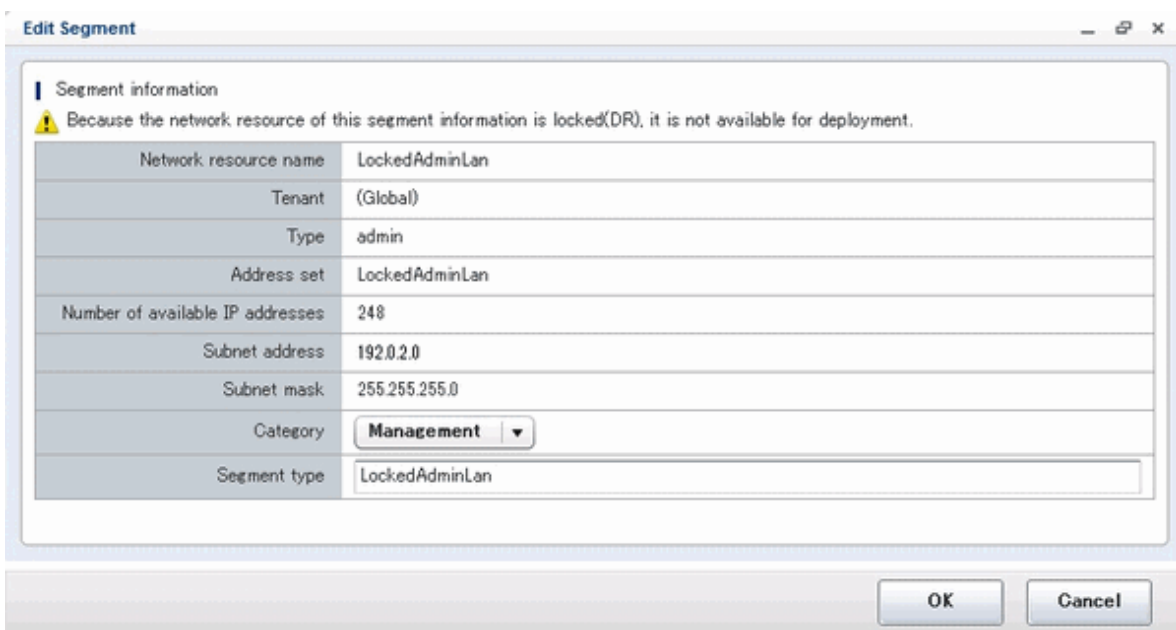
[Create New Segment] Area

Locked network resources are not listed in the window for creating segment information.

[Edit Segment] Area

If the network resource specified in the segment information is locked, a warning icon and a message are displayed in the area for [Edit Segment] area.

Segment information can still be edited (to change category and segment type), even if network resources are locked.



D.1.2 [Template] Tab

This section explains how template information that uses locked disk or network resources is treated in the [Template] tab of the [L-Platform Template] window for each of the following items.

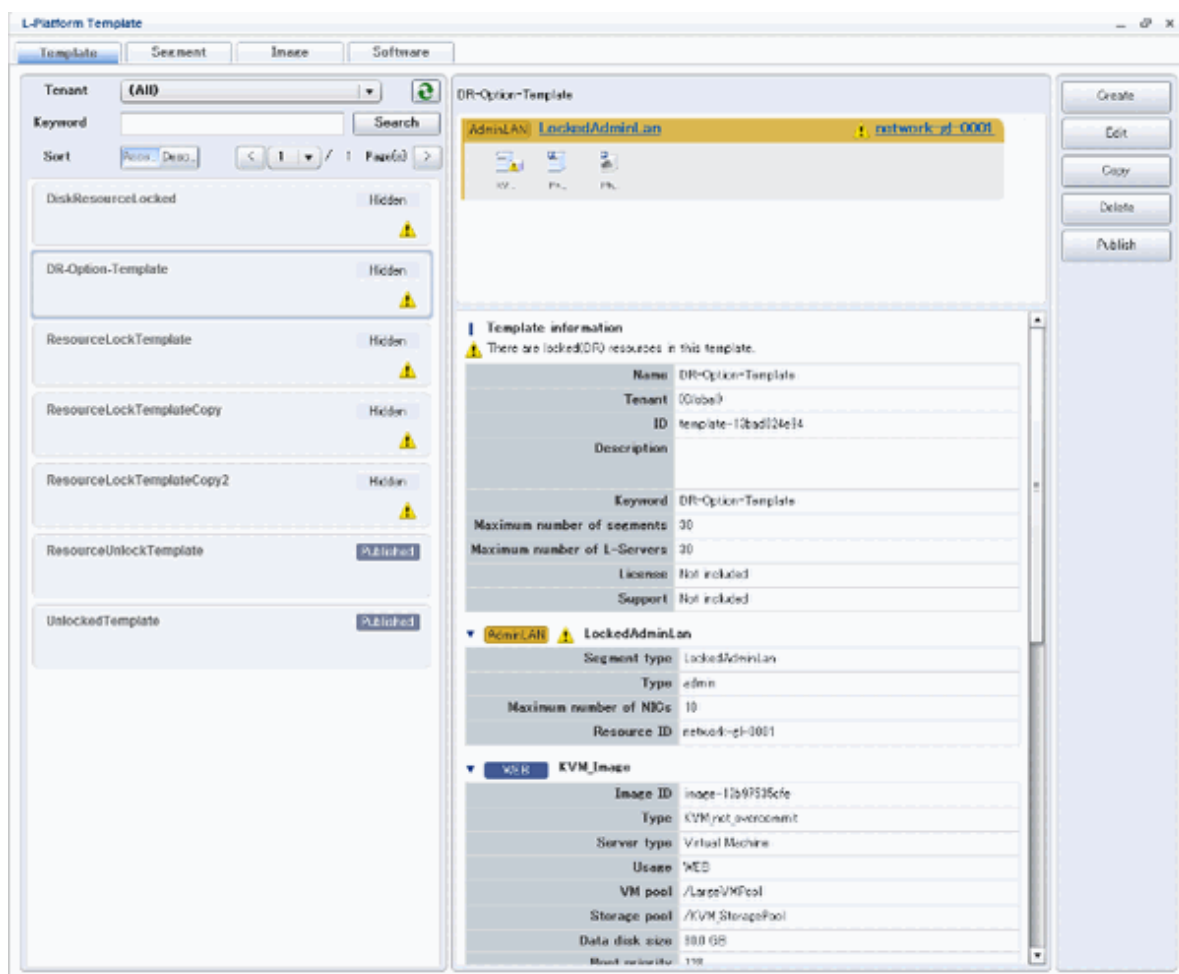
- Table component of the [Template] tab
- Configuration

Table Component of the [Template] Tab

You can check whether template information contains locked resources in this window.

If template information contains locked resources, a warning icon is displayed at the right side of the list at the left side of the page. When template information is selected, a message indicating that resources are locked is displayed in the template information area at the lower right of the window, and a warning icon is displayed with the information related to the locked resources.

Template information containing locked resources cannot be published.



Configuration

When an L-Platform template is being created, copied, or edited, locked resources on the [Configure] page are treated as follows:

- Locked disk resources and segment information are not displayed as [Additional Options].
- If an L-Platform template contains locked network resources, the corresponding segment is displayed with a warning icon next to the network resource name in the header.
- If the L-Platform template contains locked disk resources, the corresponding server icon is displayed with a warning icon.

- If a segment contained in the L-Platform template is selected and resources are locked, messages indicating that the resources are locked are displayed in the element details area.
- If a server contained in the L-Platform template is selected and a disk with locked resources is selected in the element details area, messages indicating that the resources are locked are displayed.
- If the L-Platform template contains a locked network resource, images and SLBs cannot be added to the corresponding segment from [Additional Options].

When the [Next] button is clicked in the [Configure] page, the application checks whether the L-Platform template contains locked resources. If it does, a message indicating that unusable resources are specified is displayed.

Modify the L-Platform template in the [Configure] page so that it contains only usable resources, and then click the [Next] button.

D.2 [L-Platforms] Tab

Locked resources are treated as follows in the [L-Platform] tab of the [L-Platform Management] window:

- L-Platform templates containing locked resources cannot be used to subscribe L-Platforms.
- When an L-Platform is being reconfigured and some of its resources are locked, information for the corresponding segments and servers cannot be modified.

The following sections describe how the operation of L-Platform subscription and L-Platform management is affected when there are locked resources.

D.2.1 L-Platform Subscription

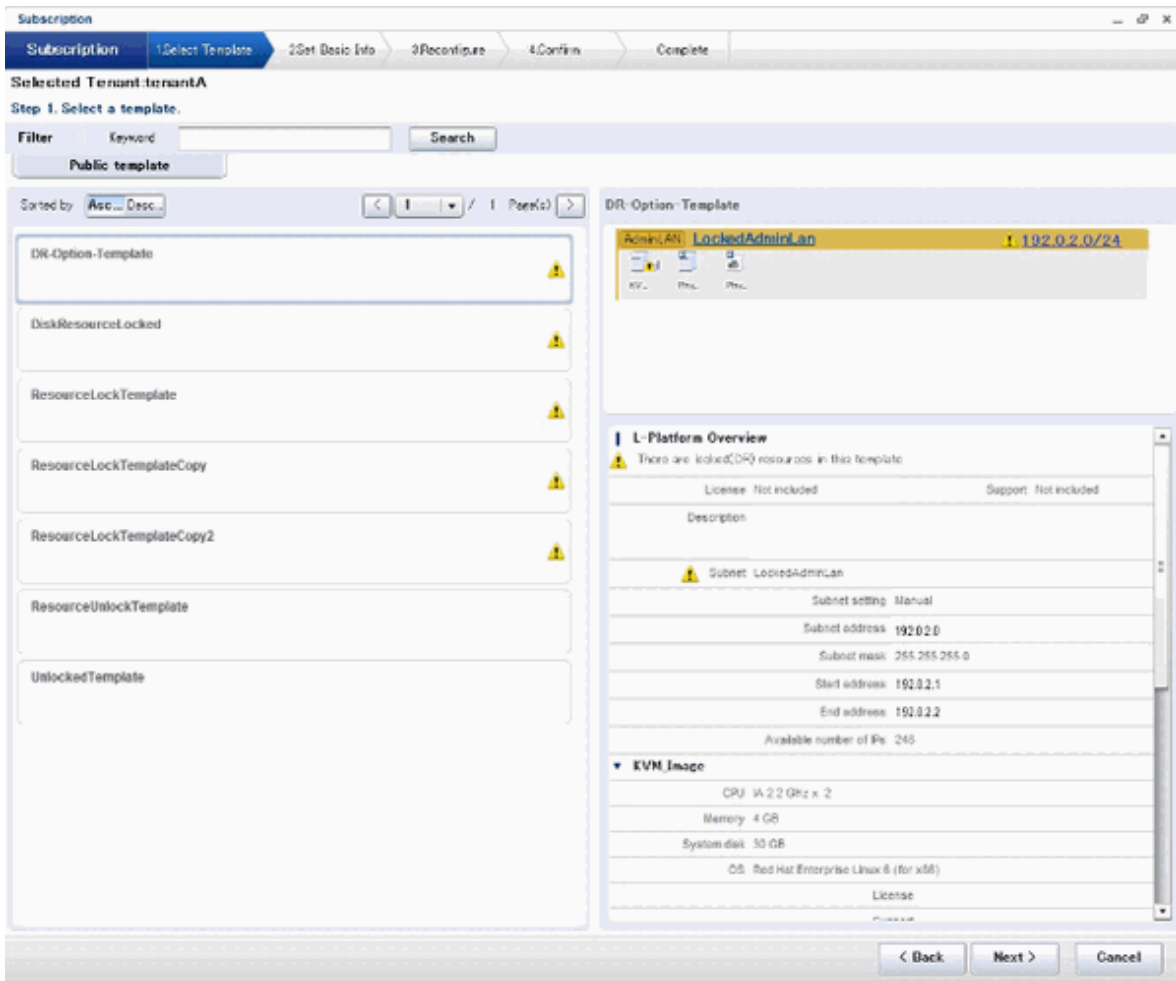
This section explains how L-Platform subscription is affected when there are locked resources for each of the following pages.

- The [Search Template] page for new configurations
- The [Select Template] page for saved configurations
- The [Reconfigure] page

The [Select Template] Page for New Configurations

You can check whether an L-Platform template contains locked resources on this page.

If an L-Platform template contains locked resources, a warning icon is displayed on the right side of the list in the left part of the window. When the L-Platform template is selected, a message indicating that resources are locked is displayed in the [L-Platform Overview] of the template details area at the lower right of the window, and a warning icon is displayed next to the information for the locked resources.



The [Select Template] Page for Saved Configurations

As with the page for a new configuration, you can check whether an L-Platform template contains locked resources on this page.

If an L-Platform template contains locked resources, a warning icon is displayed on the right side of the list in the left part of the window. When the L-Platform template is selected, a message indicating that resources are locked is displayed in the [L-Platform Overview] of the template details area at the lower right of the window, and a warning icon is displayed next to the information for the locked resources.

In addition, saved configurations of an L-Platform template that satisfy any of the conditions below cannot be used to subscribe an L-Platform.

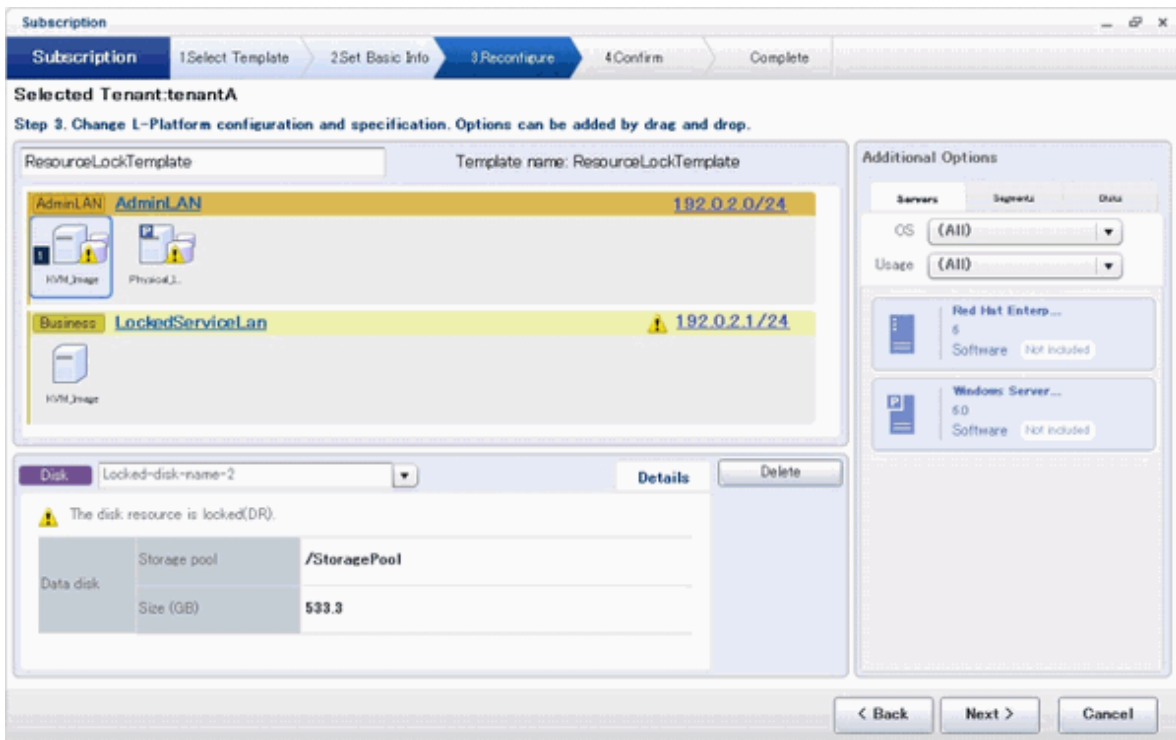
- It is for a new L-Platform subscription, and it contains locked resources.
- It is for an L-Platform reconfiguration, and it contains locked resources that have been added for the reconfiguration.

The [Reconfigure] Page

Locked resources are treated as follows in the [Reconfigure] page for subscribing an L-Platform:

- Locked disk resources and segment information are not displayed as [Additional Options].
- If an L-Platform template contains locked network resources, the corresponding segment is displayed with a warning icon next to the network resource name in the header.
- If the L-Platform template contains locked disk resources, the corresponding server icon is displayed with a warning icon.
- When a segment contained in the L-Platform template is selected and resources are locked, messages indicating that the resources are locked are displayed in the element details area.
- When a server contained in the L-Platform template is selected and a disk with locked resources is selected in the element details area, messages indicating that the resources are locked are displayed.

- If the L-Platform template contains a locked network resource, images cannot be added to the corresponding segment from [Additional Options].



D.2.2 L-Platform Management

This section explains how L-Platform management is affected when there are locked resources for each of the following pages.

- The [L-Platform Management] page
- The [L-Platform Details] page
- L-Platform reconfiguration - The [Reconfigure] page
- L-Platform cancellation - The [Confirm] page

The [L-Platform Management] Page

You can check whether an L-Platform contains locked resources on this page.

If an L-Platform contains locked resources, a warning icon is displayed on the right side of the list.

The [L-Platform Details] Page

Locked resources are treated as follows on this page:

- If the L-Platform contains locked network resources, the corresponding segment is displayed with a warning icon next to the network resource name in the header.
- If the L-Platform contains locked disk resources, the corresponding server icon is displayed with a warning icon.
- When a segment contained in the L-Platform is selected and resources are locked, messages indicating that the resources are locked are displayed in the element details area.
- When a server contained in the L-Platform is selected and a disk with locked resources is selected in the element details area, messages indicating that the resources are locked are displayed.

L-Platform Reconfiguration - The [Reconfigure] Page

Locked resources are treated as follows on this page:

- Locked disk resources and segment information are not displayed as [Additional Options].
- If the L-Platform contains locked network resources, the corresponding segment is displayed with a warning icon next to the network resource name in the header. The only possible operation on such a segment is deletion.
- If the L-Platform contains locked disk resources, the corresponding server icon is displayed with a warning icon. The only possible operation on locked disk resources of such a server is deletion.
- When a segment contained in the L-Platform is selected and resources are locked, messages indicating that the resources are locked are displayed in the element details area.
- When a server contained in the L-Platform is selected and a disk with locked resources is selected in the element details area, messages indicating that the resources are locked are displayed.
- If the L-Platform contains a locked network resource, servers (NICs) cannot be placed in the corresponding segment.

L-Platform Cancellation - The [Confirm] Page

Locked resources are treated as follows on this page:

- Even if the L-Platform contains locked resources, it can be canceled.
- If the L-Platform contains locked network resources, the corresponding segment is displayed with a warning icon next to the network resource name in the header.
- If the L-Platform contains locked disk resources, the corresponding server icon is displayed with a warning icon.
- When a segment contained in the L-Platform is selected and resources are locked, messages indicating that the resources are locked are displayed in the element details area.
- When a server contained in the L-Platform is selected and a disk with locked resources is selected in the element details area, messages indicating that the resources are locked are displayed.

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