

# ServerView Resource Orchestrator Cloud Edition V3.1.0

A decorative graphic consisting of several overlapping, glowing blue and purple curved lines that sweep across the page from left to right.

## DR Option Instruction

Windows/Linux

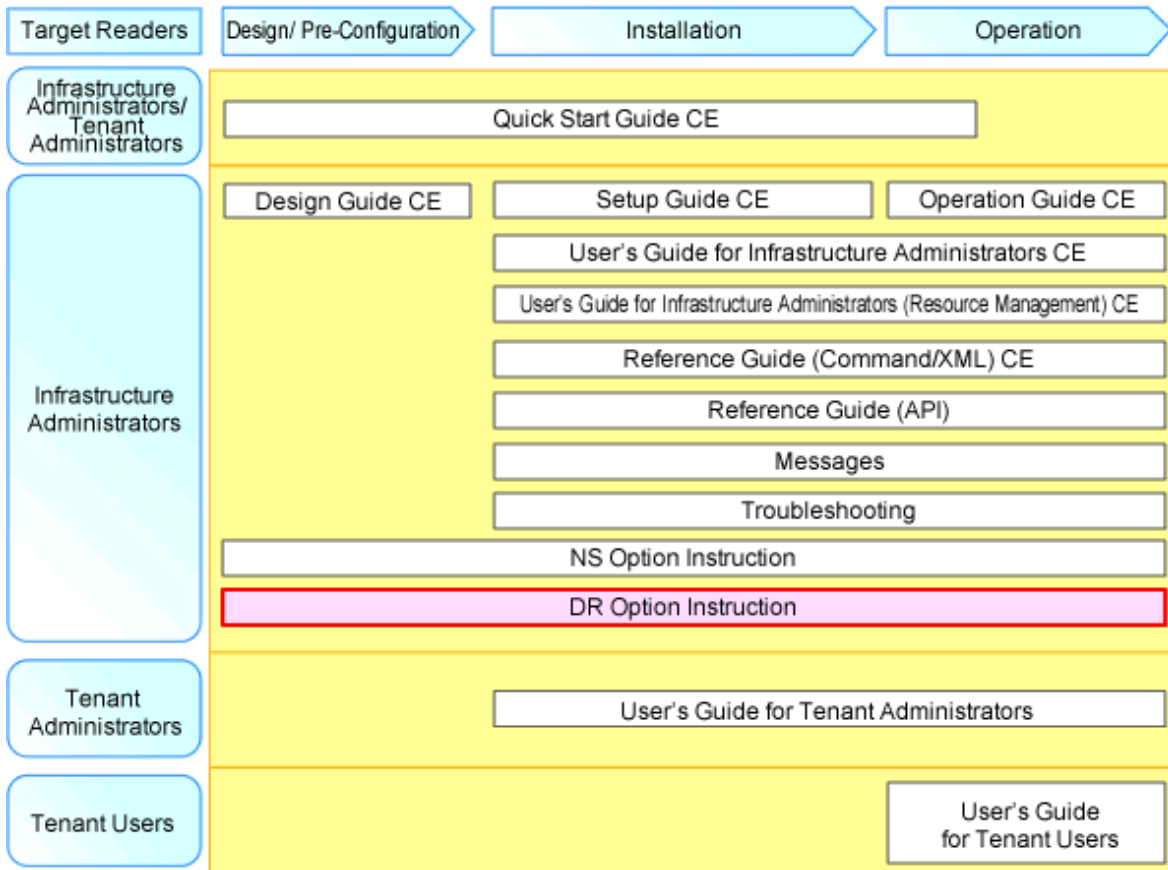
J2X1-7735-01ENZ0(00)  
October 2012

# Preface

## Resource Orchestrator Documentation Road Map

The documentation road map for Resource Orchestrator is as shown below.

### Resource Orchestrator Documentation Road Map



For information about the documents for Resource Orchestrator, refer to "Chapter 1 Documentation Road Map" in the "Quick Start Guide CE".

## Purpose

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

\*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.

## Target 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.

## Organization

This manual is composed as follows:

### Chapter 1 Overview

Provides an overview of the DR Option.

### 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 Output Logs when Switchover Occurs because of Disaster Recovery

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

## Notational Conventions

The notation in this manual conforms to the following conventions.

- When using DR Option and the operation differs depending on the basic software (OS) on which the manager of NS Option operates, it is indicated as follows:

[Windows]	Sections related to Windows
[Linux]	Sections related to Linux

- Unless specified otherwise, the blade servers mentioned in this manual refer to PRIMERGY BX servers.
- 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.
- Character strings or values requiring emphasis are indicated using double quotes ( " ).
- 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 "#".

## Abbreviations

The following abbreviations are used in this manual:

Abbreviation	Products
Windows	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

Abbreviation	Products
	Microsoft(R) Windows Server(R) 2008 R2 Datacenter 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(R) 7 Professional Windows(R) 7 Ultimate Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate Microsoft(R) Windows(R) XP Professional operating system
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) SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T
ROR CE	ServerView Resource Orchestrator Cloud Edition

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Month/Year Issued, Edition	Manual Code
October 2012, First Edition	J2X1-7735-01ENZ0(00)

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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 environment when a disaster strikes a cloud environment which is managed by Resource Orchestrator.

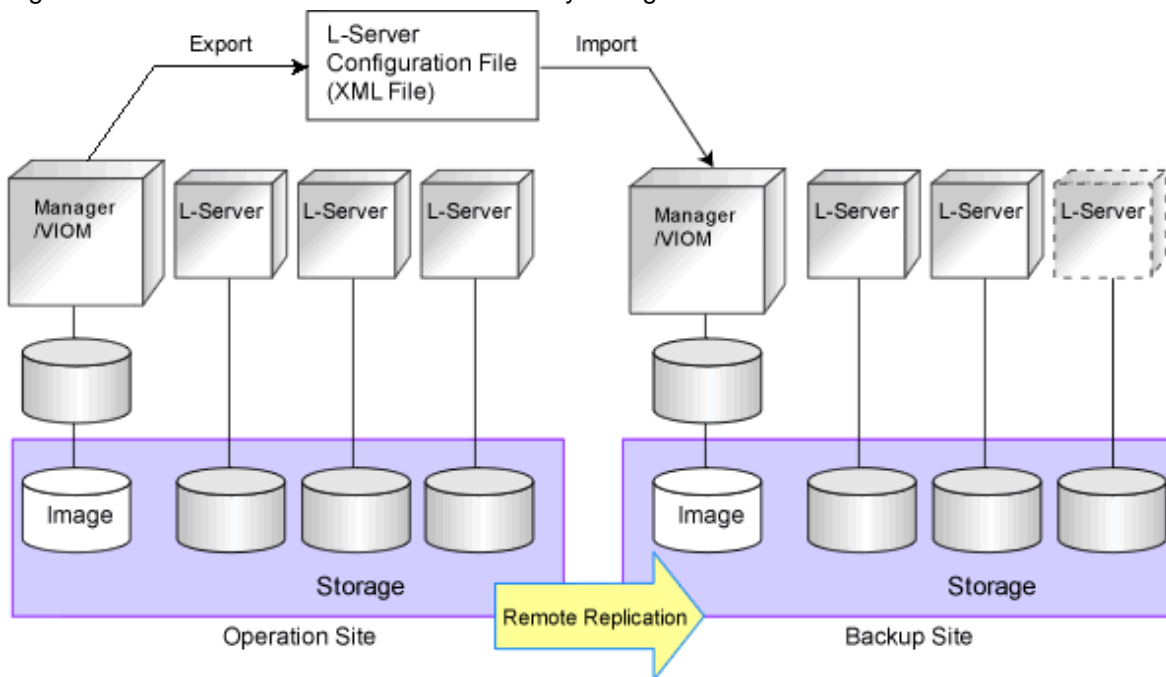
This product provides simple and highly reliable Disaster Recovery, through exporting and importing the following information that Resource Orchestrator manager handles.

Failover from the primary site to a backup site is realized by utilizing storage replication between the sites.

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

The following figure shows an overview of the Disaster Recovery configuration.

Figure 1.1 An overview of the Disaster Recovery configuration



For details on prerequisites, refer to "[Chapter 2 Design](#)".

For details on installing Disaster Recovery, refer to "[Chapter 3 Installation](#)".

For details on operating Disaster Recovery, refer to "[Chapter 4 Operation](#)".

# Chapter 2 Design

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

## 2.1 Prerequisites

This section explains the prerequisites for configuring a Disaster Recovery environment.

Item	Reference
Configurations	Refer to " <a href="#">Supported Configurations</a> ".
	Refer to " <a href="#">Configuration of the Primary Site and Backup Sites</a> ".
Environments	Refer to " <a href="#">Items that must be Identical on the Primary and Backup Sites</a> ".
Settings	Refer to " <a href="#">Items that must be Different on the Primary and Backup Sites</a> ".
	Refer to " <a href="#">Customized Settings on the Primary Site</a> ".
Licenses	Refer to " <a href="#">Necessary Licenses</a> ".
Space Estimation	Refer to " <a href="#">Estimation of Replication Disk Capacity</a> ".

### Supported Configurations

The following configuration is supported:

Admin servers	An admin server on which Windows manager is installed
Managed servers	Blade servers
Managed L-Server/L-Platform	<ul style="list-style-type: none"><li>- Physical L-Servers</li><li>- Virtual L-Servers using VMware or Hyper-V</li><li>- Use the following configuration when you use a virtual L-Server.<ul style="list-style-type: none"><li>- VM host: Install on a Physical L-Server</li><li>- VM data: Deploy data on the SAN storage disks with Fibre Channel connections</li><li>- VM management software: Install on either a Physical L-Server or the admin server</li></ul></li></ul> <p>Recovery of VM management software needs to be performed using backup and restore of VM management software when it is configured on the admin server.</p>
Managed switch blade settings	<ul style="list-style-type: none"><li>- A CB (Connection Blade) which is in switch mode or end host mode</li></ul> <p>IBP mode cannot be used.</p>

### Note

- L-Platforms including server load balancers (SLB) cannot be used.
- L-Servers on the primary site for which only the configuration definition has been created are not covered by disaster recovery failover.



## Configuration of the Primary Site and Backup Sites

Choose either of the following configurations to make Disaster recovery failover from the primary site to the backup site transparent to ROR console users.

- Assign the same IP address to the admin servers of the primary and backup sites to make the FQDN of the admin servers the same.  
In this case, do not connect the admin servers on the primary site and the backup site to the same network.
- Assign different IP addresses to the admin servers of the primary and backup site but make the FQDN of the admin servers the same.  
In this case, when failover is performed, DNS server settings need to be changed so that the FQDN is resolved to the IP address of the admin server on the backup site. Upon switchover this IP address will be switched with the IP address of the admin server on the backup site.

## Items that must be Identical on the Primary and Backup Sites

The following must be the same between the primary and backup sites.

- The version and level of the manager
- The installation folder of the manager
- Managed server configuration

Some services may not continue after disaster recovery failover if the number of managed servers in the backup site is smaller than that of the primary site. To avoid that situation, it is recommended that the primary site and backup site have the same server configuration so the server and network trees display the same contents.

- Resource names registered in server and network trees (except chassis names)  
Different server names can be used by preparing a mapping file in advance.
- Network device configurations (network device models, connections, firmware, account settings)  
The configuration must be the same when performing auto-configuration of network devices.
- External networks (VLAN, CB uplink port settings) and SAN switch settings (zoning).  
The setting must be the same when performing manual network settings in advance.
- The tuning parameters in the following file
  - Settings under *installation\_folder*\SVROR\Manager\etc\customize\_data except the below files
    - storage\_portset.rcxprop
    - storage\_vmhost.rcxprop
  - *Installation\_folder*\SVROR\Manager\rails\config\rcx\vm\_guest\_params.rbFor details on configuring tuning parameters, refer to "Message number 69122" in "Messages".
- The user name of the dual-role administrator created during Resource Orchestrator installation

## Items that must be Different on the Primary and Backup Sites

The following must be different between the primary and backup sites.

- The computer name of the admin server  
The computer name must be changed after each disaster recovery failover/failback. Computer names which were used in the past cannot be used again.
- The IP addresses of servers registered in the server tree  
Assign a different IP address when creating a physical L-Server with IP address auto-configuration.

- The IP addresses of storage units which are registered to the admin server  
IP addresses of storage units are required for replication.
- The user names of dual-role administrators and infrastructure administrators  
User names of dual-role administrators (except the one created during ROR installation) and infrastructure administrators.
- Virtual storage resources and disk resources  
Assign a different name excluding the composition in which all the resources that exist in the mirror and the replication relation are made the same name when the storage device is NetApp storage, and the disk resource name and the virtual storage name are used as the alias name and the RAID group name of ESC.

## Customized Settings on the Primary Site

The following customizations, which are performed according to "Chapter 19 To Customize Environment" in the "Setup Guide CE", of the primary site 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.

- "19.1 Settings for Sending Email"
- "19.2.3 Setting Application process settings"
- "19.2.4 Setting Application process to be used"
- "19.3 Customizing the Dashboard"
- "19.4 Setting the Host Names for Virtual Servers"
- "19.5 Setting the Method for Setting Resource Names"
- "19.6 Settings for the Overcommit Function"
- "19.7 Editing the Environment Setup File for the L-Platform API"
- "19.9 System Disk Settings for Physical L-Servers"
- "19.12 Edit the License Agreement"
- "19.13 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

## Necessary Licenses

DR licenses are required for each physical server for which disaster recovery failover is performed.

## Estimation of Replication Disk Capacity

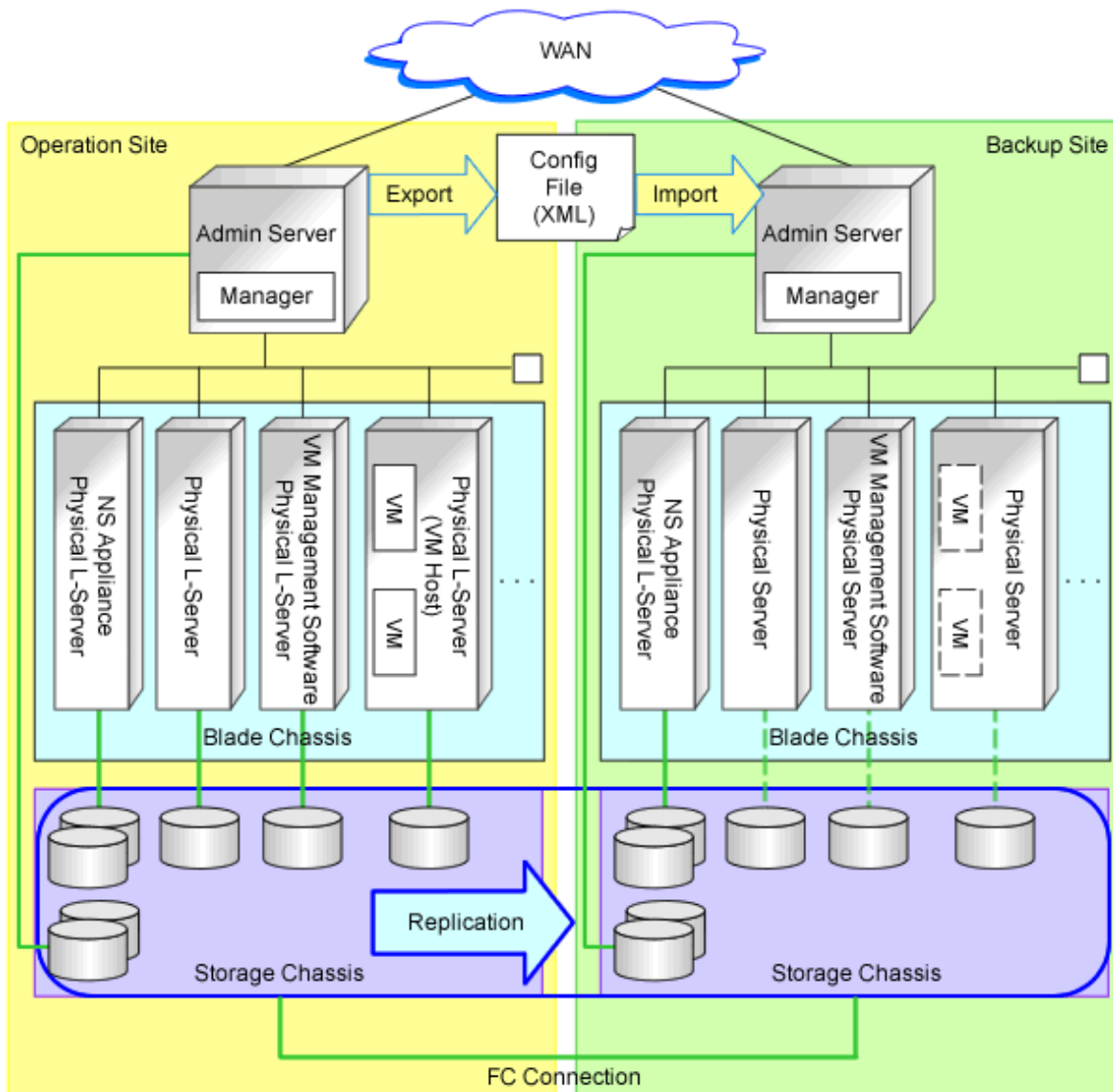
The following resources of admin servers need to be covered by storage replication. Take the disk space consumed by these resources into account when you estimate the disk space for replication. For details, refer to "[Chapter 3 Installation](#)" and "[Chapter 4 Operation](#)".

- The image file storage folders of physical servers
- The output of the `rcxmgrexp` command
- The output of the `rcxstorage` command
- User scripts and definition files

## 2.2 Example of System Configuration

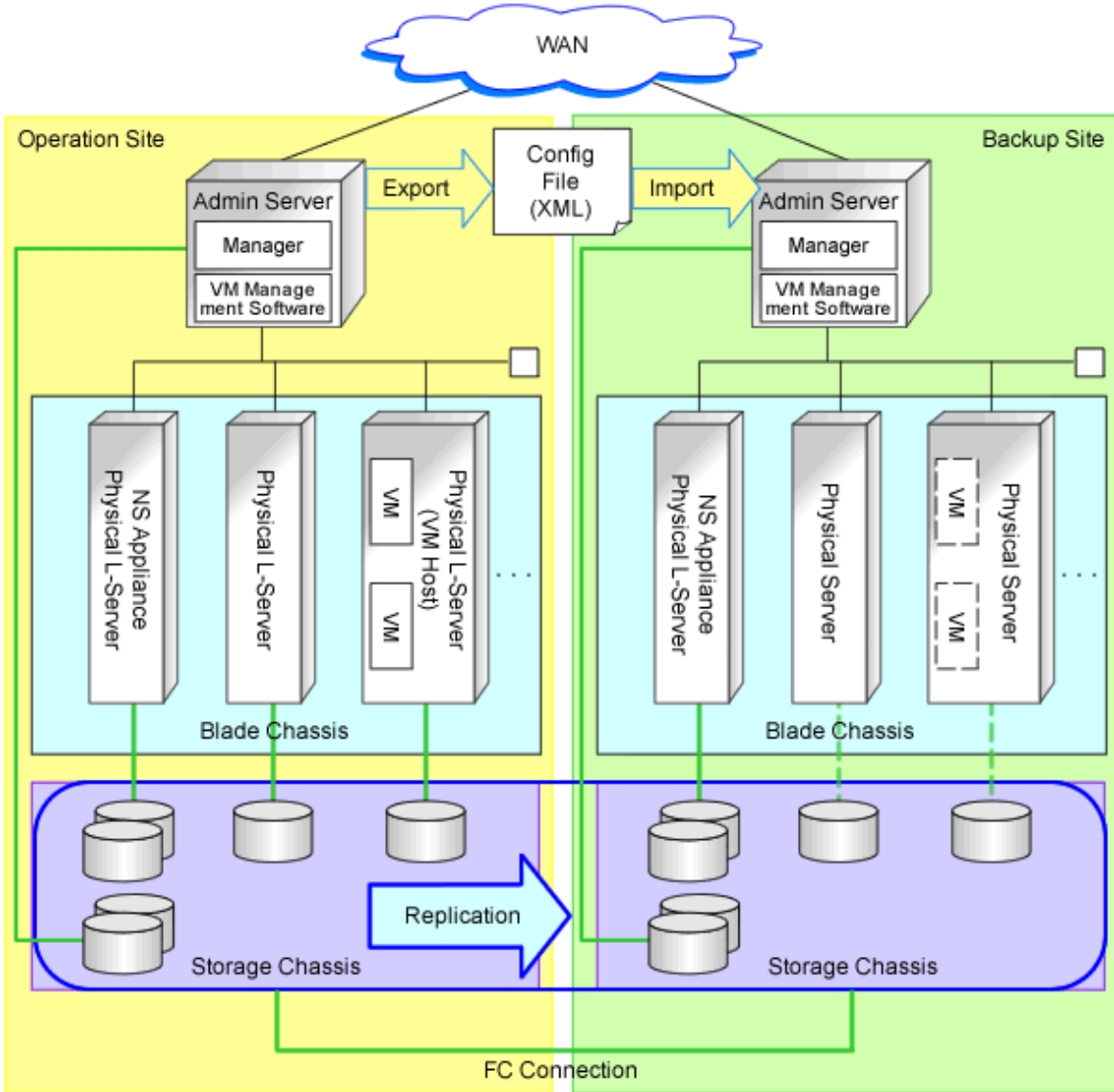
An example system configuration which contains both physical and virtual L-Servers is shown below:

Figure 2.1 Example Disaster Recovery Environment with a Mixture of Physical and Virtual L-Servers



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

Figure 2.2 Example Configuration of Installing VM Management Software on an Admin Server



# 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

Perform pre-setup preparations for the primary and backup sites.  
For details, refer to the "Design Guide CE".

### - Replication of Storage Units

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

For storage replication, use the functions explained in "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 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.

Configure the image file storage folder on the storage that is the target of the replication. Copy the image files stored in the image file storage folder in the same way.

### - When Creating Physical L-Servers

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

### - When Using Server Virtualization Products to Create L-Servers

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

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 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 failover operations because automatic replication setting is not available for LUNs created beforehand. For details about LUNs created by dynamic LUN mirroring and LUNs created beforehand, refer to "D.3 Storage Preparations" in the "Design Guide CE".

## 2. Configure the Disaster Recovery function

Perform the following configuration to collect information for disaster recovery failover and simplify failover operations.

### a. Create folders to contain failover information

Create the following folders and files which are used to contain failover information.

```
The folder which contains failover information
The folder which contains failover information\Image      - Folder to contain
physical server image files
The folder which contains failover information\ManagerExport - Output directory of
the rcxmgrexport command
The folder which contains failover information\MAP        - Folder to contain the
mapping file of physical server names
The folder which contains failover information\OtherBackupFiles - Folder to contain
definition files and user scripts
```

The folder which contains failover information\vmmgr\_file.txt - File to define VM management software



## Information

For the contents of vmmgr\_file.txt, Refer to "6. Create the file used in disaster recovery".



## Example

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

Create the following folders under the failover information folder.

The failover information folder and the folders under it need to be replicated to the backup site because they are used in recovery operations.

### *Folders which contain failover information*

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

- Image

This folder is used to transfer physical image files. Any folder name can be used.

- ManagerExport

This folder is mandatory. The folder name must not be changed.

- MAP

This folder is used to map physical server names. The folder name must not be changed.

- OtherBackupFiles

This folder is used to contain files other than the above. Any folder name can be used.

### 3. Install and configure the manager

Install Resource Orchestrator manager on the primary and backup sites.

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 *failover information folder* which was created in step 2. in the following definition file. The same settings must be made on the backup site as well as on the primary site in preparation for disaster recovery failover.

[Windows Manager]

*Installation\_folder*\SVROR\Manager\etc\customize\_data\fa\_dr.rcxprop

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".

The image file storage folder must be the Image folder created in step a. of "2. Set up for disaster recovery".

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\FJSVssmgr\current\certificate
- *Installation\_folder*\SVROR\Manager\etc\opt\FJSVrcxdm\certificate
- *Installation\_folder*\SVROR\Manager\sys\apache\conf\ssl.crt
- *Installation\_folder*\SVROR\Manager\sys\apache\conf\ssl.key

The following customizations, which are performed according to "Chapter 19 To Customize Environment" in the "Setup Guide CE", of the primary site 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.

- "19.1 Settings for Sending Email"
- "19.2.3 Setting Application process settings"
- "19.2.4 Setting Application process to be used"
- "19.3 Customizing the Dashboard"
- "19.4 Setting the Host Names for Virtual Servers"
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- "19.7 Editing the Environment Setup File for the L-Platform API"
- "19.9 System Disk Settings for Physical L-Servers"
- "19.12 Edit the License Agreement"
- "19.13 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

#### 4. Configure managed servers

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

Refer to "[Chapter 2 Design](#)" beforehand.

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.

- Register servers on the server tree in advance on the backup site as well as on the primary site. As for pools, L-Platforms, users and user groups registered on the orchestration tree on backup site, these do not need to be the same as those of primary site. Register them depending on the operations that will be performed on the backup site.
- For network devices registered on the network device 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

#### 5. Configure the server NIC definition

When using a NIC other than one in the default configurations of network auto-configuration and using a blade server, 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 "14.11 Server NIC Definitions" 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".

6. Create the files used for disaster recovery

a. Create the VM management software definition file

Create the following file under the failover information folder. This file is used to register VM management software to Resource Orchestrator on the backup 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](#)".

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

b. Create the physical server mapping definition file

If you want to change the names of servers used for physical L-Servers on the primary and backup sites, create a physical server mapping definition file.

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

<code>#PhysicalServer</code>
<code>Server1-1,Server2-1</code>
<code>Server1-2,Server2-2</code>
<code>:</code>
<code>:</code>

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](#)".

7. Set up for automatic failover information collection

The portion of failover information, excluding setting information for firewalls and server load balancers, which is modified through operations by tenant users or tenant administrators can be collected automatically. There are the following two methods for operations to automatically collect the information:

- 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](#)".

- 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 failover information are performed.

[Windows Manager]

```
>Installation_folder\SVROR\Manager\bin\rcxmgrexpport -event on <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 which is not collected by the automatic collection performed by "7. Set up for automatic failover information collection", but is necessary for disaster recovery failover. 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 before disaster recovery failover.

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
- Accounting Information
- Metering Logs
- Execution Information of Sample Scripts

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 -dir dir1 <RETURN>
```

For details on the rcxmgrexpport command, refer to "A.1 rcxmgrexpport".

- b. Export the network device 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 file.xml<RETURN>
```

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, return, 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.

---

## 2. Backup customized information of the primary site

When disaster recovery failover is performed from the primary site to the backup site, some settings must be performed again. To simplify these settings, save the following information of the primary site. Use the "OtherBackupFiles" folder in the failover information folder to save the information.

- *Installation\_folder*\SVROR\Manager\etc\customize\_data
- *Installation\_folder*\SVROR\Manager\etc\trapop.bat
- *Installation\_folder*\SVROR\Manager\etc\event\_handler
- *Installation\_folder*\SVROR\Manager\etc\scripts
- *Installation\_folder*\SVROR\Manager\etc\vm

## 3. Obtain the storage replication information

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

When "Operation collecting the configuration definition information after changes are made" in step 7. in "[Chapter 3 Installation](#)" has been configured, this operation is not necessary, as 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 replication definitions are created, modified, or deleted, the storage management software will create a replication definition file using the rcxrepdef command.

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 *Failover\_information\_folder*\storage\_file for the -outfile option.

For the *Failover\_information\_folder*, refer to "2 Configure the Disaster Recovery function" in "[Chapter 3 Installation](#)".

For details on replication definition files, refer to "Replication Definition Files" in "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".

## 4. 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.

## 5. Back up VM management software information

When configuring VM management software on an admin server, 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.

## 6. 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 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.

## 7. 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 Modifying 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 Operation During Disasters

---

This section explains operations of disaster recovery switchover when a disaster strikes the primary site.

The same operations can be used for failback from the backup site to the recovered primary site.

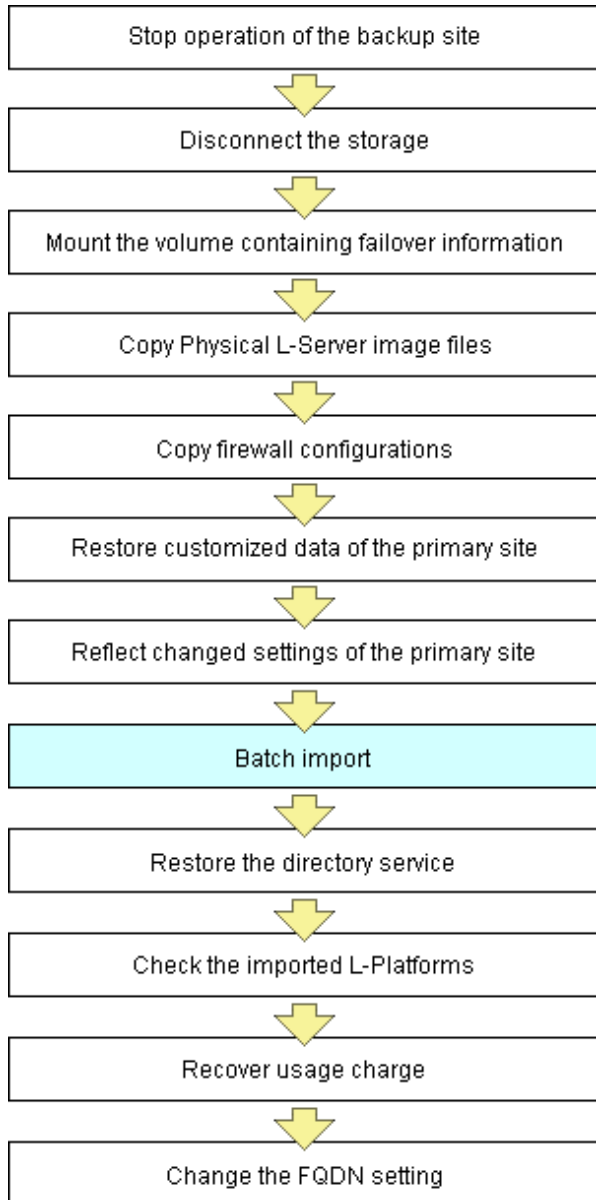
For switchover operations during a disaster, there are the two main operations described below.

- Operations to Perform Batch Switchover of All Resources

Restore global resources and all tenants.

For details, refer to "[Detailed Procedure for Switchover Operation during Disasters](#)".

Figure 4.1 Operations to Perform Batch Switchover of All Resources

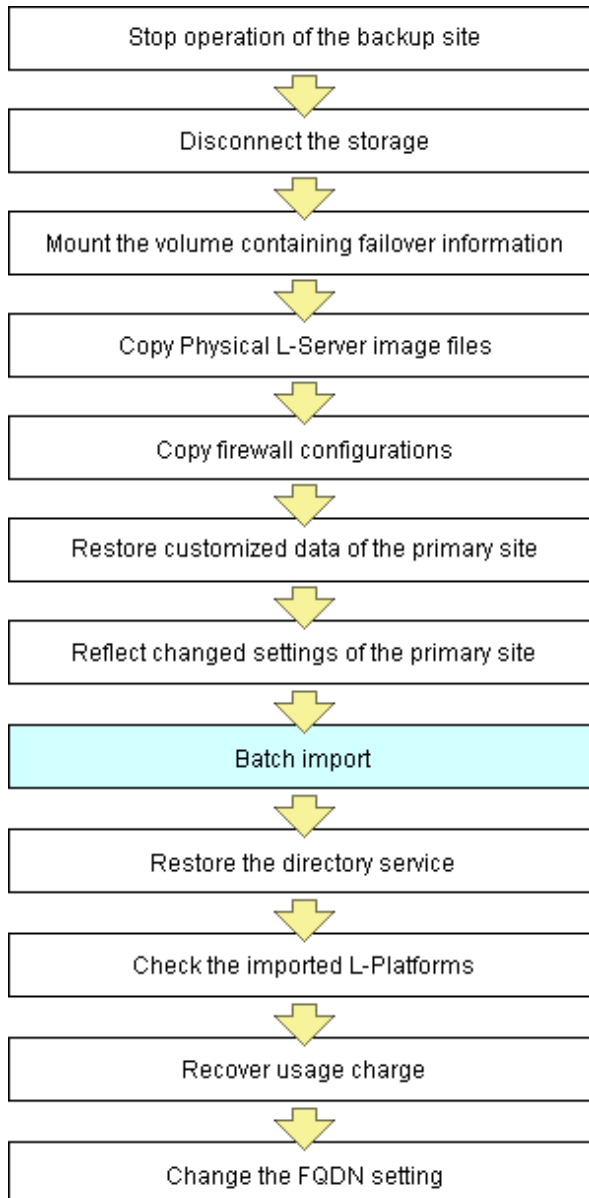


- Operation Involving Resource Switchover by Tenant

Restore each tenant, after restoring global resources.

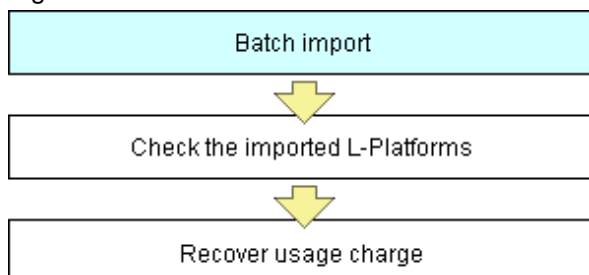
a. Restore global resources

Figure 4.2 Restore Global Resources



b. Restore each tenant resource

Figure 4.3 Restore Each Tenant Resource



For details, refer to "[Detailed Procedure for Switchover Operation during Disasters](#)".

### Detailed Procedure for Switchover Operation during Disasters

The details of the procedure are explained below.

1. Stop operation of the backup site

Stop the operations being performed on the backup site, and prepare to switch over from the primary site.

2. Disconnect the storage

Stop the storage replication function, and disconnect the backup site from the primary site.

3. Mount volumes which contain the information for failover

Mount the volume which was replicated from the primary site when performing "2. Configure the Disaster Recovery function" in "[Chapter 3 Installation](#)", to the manager of the backup site.

4. Copy physical L-Server images

Physical L-Server images for the primary site are replicated to the backup site. However, the image file storage folder of the backup site contains the physical L-Server images for the backup site. Perform the following operation to switch the physical L-Server images on the backup site.

- a. Save the physical L-Server images in the image file storage folder on the backup site to a different folder.

The image file storage folder can be shown by executing the `rcxadm imagemgr` command with the `info` option.

For details on `rcxadm imagemgr` command, refer to "5.9 `rcxadm imagemgr`" in the "Reference Guide (Command/XML) CE".

- b. Clear the content of the image file storage folder.

- c. Copy the physical L-Server images for the primary site to the image file storage folder.

The physical L-Server images for the primary site can be found in the Image folder of the volume mounted in "3. Mount volumes which contain the information for failover".

- d. Restart the manager.

5. Copy firewall configurations

When using the firewall auto-configuration function for network devices, copy the newest configuration from the primary site to the firewall of the backup site.

6. Recover customized information of the primary site

If any files in the following folder on the primary site have been modified, restore the files from the backup saved in "2. Backup customize information of the primary site" in "[4.1 Normal Operation](#)", and restart manager if necessary.

[Windows Manager]

- The following files under *Installation\_folder*\SVROR\Manager\etc\customize\_data

- l\_server.rcxprop
- logctl\_env.rcxprop
- storage\_rcxprop
- vnetwork\_vmware.rcxprop
- vnetwork\_hyperv.rcxprop
- vnetwork\_excluded\_vmware.rcxprop
- rcx\_base.rcxprop
- server\_spec.rcxprop
- library\_share\_deny.conf
- image\_admin\_hyperv.rcxprop
- library\_share\_User\_Group\_Name\_deny.conf
- kb978336\_scvmm.rcxprop
- image\_admin\_hyperv\_User\_Group\_Name.rcxprop
- server\_control.rcxprop



- vm.rcxprop
- vm\_console.rcxprop
- scvmm\_mac\_pool.rcxprop
- scvmm\_mac\_pool\_*Tenant\_Name*.rcxprop
- vm\_VMware.rcxprop
- vm\_Hyper-V.rcxprop
- create\_image\_previous\_folder\_name\_scvmm.rcxprop
- auto\_replace.rcxprop
- Physical.rcxprop
- spare\_server\_config.rcxprop
- *Installation\_folder*\SVROR\Manager\etc\trapop.bat
- All files under *Installation\_folder*\SVROR\Manager\etc\event\_handler
- All files under *Installation\_folder*\SVROR\Manager\etc\scripts
- The following file under *Installation\_folder*\SVROR\Manager\etc\vm
  - vds\_vc

#### 7. Reflecting changes of settings of the primary site

Reflect the following customization settings of the primary site, which are performed according to "Chapter 19 To Customize Environment" in the "Setup Guide CE", on the backup site.

- "19.1 Settings for Sending Email"
- "19.2.3 Setting Application process settings"
- "19.2.4 Setting Application process to be used"
- "19.3 Customizing the Dashboard"
- "19.4 Setting the Host Names for Virtual Servers"
- "19.5 Setting the Method for Setting Resource Names"
- "19.6 Settings for the Overcommit Function"
- "19.7 Editing the Environment Setup File for the L-Platform API"
- "19.9 System Disk Settings for Physical L-Servers"
- "19.12 Edit the License Agreement"
- "19.13 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 Modifying 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"

## 8. Batch import

Perform batch switchover operations, using the switchover information for Disaster Recovery.

- Operations to Perform Batch Switchover of All Resources

Execute the following command when settings for disaster recovery are complete.

[Windows Manager]

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

- Operation Involving Resource Switchover by Tenant

- a. Restore global resources

Execute the following command when settings for disaster recovery are complete.

[Windows Manager]

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

- b. Restore each tenant resource

Execute the following command for each tenant.

Execute the following command when settings for disaster recovery are complete.

[Windows Manager]

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

- 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:

- Global resources and resources of individual tenants
- Physical L-Server resources and virtual L-Server resources

- Delete the backup site environment

Delete the following environment used for backup site operations.

- L-Platform templates
- L-Platform configuration information
- Resource information
- Accounting information
- Metering logs

- Import the information

Import the following information:

- L-Platform templates
- L-Platform configuration information
- Resource information
- Accounting information
- Metering logs

## Note

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

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 failover. Wait for about 3 minutes after the failover 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 failover 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>
```

---

## 9. Restore directory service information

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

## 10. Check the imported L-Platforms

When an L-Platform is exported during its deployment or a reconfiguration, and then the L-Platform configuration information is imported using the rcxrecovery command, L-Platform information without resources may be recovered.

In this case, information of the L-Platform whose resources may not exist is output to the log.

Confirm the details output in logs, and take corrective action.

For information on the content output to the log and the corrective actions, refer to "[Appendix B Output Logs when Switchover Occurs because of Disaster Recovery](#)".

## 11. Recover usage charges

- 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

- 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

- 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 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.

## 12. Change the FQDN setting

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 failover 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".

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.

## 4.3 Operation after Switchover

---

This section explains operations that are necessary after switchover to a backup site.

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.

## **4.4 Switchback After Recovery of the Primary Site**

---

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

The switchback 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 switchback. 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 switchback information

Collect switchback information from the backup site. For details on how to collect the switchback 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.

# Appendix A Commands

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

## A.1 rcxmgrexpport

### Name

[Windows Manager]

*Installation\_folder*\SVROR\Manager\bin\rcxmgrexpport - Collecting switchover information of Disaster Recovery

### Format

```
rcxmgrexpport -help
rcxmgrexpport [-dir directory] [[-noretry] | [-timeout value]]
rcxmgrexpport -interval minutes | off
rcxmgrexpport -event on | off
```

### Description

rcxmgrexpport 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 (2days).

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\_rcxmgrexp

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

[Windows Manager]

*Installation\_folder*\SVROR\Manager\var\dr\rcxmgrexp\_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, rcxmgrexp, 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 rcxmgrexp, rcxrepdef, and rcxstorage.

[Windows Manager]

*Installation\_folder*\SVROR\Manager\etc\customize\_data\fa\_dr.rcxprop

The timing of information collection is as follows.

- rcxmgrexp
  - 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 rcxmgrexp 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\rcxmgregport\_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.

## 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] [-nocleanup] [-allon]
rcxrecovery [-dir directory] [-map mapping_dir] [-mirror storage_file] [-vmmgr vmmgr_file] [-nocleanup]
    [-allon] -global [-tenant tenant1[,tenant2,,,]]
rcxrecovery [-dir directory] [-map mapping_dir] [-mirror storage_file] [-vmmgr vmmgr_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.

```
#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
:           :
```

### -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 definition file formats for VM management software are as follow. The description in the first line is the explanation of detailed definitions, and the description is not included in vmmgr\_file.txt.

```
name      soft name  ip           user name  password  physical-1server
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 global resources.

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
(1/10)check of input data           : completed
(2/10)cleanup of resources          : completed
(3/10)copy of definition files      : completed
(4/10)import physical resources (global) : completed
(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

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

# Appendix B 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".

## L-Platforms that require action after Disaster Recovery switchover

If information for switchover is collected while an L-Platform is being deployed or when being reconfigured, and this information is used for the switch, L-Platform information for which resources do not exist may be restored.

If this occurs, the rcxrecovery extracts the information for L-Platforms that may not have resources and output to the format 1 log.

Output message details are shown below.

- 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	The process being performed when the L-Platform is exported
L-Platform ID	The ID of the L-Platform that needs checking
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

Item name	Content
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

One of the following contents is output for the content of "Processing" item.

Content	Meaning
SUBSCRIBING	Deploying
RECONFIGURING	Reconfiguring
UNSUBSCRIBING	Unsubscribing
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

### Actions after performing Disaster Recovery

After performing Disaster Recovery, check vsys\_dr\_log to see if the logs shown in "[L-Platforms that require action after Disaster Recovery switchover](#)" are output.

If the logs shown in "[L-Platforms that require action after Disaster Recovery switchover](#)" are output, take the following actions according to the unfinished process indicated by the "Processing" item even if it is displayed on the L-Platform management window.

#### a. SUBSCRIBING

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

What to check	Check if the L-Platform is displayed on the resource management window.	
Pattern 1	Condition	It is displayed on the resource management window.
	Action	It was successfully deployed after the export. Use the deployed L-Platform as it is.
Pattern 2	Condition	It is not displayed on the resource management window.
	Action	The deployment process was not completed successfully after the export. Perform the following procedure:  Using the cfmg_deletesysdata command, delete the L-Platform. Refer to "12.3 cfmg_deletesysdata (Unnecessary Data Deletion)" in the "Reference Guide (Command/XML) CE".  Deploy an L-Platform again.

b. RECONFIGURING

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

When its servers or disks have been added or deleted.

What to check	On the resource management window, check if the configuration of the servers and their disks agrees with the L-Platform management window.	
Pattern 1	Condition	The configuration of servers or disks agrees, and servers or disks have been added.
	Action	Adding servers or disks succeeded after the export. Use the L-Platform as it is.
Pattern 2	Condition	The configuration of servers or disks agrees, and servers or disks have been deleted.
	Action	Deleting servers or disks was not completed successfully after the export. Delete servers or disks again by a reconfiguration.
Pattern 3	Condition	The configuration of servers or disks does not agree, and servers or disks have been added.
	Action	Adding servers or disks was not completed successfully after the export. Perform the following procedure: Using the <code>cfmg_deletesysdata</code> command, delete the servers or disks that have been added. Refer to "12.3 <code>cfmg_deletesysdata</code> (Unnecessary Data Deletion)" in the "Reference Guide (Command/XML) CE". Add servers or disks again.
Pattern 4	Condition	The configuration of servers or disks does not agree, and servers or disks have been deleted.
	Action	Deleting servers or disks succeeded after the export. Perform the following procedure: Using the <code>cfmg_deletesysdata</code> command, delete the servers or disks that have been deleted. Refer to "12.3 <code>cfmg_deletesysdata</code> (Unnecessary Data Deletion)" in the "Reference Guide (Command/XML) CE".

When server details, the L-Platform name, server names, or boot priorities have been changed.

What to check	Compare the resource management window and the L-Platform management window to check if the management information of the L-Platform agrees.  On the resource management window, the L-Platform name is displayed in the L-Platform comment field and server names are in the L-Server comment fields.	
Pattern 1	Condition	The management information agrees.
	Action	The reconfiguration such as changing server details succeeded after the export. Use the L-Platform as it is.
Pattern 2	Condition	The management information does not agree.
	Action	The reconfiguration such as changing server details was not completed successfully after the export. Reconfigure it again.

c. UNSUBSCRIBING

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



What to check	Check if the L-Platform is displayed on the resource management window.	
Pattern 1	Condition	It is displayed on the resource management window.
	Action	The unsubscription was not completed successfully after the export. Unsubscribe it again.
Pattern 2	Condition	It is not displayed on the resource management window.
	Action	The unsubscription succeeded after the export. Perform the following procedure:  Using the <code>cfmg_deletesysdata</code> command, delete the L-Platform. Refer to "12.3 <code>cfmg_deletesysdata</code> (Unnecessary Data Deletion)" in the "Reference Guide (Command/XML) CE".

#### d. TAKING SNAPSHOT

The L-Platform contains virtual servers that were being taken snapshots or physical servers that were being backed up 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.

#### 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.

What to check	Check if the collected cloning images are displayed on the resource management window.	
Pattern 1	Condition	They are displayed on the resource management window.
	Action	Collecting images succeeded after the export. Register the image information of the cloning images.
Pattern 2	Condition	They are not displayed on the resource management window.
	Action	Collecting images was not completed successfully after the export. Collect images again.

#### g. APPLYING UNSUBSCRIPTION

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

What to check	Check if the L-Platform is displayed on the resource management window.	
Pattern 1	Condition	It is displayed on the resource management window.
	Action	The request was not approved or the unsubscription was not completed successfully after the export. Apply an unsubscription again.
Pattern 2	Condition	It is not displayed on the resource management window.
	Action	The request was approved and the unsubscription was succeeded after the export.  Using the <code>cfmg_deletesysdata</code> command, delete the L-Platform. Refer to "12.3 <code>cfmg_deletesysdata</code> (Unnecessary Data Deletion)" in the "Reference Guide (Command/XML) CE".

h. APPLYING SUBSCRIPTION

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

What to check	Check if the L-Platform is displayed on the resource management window.	
Pattern 1	Condition	It is displayed on the resource management window.
	Action	The request was approved and the L-Platform was deployed successfully after the export. Use the deployed L-Platform as it is.
Pattern 2	Condition	It is not displayed on the resource management window.
	Action	The request was not approved or the deployment was not completed successfully after the export. Apply a subscription again.

i. SAVING NEW CONFIGURATION

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

What to check	Check if the L-Platform is displayed on the resource management window.	
Pattern 1	Condition	It is displayed on the resource management window.
	Action	It was deployed after the export. Use the deployed L-Platform as it is.
Pattern 2	Condition	It is not displayed on the resource management window.
	Action	It was not deployed or the deployment was not completed successfully after the export. If it has been deployed, create an L-Platform again.

j. APPLYING RECONFIGURE

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

What to check	Check if the L-Platform is in the applied state.	
Pattern 1	Condition	It is in an applied state.
	Action	The reconfiguration succeeded after the export. Use the L-Platform as it is.
Pattern 2	Condition	It is not in an applied state.
	Action	The request was not approved or the reconfiguration was not completed successfully after the export. If the request has been approved, request a reconfiguration again.

k. SAVING RECONFIGURATION

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

What to check	Check if the L-Platform is in a state with its configuration saved.	
Pattern 1	Condition	It is in a state with its configuration saved.
	Action	The reconfiguration was completed successfully after the export. Use the L-Platform as it is.
Pattern 2	Condition	It is not in a state with its configuration saved.
	Action	It was not reconfigured or the reconfiguration was not completed successfully after the export. If it has been reconfigured, reconfigure it again.

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