

ServerView Resource Orchestrator V2.3.0



User's Guide

Windows/Linux

J2X1-7530-01ENZ0(02)
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Preface

Purpose

This manual provides an outline of ServerView Resource Orchestrator (hereinafter Resource Orchestrator) and the operations and settings required for setup.

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 setting up systems, it is assumed that readers have the basic knowledge of ServerView Resource Coordinator VE required to configure the servers, storage, network devices, and server virtualization software to be installed. Additionally, a basic understanding of directory services such as Active Directory and LDAP is necessary.

Organization

This manual consists of six chapters, eleven appendices, and a glossary.

Chapters 1 through 6 explain how to use the basic functions provided in Resource Orchestrator.

Appendices A through M provide an explanation of the functions useful for large-scale configuration management.

For infrastructure administrators working in private cloud or data center environments, refer to the appendices according to the configuration.

The contents of each chapter are listed below.

Title	Description
Chapter 1 Overview	Provides an overview of Resource Orchestrator.
Chapter 2 Screen Layout	Provides an overview of the RC console.
Chapter 3 Pre-setup Preparations	Explains the preparations necessary when setting up Resource Orchestrator.
Chapter 4 Installation and Uninstallation	Explains how to install and uninstall Resource Orchestrator.
Chapter 5 Setup	Explains how to set up Resource Orchestrator.
Chapter 6 L-Servers	Explains the details of L-Server creation and operation.
Appendix A Resource Pools	Provides an overview of resource pools.
Appendix B Resource Folders and Tenants	Provides an overview of resource folders and tenant folders.
Appendix C Roles and User Groups	Provides an overview of roles and user groups.
Appendix D L-Server Parameter Details	Explains how to create an L-Server allocated with server, storage, and network specifications without using an L-Server template.
Appendix E Backup and Restoration of Admin Servers	Explains how to back up and restore the admin server.
Appendix F Configuration when Creating a Physical L-Server	Explains how to perform configuration when creating a physical L-Server.
Appendix G Configuration of Server Virtualization Software	Explains how to configure server virtualization software.
Appendix H Dashboard Coordination	Explains how to use coordination with the dashboard.
Appendix I Realization of High Availability	Explains how to realize high availability.
Appendix J Disaster Recovery	Explains the Disaster Recovery of L-Servers.
Appendix K Installation of VM Hosts on Physical L-Servers	Explains how to install VM hosts on physical L-Servers.

Title	Description
Appendix L Linking L-Servers with Configured Physical Servers or Virtual Machines	Explains how to link a configured physical server to a physical L-Server and how to link a configured virtual machine to a virtual L-Server.
Appendix M Using Link Aggregation	Explains the procedures for using Resource Orchestrator and link aggregation at the same time.
Glossary	Explains the terms used in this manual. Please refer to it when necessary.

Notational Conventions

The notation in this manual conforms to the following conventions.

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

[Windows]	Sections related to Windows (When not using Hyper-V)
[Linux]	Sections related to Linux
[VMware]	Sections related to VMware
[Hyper-V]	Sections related to Hyper-V
[Xen]	Sections related to RHEL5-Xen
[Oracle VM]	Sections related to Oracle VM
[Windows/Hyper-V]	Sections related to Windows and Hyper-V
[Windows/Linux]	Sections related to Windows and Linux
[Linux/VMware]	Sections related to Linux and VMware
[VM host]	Sections related to Windows Server 2008 with VMware or Hyper-V enabled

- 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 square brackets ([]).
- Button names are shown enclosed by angle 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 "#".

Menus in the RC console

Operations on the RC 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.

Related Manuals

The following manuals are provided with Resource Orchestrator. Please refer to them when necessary:

- ServerView Resource Orchestrator User's Guide (This manual)
Provides an outline of ServerView Resource Orchestrator and the operations and settings required for setup.
- ServerView Resource Orchestrator Reference Guide
Explains the commands and messages displayed by Resource Orchestrator, and provides details of configuration files.

Reference Documentation

Functions provided by ServerView Resource Coordinator VE can also be used with Resource Orchestrator. When installing/setting up/operating Resource Orchestrator, please refer to the following manuals included with Resource Orchestrator when necessary:

- ServerView Resource Coordinator VE Installation Guide
- ServerView Resource Coordinator VE Setup Guide
- ServerView Resource Coordinator VE Operation Guide
- ServerView Resource Coordinator VE Command Reference
- ServerView Resource Coordinator VE Messages

Related Documentation

Please refer to the following manuals when necessary:

- EMC Solutions Enabler INSTALLATION GUIDE
- EMC CLARiiON Server Support Products for Linux Servers INSTALLATION GUIDE
- EMC CLARiiON Server Support Products for Windows Servers INSTALLATION GUIDE
- EMC Navisphere Command Line Interface (CLI) REFERENCE
- EMC Navisphere Manager ADMINISTRATOR'S GUIDE
- ESN Manager PLANNING AND INSTALLATION GUIDE
- When using VMware
 - vSphere Basic System Administration
 - vSphere Resource Management Guide
 - Guest Operating System Installation Guide
- When using the Red Hat(R) Enterprise Linux(R) 5.4 (for x86) Linux Virtual Machine Function or the Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64) Linux Virtual Machine Function
 - Red Hat Enterprise Linux 5 Virtualization Guide
 - Systemwalker Software Configuration Manager Operation Guide
- When using Oracle VM
 - Oracle VM Manager User's Guide
 - Oracle VM Server User's Guide
- When using NetApp storage
 - Data ONTAP Software Setup Guide
 - Data ONTAP System Administration Guide
 - Data ONTAP Storage Management Guide
 - Data ONTAP Block Access Management Guide for iSCSI and FC

- When using ETERNUS storage
 - ETERNUS SF Storage Cruiser User's Guide
 - ETERNUS SF Storage Cruiser Message Guide
- When using ServerView Suite
 - ServerView Suite User Management in ServerView

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 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
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 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 7	Windows(R) 7 Professional Windows(R) 7 Ultimate
Windows Vista	Windows Vista(R) Business Windows Vista(R) Enterprise Windows Vista(R) Ultimate
Windows XP	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)

Abbreviation	Products
	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) 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 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)
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
SUSE Linux Enterprise Server	SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T
Oracle VM	Oracle VM Server for x86
ESC	ETERNUS SF Storage Cruiser
GLS	PRIMECLUSTER GLS
Navisphere	EMC Navisphere Manager
Solutions Enabler	EMC Solutions Enabler
MSFC	Microsoft Failover Cluster
SCVMM	System Center Virtual Machine Manager 2008 R2
VMware	VMware vSphere(TM) 4 VMware vSphere(TM) 4.1
VMware FT	VMware Fault Tolerance
VMware DRS	VMware Distributed Resource Scheduler

Abbreviation	Products
VMware DPM	VMware Distributed Power Management
VMware vDS	VMware vNetwork Distributed Switch
VIOM	ServerView Virtual-IO Manager
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
Resource Coordinator	Systemwalker Resource Coordinator Systemwalker Resource Coordinator Virtual server Edition

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Chapter 1 Overview

This chapter provides an overview of Resource Orchestrator.

1.1 Features

Resource Orchestrator enables uniform management of private clouds and data center resources (servers, storage, and networks). By managing these resources as resource pools, this dynamic resource management software reduces infrastructure costs and strengthens ICT governance.

This section explains some of the features provided by Resource Orchestrator.

Accelerated Support for Transforming Businesses

Resource Orchestrator enables you to quickly tailor a server (with storage and networks) to your specific needs by managing your ICT resources, such as servers, storage, networks, and images (*1), as resource pools. By simplifying the launch, expansion, or change of business operations, this software accelerates the transformation of businesses.

*1: An image is a copy of the contents of a disk (including the operating system) of a server, which can be deployed to other servers.

Reduced Infrastructure Investment Costs

Resource Orchestrator provides visualization services for servers, storage resources, and network resources, making the state of each of these resources visible to you. This enables you to efficiently utilize all of your resources and effectively plan for the installation of required resources, reducing infrastructure investment costs.

Reduced Infrastructure Operational Costs

Resource Orchestrator provides a template with defined logical specifications (number of CPUs, memory capacity, disk capacity, number of NICs, etc.) for a server with storage and networks. Using this template to standardize the configuration of a system including servers, storage, and networks, offers the following benefits:

- Simplified system configuration.
- Reduced risk of mistakes through the use of proven values for parameter settings when installing an operating system or setting up storage and networks.
- Reduced infrastructure operational costs through a unified configuration for managing versions of security software or backup methods over multiple systems.

Practicing ICT Governance

Resource Orchestrator enables you to perform security management (user role management and access control) regardless of the platform size. Pooled resources can be divided and secured by user (tenant), ensuring appropriate ICT governance.

Unified Operation and Monitoring of Physical and Virtual Resources

Even if physical and virtual resources exist in the same environment, unified management and operation can be performed from one console.

1.2 Function Overview

The following functions are provided by Resource Orchestrator.

For details on the operational environment for Resource Orchestrator, refer to "[1.3 Software Environment](#)" and "[1.4 Hardware Environment](#)".

Table 1.1 List of Available Functions

Functional Area	Functional Overview	Remarks
Resource Pool	A function that enables you to effectively and efficiently use all resources.	For details, refer to " 1.2.1 Resource Pool ".
L-Server Creation	<p>A function that provides L-Servers, logical servers including physical and virtual servers, which are comprised of appropriate resources in a resource pool, such as servers, storage, OS images and network.</p> <p>Even if there are no resources to allocate to L-Servers, flexible configuration and operation, such as creating L-Server definitions in advance, is possible.</p>	<p>For details on L-Servers, refer to "1.2.2 Logical Server (L-Server)".</p> <p>For details on how to create an L-Server, refer to "1.2.3 Creating an L-Server".</p> <p>For details on allocating and releasing resources to and from L-Servers, refer to "6.9 Allocating and Releasing Resources".</p>
L-Server Template	A function that enables pre-definition of L-Server specifications (number of CPUs, memory capacity, disk capacity, number of NICs, etc.) to simplify L-Server creation.	For details, refer to " 1.2.4 L-Server Template ".
Resource Visualization	A function that displays the total size and the free space of the resources in a resource pool.	For details, refer to " 1.2.5 Resource Visualization ".
Simplifying Network Settings	A function which automates network settings when creating an L-Server.	For details, refer to " 1.2.6 Simplifying Network Settings ".
Simplifying Storage Settings	To use storage from a physical L-Server, configure storage units and storage networks.	For details, refer to " 1.2.10 Simplifying Storage Settings ".
Changing Physical Server Usage	This function enables effective use of server resources as the operating systems and software that are started on physical servers can be changed depending on the time and situation.	For details, refer to " 6.10 Changing Physical Server Usage ".
Linking L-Servers with Configured Physical Servers or Virtual Machines	Enables uniform management of configured physical servers or virtual machines as L-Servers by linking them to an L-Server.	Refer to " Appendix L Linking L-Servers with Configured Physical Servers or Virtual Machines ".
Managing Multiple Resources Using Resource Folders	A function for managing clustered multiple resources.	For details, refer to " 1.2.7 Managing Multiple Resources Using Resource Folders ".
Restricting Access Using Roles	<p>A function for configuring roles (a collection of available operations) and access scopes (resources which can be operated) for individual users.</p> <p>A large number of users can be configured as a single unit using user groups that manage multiple users.</p>	For details, refer to " 1.2.8 Restricting Access Using Roles and User Groups ".
Sharing and Dividing Resources Between Multiple Departments Using Tenants	By specifying a combination of a user group and access scope when defining the tenant, this function provides safer operations for	For details, refer to " 1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants ".

Functional Area	Functional Overview	Remarks
	sharing and dividing resources between multiple departments.	
Managing and Sharing User information Using LDAP Coordination	By using a directory service which supports LDAP, such as Active Directory, user information can be managed and shared with other services.	For details, refer to " C.4 User Management Using Directory Service ".
Realization of High Availability	Functions to enable high availability systems, with features such as L-Server and admin server redundancy, server switchover for chassis failures, and storage switchover.	For details, refer to " 1.2.11 Realization of High Availability ".
DR (Disaster Recovery)	Preparing a backup system (a backup site) at remote sites to handle fatal damage caused by disasters enables administrators to perform switchover when trouble occurs.	For details, refer to " 1.2.12 Realization of DR (Disaster Recovery) ".
Monitoring	A function for monitoring resource statuses of servers and displaying if the status is normal or not by using the GUI.	For details, refer to "Chapter 5 Monitoring", "Chapter 6 Power Control", and "Chapter 9 Hardware Maintenance" of the "ServerView Resource Coordinator VE Operation Guide".
Power Operations	A function for turning servers ON or OFF.	
Hardware Maintenance	Functions to simplify hardware replacement. When connected with a SAN, it is not necessary to re-configure storage units by configuring the I/O virtualization settings. By using VIOM, it is not necessary to change the settings of software or network devices to refer to MAC addresses, as the MAC address, boot settings, and network settings are automatically changed. VM host maintenance can be easily performed, using VM Home Positions.	
L-Server Console Screen	The L-Server console screen that displays the information of physical and virtual L-Servers can be opened with common, simple operations from the Resource Orchestrator screen.	For details, refer to " 6.4 Using the L-Server Console ".

1.2.1 Resource Pool

A resource pool is a collection of physical servers, VM hosts, storage, networks, images, and other resources of the same type.

Resource pools offer the following benefits.

Until now, launching or expanding business operations required the purchase of servers, storage, networks, and other resources. Furthermore, significant time and effort was spent preparing and organizing such operations. Resource Orchestrator can save you time and effort by enabling you to configure a server simply by removing the required resource from a resource pool. This allows you to effectively plan the organization and operation of your infrastructure environment.

The resource pool management function allows you to effectively and efficiently use all resources. The types of resource pools are as described in "[Table 1.2 Resource Pool Types](#)". For details, refer to "[Appendix A Resource Pools](#)".

By using Resource Orchestrator to first register resources to control in a resource pool, an appropriate resource can be created from the resource pool at a user's request and be used to quickly configure a server (with storage and networks). When the server is no longer required, the resource can be reused.

Multiple resource pools can be created depending on operational requirements (hardware type, security, resource management units). If the resources in a resource pool are insufficient, a new resource can be added or a resource can be moved from another resource pool to compensate.

Table 1.2 Resource Pool Types

Resource Pool Types	Overview
VM	<p>A resource pool for storing VM hosts used when creating new servers (VM). VM hosts of different server virtualization software can be stored.</p> <p>In VM pools where different server virtualization software exists, an appropriate VM host can be selected and an L-Server created by specifying VM type during L-Server creation.</p> <p>Moving an L-Server (migration) is only possible between VM hosts belonging to the same cluster group, when two or more cluster groups are registered in the same VM pool.</p>
Servers	<p>A resource pool for storing the physical servers used when creating new servers.</p>
Storage	<p>Virtual storage resources and disk resources can be managed using Resource Orchestrator. Virtual storage resources indicate such as RAID groups controlled by storage management software, and file systems for VM guests controlled by VM management software. The resources can be managed as virtual storage resources using the same operations.</p> <p>A disk resource refers to a disk resource allocated to a server.</p> <ul style="list-style-type: none"> - When using ETERNUS storage and EMC CLARiON LUN (Logical Unit Number) - When using NetApp storage - For EMC Symmetrix DMX Device - For VM guests Virtual Disk <p>In Resource Orchestrator, use the following procedure to allocate a disk resource to an L-Server:</p> <ul style="list-style-type: none"> - Create the required size of disk resources from the virtual storage resource, and allocate them to the L-Server. - Allocate the disk created in advance using storage management software to the L-Server. <p>The following storage resources are stored in storage pools:</p> <ul style="list-style-type: none"> - For VM <ul style="list-style-type: none"> A file system for creation of VMs and virtual disks such as VMFS (data store) of VMware, shared volumes for clusters of Hyper-V, or storage repositories of Oracle VM - For physical server <ul style="list-style-type: none"> An original resource used to create LUN such as ETERNUS RAID groups or NetApp aggregates on storage units <p>The following disk resources are stored in storage pools:</p> <ul style="list-style-type: none"> - For physical servers <ul style="list-style-type: none"> Resources for the disk to be allocated to the server, such as a LUN of ETERNUS and EMC CLARiON, a FlexVol of NetApp, or a device of EMC Symmetrix DMX
Network	<p>A resource pool for storing network resources with a defined network for connecting servers. For details on network resources, refer to "1.2.6 Simplifying Network Settings".</p>
Address	<p>The following resources are stored:</p> <ul style="list-style-type: none"> - MAC address (Media Access Control address) - WWN
Image	<p>The following resources are stored:</p> <ul style="list-style-type: none"> - Cloning Images

1.2.2 Logical Server (L-Server)

Resource Orchestrator provides a Logical Server (hereinafter L-Server) function which defines logical specifications (number of CPUs, memory capacity, disk capacity, number of NICs, etc.) for servers (with storage and networks).

Resources can be allocated to an L-Server according to defined specifications. An L-Server with allocated resources can perform the same operations as a normal physical server and a virtual machine.

In addition, configured physical servers and virtual machines can be managed by linking them with L-Servers.

To operate the server, L-Server users only need to be aware of the specifications defined for the server, and not the resources allocated to it.

The following advantages are gained by using L-Servers:

- Simple and rapid server configuration

The ideal server can be configured simply and quickly by automatically allocating resources from resource pools according to the L-Server defined specifications.

- Reduced management costs

L-Server users do not need to manage the resources allocated to the server. Moreover, resource management is performed by an infrastructure administrator, reducing overall management costs.

- Integrated operation of physical servers and virtual machines

L-Servers can be created for both physical servers and virtual machines.

- An L-Server created using a physical server is called a physical L-Server.
- An L-Server created using a virtual machine is called a virtual L-Server.

After creating L-Servers, operations can be performed without differentiation between physical servers and virtual machines.



Information

Resources from resource pools can be automatically allocated or specific resources can be manually allocated to an L-Server.

1.2.3 Creating an L-Server

By specifying server specifications (number of CPUs, memory capacity or model type), storage capacity, operating system image, and network connections, Resource Orchestrator quickly creates a practical L-Server using the applicable resources from resource pools. It is possible to choose from two operational methods: (1) only create the configuration definition of an L-Server. In this case, resources are allocated to it when it is powered on for the first time; (2) create an L-Server with resources allocated. In this case, the L-Server will be ready for use after creation.

Resources can be selected using the following two methods:

- Automatic assignment
- Specifying resources or resource pools by each user

L-Server specifications can be specified by the following two methods.

- Selecting an L-Server template

For details on how to create an L-Server using an L-Server template(with L-Server specifications pre-defined), refer to "[Chapter 6 L-Servers](#)".

- Manually specifying each L-Server specification without using an L-Server template

For details on how to create an L-Server with individual specifications assigned, without using an L-Server template, refer to "[Appendix D L-Server Parameter Details](#)".

Basic operations, such as startup, shutdown, and delete, can be performed for an L-Server in the same way as for a typical server. L-Server users do not require detailed knowledge of the resources allocated to the server in order to operate it.

The following operations can be performed:

- Changing of L-Server configurations

Configurations of resources to allocate to the L-Server can be changed.

For details, refer to "[6.3 Modifying an L-Server](#)".

- Moving an L-Server between servers (migration) (For virtual L-Servers)

The function that moves a virtual L-Server to another VM host without stopping it.

For details, refer to "[6.8 Moving an L-Server Between Servers \(Migration\)](#)".

- Snapshot (For virtual L-Servers)

The function that saves the content of the system disk and data disk of a virtual L-Server disk at a certain point of time.

For details, refer to "[6.7.1 Snapshot](#)".

- Backup (For physical L-Servers)

The function that saves the system disk of a physical L-Server.

For details, refer to "[6.7.2 Backup and Restore](#)".

When determining the location of an L-Server, Resource Orchestrator first selects a VM pool.

The VM pool and VM host to use for the L-Server can be selected using the following two methods:

- When the VM host on which L-Server will be operated is not specified (when Resource Orchestrator automatically selects the VM host)

When multiple VM pools are accessible, the priority for L-Server creation can be specified for individual VM pools in advance. Resource Orchestrator selects the location from the VM pools, using the order of priority (1 is the highest, 10 lowest). When multiple VM pools have the same priority, the VM pool is selected at random.

- When the VM host on which an L-Server will be operated is specified (when Resource Orchestrator creates an L-Server on the specified VM host)

Select the location from the specified VM pools or VM hosts.

Then, determine the VM host on which the L-Server is to be placed.

The destination VM host must meet the following conditions:

- The VM host is powered on
- Monitoring status is "normal"
- Maintenance mode is not set

For details on maintenance mode, refer to "Appendix F Maintenance Mode" in the "ServerView Resource Coordinator VE Setup Guide".

- Maintenance mode has not been set for the server virtualization software

When a VM host is specified for "VM host", the capacity of the VM host is checked, and then the L-Server is created.

- When using L-Server templates

The VM host on which another L-Server that was created from the same L-Server template is placed is searched for, and then the L-Server is created.

If there is insufficient space on the VM host, a VM host that has more capacity is searched for, and then the L-Server is created.

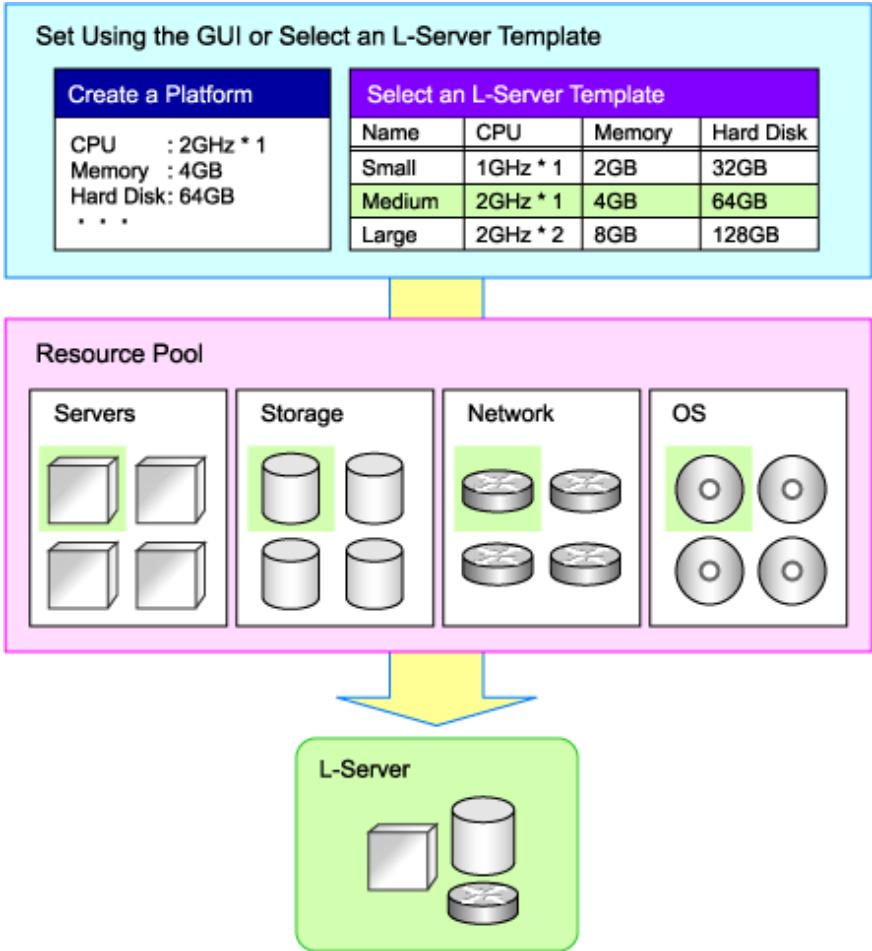
- When not using L-Server templates

A VM host that has more capacity is searched for, and then the L-Server is created.



When the resources for allocation to an L-Server have not been prepared yet, it is possible to create only the configuration definition of the L-Server.

Figure 1.1 L-Server Creation



1.2.4 L-Server Template

An L-Server template comprises pre-defined specifications (number of CPUs, memory capacity, disk capacity, number of NICs, etc.) for an L-Server.

L-Server templates deliver the following advantages:

- Reduced effort

By simply selecting an L-Server template, server specifications can be set with ease.

An L-Server template can easily be created by selecting an L-Server template, cloning image, and network connections.

- Standardization

Creating L-Servers using a standardized L-Server template can reduce configuration errors while also reducing management costs.

L-Server templates can be exported/imported as files in XML format. This enables L-Server templates to be designed separately from the admin server, which allows for standardization between different systems.

A sample L-Server template is provided with Resource Orchestrator. Create your own L-Server template using this sample as a reference.

For details on L-Server templates, refer to "2.2 L-Server Template" of the "ServerView Resource Orchestrator Reference Guide".

1.2.5 Resource Visualization

Resource Orchestrator includes the RC console graphical user interface. The RC console comprises the ServerView Resource Coordinator VE RC console with Resource Orchestrator functions (view/operate an L-Server).

The total size and the free space of the resources in the resource pool are displayed. The number of L-Servers that can be created for each L-Server template can also be displayed, in units of the specified L-Server template. For details on the L-Server conversion view, refer to "[A.4 Viewing a Resource Pool](#)".

For details on the RC console, refer to "[2.1 RC Console](#)".

1.2.6 Simplifying Network Settings

Network resources handled by Resource Orchestrator consist of network definition information used for L-Server connection. Network configurations can be set in advance so that network settings are automated when creating an L-Server.

Network resources are categorized into the following two types:

- Internal network

Used to connect an L-Server to another L-Server. The following information is retained:

- VLAN ID for use on the connection path
- IP address range (optional) to allocate to the NIC for a connected L-Server

- External network

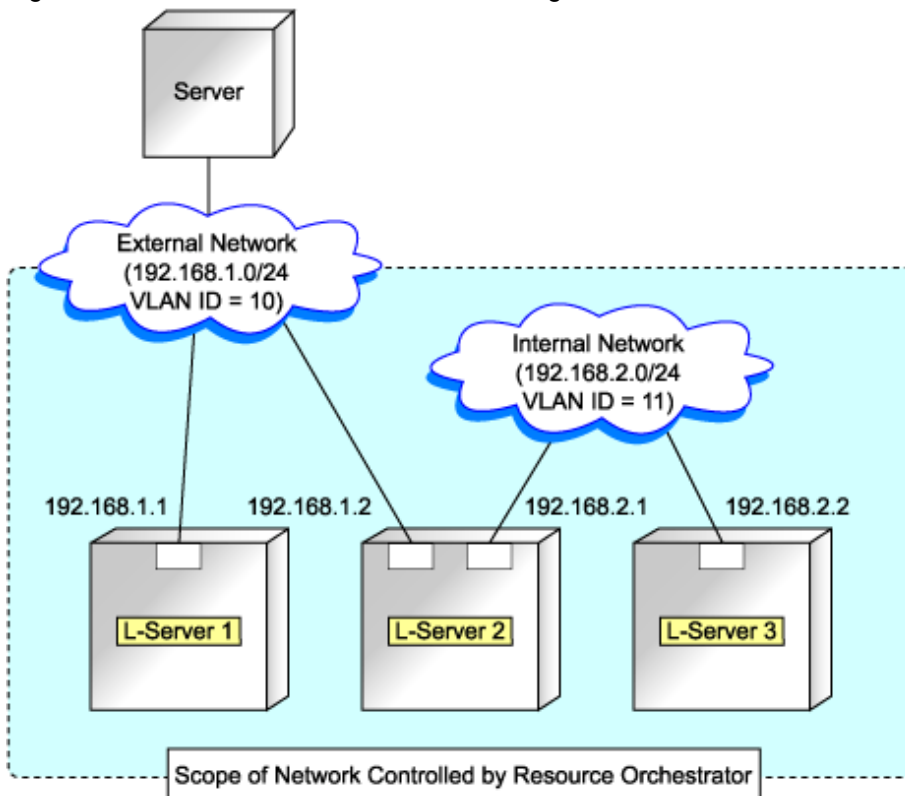
Used to connect an L-Server to an existing network that is not managed by Resource Orchestrator. In addition to internal networks, the following information is retained:

- Networks managed by Resource Orchestrator, and LAN switch blades for network connection and their ports (hereinafter external connection port)

Simplifying Network Settings Using Network resources

By connecting the NIC for an L-Server to a network resource as in the picture below, multiple network settings can be configured by one operation.

Figure 1.2 Network Resource Connection Image



By connecting the NIC for an L-Server to a network resource, the following settings are automatically configured.

Automatic Network Configuration for Blade Servers

For network configuration patterns other than the supported ones, refer to the following descriptions.

- For physical L-Servers

Refer to "[F.6.1 Automatic Network Configuration](#)".

- For virtual L-Servers

[VMware]

Refer to "[Automatic Network Configuration](#)" in "G.1.4 Setup".

[Hyper-V]

Refer to "[Automatic Network Configuration](#)" in "G.2.4 Setup".

Manual Network Configuration for Blade Servers

For network configuration patterns other than the supported ones, refer to the following descriptions.

- For physical L-Servers

Refer to "[F.6.2 Manual Network Configuration](#)".

- For virtual L-Servers

[VMware]

Refer to "[Manual Network Configuration](#)" in "G.1.4 Setup".

[Hyper-V]

Refer to "[Manual Network Configuration](#)" in "G.2.4 Setup".

If the configuration is not done automatically, manual configuration can be performed.

Figure 1.3 Automatic Network Configuration for Blade Servers

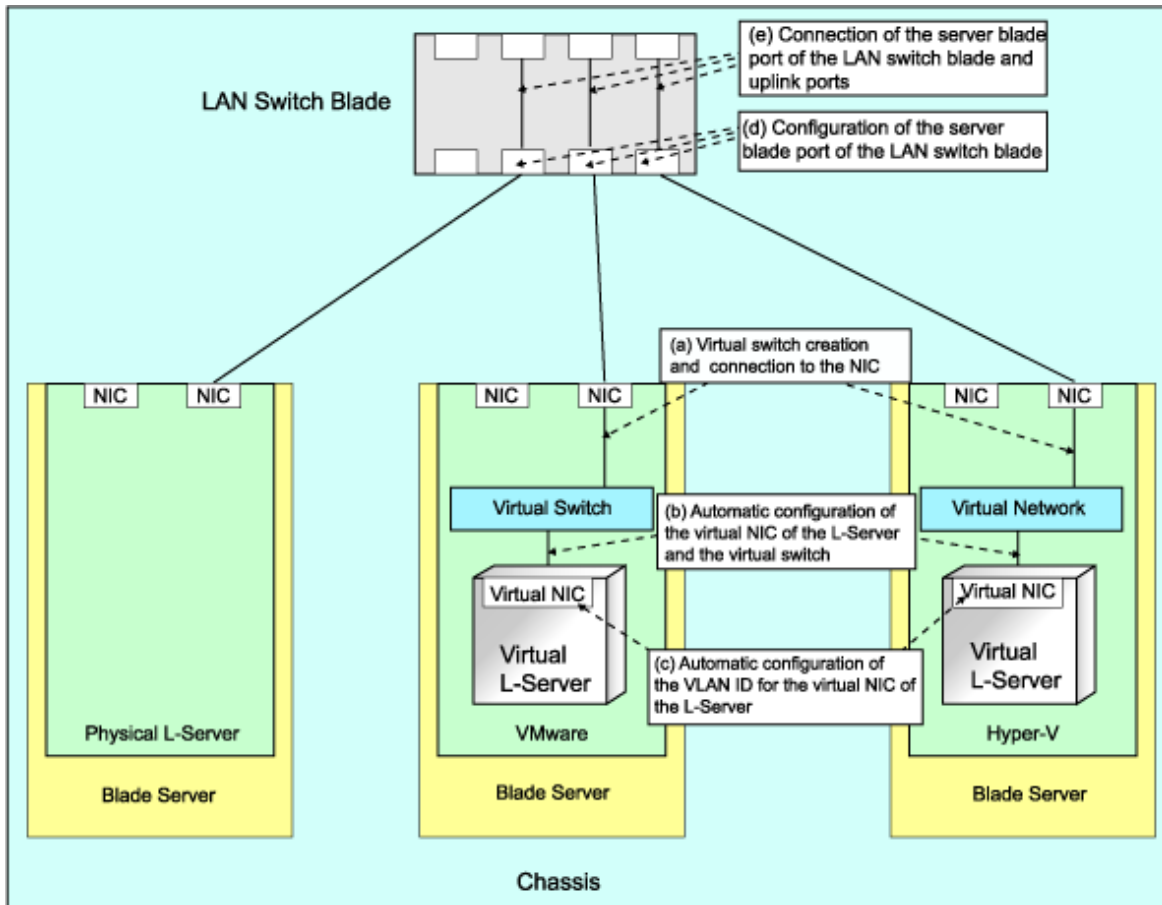


Table 1.3 Network Configurations for Blade Servers

		Physical L-Server		Virtual L-Server							
				VMware		Hyper-V		RHEL5-Xen		Oracle VM	
		No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy
A	Creating Virtual Switches and Connecting to NICs (*1)	-	-	No (*2)	Yes	No (*2)	Yes (*3)	No	No	No	No
B	Automatic Connection between L-Server Virtual NICs and Virtual Switches (*4)	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C	Automatic VLAN ID Configurati	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

		Physical L-Server		Virtual L-Server							
				VMware		Hyper-V		RHEL5-Xen		Oracle VM	
		No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy
	on for L-Server Virtual NICs										
D	Configurations for the Server Blade Ports of LAN Switch Blades	Yes (*5)	No (*2)	No (*2, *6)	Yes (*6)	Yes (*2, *6)	Yes (*3, *6)	No	No	No	No
E	Connection between the Server Blade Ports of LAN Switch Blades and External Connection Ports	Yes	No	No (*2)	Yes (*6)	No (*2)	Yes (*2, *3)	No	No	No	No

Yes: Configured in Resource Orchestrator
No: Not configured in Resource Coordinator

*1: Replace as follows for each server virtualization software.

Table 1.4 Correspondence Table for Server Virtualization Software

VMware	Create virtual switches and port groups
Hyper-V	Create a virtual network
RHEL5-Xen Oracle VM	Creating a virtual bridge

*2: Manual configuration is possible.

*3: Automatic configuration is possible for redundancy configurations with Intel PROSet or PRIMECLUSTER GLS.

*4: Replace as follows for each server virtualization software.

Table 1.5 Correspondence Table for Server Virtualization Software

VMware	Connections Virtual NICs of L-Servers and Port Groups of Virtual Switches
Hyper-V	Connections Virtual NICs of L-Servers and Virtual Networks
RHEL5-Xen Oracle VM	VLAN ID configuration for the L-Server virtual network interface and connection with virtual bridges which have been created manually in advance

*5: Configure a port VLAN or a tagged VLAN.

*6: Configure a tagged VLAN.

In Resource Orchestrator, when a virtual L-Server is connected to the admin LAN that has the same subnet address as the admin server, to preserve security, virtual switches are not automatically created.

Ensure the network security of the communication route between the admin server and the virtual L-Server, then create virtual switches.

Configuring VLANs automatically on LAN Switch Blades

VLANs are automatically configured on LAN switch blades. For LAN switch blades, there is Switch firmware which provides the layer 2 switch functions, and the IBP firmware which realizes the virtualization.

In Resource Orchestrator, to operate a LAN switch blade using Switch firmware is called Switch mode, and to operate using IBP firmware is called IBP mode.

For details, refer to the manual of the LAN switch blade.

- Switch mode

Automatic configuration of tagged VLANs and port VLANs for server blade ports is performed.

- IBP mode

Automatic configuration of VLANs is not supported.

Configurations for Servers Other Than Blade Servers

For servers other than blade servers, make connections between L-Server virtual NICs and virtual switches.

Figure 1.4 Network Configurations for Servers Other than Blade Servers

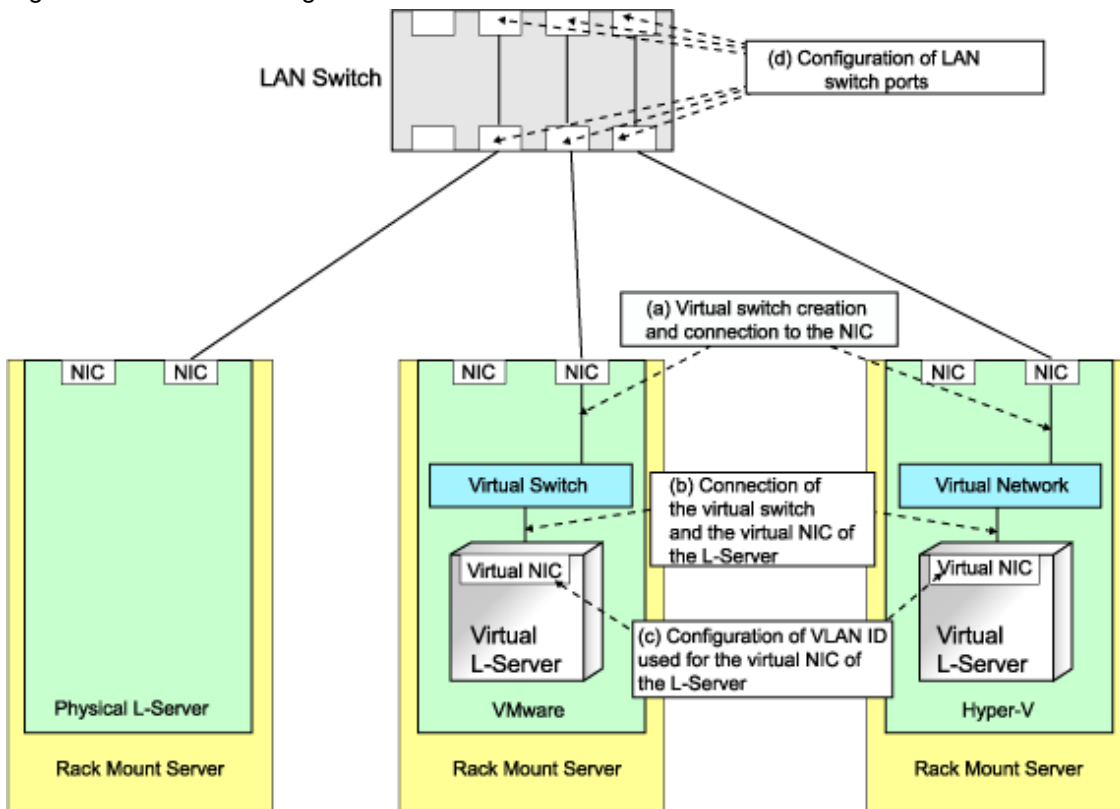


Table 1.6 List of Network Configurations for Servers Other than Blade Servers

		Physical L-Server		Virtual L-Server							
				VMware		Hyper-V		RHEL5-Xen		Oracle VM	
		No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy	No Redundancy	For Redundancy
A	Creating Virtual Switches and Connecting to NICs (*1)	-	-	No	No	No	No	No	No	No	No
B	Connection between L-Server Virtual NICs and Virtual Switches (*2)	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
C	Configuration of VLAN IDs Used by L-Server Virtual NICs	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
D	Configuration of LAN Switch Ports	No	No	No	No	No	No	No	No	No	No

Yes: Configured in Resource Orchestrator
 No: Not configured in Resource Orchestrator

*1: Replace as follows for each server virtualization software.

Table 1.7 Correspondence Table for Server Virtualization Software

VMware	Create virtual switches and port groups
Hyper-V	Create a virtual network
RHEL5-Xen Oracle VM	Creating a virtual bridge

*2: Replace as follows for each server virtualization software.

Table 1.8 Correspondence Table for Server Virtualization Software

VMware	Connections Virtual NICs of L-Servers and Port Groups of Virtual Switches
Hyper-V	Connections Virtual NICs of L-Servers and Virtual Networks
RHEL5-Xen Oracle VM	VLAN ID configuration for the L-Server virtual network interface and connection with virtual bridges which have been created manually in advance

Available Network Configurations

Available network configurations and configuration methods in Resource Orchestrator are given below.

Table 1.9 Available Network Configurations and Configuration Methods

Hardware	Network Configuration	References
PRIMERGY Blade Servers	Non-redundancy configuration	<p>When using physical L-Servers, refer to "F.6.1 Automatic Network Configuration".</p> <p>On virtual L-Servers, settings differ according to the server virtualization software being used.</p> <p>[VMware] Refer to "Manual Network Configuration" in "G.1.4 Setup".</p> <p>[Hyper-V] Refer to "Manual Network Configuration" in "G.2.4 Setup".</p> <p>[Xen] Refer to "Manual Network Configuration" in "G.3.4 Setup".</p> <p>[Oracle VM] Refer to "Manual Network Configuration" in "G.4.4 Setup".</p>
	Redundancy configuration	<p>For physical L-Servers, refer to "F.6.1 Automatic Network Configuration" and "F.7.4 Network Redundancy and VLAN Settings of L-Servers".</p> <p>On virtual L-Servers, settings differ according to the server virtualization software being used.</p> <p>[VMware] Refer to "Automatic Network Configuration" in "G.1.4 Setup".</p> <p>[Hyper-V] Refer to "Automatic Network Configuration for Blade Servers" in "G.2.4 Setup".</p> <p>[Xen] Refer to "Manual Network Configuration" in "G.3.4 Setup".</p> <p>[Oracle VM] Refer to "Manual Network Configuration" in "G.4.4 Setup".</p>
<ul style="list-style-type: none"> - PRIMERGY Rack Mount Servers - PRIMERGY Tower Servers - PRIMEQUEST 	Non-redundancy configuration	<p>When using physical L-Servers, refer to "F.6.1 Automatic Network Configuration".</p> <p>On virtual L-Servers, settings differ according to the server virtualization software being used.</p> <p>[VMware] Refer to "Manual Network Configuration" in "G.1.4 Setup".</p> <p>[Hyper-V] Refer to "Manual Network Configuration" in "G.2.4 Setup".</p> <p>[Xen] Refer to "Manual Network Configuration" in "G.3.4 Setup".</p> <p>[Oracle VM] Refer to "Manual Network Configuration" in "G.4.4 Setup".</p>
	Redundancy configuration	<p>When using physical L-Servers, refer to "F.6.1 Automatic Network Configuration".</p> <p>On virtual L-Servers, settings differ according to the server virtualization software being used.</p> <p>[VMware] Refer to "Automatic Network Configuration" in "G.1.4 Setup".</p> <p>[Hyper-V] Refer to "Manual Network Configuration" in "G.2.4 Setup".</p>

Hardware	Network Configuration	References
		[Xen] Refer to " Manual Network Configuration " in "G.3.4 Setup". [Oracle VM] Refer to " Manual Network Configuration " in "G.4.4 Setup".

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For an example of network configuration when creating a physical L-Server, refer to "[Appendix F Configuration when Creating a Physical L-Server](#)".

For an example of network configuration when creating a virtual L-Server, refer to "[Appendix G Configuration of Server Virtualization Software](#)".

IP Address Auto-Configuration

[Windows/Linux] [VMware] [Hyper-V]

If an IP address range is set for a network resource, the IP address can be automatically set when deploying an image to an L-Server. If no IP address range is set, the DHCP settings are adopted.

[Hyper-V]

IP addresses can be automatically configured, in the following guest OS's on which the integrated services are installed.

- Microsoft(R) Windows Server(R) 2008 R2
- Microsoft(R) Windows Server(R) 2008
- Microsoft(R) Windows Server(R) 2003 R2
- Microsoft(R) Windows Server(R) 2003
- Microsoft(R) Windows(R) 7
- Microsoft(R) Windows Vista(R)
- Microsoft(R) Windows(R) XP

[Xen] [Oracle VM]

Automatic configuration of IP addresses is not supported.

If an IP address range is set for a network resource, set an IP address manually after deploying an image to an L-Server (Also set an IP address manually on the DNS server).

For details on how to confirm IP addresses, refer to the Note of "[D.4 \[Network\] Tab](#)".

If an IP address range is not set, manually set an IP address for operation on the DHCP server after deploying an image to an L-Server.

Network Settings for Physical L-Servers

In Resource Orchestrator, settings for an operating system, such as NIC redundancy on servers or tagged VLANs, are not performed. These settings should be made manually after creation of an L-Server.

When setting them automatically upon deployment of an OS image, prepare a script like the following, and perform collection of a cloning image with the script executed once on starting of the OS.

- According to the description in the network information file, perform settings for NIC redundancy, tagged VLANs, and IP addresses using NIC redundancy software (such as Windows Intel PROSet/Linux bonding).

For details on the network information file, refer to "[Network Information File](#)" in "F.7.4 Network Redundancy and VLAN Settings of L-Servers".

For details on configuration using the network information file, refer to "[F.7.4 Network Redundancy and VLAN Settings of L-Servers](#)".



- Depending on operating conditions of the network configuration script, a communication error may occur on the business application which is installed on the server.

Since this error cannot be detected by Resource Orchestrator, please check any network errors that occur on user applications to detect it.

When those errors occur, the server or the application must be restarted.

Restart the server using the network configuration script.

- The RCVE network parameter configuration function cannot be used.

Modifying Network Resource Specifications

The following network resource specifications can be modified.

- Basic Information
- Connection Information
- Subnet Information

The following network resources can be added.

- External connection ports of attached chassis

For details on modifying network resources specifications, refer to "[Modifying Network Resource Specifications](#)" in "A.3 Resource Operations".

1.2.7 Managing Multiple Resources Using Resource Folders

Resource Folders

Resource folders are used when managing a large number of resources or when you want to divide resources according to certain conditions.

Resources stored in resource folders can be freely placed. Using hierarchical folders, other resource folders can be stored in the resource folders. For details on resource folders, refer to "[Appendix B Resource Folders and Tenants](#)".

Resource folders enable you to do the following:

- Since the number of resources selected at the same time is reduced, operation of resources is easier.
- Resources can be categorized in detail.

1.2.8 Restricting Access Using Roles and User Groups

With Resource Orchestrator, you can restrict the operations that each user can perform and the resources that operations can be performed on. A collection of operations that can be performed is called a "role" and the resource that operations can be performed on is called an "access scope".

By setting a role and access scope for each user, you can restrict their privileges.

A user group is a function for the batch management of multiple users. By setting a role and access scope for a user group in the same way as for a user, you can set the privileges for all the users that belong to that user group.

By default, only the "supervisor" user group is defined. If you do not specify a user group when creating a user, that user will belong to the "supervisor" user group.

The role and access scope of "all=supervisor" is set for the "supervisor" user group.

When a role and access scope are not set for a user, the role and access scope set for a user group are enabled.

When a role and access scope are set for a user, only the role and access scope set for the user are enabled.

When resource folders and resources specified in the access scope of a user are deleted, they are also deleted from the access scope of the user.

When all resource folders and resources specified in the access scope of a user are deleted, the access scope configured for the user group is adopted for the access scope of the user.

And when all resource folders and resources specified in the access scope of a user group are deleted, all users belonging to the user group will not be able to access to any of the resources.

Therefore, if resources are only being used within a department, there is no need to pay attention to user groups.

For details on roles and user groups, refer to "[Appendix C Roles and User Groups](#)".

Directory services can be used for management of users and roles. For details on how to install and operate, refer to "[C.4 User Management Using Directory Service](#)".

Roles are named as follows. For details on the operating privileges for each role, refer to "[Table C.1 Operation Scope of Roles](#)" of "C.1 Roles".

Table 1.10 Role Type

Role Type	Role Name
Basic Roles	supervisor (special administrator) administrator (administrator) operator (operator) monitor (operator)
Service Administrative Role	service_admin (service administrator) lserver_operator (L-Server operator) lserver_monitor (L-Server monitor)
Infrastructure Administrative Role	infra_admin (infrastructure administrator) infra_operator (infrastructure operator)

Environments shared by a resource administrator and L-Server users can be operated using basic roles.

Basic roles have the following operating privileges:

Table 1.11 Basic Roles

Role Name	Resource Operations	User Operations
supervisor (special administrator)	All	All users
administrator (administrator)	All	Within a user group
operator (operator)	Monitoring, power control, and snapshot only	Change one's own information only
monitor (monitor)	Monitoring only	Change one's own information only

Operating privileges for service administrator roles are limited to the L-Server only. Use this role if you want to assign a separate administrator for L-Server management, in cases such as a cloud operating system where an L-Server is leased.

The service_admin (service administrator) role can only perform the following operations and commands:

- L-Server
 - All operations excluding moving L-Servers between servers (migration)
- Resource Pools
 - Viewing a Resource Pool
- Resource Folders
 - All operations
- Tenant Folders
 - Viewing a Tenant Folder

The `lserver_operator` (L-Server operator) and `lserver_monitor` (L-Server monitor) roles can only perform operations and monitoring operations for L-Servers.

Infrastructure administrative roles are prohibited from performing operations on an L-Server that is in use.

Use this role if you want to restrict the privileges of the users that manage the infrastructure to prevent the operation of L-Servers being affected by erroneous operations.

The `infra_admin` (infrastructure administrator) role can only perform monitoring and "[6.8 Moving an L-Server Between Servers \(Migration\)](#)" of L-Servers, but all operations can be performed for other resources.

The `infra_operator` (infrastructure operator) role can only perform monitoring of L-Servers. Only power operations can be performed for other resources.

1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants

You may want to share some resources between departments in case of future changes or faults while maintaining the segregation of resources for each department.

Tenants

In Resource Orchestrator, the unit for division of management and operation of resources based on organizations or operations is called a tenant.

In order to manage the resource allocated to a tenant, a resource folder, called a tenant folder, is created for an each tenant.

Resource pools to be occupied for each L-Server and tenant are stored, in tenant folders. The exclusive resource pool for each tenant is called a local pool.

There are resource pools which can be used by multiple tenants including local pools.

This resource pool is called a global pool.

Resource Orchestrator enables operation of tenants through division of resources on a tenant folder level, as well as by user groups, and combinations of scopes configured to divide resources.

Perform the following settings to share and segregate resources without combining them by tenants:

- Create a tenant folder for each department

When creating a tenant folder, batch creation or setting of user groups, users, or resource pools can be performed.

Local pool creation or global pool selection can be performed for each resource pool.

Additionally, when using a tenant only within a department, create a local pool.

When sharing a tenant between multiple departments, select an existing global pool.

For details on tenant folders, refer to "[B.3 Tenants](#)".

When using tenants to segregate resources, the following operations are limited:

- A powered on L-Server cannot be moved to another tenant.

Stop the L-Server before moving it.

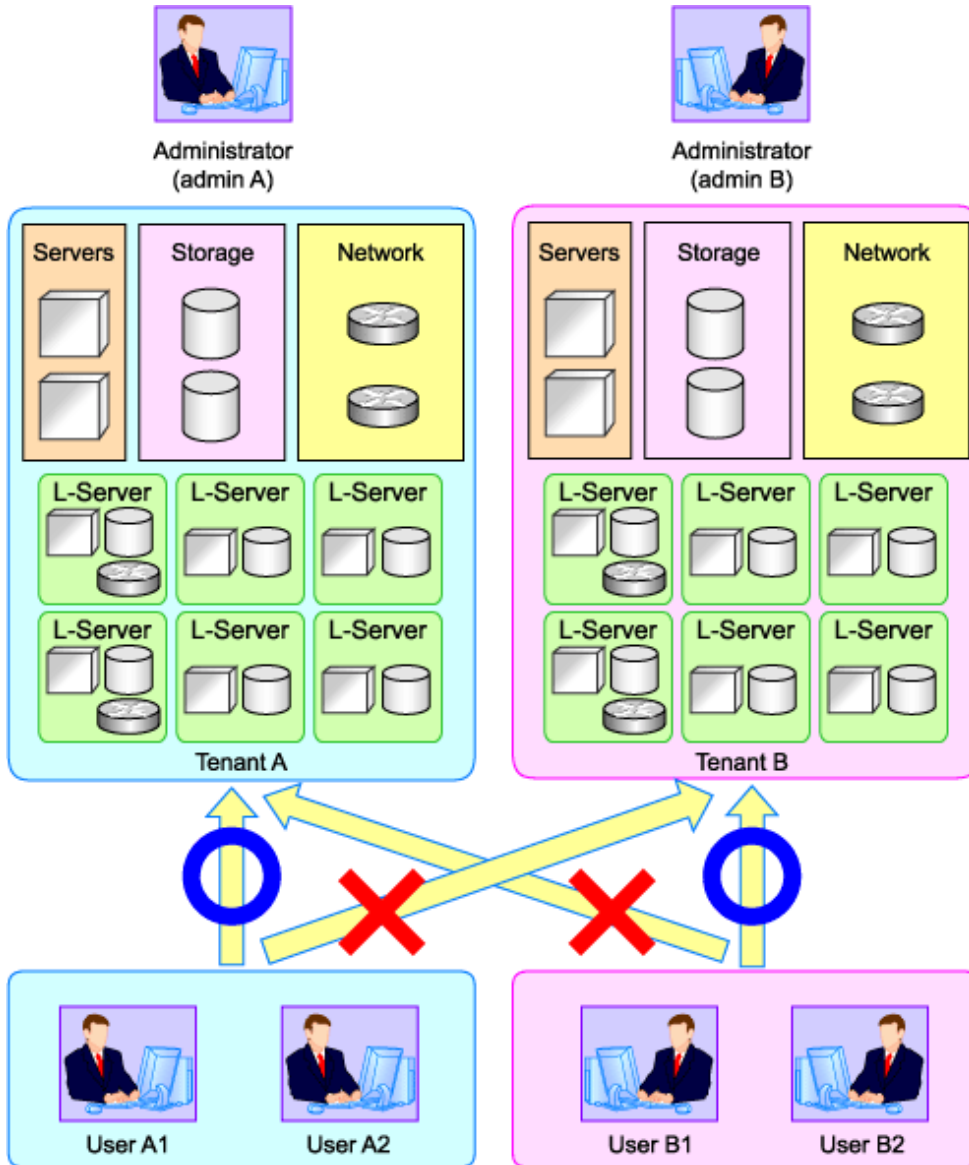
- Resources used by powered on L-Servers, and resource pools or resource folders that contain those resources cannot be moved to another tenant.

Stop the L-Servers before moving them.

- L-Servers that are using resources in another tenant cannot be started.

Required resources must be placed in the same tenant or the same global pool as the L-Server.

Figure 1.5 Sharing and Dividing Resources Using Tenants



1.2.10 Simplifying Storage Settings

When creating physical servers and virtual machines, it was difficult to smoothly provide servers as configuration of storage units and the storage network was necessary.

Using the following functions of Resource Orchestrator, servers can be provided smoothly.

Allocating Storage to a Virtual L-Server

1. Through coordination with VM management software, Resource Orchestrator automatically detects virtual storage resources (such as the file systems of VM guests) that were created in advance.
2. From the detected virtual storage resources, Resource Orchestrator automatically selects virtual storage resources meeting virtual L-Server specifications.
3. From the automatically selected virtual storage resources, create disk resources (such as virtual disks) of the specified size and allocate them to the virtual L-Server.

Allocating Storage to a Physical L-Server

There are two ways to allocate storage to a physical L-Server:

- Allocate disk resources (LUNs) automatically created from virtual storage resources (RAID groups)
 1. Through coordination with storage products, Resource Orchestrator automatically detects virtual storage resources that were created in advance.
 2. From the detected virtual storage resources, Resource Orchestrator automatically selects virtual storage resources meeting physical L-Server specifications.
 3. From the automatically selected virtual storage resources, create disk resources of the specified size and allocate them to the physical L-Server.
- Allocate disk resources (LUNs) that were created in advance
 1. Through coordination with storage products, Resource Orchestrator automatically detects disk resources that were created in advance.
 2. From the detected disk resources, Resource Orchestrator automatically selects disk resources meeting physical L-Server specifications and allocates them to the L-Server.

The storage allocation method varies depending on the storage units being used.

For details on storage units, refer to "[Table 1.29 Storage Units which can be Connected with L-Servers on Physical Servers](#)" in "1.4 Hardware Environment".

Table 1.12 Storage Allocation Methods and Storage Types

Allocation Method	Storage Type
Allocate disk resources automatically created from virtual storage resources	- ETERNUS Storage - NetApp FAS Storage
Allocate disk resources that were created in advance	- EMC CLARiiON Storage - EMC Symmetrix DMX Storage

Prerequisites When Creating L-Servers Using Physical Servers

- When using a physical server as an L-Server, it is necessary that connection using HBA address rename or VIOM is supported. For details on connection using HBA address rename or VIOM, refer to "3.3 Defining the Storage Environment" and "3.7 Configuring the Storage Environment" in the "ServerView Resource Coordinator VE Setup Guide".
- Usage methods of HBA address rename or VIOM differ depending on the manager OS and the hardware of managed servers used to configure a physical L-Server.

Table 1.13 Available Combinations of Manager OS and Hardware for Managed Servers

	Blade Servers	Rack Mount Servers
Windows	VIOM	HBA address rename
Linux	Usage is not possible	HBA address rename

- For L-Server SAN storage paths and iSCSI storage paths, multipaths (two paths) are supported.
- Configurations with less than 2 or less HBA ports on managed servers are supported.
- L-Server supports SAN boot and iSCSI boot configurations.
- In the case of blade servers, only configurations where Fibre Channel cards are mounted in expansion slot 2 are supported.
- In the case of blade servers, please do not set the following parameters during setup of VIOM.
 - WWN Address Range

- MAC Address Range

Storage Configuration when Using a Physical Server as an L-Server

- When using a Fibre Channel connection, multiple storage units can be connected to a single L-Server (when VIOM connections are not supported, only one storage unit can be connected). When using an iSCSI connection, one storage unit can be connected to a single L-Server.
- Sharing of storage between multiple L-Servers is supported.

When setting a physical server as an L-Server, locate L-Server system disks and data disks as follows.

Table 1.14 Location of System Disks and Data Disks

Configuration	System Disk	Data Disk
1	SAN storage	SAN storage
2	iSCSI storage (*1, *2)	iSCSI storage (*1, *3)

*1: Available when ETERNUS storage and NetApp storage are used.

*2: When using Linux for a physical L-Server, and iSCSI storage for a system disk, it is not possible to create an L-Server using a cloning image.

*3: When creating an L-Server, iSCSI storage is not allocated to the L-Server as a data disk.

Manually allocate the iSCSI storage to the L-Server, after starting the L-Server.

Attaching or detaching iSCSI storage to or from an L-Server cannot be performed using Resource Orchestrator. Perform those operations manually.

For details on data disk allocation for iSCSI storage, refer to "Information- Physical L-Server Data Disk for iSCSI Boot".



Information

Physical L-Server Data Disk for iSCSI Boot

- When using ETERNUS storage

Using storage management software, the data disk can be accessed from managed servers by defining LUNs of the iSCSI boot disk and of the data disk in the same Affinity group.

- When using NetApp storage

Using storage management software, the data disk can be accessed from managed servers by defining LUNs of iSCSI boot disk and of the data disk in the same igroup.



Note

Local disks are not supported.

Do not connect local disks.

For details on required VM management software and storage management software, refer to "[1.3.2.2 Required Software](#)".

For details on supported storage units and Fibre Channel switches, refer to "[1.4 Hardware Environment](#)".

For details on configuration of storage networks and storage configuration, refer to "[1.5 System Configuration](#)".

For details on configuration of storage environments, refer to "[F.1 System Configuration](#)".

1.2.11 Realization of High Availability

Using the following functions of Resource Orchestrator, high availability systems can be provided smoothly.

- L-Server redundancy

L-Server redundancy can be made with Resource Orchestrator.

On physical L-Servers, by specifying a spare server pool, an operating server can be switched to a spare server during server failure.

On virtual L-Servers, settings differ according to the server virtualization software being used.

For details, refer to "[I.1.1 L-Server High Availability](#)".

- Server switchover when a chassis fails

If a blade chassis in a configuration which Resource Orchestrator manages multiple blade chassis fails, when starting the physical L-Server on a blade chassis which is not damaged, operations can be re-started.

For details, refer to "[I.1.2 Blade Chassis High Availability](#)".

When creating VM hosts on physical L-Servers, server switchover can be performed for VM hosts if chassis failure occurs.

For details, refer to "[Appendix K Installation of VM Hosts on Physical L-Servers](#)".

- Switchover of operating or standby status of storage

For physical L-Servers, realizes the switchover of operating or standby disks (system/data disks) in configurations in which replication of the operating storage volume used by an L-Server to a standby storage volume is configured.

For details, refer to "[I.1.3 Storage Chassis High Availability](#)".

- Admin server redundancy

Managers can be operated in cluster systems with Resource Orchestrator.

When operating the admin server in a Windows or Linux environment, redundancy for managers is also possible using clustering software.

An admin server can be operated on VMware and Hyper-V virtual machines.

Using redundancy for virtual machines, redundancy for managers is also possible.

For details, refer to "[I.2 Admin Server High Availability](#)".

1.2.12 Realization of DR (Disaster Recovery)

- Realization of Disaster Recovery (DR) environments

Realizes, simple, low-cost, yet highly reliable Disaster Recovery (DR) between the primary site and backup site, when exporting and importing the configuration information of Resource Orchestrator.

For details, refer to "[Appendix J Disaster Recovery](#)".

1.3 Software Environment

Resource Orchestrator is composed of the following DVD-ROM.

- ServerView Resource Orchestrator (Windows Edition/Linux Edition)

1.3.1 Software Organization

Resource Orchestrator is composed of the following software.

Table 1.15 Software Organization

Software	Function Overview
ServerView Resource Orchestrator V2.3.0 Manager (hereinafter manager)	<ul style="list-style-type: none"> - Used to control managed servers and neighboring network devices - Manages resource pools and L-Servers - Operates on the admin server

Software	Function Overview
ServerView Resource Orchestrator V2.3.0 Agent (hereinafter agent)	<ul style="list-style-type: none"> - Performs pre-configuration during deployment, monitors operating servers, and controls backup and cloning - Operates on managed servers (*1)
ServerView Resource Orchestrator V2.3.0 HBA address rename setup service (hereinafter HBA address rename setup service)	<ul style="list-style-type: none"> - Realization of high availability of the HBA address rename setup used by the admin server (*2) - Operates on a separate device from the admin server or managed servers, such as a desktop computer

*1: When using a combination of a manager of this version and agents of earlier versions, only operations provided by the agent version are guaranteed.

*2: For details on HBA address rename setup, refer to "3.3 Defining the Storage Environment" in the "ServerView Resource Coordinator VE Setup Guide".

1.3.2 Software Requirements

This section explains the software requirements for installation of Resource Orchestrator.

1.3.2.1 Basic Software

The basic software listed below is required when using Resource Orchestrator.

Table 1.16 List of Basic Software

Software	Basic Software	Remarks
Manager [Windows]	Microsoft(R) Windows Server(R) 2008 Standard (x86, x64) Microsoft(R) Windows Server(R) 2008 Enterprise (x86, x64) Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	SP1 or later supported. The Server Core installation option is not supported.
	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	SP2 or later supported.
Manager [Linux]	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) 5.4 (for x86) Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64)	Prepare any required driver kits, update kits, or software. For information about required software, refer to the manual of the server or the Linux installation guide.
Agent [Windows]	Microsoft(R) Windows Server(R) 2008 Standard (x86, x64) Microsoft(R) Windows Server(R) 2008 Enterprise (x86, x64) Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	SP1 or later supported. The Server Core installation option is not supported.
	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	SP2 or later supported.
Agent [Linux]	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) 5.5 (for x86)	Prepare any required driver kits, update kits, or software. For information about required

Software	Basic Software	Remarks
	Red Hat(R) Enterprise Linux(R) 5.5 (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) 5.3 (for x86) Red Hat(R) Enterprise Linux(R) 5.3 (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) 5.1 (for x86) Red Hat(R) Enterprise Linux(R) 5.1 (for Intel64) Red Hat(R) Enterprise Linux(R) 5 (for x86) Red Hat(R) Enterprise Linux(R) 5 (for Intel64) SUSE(R) Linux Enterprise Server 11 for x86 SUSE(R) Linux Enterprise Server 11 for EM64T	software, refer to the manual of the server or the Linux installation guide.
Agent [VMware]	VMware vSphere(TM) 4 VMware vSphere(TM) 4.1	Install Resource Orchestrator on the VMware ESX host.
Agent [Hyper-V]	Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	SP1 or later supported. The Server Core installation option is not supported. Turn ON the Hyper-V role. Add MSFC. Only Windows managers are supported.
Agent [Oracle VM]	Oracle VM 3.0	-
Agent [Xen]	Red Hat(R) Enterprise Linux(R) 5.4 (for x86) Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64)	-
HBA address rename setup service [Windows]	Microsoft(R) Windows Server(R) 2008 Standard (x86, x64) Microsoft(R) Windows Server(R) 2008 Enterprise (x86, x64) Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	The Server Core installation option is not supported.
	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	SP2 or later supported.
	Microsoft(R) Windows Vista(R) Business Microsoft(R) Windows Vista(R) Enterprise Microsoft(R) Windows Vista(R) Ultimate	-
	Microsoft(R) Windows(R) XP Professional Edition	SP2 or later supported.
	Microsoft(R) Windows(R) 7 Professional Microsoft(R) Windows(R) 7 Ultimate	-
HBA address rename setup service [Linux]	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) 5.4 (for x86) Red Hat(R) Enterprise Linux(R) 5.4 (for Intel64)	Prepare any required driver kits, update kits, or software. For information about required software, refer to the manual of the server or the Linux installation guide.

Note

Installation will fail when a Resource Orchestrator agent is installed on an unsupported OS.

[Hyper-V]

When using Hyper-V on managed servers, the only supported OS of the admin server is Windows.

[Xen]

When using RHEL5-Xen on managed servers, the only supported OS of the admin server is Linux.

Use of some functions used in the server virtualization software for Resource Orchestrator at the same time with this product is not supported. Please do not use these functions.

[Hyper-V]

VMware ESX can be managed by SCVMM using VMware vCenter Server. In Resource Orchestrator, VMware ESX cannot be managed through SCVMM. When managing VMware ESX in the above configuration, register VMware vCenter Server in Resource Orchestrator.

Table 1.17 List of Functions with no Support of Combined Use

Server Virtualization Software	Functions with no Support of Combined Use
VMware vSphere (TM) 4 VMware vSphere (TM) 4.1	Cisco Nexus 1000V virtual switch
Microsoft(R) System Center Virtual Machine Manager 2008 R2	<ul style="list-style-type: none"> - Movement of storage areas - Movement changing the virtual machine storage destination - Saving in the virtual machine library
Oracle VM Manager	Template

 **Note**

- If an L-Server is created with a specified Windows image, when deploying the image use Sysprep, provided by Microsoft, to re-configure the properties unique to the server. By executing Sysprep, the user information and OS setting information are reset. For details on Sysprep, refer to the information provided by Microsoft.
- If stopping or restarting of the manager is performed during execution of Sysprep, the operation being executed will be performed after the manager is started. Until the process being executed is completed, do not operate the target resource.
- When using MAK license authentication for activation of Windows Server 2008 image OS, Sysprep can be executed a maximum of three times. Since Sysprep is executed when creating L-Server with images specified or when collecting cloning images, collection of cloning images and creation of L-Servers with images specified cannot be performed more than four times. Therefore, it is recommended not to collect cloning images from L-Servers which have had cloning images deployed, but to collect them from a dedicated master server. When customization of a guest OS is performed using the template function in VMware or when the template is created using SCVMM, Sysprep is executed and the number is included in the count.

[Windows] [VMware]

Note the following points when collecting cloning images from an L-Server that was created using a cloning image.

- As L-Servers which has not been used even once after creation do not have server specific information set, creation of L-Servers using cloning images collected from an L-Server may fail. When collecting cloning images, set the server specific information on L-Server, after starting the target L-Server.

[Oracle VM]

The information on the [OS] tab cannot be set when deploying the image.

It is not necessary to install Resource Orchestrator on admin clients, but the following basic software is required.

Table 1.18 List of Basic Software for Admin Clients

Basic Software (OS)	Remarks
Microsoft(R) Windows(R) 7 Professional Microsoft(R) Windows(R) 7 Ultimate	-

Basic Software (OS)	Remarks
Microsoft(R) Windows Vista(R) Business Microsoft(R) Windows Vista(R) Enterprise Microsoft(R) Windows Vista(R) Ultimate	SP1 or later supported.
Microsoft(R) Windows(R) XP Professional operating system	SP3 or later supported.
Microsoft(R) Windows Server(R) 2008 Standard (x86, x64) Microsoft(R) Windows Server(R) 2008 Enterprise (x86, x64) Microsoft(R) Windows Server(R) 2008 R2 Standard Microsoft(R) Windows Server(R) 2008 R2 Enterprise Microsoft(R) Windows Server(R) 2008 R2 Datacenter	The Server Core installation option is not supported.
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	SP2 or later supported.

Table 1.19 Required Patches

Software	Basic Software (OS)	Patch ID/Bundle Update
Manager [Windows]	Microsoft(R) Windows Server(R) 2003 R2 Standard x64 Edition	KB942589 batch program (*1)
	Microsoft(R) Windows Server(R) 2003 R2 Enterprise x64 Edition	KB942589 batch program (*1)
	PRIMECLUSTER GLS	TP002714XP-06
Manager [Linux]	Red Hat(R) Enterprise Linux(R) 5 (for x86)	Bundle Update U09091 (5.4 compatible) Bundle Update U10041 (5.5 compatible)
	Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	Bundle Update U09091 (5.4 compatible) Bundle Update U10041 (5.5 compatible)
Agent [Windows]	PRIMECLUSTER GLS	TP002714XP-06
Agent [Windows/Hyper-V]	None	-
Agent [VMware]	None	-
Agent [Xen]	None	-
Agent [Oracle VM]	None	-
Agent [Linux]	Red Hat(R) Enterprise Linux(R) 5 (for x86)	Bundle Update U07121 (5.1 compatible) Bundle Update U08071 (5.2 compatible) Bundle Update U09031 (5.3 compatible) Bundle Update U09091 (5.4 compatible) Bundle Update U10041 (5.5 compatible)
	Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	Bundle Update U07121 (5.1 compatible) Bundle Update U08071 (5.2 compatible) Bundle Update U09031 (5.3

Software	Basic Software (OS)	Patch ID/Bundle Update
		compatible) Bundle Update U09091 (5.4 compatible) Bundle Update U10041 (5.5 compatible)
HBA address rename setup service [Windows]	None	-
HBA address rename setup service [Linux]	Red Hat(R) Enterprise Linux(R) 5 (for x86)	Bundle Update U09091 (5.4 compatible) Bundle Update U10041 (5.5 compatible)
	Red Hat(R) Enterprise Linux(R) 5 (for Intel64)	Bundle Update U09091 (5.4 compatible) Bundle Update U10041 (5.5 compatible)

*1: Necessary when managing a managed server within a separate subnet to the admin server.

[Hyper-V]

For manager, agents, SCVMM, SCVMM agents and Windows guest OS's, apply the latest updated program using the Microsoft Update.

Installation of the latest integrated service provided by each OS on VM guests is necessary.

1.3.2.2 Required Software

The software listed below is required when using Resource Orchestrator.

Table 1.20 List of Required Software

Software	Required Software	Version	Remarks
Manager [Windows]	ServerView Operations Manager for Windows (*1,*2) (previously ServerView Console for Windows)	V4.20.25 or later	This is necessary when viewing the server management software Web UI from the RC console. For details, refer to "Settings for ServerView Operations Manager 4.X for Windows" of "2.1.1.1 Software Preparation and Checks" in the "ServerView Resource Coordinator VE Installation Guide". When using VIOM, refer to the VIOM manual and use a supported version of ServerView Operations Manager.
		V5.00 or later	Necessary when using VMware ESXi as a managed server. Use a version of ServerView Operations Manager that supports VMware ESXi.
		V5.10.03 or later	This is necessary when viewing the server console window from the RC console. Use a version of ServerView Operations Manager that supports viewing of the server console window. When displaying the console window, install ServerView Operations Manager on the same computer as the Resource Orchestrator manager.

Software	Required Software	Version	Remarks
			When registering monitored servers with ServerView Operations Manager, specify the IP address of the iRMC server.
	Microsoft(R) LAN Manager module (*1)	-	Necessary when using backup and restore, or cloning. Obtain it from the Microsoft FTP site. (*3)
	BACS or Intel PROSet or PRIMECLUSTER GLS for Windows (*1)	-	Necessary when performing redundancy of the admin LAN for admin servers.
	ServerView RAID (*1,*2)	-	Necessary when a RAID is composed of local disks (*4).
	ServerView Virtual-IO Manager (*1)	2.4 or later	Necessary when creating physical L-Servers using blade servers.
	VMware vCenter Server (*1) (previously VMware VirtualCenter)	4.0 4.1	[VMware] Necessary for management of VM guests and VM hosts. Can be placed on the same admin server as the manager or on another server.
	SNMP Trap Service (*1)	-	-
	DHCP Server (*1) (Standard OS service)	-	Necessary when managing a managed server within a separate subnet to the admin server.
	Microsoft(R) System Center Virtual Machine Manager 2008 R2 (*1)	-	[Hyper-V] Necessary for management of VM guests and VM hosts. Can be placed on the same admin server as the manager or on another server. Multiple library servers can be configured. Configure control settings for a maximum of six sessions, referring to " SCVMM Server MaxShellPerUser Settings ".
	Windows PowerShell (*1)	2.0	[Hyper-V] Necessary for management of VM guests and VM hosts.
	ETERNUS SF Storage Cruiser Manager (*1)	14.2 or later	Necessary when connecting an ETERNUS LUN to a physical L-Server. Install on the same admin server as the manager.
	NavisecCLI (*1)	7.30 or later	Necessary when connecting an EMC CLARiiON LUN to a physical L-Server. Install on the same admin server as the manager.
	SymCLI (*1)	-	Necessary when connecting an EMC Symmetrix DMX to a physical L-Server. Install on the same admin server as the manager.
	Solutions Enabler (*1)	7.1.2 or later	Necessary when connecting an EMC Symmetrix DMX to a physical L-Server.

Software	Required Software	Version	Remarks
			Necessary to connect the server on which Solutions Enabler is operated to storage using a Fibre Channel connection. Can be installed on the same admin server as the manager or on another admin server.
	Oracle VM Manager (*1)	2.1 or later	[Oracle VM] Necessary for management of VM guests and VM hosts.
Manager [Linux]	ServerView Operations Manager for Linux (*1)	V4.81.05 or later	This is necessary when viewing the server management software Web UI from the RC console.
		V5.00 or later	Necessary when using VMware ESXi as a managed server. Use a version of ServerView Operations Manager that supports VMware ESXi.
		V5.10.03 or later	This is necessary when viewing the server console window from the RC console. Use a version of ServerView Operations Manager that supports viewing of the server console window. When displaying the console window, install ServerView Operations Manager on the same computer as the Resource Orchestrator manager. When registering monitored servers with ServerView Operations Manager, specify the IP address of the iRMC server.
	Microsoft(R) LAN Manager module (*1)	-	Necessary when using backup and restore, or cloning. Obtain it from the Microsoft FTP site. (*3)
	PRIMECLUSTER Enterprise Edition (*1)	4.3A00 or later	When an admin server is in a cluster configuration, one of the following software is necessary. The supported standby cluster type is 1:1 hot standby.
	PRIMECLUSTER HA Server (*1)	4.3A00 or later	
	PRIMECLUSTER GLS (*1)	-	Necessary when performing redundancy of the admin LAN for admin servers.
	VMware vCenter Server (*1) (previously VMware VirtualCenter)	4.0 4.1	Necessary for management of VM guest and VM host.
	net-snmp package (*1)	-	Included in operating system installation media.
	ETERNUS SF Storage Cruiser Manager (*1)	14.2 or later	Necessary when connecting an ETERNUS LUN to a physical L-Server. Install on the same admin server as the manager.
	NavisecCLI (*1)	7.30 or later	Necessary when connecting an EMC CLARiiON LUN to a physical L-Server. Install on the same admin server as the manager.
SymCLI (*1)	-	Necessary when connecting an EMC Symmetrix DMX to a physical L-Server.	

Software	Required Software	Version	Remarks
			Install on the same admin server as the manager.
	Solutions Enabler (*1)	7.1.2 or later	Necessary when connecting an EMC Symmetrix DMX to a physical L-Server. Necessary to connect the server on which Solutions Enabler is operated to storage using a Fibre Channel connection. Can be installed on the same admin server as the manager or on another admin server.
	Systemwalker Software Configuration Manager (*1)	-	Necessary when using RHEL5-Xen servers.
Agent [Windows]	ServerView Agent for Windows (*2)	V4.50.05 or later	-
	"setupcl.exe" module "sysprep.exe" module	-	Necessary when using backup and restore, or cloning. Refer to the Microsoft web site and obtain the latest modules. (*5) When using Windows Server 2008, the modules are already configured in the OS so there is no need to obtain new modules.
	Intel PROSet or PRIMECLUSTER GLS for Windows (*2)	-	Necessary when performing redundancy of the admin LAN and public LAN for managed servers.
	ServerView RAID (*2)	-	Necessary when a RAID is composed of local disks (*4).
	ETERNUS Multipath Driver	V2.0L10 or later	Necessary for multipath connections between servers and storage units (ETERNUS). Versions differ depending on OS and storage types. Refer to ETERNUS Multipath Driver support information.
	Data ONTAP DSM	3.2R1 or later	Necessary for connection between servers and storage units (NetApp). Versions differ depending on OS and storage types. Refer to Data ONTAP DSM support information.
	PowerPath	5.3 or later	Necessary for multipath connections between servers and storage units (EMC CLARiiON or EMC Symmetrix DMX). Versions differ depending on OS and storage types. Refer to PowerPath support information.
Agent [Linux]	ServerView Agent for Linux (*2)	V4.90.14 or later	-
	ServerView RAID (*2)	-	Necessary when a RAID is composed of local disks (*4).
	ETERNUS Multipath Driver	V2.0L02 or later	Necessary for multipath connections between servers and storage units (ETERNUS). Versions differ depending on OS and storage types. Refer to ETERNUS Multipath Driver support information.

Software	Required Software	Version	Remarks
	PowerPath	5.3	Necessary for multipath connections between servers and storage units (EMC CLARiiON or EMC Symmetrix DMX). Versions differ depending on OS and storage types. Refer to PowerPath support information.
Agent [Red Hat Enterprise Linux]	PRIMECLUSTER GLS (*2)	4.2A00 or later	Necessary when performing redundancy of the admin LAN and public LAN for managed servers.
Agent [VMware]	ServerView Agent for VMware (*2)	V4.30-20 or later	Not necessary when using VMware ESXi for the agent.
	ServerView RAID (*2)	-	Necessary when a RAID is composed of local disks (*4).
	ServerView ESXi CIM Provider	1.10.01 or later	Necessary when using VMware ESXi.
Agent [Hyper-V]	ServerView Agent for Windows (*2)	V4.50.05 or later	-
	"setupcl.exe" module "sysprep.exe" module	-	Necessary when using backup and restore, or cloning. Refer to the Microsoft web site and obtain the latest modules. (*5) When using Windows Server 2008, the modules are already configured in the OS so there is no need to obtain new modules.
	Intel PROSet	15.6.25.0 or later	Necessary to automatically perform the following configurations using Intel PROSet on blade servers: <ul style="list-style-type: none"> - Virtual network creation and NIC connection - Configuration of the server blade connection ports of LAN switch blades - Connection of the server blade ports and external connection ports This is not necessary when the following applies: <ul style="list-style-type: none"> - When not performing network redundancy for L-Servers using blade servers - When using servers other than blade servers
	PRIMECLUSTER GLS for Windows (*2)	-	After configuring redundancy for blade servers using PRIMECLUSTER GLS, it is necessary to perform the following configurations automatically: <ul style="list-style-type: none"> - Virtual network creation and NIC connection - Configuration of the server blade connection ports of LAN switch blades - Connection of the server blade ports and external connection ports This is not necessary when the following applies: <ul style="list-style-type: none"> - When not performing network redundancy for L-Servers using blade servers

Software	Required Software	Version	Remarks
			- When using servers other than blade servers For details, refer to " 1.2.6 Simplifying Network Settings ".
Agent [Xen]	ServerView Agent for Linux	V4.81-14 or later	Necessary when using PRIMEQUEST series servers.
	ServerView RAID (*2)	-	Necessary when a RAID is composed of local disks (*4).
	PRIMECLUSTER GDS	-	Necessary when using RHEL5-Xen servers.
Agent [Oracle VM]	ServerView Agent for Linux	5.0 or later	-
HBA address rename setup service [Windows]	Windows(R) Internet Explorer(R)	7 8	Necessary in the following cases: - When displaying the online help - When creating physical L-Servers using rack mount servers
HBA address rename setup service [Linux]	Firefox	3	Necessary in the following cases: - When displaying the online help - When creating physical L-Servers using rack mount servers

*1 Unless specified otherwise, install on the same server as the manager.

*2: Necessary when using PRIMERGY series servers.

When installing managers in cluster environments, installation on both the primary and secondary nodes is necessary.

*3: Obtain it from the following Microsoft FTP site.

Microsoft FTP site

URL: <ftp://ftp.microsoft.com/bussys/clients/msclient/dsk3-1.exe> (As of July 2011)

*4: A local disk refers either to a server's internal disk, or to one stored in a storage blade.

*5: The necessary files vary depending on the CPU architecture (x86, x64) of the target system, and the OS version. Check the Microsoft web site for the modules to obtain.

Microsoft web site

URL(x86):
<http://www.microsoft.com/downloads/details.aspx?familyid=93F20BB1-97AA-4356-8B43-9584B7E72556&displaylang=en>
(As of July 2011)

URL(x64):
<http://www.microsoft.com/downloads/details.aspx?familyid=C2684C95-6864-4091-BC9A-52AEC5491AF7&displaylang=en>
(As of July 2011)

After obtaining the latest version of module, place it in a work folder (such as C:\temp) of the system for installation and execute it. For details on execution, refer to "Required Software Checks" of "[4.2 Installing the Agent](#)".

The module is not necessary after installation of agents.

The following software is necessary for admin clients.

Table 1.21 List of Required Software for Admin Clients

Required Software	Version	Remarks
Windows(R) Internet Explorer(R)	7 8 9	-
Java(TM) 2 Runtime Environment Standard Edition	(*1)	Necessary for displaying the management window of ServerView Operations Manager, the VM management console, or console window on admin clients.
VMware vSphere(TM) Client	4.0 4.1	Necessary on admin clients when using the functions for coordinating with VMware or the VM management software on managed servers. [VMware]
Hyper-V Manager	-	Necessary on admin clients when using the functions for coordinating with Hyper-V on managed servers. Operation on Windows XP and Windows 2003 are not supported. [Hyper-V]
Microsoft(R) System Center Virtual Machine Manager 2008 R2 VMM management console	-	Necessary on admin clients when using the functions for coordinating with VM management software and connecting with the L-Server console. [Hyper-V]
ETERNUS SF Storage Cruiser clients	14.2 or later	Necessary when checking the detailed information of storage using the admin client. Operation on Windows 2003 x64 Edition is not supported.

*1: To display the management window of ServerView Operations Manager, please refer to the ServerView Operations Manager manual.

To display the VM management console, version 1.5 or later is necessary.

1.3.2.3 Exclusive Software

Resource Orchestrator cannot be used in combination with Resource Coordinator, Cloud Infrastructure Management Software, or the following products.

Table 1.22 List of Exclusive Software

Software	Product Name
Manager [Windows]	ServerView Deployment Manager
	ServerView Installation Manager (*1)
Manager [Linux]	Server System Manager
Agent [Windows/Hyper-V]	Server System Manager
	ServerView Deployment Manager (*2)
Agent [Linux]	Server System Manager
	ServerView Deployment Manager (*2)
Agent [VMware]	ServerView Deployment Manager (*2)
Agent [Xen]	-
Agent [Oracle VM]	ServerView Deployment Manager (*2)

*1: As managers of this product include PXE server, use in combination with the PXE server required for remote installation of ServerView Installation Manager is not possible.

*2: ServerView Deployment Manager can be installed after Resource Coordinator has been installed. For details on installation, refer to "4.2 Installing the Agent".

Note

- The admin server of Resource Orchestrator can manage the ServerView Resource Coordinator VE V2.2.2 Agent. In such cases, the agent can be used within the function range for ServerView Resource Coordinator VE.
- The same resource cannot be managed by the Resource Orchestrator admin server and the ServerView Resource Coordinator VE admin server.
- Resource Orchestrator managers contain some functions of DHCP servers and PXE servers. Therefore, do not place products or services with other DHCP server or PXE server functions on the admin server. Such products or services can be placed in the same network as Resource Orchestrator managers.

Examples of Products Including DHCP Servers and PXE Servers

- The Windows Server 2003 "Remote Installation Service", and the Windows Server 2008/Windows Server 2003 "Windows Deployment Service"
- ADS (Automated Deployment Services) of Windows Server 2003
- Boot Information Negotiation Layer (BINLSVC)
- ServerView Deployment Manager (*1)
- ServerStart (when using the remote installation function)
- ServerView Installation Manager
- Solaris JumpStart

*1: As PXE server is included, the use of some functions is restricted when it is used on the same admin LAN as ServerView Resource Orchestrator. For details on co-existence with ServerView Deployment Manager, refer to "Appendix J Co-Existence with ServerView Deployment Manager" of the "ServerView Resource Coordinator VE Setup Guide".

[Windows]

- Depending on the Windows Server domain type, the available functions differ as indicated in the table below.

Table 1.23 Function Restrictions Based on Domain Type

Domain Type	Backup and Restore	Cloning	Server Switchover Using Backup and Restore
Domain controller	No	No	No
Member server (*1)	Yes (*2)	Yes (*2, *3)	Yes (*2, *4)
Workgroup	Yes	Yes	Yes

Yes: Use possible.

No: Use not possible.

*1: Member servers of Windows NT domains or Active Directory.

*2: After performing operations it is necessary to join Windows NT domains or Active Directory again.

*3: Before obtaining cloning images, make sure that the server is not a member of a Windows NT domain or Active Directory.

*4: When switchover has been performed using Auto-Recovery, join Windows NT domains or Active Directory again before starting operations.

[Windows/Linux]

- Contact Fujitsu technical staff for information about ServerView Deployment Manager.

1.3.2.4 Static Disk Space

For new installations of Resource Orchestrator, the following static disk space is required. The amount of disk space may vary slightly depending on the environment in question.

Table 1.24 Static Disk Space

Software	Folder	Disk Capacity (Unit: MB)
Manager [Windows]	<i>Installation_folder</i> (*1)	800
Manager [Linux]	/opt	570
	/etc/opt	4
	/var/opt	120
Agent [Windows/Hyper-V]	<i>Installation_folder</i> (*1)	100
Agent [Linux]	/opt	90
	/etc/opt	5
	/var/opt	5
Agent [VMware]	/opt	90
	/etc/opt	5
	/var/opt	5
Agent [Xen]	/opt	90
	/etc/opt	5
	/var/opt	5
Agent [Oracle VM]	/opt	90
	/etc/opt	5
	/var/opt	5

*1: The installation folder name specified when this software is installed.
 The default folder name when Windows is installed on C:\ is as follows:
 C:\Program Files\Resource Orchestrator

1.3.2.5 Dynamic Disk Space

When using Resource Orchestrator, the following disk space is required for each folder, in addition to static disk space. For details on each item, refer to "1.1.2.5 Dynamic Disk Space" in the "ServerView Resource Coordinator VE Installation Guide".

Table 1.25 Dynamic Disk Space

Software	Folder	Disk Capacity (Unit: MB)
Manager [Windows]	<i>Installation_folder</i> (*1)	2400 + <i>Number_of_managed_servers</i> * 4
		<i>Environmental_data_storage_area</i>
	<i>Image_file_storage_folder</i> (*2)	<i>Image_file_storage_area</i> (*3)
	<i>Backup_storage_folder_for_configuration_definition_information</i>	<i>Backup_storage_area_for_configuration_definition_information</i>
	<i>L-Server_restoration_log_storage_folder</i>	<i>L-Server_restoration_log_storage_area</i> (*4)
Manager [Linux]	/etc	2
	/var/opt	2400 + <i>Number_of_managed_servers</i> * 4
		<i>Environmental_data_storage_area</i>
	<i>Image_file_storage_directory</i> (*2)	<i>Image_file_storage_area</i> (*3)
	<i>Backup_storage_folder_for_configuration_definition_information</i>	<i>Backup_storage_area_for_configuration_definition_information</i>
<i>L-Server_restoration_log_storage_folder</i>	<i>L-Server_restoration_log_storage_area</i> (*4)	

Software	Folder	Disk Capacity (Unit: MB)
Agent [Windows/ Hyper-V]	<i>Installation_folder</i> (*1)	60
Agent [Linux]	/etc	1
	/var/opt	1
Agent [VMware]	/etc	1
	/var/opt	1
HBA address rename setup service [Windows]	<i>Installation_folder</i> (*1)	60
HBA address rename setup service [Linux]	/etc	1
	/var/opt	60
Agent [Xen]	/etc	1
	/var/opt	1
Agent [Oracle VM]	/etc	1
	/var/opt	1

*1: The installation folder name specified when this software is installed.

The default folder name when Windows is installed on C:\ is as follows:

C:\Program Files\Resource Orchestrator

*2: The name of the storage folder (directory) specified for image files when this software is installed.

[Windows]

The default folder name when Windows is installed on C:\ is as follows:

C:\Program Files\Resource Orchestrator\ScwPro\depot

[Linux]

The default folder name is as follows:

var/opt/FJSVscw-deployv/depot

*3: The image storage area when using cloning images for cloning of physical servers using RCVE.

Cloning images of L-Servers are stored in image pools regardless of server types.

*4: The backup storage area for configuration definition information and the L-Server restoration log storage area can be specified in the definition file. Estimate according to the location of the specified disk. For details on disk capacity and the content of the backup storage area for configuration definition information and the L-Server restoration log storage area, refer to "[Appendix E Backup and Restoration of Admin Servers](#)".

1.3.2.6 Memory Size

The memory size listed below is required when using Resource Orchestrator.

Table 1.26 Memory Size

Software	Memory Size (Unit: MB)
Manager [Windows]	3072
Manager [Linux]	3072
Agent [Windows/Hyper-V]	32
Agent [Linux]	32
Agent [VMware]	32
Agent [Xen]	32

Software	Memory Size (Unit: MB)
Agent [Oracle VM]	32

1.4 Hardware Environment

The hardware conditions described in the table below must be met when using Resource Orchestrator.

Table 1.27 Required Hardware

Software	Hardware	Remarks
Manager	PRIMERGY BX series servers PRIMERGY RX series servers PRIMERGY TX series servers	The CPU must be a multi-core CPU. 4 GB or more of memory is necessary.
Agent	PRIMERGY BX400 S1 PRIMERGY BX620 S6 PRIMERGY BX620 S5 PRIMERGY BX620 S4 PRIMERGY BX920 S2 PRIMERGY BX920 S1 PRIMERGY BX922 S2 PRIMERGY BX924 S2 PRIMERGY BX960 S1 PRIMERGY RX100 S6 PRIMERGY RX100 S5 PRIMERGY RX200 S6 PRIMERGY RX200 S5 PRIMERGY RX200 S4 PRIMERGY RX300 S6 PRIMERGY RX300 S5 PRIMERGY RX300 S4 PRIMERGY RX600 S5 PRIMERGY RX600 S4 PRIMERGY RX900 S1 PRIMERGY TX150 S7 PRIMERGY TX150 S6 PRIMERGY TX200 S6 PRIMERGY TX200 S5 PRIMERGY TX300 S6 PRIMERGY TX300 S5 PRIMERGY TX300 S4 PRIMEQUEST 1000 series servers Other PC servers	<ul style="list-style-type: none"> - In the case of PRIMERGY BX series servers, only configurations where Fibre Channel cards are mounted in expansion slot 2 are supported. - When using servers other than the PRIMERGY BX series, it is necessary to mount an IPMI-compatible (*1) server management unit (*2). - In the case of physical L-Servers, PRIMERGY TX series, PRIMERGY RX100 series, PRIMEQUEST 1000 series, and other PC servers cannot be used. - When the server virtualization software is RHEL5-Xen, only PRIMEQUEST 1000 series are supported as managed servers. - When using iSCSI boot on physical L-Servers, both PRIMERGY BX900 and VIOM are necessary. - When the destination of a physical L-Server is a PRIMERGY BX series server and the LAN switch being used is a PG-SW109 or a PG-SW201, only NIC1 and NIC2 can be used.

*1: Supports IPMI2.0.

*2: This usually indicates a Baseboard Management Controller (BMC).

For PRIMERGY, it is called an integrated Remote Management Controller (iRMC).

The following hardware is required for admin clients:

Table 1.28 Required Hardware for Admin Clients

Software	Hardware	Remarks
Client	Personal computers PRIMERGY RX series servers PRIMERGY BX series servers PRIMERGY TX series servers Other PC servers	-

When connecting storage units that can be connected to the physical servers of L-Servers, the following storage units can be used:

Table 1.29 Storage Units which can be Connected with L-Servers on Physical Servers

Hardware	Remarks
ETERNUS DX8000 series ETERNUS DX400 series ETERNUS DX90 ETERNUS DX80 ETERNUS DX60 ETERNUS8000 series	-
ETERNUS4000 series	Model 80 and model 100 are not supported.
ETERNUS2000 series	-
NetApp FAS6000 series NetApp FAS3100 series NetApp FAS2000 series NetApp V6000 series NetApp V3100 series	Data ONTAP 7.3.3 or later (8.x.x is not supported)
EMC CLARiiON CX4-120 EMC CLARiiON CX4-240 EMC CLARiiON CX4-480 EMC CLARiiON CX4-960	Navisphere Manager and Access Logix must be installed on SP.
EMC Symmetrix DMX-3 EMC Symmetrix DMX-4	VolumeLogix must be installed on SP.

When using storage management software, do not change or delete the content set for storage units by Resource Orchestrator. Insufficient disk space does not cause any problems for RAID group or aggregate creation.

When connecting storage units that can be connected to the physical servers of L-Servers, the following Fibre Channel switches can be used:

Table 1.30 Fibre Channel Switches which can be used when Connecting ETERNUS Storage, NetApp Storage, EMC CLARiiON Storage, and EMC Symmetrix DMX Storage with L-Servers on Physical Servers

Hardware	Remarks
Brocade series ETERNUS SN200 series	-
PRIMERGY BX600 Fibre Channel switch blades	Connect fibre channel switch blades to the following connection blades: - NET3, NET4
PRIMERGY BX900 Fibre Channel switch blades	Connect fibre channel switch blades to the following connection blades: - CB5, CB6
PRIMERGY BX400 Fibre Channel switch blades	Connect fibre channel switch blades to the following connection blades: - CB3, CB4

The following LAN switch blades are available when using the simplifying network settings:

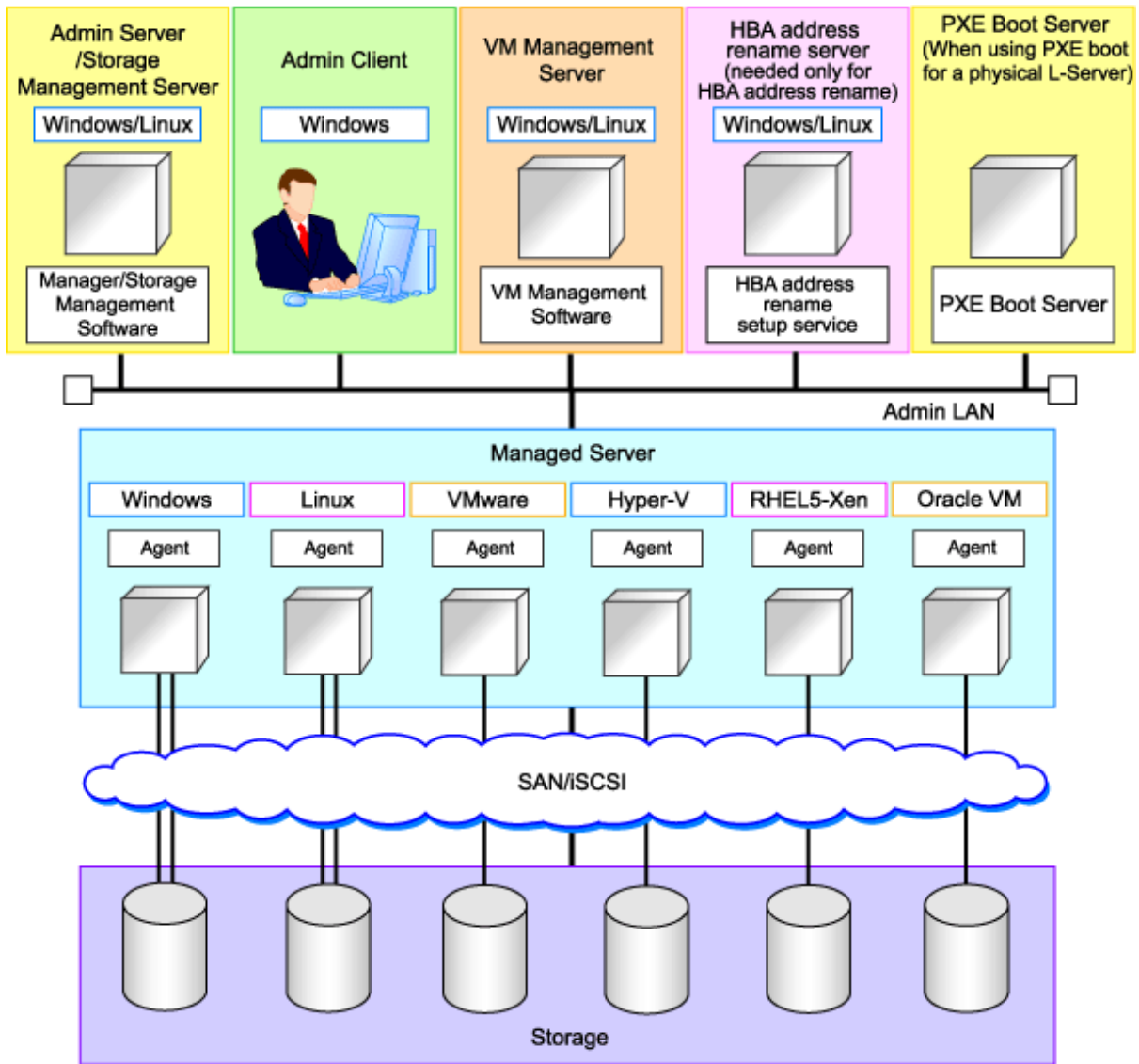
For details on physical L-Servers, refer to "[F.6.1 Automatic Network Configuration](#)".

For details on virtual L-Servers, refer to "[G.1.4 Setup](#)", "[G.2.4 Setup](#)".

1.5 System Configuration

This section provides an example of a Resource Orchestrator system configuration.

Figure 1.6 Example of System Configuration



Admin Server

The admin server operates in a Windows or Linux environment. An admin server can be operated on VMware and Hyper-V virtual machines.

The Resource Orchestrator manager should be installed on the admin server. The admin server can be made redundant by using clustering software. The admin client can operate on the same machine as the admin server.

The Resource Orchestrator agent cannot be installed on the admin server to monitor and manage the admin server itself.

Note

Also install ServerView Virtual-IO Manager when creating physical L-Servers using blade servers.

When operating an admin server on a virtual machine on VMware or Hyper-V, do not register VM hosts which operate on the admin server in VM pools.

[Hyper-V]

When using Hyper-V on managed servers, the only supported OS of the admin server is Windows.

[Xen]

When using RHEL5-Xen on managed servers, the only supported OS of the admin server is Linux.

Managed Server

A managed server is a server used for operational purposes. It is managed by the admin server.

Install agents on managed servers.

In server virtualization environments, the agent should only be installed on the VM host.



Note

When using VMware ESXi, Resource Orchestrator agents cannot be installed.

Install ServerView ESXi CIM Provider agents.

Admin Client

Admin clients are terminals used to connect to the admin server, which can be used to monitor and control the configuration and status of the entire system.

Admin clients should run in a Windows environment.

Storage Management Server

A server on which storage management software which manages multiple storage units has been installed.

Sharing with the admin server differs depending on the storage in use.

- When using ETERNUS storage

Operate ETERNUS SF Storage Cruiser in the same environments as the admin server.

Note that resources for both the admin and storage management software servers are required when operating the servers together.

- When using NetApp storage

In Resource Orchestrator, Data ONTAP can be used as storage management software, but a server for storage management software is not necessary, as Data ONTAP is an OS for NetApp storage.

- When using EMC CLARiiON storage

In Resource Orchestrator, Navisphere can be used as storage management software, but servers for storage management software are not necessary, as Navisphere is software operated on the SP of EMC CLARiiON storage.

- When using EMC Symmetrix DMX storage

In Resource Orchestrator, Solutions Enabler can be used as storage management software. Servers for storage management software can be operated on the same computer as the admin server, but the storage management software must be connected to EMC Symmetrix DMX storage using FC-HBA. Note that resources for both the admin and storage management software servers are required when operating the servers together.

VM Management Server

A server on which VM management software (such as VMware vCenter Server, System Center Virtual Machine Manager and Oracle VM Manager) to integrate multiple server virtualization software products has been installed. The VM management server can be operated on the same machine as the admin server.

Note that resources for both the admin and VM management servers are required when operating the servers together.

PXE Boot Server

For purposes such as OS installation, it is necessary to perform PXE boot of a physical L-Server using its own PXE server.

The PXE boot server must be operated on a server other than the admin server.

Note

PXE boot is unavailable on networks that use tagged VLAN settings.

Do not configure tagged VLANs for PXE boot servers.

HBA address rename Setup Service Server

A server on which the HBA address rename setup service operates.

This is necessary when creating physical L-Servers using rack mount servers.

This is not necessary when creating physical L-Servers using blade servers.

When an admin server cannot be communicated with from a managed server, configure the necessary WWNs for starting the managed server instead of the admin server.

The server for the HBA address rename setup service can be operated in a Windows or Linux environment.

Install the HBA address rename setup service on this server.

Use as an admin server and managed server at the same time is not possible.

Keep this server powered ON at all times, in preparation for admin server trouble or communication errors.

For details, refer to "3.3.2 HBA and Storage Device Settings" and "Appendix I WWN Allocation Order During HBA address rename Configuration" in the "ServerView Resource Coordinator VE Setup Guide".

Admin LAN

The admin LAN is the LAN used by the admin server to control managed servers and storage.

The admin LAN is set up separately from the public LAN used by applications on managed servers.

Using network redundancy software on the server enables redundancy for the admin LAN or the public LAN. Manually configure network redundancy software.

When using a physical L-Server, the default physical network adapter numbers available for the admin LAN are as given below.

- When not performing redundancy, "1" is available
- When performing redundancy, "1" and "2" are available

Note

When using a NIC other than the default one, the configuration at the time of physical server registration and at L-Server creation must be the same. Thus when designing systems it is recommended that physical servers registered in the same server pool use the same NIC index.

Information

The first NIC that is available for the admin LAN can be changed.

For details, refer to "6.1.3.1 Registering Blade Servers and Partition Model Servers" in the "ServerView Resource Coordinator VE Setup Guide".

iSCSI LAN

Refer to "3.2.1 Network Configuration" in the "ServerView Resource Coordinator VE Setup Guide".

1.6 Managed Resources

Resource Orchestrator can be used to manage the resources described in the table below.

For details on management of chassis, servers, VM hosts, VM management software, and LAN switches, refer to "Chapter 3 System Design and Initial Setup" of the "ServerView Resource Coordinator VE Setup Guide".

Table 1.31 Managed Resources

resource	Description
Chassis	A chassis is an enclosure used to house server blades. It can monitor the statuses of servers, display their properties, and control their power states.
Physical server	<p>This is a general term for any physical server. This term is used to distinguish physical servers from virtual machines that are created using server virtualization software such as VMware or Hyper-V. The following usage methods are available for physical servers:</p> <ul style="list-style-type: none"> - Managing unused physical servers as L-Servers by registering them with Resource Orchestrator - Managing configured physical servers by linking them to L-Servers <p>VM hosts and physical OS's running on physical servers can be detected and registered as managed resources by Resource Orchestrator.</p>
VM host	<p>This refers to the server virtualization software running on a server to operate a virtual machine. For example, Windows Server 2008 R2, or VMware ESX for VMware or Oracle VM Server with Hyper-V roles added.</p> <p>VM hosts can be managed by monitoring their statuses, displaying their properties, and performing operations such as HBA address rename and server switchover.</p> <p>When a VM host is registered, any VM guests on the VM host are automatically detected and displayed in the server tree. The power and migration operations of VM guests can be performed from the server tree, however, detected VM guests cannot perform operations as L-Servers.</p>
VM management software	<p>This software manages multiple server virtualization software. For example, for VMware, it is vCenter Server, for Hyper-V, it is SCVMM, and for Oracle VM, it is Oracle VM Manager.</p> <p>VM management software can be integrated (registered) into Resource Orchestrator to enable the use of functions for VM guests.</p>
LAN switch	<p>This term encompasses both the network switches that are mounted in a blade server chassis (LAN switch blades), and the external LAN switches that are directly connected to them.</p> <p>Resource Orchestrator can monitor LAN switch blade statuses, display their properties, and manage their VLAN configurations.</p> <p>For LAN switch blades and external LAN switches, the following information is displayed in a comprehensive Network Map.</p> <ul style="list-style-type: none"> - Network configurations of physical servers and virtual machines (Virtual switches, VM Guests) - Statuses of network connections between resources - VLAN configuration status within physical servers and virtual machines
VM guest	<p>This refers to the operating system running on a virtual machine.</p> <p>Resource Orchestrator can monitor VM guest statuses, display their properties, and control their power states. In addition to the functions of ServerView Resource Coordinator VE, the following functions are available for use:</p> <ul style="list-style-type: none"> - Managing new VM guests as L-Servers - Managing configured virtual machines by linking them to L-Servers
Virtual switch	<p>This is a virtual LAN switch used to manage a VM guest network on the VM host.</p> <p>In Hyper-V it represents the concept of virtual networks.</p> <p>It supports virtual switches, which are standard Hyper-V virtual network and VMware functions. Cisco Nexus 1000V virtual switches are not supported.</p>

resource	Description
Disk resource	This refers to a disk resource allocated to a server. For EMC CLARiiON and ETERNUS storage this is a LUN, for NetApp storage it is a FlexVol, for EMC Symmetrix DMX storage it is a device, and for VM guests it is a virtual disk.
Virtual storage resources	This refers to a resource that can create a disk resource. Examples include RAID groups, aggregates, DSK groups, and file systems for creating VM (VMFS (data store) of VMware, etc.). Disk resources can be created from RAID groups of ETERNUS storage, aggregates of NetApp storage, and file systems for creating VM.
Storage management software	Software to manage and integrate one or multiple storage units. For EMC CLARiiON storage, they are Navisphere, for EMC Symmetrix DMX storage, it is Solutions Enabler, for ETERNUS storage, it is ETERNUS SF Storage Cruiser, and for NetApp storage, it is Data ONTAP. Integration (registration) with Resource Orchestrator enables the use of functions for basic management of storage units.
Network resource	This refers to a resource that defines network information for use by an L-Server. By connecting the NIC for an L-Server to a network resource, the physical and virtual network switches are configured, enabling the L-Server to communicate. If an IP address range is set for a network resource, the IP address can be automatically set when deploying an image to an L-Server. For details, refer to " 1.2.6 Simplifying Network Settings ".
Address set resources	WWNs and MAC addresses. Necessary when creating physical L-Servers.
Virtual image resources	An image that is created using a template from a VM management software for VM guest creation, or that is collected as a cloning image from an L-Server.
Physical image resources	An image that is collected as a cloning image from an L-Server.

1.7 Setup Operations When Using Resource Orchestrator

This section explains setup operations when using Resource Orchestrator, based on user types.

This section explains the users who operate Resource Orchestrator, and their roles.

Infrastructure Administrators

Infrastructure administrators manage ICT resources such as servers, storage, networks, and images.

They collectively manage ICT resources in resource pools, and perform addition, configuration modification, and maintenance of ICT resources when necessary.

In Resource Orchestrator, the following roles can be assigned to infrastructure administrators:

- supervisor (special administrator)
- infra_admin (infrastructure administrator)

Service Administrators

Service administrators provide L-Servers for service users depending on the purpose of usage.

In Resource Orchestrator, the following role can be assigned to service administrators:

- service_admin (service administrator)

The following role combines the roles of infrastructure administrators and service administrators.

- administrator (administrator)

For details on roles, refer to "[C.1 Roles](#)".

1.7.1 Setup Operations for Infrastructure Administrators without Tenants

This section explains the operation procedure for infrastructure administrators.

When sharing resources within a department, perform the following procedure.

1. Pre-setup Preparations

- Decide the server environment
- Decide the network environment
- Decide the storage environment
- Decide the power monitoring environment

For details on pre-setup preparations, refer to "[Chapter 3 Pre-setup Preparations](#)".

2. Installation

- Install the manager
- Install agents

For details on installation, refer to "[Chapter 4 Installation and Uninstallation](#)".

3. Setup

- Register resources
- Register resources in the resource pool
- Create an L-Server template

For details on how to set up Resource Orchestrator, refer to "[Chapter 5 Setup](#)".

1.7.2 Setup Operations for Infrastructure Administrators with Tenants

When sharing resources between multiple departments, perform the following operations.

1. Pre-setup Preparations

- Decide the server environment
- Decide the network environment
- Decide the storage environment
- Decide the power monitoring environment

For details on pre-setup preparations, refer to "[Chapter 3 Pre-setup Preparations](#)".

2. Installation

- Install the manager
- Install agents

For details on installation, refer to "[Chapter 4 Installation and Uninstallation](#)".

3. Tenant creation

Create tenants.

- Tenant creation

When a tenant is created, tenant folders and resource pools to store the resources of the tenant are created. Users and user groups to manage the tenant are also created.

For details on tenants, refer to "[B.3 Tenants](#)".

When managing users using directory services, create users and user groups using another method.

For details, refer to "[C.4 User Management Using Directory Service](#)".

4. Setup

- Register resources
- Register resources in the resource pool
- Create an L-Server template

For details on how to set up Resource Orchestrator, refer to "[Chapter 5 Setup](#)".

When a resource folder was created in step 3., configure the operations and access scopes by creating users and user groups. For details on how to create users and user groups, refer to "[Appendix C Roles and User Groups](#)".

When using a physical server as an L-Server, also refer to "[Appendix F Configuration when Creating a Physical L-Server](#)".

When using the settings of virtualization software, the installation method differs depending on the server virtualization software used.

Refer to "[Appendix G Configuration of Server Virtualization Software](#)".

1.7.3 Setup Operations for Service Administrators

Service administrators perform the following operations:

- When creating only L-Server configuration definitions

Check the "None (Definition only)" checkbox on the [General] tab of the [Create an L-Server] dialog.

- When performing creation using an L-Server template

Create an L-Server, referring to "[6.1 Creation Using an L-Server Template](#)".

- Create an L-Server specifying individual specifications

Create an L-Server, referring to "[Appendix D L-Server Parameter Details](#)".

- When creating an L-Server and allocating resources

The procedures differ when using an L-Server template and when specifying individual specifications.

- When performing creation using an L-Server template

- When there are no cloning images, or when not using already registered cloning images

1. Create an L-Server, referring to "[6.1 Creation Using an L-Server Template](#)".

Specify "None" for images.

2. Install an OS, referring to "[6.1.1 Manual OS Installation](#)".

3. When collecting cloning images after creating an L-Server, the cloning images are stored in the image pool.

For details on how to collect cloning images, refer to "[6.6 Cloning Images](#)".

- When using an existing cloning image

Create an L-Server, referring to "[6.1 Creation Using an L-Server Template](#)".

For the image, specify the cloning image which you want to use.

- Create an L-Server specifying individual specifications

Create an L-Server, referring to "[Appendix D L-Server Parameter Details](#)".

When there are no cloning images, or when not using already registered cloning images, select "None" for images.

When using an existing cloning image, specify the cloning image that you want to use for the image.

1.8 System Operations When Using Resource Orchestrator

This section explains system operations when using Resource Orchestrator.

Operations for Infrastructure Administrators

Operations which infrastructure administrators (infra_admin) can perform are as follow:

- Registration, modification, and deletion of resources
For details, refer to "[5.2 Registering a Resource](#)", "[5.3 Registering to a Resource Pool](#)" and "[A.3 Resource Operations](#)".
- Creation, modification, and deletion of resource pools
For details, refer to "[Appendix A Resource Pools](#)".
- Creation, modification, and deletion of L-Server templates
For details, refer to "[5.4 L-Server Template](#)".
- Realization of High Availability
For details on how to use the following functions, refer to "[Appendix I Realization of High Availability](#)".
 - Blade chassis high availability
 - Storage chassis high availability
 - Disaster RecoveryFor details, refer to "[Appendix J Disaster Recovery](#)".

Operations for Service Administrators

Operations which service administrators (service_admin) can perform are as follow:

- L-Server
 - "[6.2 Power Operations](#)"
 - "[6.3 Modifying an L-Server](#)"
 - "[6.4 Using the L-Server Console](#)"
 - "[6.5 Deleting an L-Server](#)"
 - "[6.7 Snapshots, and Backup and Restoration of L-Servers](#)"
 - "[6.9 Allocating and Releasing Resources](#)"
 - "[6.10 Changing Physical Server Usage](#)"
- Creation, modification, and deletion of resource folders
For details, refer to "[B.2 Resource Folders](#)".

1.9 Maintenance Operations When Using Resource Orchestrator

This section explains maintenance when using Resource Orchestrator.

1.9.1 Snapshots, and Backup and Restoration of L-Servers

An outline of users and overviews depending on the targets and area of backup, restore, and snapshot is as follows:

Administrators (administrator) can perform operations of both infrastructure administrators (infra_admin) and service administrators (service_admin).

Table 1.32 Users and Overviews Depending on the Backup and Restore Targets

Type	Area	User	Overview
Admin Server	System Disk	Infrastructure Administrators	Refer to " Appendix E Backup and Restoration of Admin Servers ".
	Data Disk		
VM host	System Disk	Infrastructure Administrators	Settings differ according to the server virtualization software being used. Refer to the manual of server virtualization software.
Physical L-Server	System Disk	Service Administrators	Refer to " 6.7 Snapshots, and Backup and Restoration of L-Servers ".

Table 1.33 Users and Overviews Depending on the Snapshot Targets

Type	Area	User	Overview
Virtual L-Server	System Disk	Service Administrators	Refer to " 6.7 Snapshots, and Backup and Restoration of L-Servers ".
	Data Disk		

1.9.2 Collecting Information During System Failure

Explains how to collect the information during a system failure (error).

For details on how to solve problems and gather troubleshooting data for technical investigation, refer to "Chapter 4 Troubleshooting" of the "ServerView Resource Orchestrator Reference Guide".

1.9.3 Hardware Maintenance

For details on hardware maintenance, refer to "Chapter 9 Hardware Maintenance" of the "ServerView Resource Coordinator VE Operation Guide".

For servers not using server management software

When replacing an entire server, a CPU, or memory, if there are differences in the CPU or memory specifications before and after the replacement, reflect the new CPU and memory specifications of the replaced server in the definition file before reconfiguring hardware information.

For details on the definition file, refer to "[5.2.6 Servers Not Using Server Management Software](#)".

In the following cases, reflect the correct value on the definition file before reconfiguring the hardware information.

- When defining the configuration information (CPU core count, CPU clock speed, memory capacity, etc.) of the target server after registering it with Resource Orchestrator
- When modifying the configuration information (CPU core count, CPU clock speed, memory capacity, etc.) of a server that has been registered with Resource Orchestrator, in the definition file

For reconfiguring hardware properties, refer to "For rack mount or tower servers" in "9.3 Re-configuring Hardware Properties" of "ServerView Resource Coordinator VE Operation Guide".

Chapter 2 Screen Layout

This chapter provides an overview of the RC console.

Resource Orchestrator includes two graphical user interfaces: the RC console and BladeViewer.

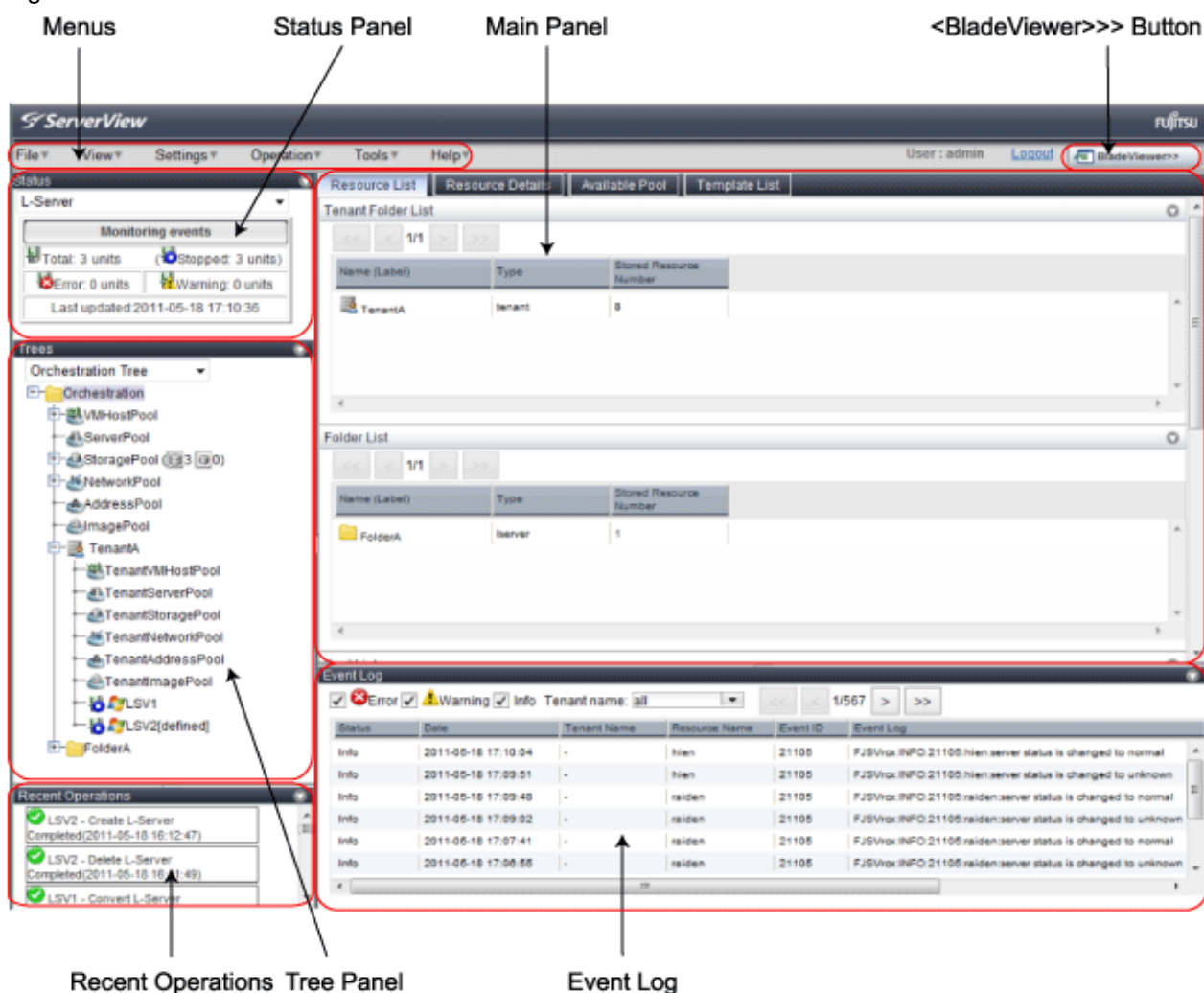
For details on how to open and close the RC console, refer to "5.3 RC Console" in the "ServerView Resource Coordinator VE Setup Guide".

For details on BladeViewer, refer to "Chapter 3 BladeViewer" of the "ServerView Resource Coordinator VE Operation Guide".

2.1 RC Console

This section explains how the RC console is organized.

Figure 2.1 RC Console



Menus

Operations can be performed either from the menu bar or popup menus.

The RC console menu is described below.

For details regarding menus not listed below, refer to "Chapter 2 User Interface" of the "ServerView Resource Coordinator VE Setup Guide".

Table 2.1 Menu Item List

Menu bar	Menu	Submenu	Function
File	L-Server Template	Import	Imports an L-Server template.
		Export	Exports an L-Server template.
Settings	Pool	Register	Registers a resource in the selected resource pool.
		Unregister	Deregisters the selected resource from a resource pool.
	Create	Folder	Creates a resource folder in the server tree or orchestration tree.
		Tenant	Creates a tenant folder in the orchestration tree.
		Pool	Creates a resource pool in the orchestration tree.
		L-Server	Creates an L-Server.
		Network Resource (New)	Creates a new network resource.
		Network Resource (Using existing admin subnet)	Creates a network resource from an admin LAN subnet.
	Move to Folder	-	Moves a resource pool, resource folder, or a resource to another resource folder.
	Move to Pool	-	Moves a resource to another resource pool.
	User Accounts	-	Creates, modifies, or deletes a user account.
	User Groups	-	Creates, modifies, or deletes a user group.
	Change Password	-	Change the password of the logged-in user.
	Modify	Basic Information	Modifies the basic information of a resource pool, resource folder, or a resource.
		Modify Specification	Change L-Server or network resource specifications.
		Attach Disk	Attaches disks to an L-Server.
		Detach Disk	Detaches disks from an L-Server.
Network Configuration		Changes the network configuration of an L-Server.	
Definition		Modifies L-Server definition information.	
L-Server Conversion	Convert	Creates a link between an L-Server and a configured physical server or virtual machine.	
	Revert	Cancels the link between an L-Server and a physical server or virtual machine.	
Operation	Snapshot	Collect	Collects a snapshot of the L-Server.
		Restore	Restores a snapshot to the L-Server.
		Delete	Deletes a snapshot.
	Console Screen	-	Opens the L-Server console.
	Install VM Tool	-	Connects the ISO images for installing VMware Tools to an L-Server.
	Backup/Restore	Backup	Backs up L-Server system images.
		Restore	Restores L-Server system images.
Delete		Deletes backup system images.	

Status Panel

The Status Panel displays the status of managed servers. The status of both physical servers and L-Servers can be displayed. The properties displayed for physical servers and L-Servers can be switched from the drop-down menu.

Only the L-Server status is displayed for the following users:

- Users with a role that only allows use of L-Servers
- Users with restricted access

If a warning or error event occurs on a managed server, the status monitoring area starts to blink.

If you click the blinking area, the server's information is displayed on the main panel.

For details of the status, refer to "2.3 Status Panel" in the "ServerView Resource Coordinator VE Setup Guide".

Tree Panel

Resource Orchestrator displays the orchestration tree and storage tree in addition to the trees provided by ServerView Resource Coordinator VE. If resource folders have been created in the server tree, these resource folders are also displayed.

Only the orchestration tree is displayed for the following users:

- Users with a role that only allows use of L-Servers
- Users with restricted access

The resources displayed are restricted according to the access rights of the logged in user.

Orchestration Tree

Manages and operates L-Servers and resource pools.

All resources authorized for access by the logged in user are displayed. The resources displayed differ depending on the role and access rights of the user.

The statuses of the following resources are shown in a tree view:

- Resource folders and L-Servers
- Resource pools and the resources registered in resource pools

The top-level resource folder of each tree is called a root folder. The standard tree consists of only the root folder.

The orchestration tree displays the following information:

- Resource List

Displays information on resources related to the resource selected in the resource tree.

- Resource Details

Displays detailed information for the resource selected in the resource tree. Additionally, external software can be opened.

- Available Pool

A list of resource pools available for use is displayed.

- Template List

A list of L-Server templates available for use is displayed.

Using an L-Server template, an L-Server can be created.

Server Resource Tree

The server resource tree displays all chassis, servers, VM hosts, VM guests, and LAN switches managed in Resource Orchestrator, in a tree view.

Network Resource Tree

The network resource tree displays all LAN switches other than LAN switch blades managed in Resource Orchestrator, in a tree view.

Storage Resource Tree

The storage resource tree displays all storage management software, storage units, RAID groups, LUNs, and virtual disks of VM guests managed in Resource Orchestrator, in a tree view.

Resources displayed in the server resource tree and network resource tree are represented by an icon and their resource name.

For details on icons and their resource names, refer to "Chapter 2 User Interface" of the "ServerView Resource Coordinator VE Setup Guide", and "5.2 Resource Status" in the "ServerView Resource Coordinator VE Operation Guide".

Main Panel

The Main Panel displays information on resources selected in the tree.

For details on resource attributes other than the basic information of the following server attributes listed in the Resource Details, refer to "2.5.2 [Resource Details] Tab" in the "ServerView Resource Coordinator VE Setup Guide".

Table 2.2 Server Attributes

Items	Description
CPU core count (*1)	Total number of CPU cores.
CPU type (*2)	Type of CPU.
CPU frequency (*2)	Frequency of CPU.
Memory capacity (*2)	Memory capacity.

*1: When using PRIMEQUEST 1000 series servers, or when using PRIMERGY series servers with no registered agent, a hyphen ("-") is displayed.

*2: When using a rack mount server or tower server with no registered agent, a hyphen ("-") is displayed.

Recent Operations

Displays the progress statuses and results of operations performed in Resource Orchestrator according to the user's scope of access.

Event Log

The Event Log displays information on events that have occurred.

ServerView Resource Coordinator VE events are displayed in addition to Resource Orchestrator events.

It displays a log of events that have occurred on managed resources.

The resources displayed are restricted according to the role and scope of access of the user.

<BladeViewer>>> Button

Opens the BladeViewer interface.

BladeViewer is a management interface specially designed for blade servers. It can only be used in conjunction with PRIMERGY BX servers registered as managed servers.

When users are as follow, <BladeViewer>>> is not displayed.

- Users with a role that only allows use of L-Servers
- Users with restricted access

Chapter 3 Pre-setup Preparations

This chapter explains the preparations necessary when setting up Resource Orchestrator.

3.1 Preparations for Server Environments

This section explains the preparations for setup of server environments.

Decide the Server Environment

Decide the following value for the server environment in advance.

- Chassis setting values (settings for blade servers and PRIMERGY Partition Models)
- Settings for rack mount servers and tower servers

For details on how to define server environments, refer to "3.1 Defining the Server Environment" in the "ServerView Resource Coordinator VE Setup Guide".

For the servers not using server management software, refer to "For rack mount or tower servers" in "3.1.2 Settings for Rack Mount or Tower Servers" of "ServerView Resource Coordinator VE Setup Guide".

For servers other than HP servers, a Baseboard Management Controller (hereinafter BMC) is used for server management.

Configure the Server Environment

Configure the following values for the server environment in advance.

- Chassis settings (settings for blade servers and PRIMERGY Partition Models)
- iRMC settings (remote management controller)
- BIOS settings of managed servers

For details on how to configure server environments, refer to "3.5 Configuring the Server Environment" in the "ServerView Resource Coordinator VE Setup Guide".

For configuration for a server environment not using server management software, refer to "Remote Management Controller Settings (for Non-Blade Servers)" of "3.5 Configuring the Server Environment" in "ServerView Resource Coordinator VE Setup Guide".

For the servers other than HP servers, replace the remote management controller with a BMC.

Configuration when Creating a Physical L-Server

When creating a physical L-Server, it is necessary to configure VIOM or HBA address rename settings as well as defining and configuring the server environment.

Usage methods of HBA address rename and VIOM differ depending on the manager OS type and the hardware of managed servers used to create a physical L-Server.

Table 3.1 Available Combinations of Manager OS and Hardware for Managed Servers

	Blade Servers	Rack Mount Servers
Windows	VIOM	HBA address rename
Linux	Usage is not possible	HBA address rename

Note

When the manager is Linux and hardware for a managed server is a blade server, a physical L-Server cannot be created.

Use Windows for manager.

When using iSCSI boot, VIOM is required in the server environment.

For details, refer to "[Appendix F Configuration when Creating a Physical L-Server](#)".

Configuring Server Virtualization Software

Settings differ according to server virtualization software being used.

When using server virtualization software, refer to the section for the server virtualization software being used in "[Appendix G Configuration of Server Virtualization Software](#)".



Note

[VMware] [Hyper-V] [Oracle VM]

When registering managed servers to the manager, the password for the administrative privilege user of the managed server is required. Set the password in advance.

3.2 Preparations for Storage Environments

This section explains how to configure a storage environment and define the settings required for Resource Orchestrator installation.

Storage Configuration

Decide the storage configuration necessary for the system.

The storage configurations supported by Resource Orchestrator are as follow:

Table 3.2 Supported Storage Configurations

Server (VM host) Type	L-Server System Disk	L-Server Data Disk
Physical	SAN storage	SAN storage
	iSCSI storage (*1)	iSCSI storage (*1, *2)
VMware	Storage configured for data stores of ESX/ESXi (VMFS Version 3 or later)	
Hyper-V	Storage configured for Cluster Shared Volumes (CSV) of MSFC	

*1: Available when ETERNUS storage and NetApp storage are used.

*2: When creating an L-Server, iSCSI storage is not allocated to the L-Server as a data disk.

Manually allocate the iSCSI storage to the L-Server, after starting the L-Server.

Attaching or detaching iSCSI storage to or from an L-Server cannot be performed using Resource Orchestrator. Perform those operations manually.

For details on data disk allocation for iSCSI storage, refer to "Information- Physical L-Server Data Disk for iSCSI Boot".



Information

Physical L-Server Data Disk for iSCSI Boot

- When using ETERNUS storage

Using storage management software, the data disk can be accessed from managed servers by defining LUNs of the iSCSI boot disk and of the data disk in the same Affinity group.

- When using NetApp storage

Using storage management software, the data disk can be accessed from managed servers by defining LUNs of iSCSI boot disk and of the data disk in the same igroup.

HBA and Storage Unit Configuration

When designing systems, define the relationships of physical servers and HBA WWNs on servers, and the relationships of storage volumes and HBA WWNs on storage.

For details on how to design systems, refer to "3.3 Defining the Storage Environment" in the "ServerView Resource Coordinator VE Setup Guide".

Configure SAN Storage Environments

SAN storage environment configurations differ according to the L-Server type in use, "Physical" or "Virtual".

When using a physical server as an L-Server, refer to "[Appendix F Configuration when Creating a Physical L-Server](#)".

When using server virtualization software, refer to the information for the software being used in "[Appendix G Configuration of Server Virtualization Software](#)".

Configure iSCSI Storage Environments

When using iSCSI boot on physical L-Servers, create LUNs that can be connected to L-Servers in advance.

For details, refer to "[F.3.1 When Using ETERNUS Storage](#)" and "[F.3.2 When Using NetApp FAS Storage](#)".

3.3 Preparations for Network Environments

This section explains how to prepare the required network configuration for systems.

For details on how to define a network environment, refer to "3.2.1 Network Configuration" in the "ServerView Resource Coordinator VE Setup Guide".

For keeping operations secure, it is necessary to physically configure the following network separately.

Admin LAN

The admin LAN is used for communication between the manager and the following devices used for management operations such as installation or maintenance.

iRMC or MB (management blade) is used for communication.

- Managed servers (VM hosts, physical L-Servers)
- VM management software
- Storage management software

Perform the redundancy of the admin LAN as below.

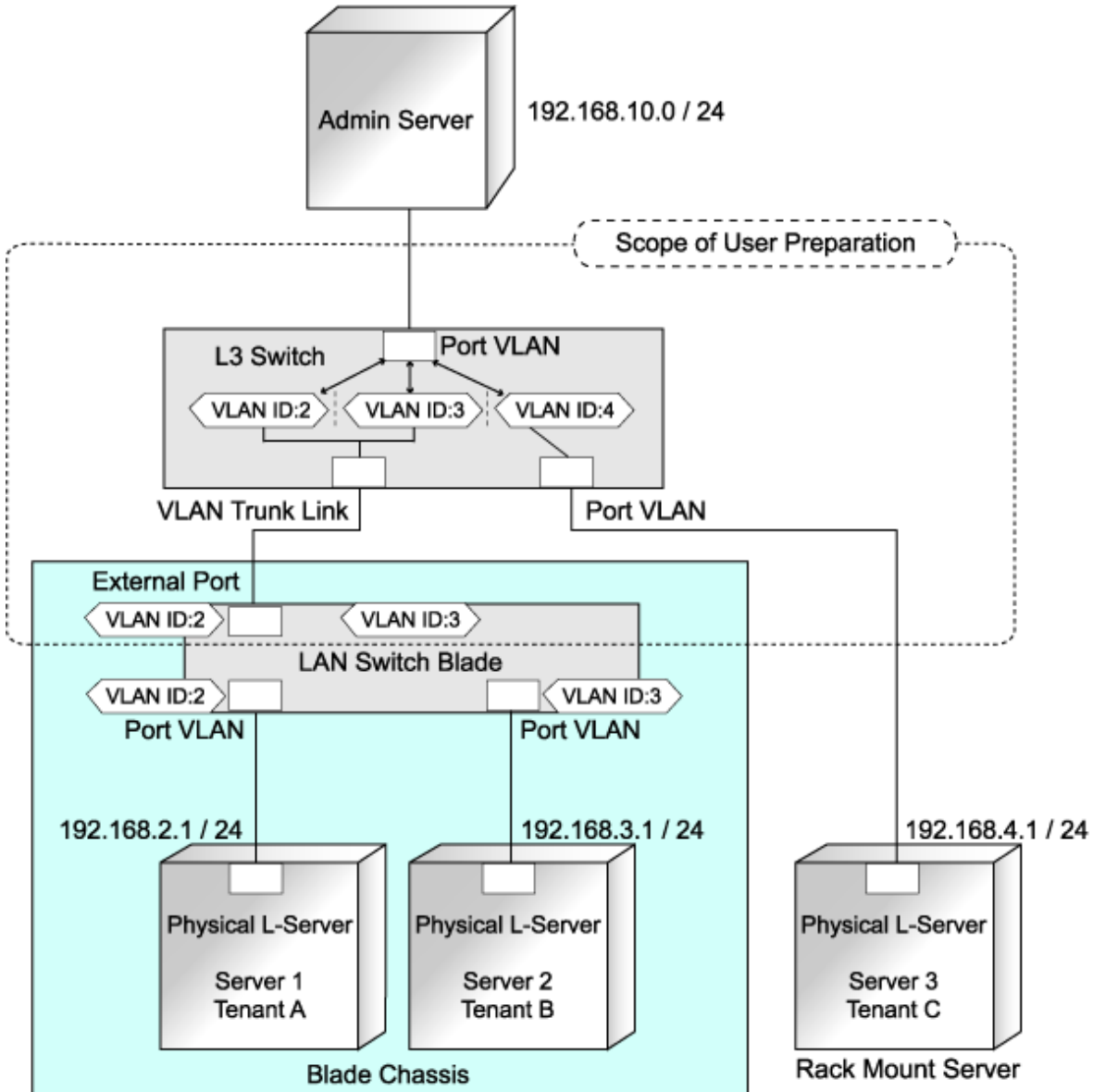
- For physical L-Servers, use Intel PROSet or PRIMECLUSTER GLS.
- For VM hosts, perform redundancy according to the server virtualization software used.

When using multi-tenant functions, prepare a separate admin LAN for each tenant, and configure the admin LAN for each tenant for network pools.

This improves the security of the network.

An admin LAN can be divided into multiple admin LANs. Using this function, communication among tenants on physical L-Servers performed through an admin LAN can be prevented.

Figure 3.1 Network Configuration for the Admin LAN



- Define the network configuration
 - Connect servers where physical L-Servers are deployed with the admin server using an L3 switch.
 - For each tenant, decide a network address and a VLAN ID to use for the admin LAN.
- When creating a network resource for the admin LAN, enter the VLAN ID and the network address. For details, refer to "[5.3.4 Network Resources](#)".

- Preparations by users

Configurations for LAN Switch Blades

- Configure the VLAN ID for a LAN switch blade external port. Set trunk links when necessary.

Configurations for L3 Switches

- Configure a VLAN ID for the port connected with the LAN switch blade. Set trunk links when necessary.
- Configure the routing of the L3 switch to enable communication between the network of the admin LAN for each tenant, and the admin server.
- For servers where physical L-Servers are deployed, set the following value for multicast routing from the admin server.

225.1.0.1 - 225.1.0.8

- When using the following functions, configure DHCP relay agents to enable the manager to receive DHCP requests from managed servers belonging to different subnets.
 - Backup and restoration of managed servers
 - Collection and deployment of cloning images
 - SAN boot using HBA address rename
- When using the HBA address rename setup service, configure DHCP relay agents to enable the HBA address rename setup service to receive DHCP requests from managed servers belonging to different subnets.
- Perform the following L3 switch settings when necessary.
 - Allowing connections between servers where physical L-Servers are located and the admin server

Example

192.168.10.0/24 (Admin server) and 192.168.2.0/24 (VLAN2)

192.168.10.0/24 (Admin server) and 192.168.3.0/24 (VLAN3)

192.168.10.0/24 (Admin server) and 192.168.4.0/24 (VLAN4)

- Preventing connections among admin LANs of tenants

Example

192.168.2.0/24 (VLAN2) and 192.168.3.0/24 (VLAN3)

192.168.2.0/24 (VLAN2) and 192.168.4.0/24 (VLAN4)

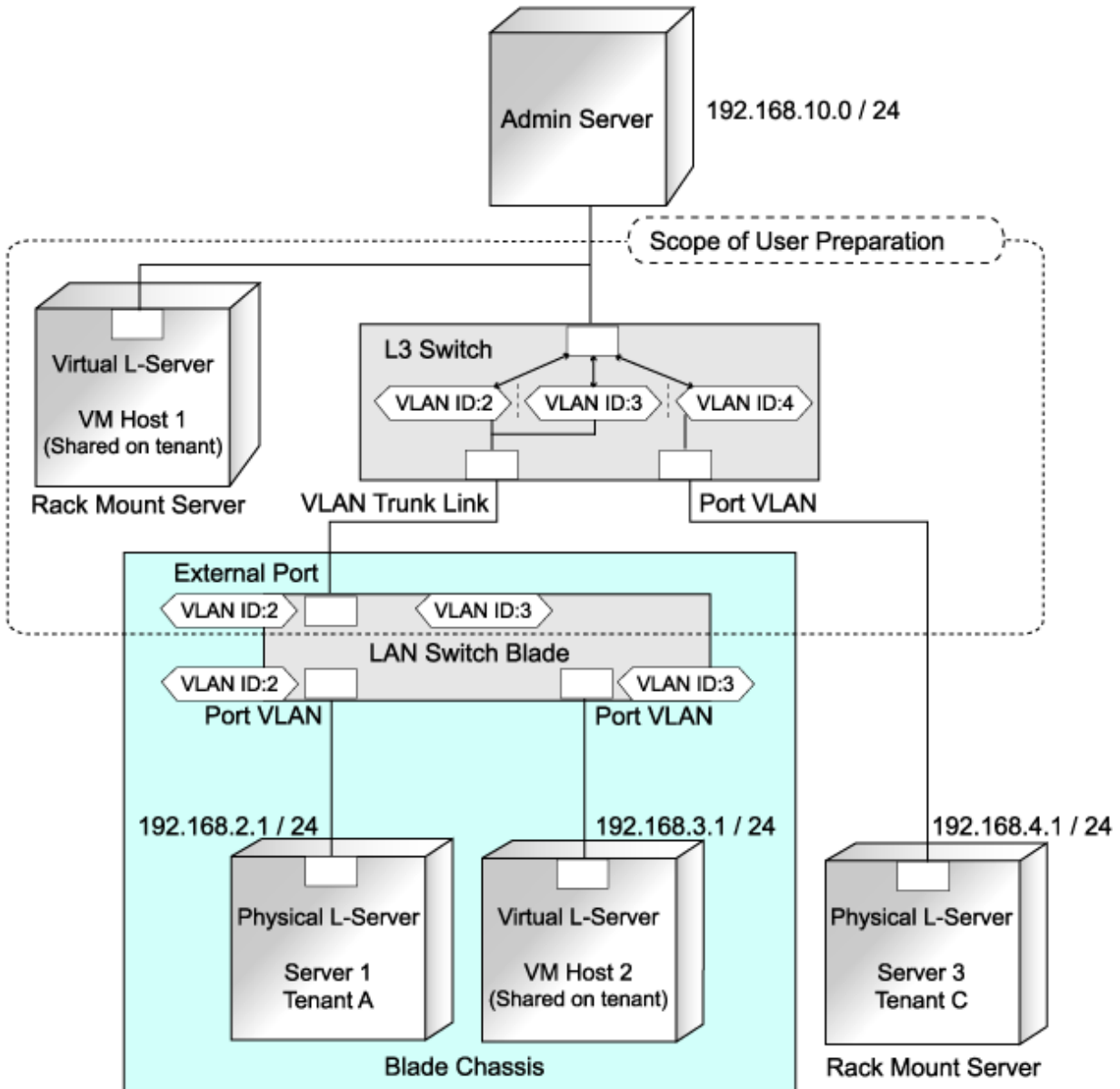
192.168.3.0/24 (VLAN3) and 192.168.4.0/24 (VLAN4)

- The range of automated configuration in Resource Orchestrator
 - The port VLAN settings between L-Servers and LAN switch blades are automatically configured when L-Servers are deployed.

When there are both virtual and physical L-Servers, the following configurations are adopted.

- Connect VM hosts with the admin server on the same network (VM host 1)
- Connection between VM hosts and the admin server using a L3 switch (VM host 2)

Figure 3.2 Network Configuration for Environments with Virtual and Physical L-Servers



In this environment, the additional configurations below are necessary for L3 switches, in addition to the environment for physical L-Servers.

- Configurations to prevent mutual communications between the admin LAN for tenant A and VM host 1
- Configurations to prevent mutual communications between the admin LAN for VM host 2 and VM host 1
- Configurations to prevent mutual communications between the admin LAN for tenant C and VM host 1

 **Note**

- Do not place DHCP servers between the manager and managed servers.
- For the admin server, only a single IP address can be used on the admin LAN.

 **See**

When operating the admin LAN among multiple subnets, install DHCP servers, referring to "4.1.2 Installation [Windows]".

Note

When the manager OS is Linux, DHCP servers cannot be installed.

A network address that was set when installing the manager has been registered as an admin LAN network resource.

Change the admin LAN network resource settings, and register the IP address of a device that is not managed by Resource Orchestrator as an IP address to exclude from allocation. If the IP address is not registered, it may conflict with the IP addresses of devices that are not managed by Resource Orchestrator.

Public LAN

This network is used for connection when using applications for business uses.

The following network VLAN IDs are automatically configured, to prevent L-Servers handling individual tasks from connecting with each other.

- Internal port VLAN IDs of LAN switch blades (when using blade servers)
External port VLAN IDs must be configured in advance.
- VLAN IDs of virtual switches (For virtual L-Servers)

iSCSI LAN

An iSCSI LAN is a network that connects storage units supporting iSCSI, and servers where physical L-Servers have been deployed. An iSCSI LAN is a separate LAN from the admin LAN and the public LAN.

- Define the network configuration
 - Define a NIC on the server used for an iSCSI LAN. Both single and multi-path configurations are available.
Include the NIC information defined here in the network definition file for iSCSI boot. For details on the network definition for iSCSI, refer to "[5.2.5 Network Resources](#)".
 - For each tenant, define a network address and a VLAN ID for use on the iSCSI LAN.
The VLAN ID and the network address defined here are entered when creating a network resource for the iSCSI LAN. For details, refer to "[5.3.4 Network Resources](#)".
 - External switches can be connected between ETERNUS storage and LAN Switch Blades, or NetApp storage and LAN switch blades.
 - When using multi-tenant functions on ETERNUS storage, it is necessary to allocate a port of the ETERNUS storage to each tenant. For the system configuration, refer to "[Figure F.2 Example of System Configuration for L-Server Creation in an ETERNUS-iSCSI Storage Environment using Virtual I/O by VIOM](#)".
 - For the system configuration when using multi-tenant functions on NetApp storage, refer to "[Figure F.3 Example of System Configuration for L-Server Creation in a NetApp-iSCSI Storage Environment using Virtual I/O by VIOM](#)".
 - Define an IQN to be used for the NIC of the server.
 - Decide a network address to be used for the port of the storage.
 - Define an IQN to be used for the port of the storage.
 - Define the use of authentication on iSCSI communication. When using authentication, define the authentication information.
- Preparations by users
 - Configurations for LAN Switch Blades
Configure a VLAN ID for a LAN switch blade external port. Set trunk links when necessary.

- Configurations for External Switches

Configure a VLAN ID for the port connected with the LAN switch blade. Set trunk links when necessary.

- Storage Configurations

Set the following items for the port for iSCSI connection.

- IP address
- Subnet mask
- Default gateway
- CHAP authentication
- Mutual CHAP authentication
- Information of hosts that can communicate with the port for iSCSI connection

- The range of automated configuration in Resource Orchestrator

- The port VLAN settings between physical L-Servers and LAN switch blades

- Automatically configured when L-Servers are deployed.

- The BIOS settings for the NIC of the server used for the iSCSI LAN

The following are automatically configured when L-Servers are deployed.

- IP address
- Subnet mask
- Default gateway
- CHAP authentication
- Mutual CHAP authentication
- Information of storage that can communicate with NICs
- The boot settings for the NIC used for iSCSI

Safer Communication

Based on the description in "Appendix C Port List" of the "ServerView Resource Coordinator VE Setup Guide", if firewalls are configured for the admin LAN, or OS firewalls are configured, the admin LAN can be operated more safely.

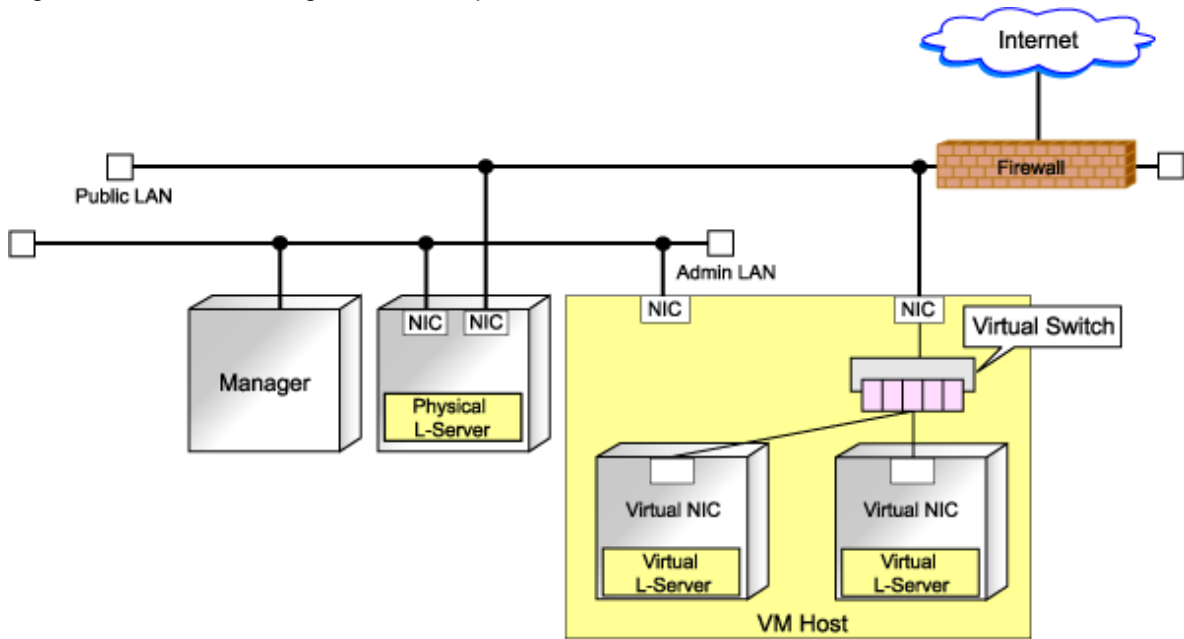
In Resource Orchestrator, the manager accesses agents using HTTPS communication.

In HTTPS communication, certificates are used for encrypting communication data and mutual authentication.

For details, refer to "Appendix E HTTPS Communications" in the "ServerView Resource Coordinator VE Setup Guide".

An example network configuration is shown below.

Figure 3.3 Network Configuration Example



Chapter 4 Installation and Uninstallation

This chapter explains the installation and uninstallation of ServerView Resource Orchestrator.

4.1 Installing the Manager

This section explains installation of the manager.

4.1.1 Collection and Confirmation of Necessary Information

This section explains the collection and confirmation of information necessary for manager installation.

Pre-Installation Preparation and Checks

- Exclusive Software Checks

Check that the software listed in "[1.3.2.3 Exclusive Software](#)" and the manager of Resource Orchestrator have not been installed on the system.

- Required Software Preparation and Checks

Check that the software listed in "[1.3.2.2 Required Software](#)" has been installed on the system. If it has not been installed, install it before continuing.

For ESC, perform Fibre Channel switch settings in advance.

- Installation Folder and Available Disk Space Check

Decide the installation folder for Resource Orchestrator.

Note that folders on removable disks cannot be specified.

Check that there are no files or folders in the installation folder.

Check that the necessary disk space can be secured on the drive for installation.

For the amount of disk space necessary for Resource Orchestrator, refer to "[1.3.2.4 Static Disk Space](#)" and "[1.3.2.5 Dynamic Disk Space](#)".

- Port Number

When Resource Orchestrator is installed, the port numbers used by it will automatically be set in the services file of the system. So usually, there is no need to pay attention to port numbers.

If the port numbers used by Resource Orchestrator are being used for other applications, a message indicating that the numbers are in use is displayed, and installation will stop.

In that case, describe the entries for the port numbers used by Resource Orchestrator in the services file using numbers not used by other software, and then start the installer. The eight port numbers are as indicated below.



Example

```
# service name port number/protocol name
Nfdomain      23457/tcp
Nfagent       23458/tcp
Rcxmgr        23460/tcp
Rcxweb        23461/tcp
Rcxtask       23462/tcp
rcxmongrel1   23463/tcp
rcxmongrel2   23464/tcp
rcxdb         23465/tcp
```

For details on port numbers, refer to "Appendix C Port List" of the "ServerView Resource Coordinator VE Setup Guide".

For details on changing port numbers, refer to "6.3.1.2 Changing Port Numbers" in the "ServerView Resource Coordinator VE Setup Guide".

When using NetApp storage, give permission for the following connections in order to operate Resource Orchestrator.

Table 4.1 Port Numbers when Using NetApp Storage

Function Overview	Source				Destination				Protocols
	Servers	Services	Port	Modification	Servers	Services	Port	Modification	
NetApp storage	Admin Server	-	Inconstant	-	Data ONTAP	-	443	Impossible	tcp

When using EMC CLARiiON storage, give permission for the following connections in order to operate Resource Orchestrator.

Table 4.2 Port Numbers when Using EMC CLARiiON Storage

Function Overview	Source				Destination				Protocols
	Servers	Services	Port	Modification	Servers	Services	Port	Modification	
EMC CLARiiON Storage	Navisphere CLI	-	Inconstant	-	EMC Navisphere Manager	-	443 or 2163	Impossible	tcp

When using EMC Symmetrix DMX storage, give permission for the following connections in order to operate Resource Orchestrator.

Table 4.3 Port Numbers when Using EMC Symmetrix DMX Storage

Function Overview	Source				Destination				Protocols
	Servers	Services	Port	Modification	Servers	Services	Port	Modification	
EMC Symmetrix DMX Storage	SYMCLI	-	Inconstant	-	SYMAPI Server	-	2707	Possible	tcp

[Hyper-V]

When using the L-Server console, give permission for the following connections in order to operate Resource Orchestrator.

Table 4.4 Port Numbers when Using the L-Server Console

Function Overview	Source				Destination				Protocols
	Servers	Services	Port	Modification	Servers	Services	Port	Modification	
Hyper-V	Admin Server	-	Inconstant	-	Managed Server	-	2179	Possible	tcp

- User account for administrative users of Resource Orchestrator

Decide the user account name and password for administrative users of Resource Orchestrator.

For details on user accounts, refer to "[C.3 User Accounts](#)".

- Check the admin LAN of the admin server and the status of the NIC

Decide the network (IP addresses) to be used for the admin LAN of the admin server.

Check that the NIC used for communication with the admin LAN is enabled.

For details on admin LANs, refer to "[3.3 Preparations for Network Environments](#)".



Note

Nullifying Firewall Settings for Ports to be used by Resource Orchestrator

When installing Resource Orchestrator on systems with active firewalls, in order to enable the manager to communicate with agents correctly, disable the firewall settings for the port numbers to be used for communication.

For the port numbers used by Resource Orchestrator and required software, refer to "Appendix C Port List" of the "ServerView Resource Coordinator VE Setup Guide" and the ESC manual.

However, when port numbers have been changed during installation of Resource Orchestrator, change the port number settings according to "6.3.1.2 Changing Port Numbers" in the "ServerView Resource Coordinator VE Setup Guide".

4.1.2 Installation [Windows]

This section explains installation of the manager, when the admin server is Windows.

4.1.2.1 Software Preparation and Checks

- Exclusive Software Checks

Before installing Resource Orchestrator, check that the software listed in "[1.3.2.3 Exclusive Software](#)", Resource Coordinator VE, and the manager of Resource Orchestrator have not been installed on the system.

- Required Software Preparation and Checks

Before installing Resource Orchestrator, check that the software listed in "[1.3.2.2 Required Software](#)" has been installed on the system. If it has not been installed, install it before continuing.

For ESC, perform Fibre Channel switch settings in advance.



- Obtain and extract the Microsoft LAN Manager module

Before installing Resource Orchestrator, obtain the Microsoft LAN Manager module from the following FTP site:

```
URL: ftp://ftp.microsoft.com/bussys/clients/msclient/dsk3-1.exe (As of July 2011)
```

After obtaining the module, extract it in a work folder (such as C:\temp) of the system for installation.

The Microsoft LAN Manager module can be installed without extracting it in advance.

The obtained module is for x86 CPU architecture. It cannot be extracted on x64 CPU architecture systems.

When extracting the module, do so on an x86 CPU architecture system.

Use the following method to extract it.



When deploying dsk3-1.exe in C:\temp

```
>cd /d c:\temp <RETURN>
>dsk3-1.exe <RETURN>
>Expand c:\temp\protman.do_ /r <RETURN>
>Expand c:\temp\protman.ex_ /r <RETURN>
```

Use the Windows 8.3 format (*1) for the folder name or the file name.

After manager installation is complete, the extracted Microsoft LAN Manager module is no longer necessary.

*1: In this format, file names are limited to 8 characters and extensions limited to 3 characters.

Transfer the following extracted files to a work folder on the system for installation.

- PROTMAN.DOS
- PROTMAN.EXE

- NETBIND.COM

- **Settings for ServerView Operations Manager 4.X for Windows**

In order for Resource Orchestrator to operate correctly, ensure that the following settings are made when installing ServerView Operations Manager for Windows.

- Do not select "IIS (Microsoft Internet Information Server)" for Web Server selection.

For details on how to configure the settings, refer to the ServerView Operations Manager 4.X for Windows manual.

- **SNMP Service Settings**

In order for Resource Orchestrator to operate correctly, the following settings for the standard Windows SNMP trap service are required.

Open "Service" from "Administrative Tools" on the Windows Control Panel, and configure the following settings on the security tab of SNMP service in the [Services] window.

- SNMP community name
- Trap community name
- Community privileges
- SNMP trap destination

- **SNMP Trap Service Settings**

In order for Resource Orchestrator to operate correctly, the following settings for the standard Windows SNMP trap service are required.

- Open "Services" from "Administrative Tools" on the Windows Control Panel, and then configure the startup type of SNMP Trap service as "Manual" on the [Services] window. Set the service status to "Started".

- **Settings for ServerView Virtual-IO Manager**

To create a physical L-Server, VIOM or HBA address rename is required.

When using VIOM, in order for Resource Orchestrator to operate correctly, ensure that the following settings are made when installing ServerView Virtual-IO Manager for Windows.

- When using the I/O Virtualization Option

Clear the "Select address ranges for IO Virtualization" checkbox on the virtual I/O address range selection window.

For details, refer to the ServerView Virtual-IO Manager for Windows manual.

- **DHCP server installation**

Installation of the Windows standard DHCP Server is necessary when managed servers belonging to different subnets from the admin server are to be managed. Install the DHCP Server following the procedure below:

1. Add DHCP Server to the server roles. For the addition settings, refer to the manual for Windows.
2. Open "Services" from "Administrative Tools" on the Windows Control Panel, and then configure the startup type of DHCP Server service as "Manual" on the [Services] window.
3. From the [Services] window, stop the DHCP Server service. When an admin server is a member of a domain, perform 4.
4. Authorize DHCP servers.
 - a. Open "DHCP" from "Administrative Tools" from the Windows "Control Panel", and then select [Action]-[Managed authorized servers] from "DHCP".

The [Manage Authorized Servers] window will be displayed.
 - b. Click <Authorize> on the [Manage Authorized Servers] window.

The [Authorize DHCP Server] window will be displayed.
 - c. Enter the admin IP address of the admin server in "Name or IP address" and click <OK>.

The [Confirm Authorization] window will be displayed.

User Account

Enter the user account name of the administrative user. Enter a character string beginning with an alphanumeric character and containing up to 16 alphanumeric characters, underscores ("_"), hyphens ("-"), and periods (".").

Entry is not case-sensitive.

Password

Enter the password of the administrative user. The string must be composed of alphanumeric characters and symbols, and can be up to 16 characters long.

Entry of the password cannot be omitted.

Confirm Password

Enter the password again to confirm it.

Note

When installing in cluster environments, specify the same character strings for the user account names and passwords of the primary node and the secondary node.

6. After selecting the network used as the admin LAN of the admin server, specify the deployment location of the Microsoft LAN Manager module prepared in advance, and click <Next>.

The [Start Copying Files] window will be displayed.

Note

Ensure that the NIC for the network to be used is enabled.

When an admin server is connected to several networks, select the network that is available for direct communication with managed servers of the same subnet.

7. Check that there are no mistakes in the contents displayed on the window, and then click <Install>.

Copying of files will start.

To change the contents, click <<Back>.

8. The Resource Orchestrator setup completion window will be displayed.

- a. When it is an initial installation, check the "Yes, I want to restart my computer now." checkbox, then click <Finish> and restart Windows.
- b. When installing to an environment where Resource Orchestrator has been installed before, check the "No, I will restart my computer later." checkbox, then click <Finish> and restart Windows. After that, replace temporarily backed up certificates to their original location then restart Windows. For backing up certificates, refer to "[4.3 Uninstalling the Manager](#)".

Note

Corrective Action for Installation Failure

Installation may stop due to the following reasons:

- System errors or processing errors such as system failure
- An error due to mistakes in operation requirements, or aborting of operations by users

Perform the following corrective actions:

- Open "Add or Remove Programs" from the Control Panel of Windows, and when "ServerView Resource Orchestrator Manager" is displayed, reinstall after uninstallation.

For details on uninstallation, refer to "[4.3 Uninstalling the Manager](#)".

Information

For Windows Server 2008, select "Programs and Features" from the Windows Control Panel.

When "ServerView Resource Orchestrator Manager" is not displayed, install it again.

4.1.3 Installation [Linux]

This section explains installation of the manager, when the admin server is Linux.

4.1.3.1 Software Preparation and Checks

- Exclusive Software Checks

Check that the software listed in "1.3.2.3 Exclusive Software" and the manager of Resource Orchestrator have not been installed on the system.

- Required Software Preparation and Checks

Check that the software listed in "1.3.2.2 Required Software" has been installed on the system. If it has not been installed, install it before continuing.

For ESC, perform Fibre Channel switch settings in advance.

Note

- Obtain and extract the Microsoft LAN Manager module

Before installing Resource Orchestrator, obtain the Microsoft LAN Manager module from the following FTP site:

```
URL: ftp://ftp.microsoft.com/bussys/clients/msclient/dsk3-1.exe (As of July 2011)
```

Extract the obtained module on Windows. Transfer the following extracted files to a work folder on the system for installation. Ensure that the file names of the transferred files are all uppercase.

The obtained module is for x86 CPU architecture.

It cannot be extracted on x64 CPU architecture systems.

When extracting the module, do so on an x86 CPU architecture system.

- PROTMAN.DOS
- PROTMAN.EXE
- NETBIND.COM

Use the following method to extract the compressed file (dsk3-1.exe).

Example

When deploying dsk3-1.exe in C:\temp

```
>cd /d c:\temp <RETURN>
>dsk3-1.exe <RETURN>
>Expand c:\temp\protman.do_ /r <RETURN>
>Expand c:\temp\protman.ex_ /r <RETURN>
```

Use the Windows 8.3 format (*1) for the folder name or the file name.

After manager installation is complete, the extracted Microsoft LAN Manager module is no longer necessary.

*1: In this format, file names are limited to 8 characters and extensions limited to 3 characters.

- SNMP Trap Daemon Settings

Add the following setting to the `/etc/snmp/snmptrapd.conf` file at the same time as net-snmp package installation for operating correctly Resource Orchestrator. When there is no file, add the following setting after creating the file.

```
disableAuthorization yes
```

4.1.3.2 Installation

Use the following procedure to install the manager.

The installation time for this software is around seven minutes.

Check that "4.1.2.1 Software Preparation and Checks" has been performed before installation.

1. Log in to the system as the OS administrator (root). Boot the server that manager is to be installed on in multi-user mode, and log in to the system using root.
2. Set the Resource Orchestrator DVD-ROM and execute the following command, then move to the directory where the installer is stored.

```
# cd DVD-ROM_mount_point/Linux/manager <RETURN>
```

3. Execute the manager installer (rcxinstall command).

```
# ./rcxinstall <RETURN>
```

ServerView Resource Orchestrator V2.3.0

This program will install ServerView Resource Orchestrator Manager on your system.

4. The license agreement is displayed.

This program is protected by copyright law and international treaties.

Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under law.

Copyright FUJITSU LIMITED 2007-2011

Do you accept the terms of the above License Agreement? [y,n,?,q]

Confirm the window details, and enter "y" if you agree and "n" if you do not agree.

If "n" or "q" is entered, installation is discontinued.

If "?" is entered, an explanation of the entry method is displayed.

5. Enter the image file storage directory.

Please enter the path to be used for the Image Folder.

Press enter to accept the default. (/var/opt/FJSVscw-deploysv/depot)[/,0-9,a-z,A-Z,_,-,]

Specify the image file storage directory to use for storing system images and cloning images obtained using Resource Orchestrator.

When not changing from the displayed directory, press the Enter key without entering a directory. When changing the directory, enter the new directory to use and then press the Enter key.

6. Create administrative users.

Please enter the user account name and password to be used as an administrative user of ServerView Resource Orchestrator.
User Account [0-9,a-z,A-Z,_,.,-]

Enter the information for creating the user account to be used as an administrative user of Resource Orchestrator.

Enter the user account name and the password decided in "User account for administrative users of Resource Orchestrator" in ["4.1.1 Collection and Confirmation of Necessary Information"](#), and press the Enter key.

User Account

Enter the user account name of the administrative user. Enter a character string beginning with an alphanumeric character and containing up to 16 alphanumeric characters, underscores ("_"), hyphens ("-"), and periods (".").

Entry is not case-sensitive.

Password

Enter the password of the administrative user. The string must be composed of alphanumeric characters and symbols, and can be up to 16 characters long. Entry of the password cannot be omitted.

Confirm Password

Enter the password again to confirm it.

7. Select the admin LAN.

Please select the network to use for the admin LAN from the list.
[1] eth0 = 192.168.1.1
[2] eth1 = 192.168.2.1
[3] eth2 = 192.168.3.1
Network to use as the admin LAN. Press enter to accept the default. (default: 1)

Enter the number of the network to use as the admin LAN for the admin server and press the Enter key. When selecting the first network displayed, press the Enter key without entering a network number.

Note

Ensure that the NIC for the network to be used is enabled.

When an admin server is connected to several networks, select the network that is available for direct communication with managed servers of the same subnet.

8. Enter the directory used to store the LAN Manager module.

Please enter a path to the LAN Manager module.
This folder should contain the following files: PROTMAN.DOS, PROTMAN.EXE, NETBIND.COM
Please note that file names should be capitalized as shown above.
Press enter to accept the default. (/tmp) [/0-9,a-z,A-Z,_,.,-]

Enter the location of the Microsoft LAN Manager module prepared in ["4.1.3.1 Software Preparation and Checks"](#) and press the Enter key. When it has been located in /tmp, press the Enter key without entering anything.

9. To continue the installation enter "y", to discontinue the installation enter "n" or "q".

Do you want to continue with the installation of this product? [y,n,?,q]

10. Enter "y" and the installation will start.

Example

```
INFO : Starting Installation of ServerView Resource Orchestrator Manager...  
...  
INFO : Package "FJSVscw-common" was successfully installed.
```

```
...  
INFO : Package "FJSVscw-tftpsv" was successfully installed.  
...
```

11. When installation is completed successfully, the following message will be displayed.

```
INFO : ServerView Resource Orchestrator Manager was installed successfully.
```

Note

- Corrective Action for Installation Failure

Execute the following command, delete the packages from the environment in which installation failed, and then perform installation again.

```
# cd DVD-ROM_mount_point/Linux/manager <RETURN>  
# ./rcxuninstall <RETURN>
```

- Nullifying Firewall Settings for Ports to be used by Resource Orchestrator

When installing Resource Orchestrator on systems with active firewalls, in order to enable the manager to communicate with agents correctly, disable the firewall settings for the port numbers to be used for communication.

For the port numbers used by Resource Orchestrator and required software, refer to "Appendix C Port List" of the "ServerView Resource Coordinator VE Setup Guide".

However, when port numbers have been changed during installation of Resource Orchestrator, change the port number settings according to "6.3.1.2 Changing Port Numbers" in the "ServerView Resource Coordinator VE Setup Guide".

4.2 Installing the Agent

This section explains the procedure for agent installation.

When creating multiple L-Servers, using cloning it is possible to copy the OS installed on one L-Server, updates, Resource Orchestrator agents, and common software between servers to other L-Servers.

For details, refer to "[6.1.1 Manual OS Installation](#)".

Pre-Installation Preparation and Checks

Confirm the following prior to installing the agent:

- Exclusive Software Checks

Check that the software listed in "[1.3.2.3 Exclusive Software](#)" and the agent of Resource Orchestrator have not been installed on the system.

- Required Software Checks

Check that the software listed in "[1.3.2.2 Required Software](#)" has been installed on the system. If it has not been installed, install it before continuing.

Note

- ServerView Agent Settings

To operate Resource Orchestrator correctly on PRIMERGY series servers, perform the necessary settings for SNMP services during installation of ServerView Agent.

For how to perform SNMP service settings, refer to the ServerView Agent manual.

- For the SNMP community name, specify the same value as the SNMP community name set for the management blade.
- For the SNMP community name, set Read (reference) and Write (reference and updating).
- For the host that receives SNMP packets, select "Accept SNMP packets from any host" or "Accept SNMP packets from these hosts" and set the admin LAN IP address of the admin server.
- For the SNMP trap target, set the IP address of the admin server.

When an admin server with multiple NICs is set as the SNMP trap target, specify the IP address of the admin LAN used for communication with the managed server.

- "setupcl.exe" and "sysprep.exe" modules

For Windows OS's other than Windows Server 2008, it is necessary to specify storage locations for the "setupcl.exe" and "sysprep.exe" modules during installation. Obtain the newest modules before starting installation of Resource Orchestrator.

For the method of obtaining the module, refer to "1.3.2.2 Required Software".

Extract the obtained module using the following method:

Example

When WindowsServer2003-KB926028-v2-x86-JPN.exe has been placed in c:\temp

```
>cd /d c:\temp <RETURN>
>WindowsServer2003-KB926028-v2-x86-ENU.exe /x <RETURN>
```

During installation, specify the cabinet file "deploy.cab" in the extracted folder, or the "setupcl.exe" and "sysprep.exe" modules contained in "deploy.cab".

After agent installation is complete, the extracted module is no longer necessary.

- Installation Folder and Available Disk Space Check

Decide the installation folder for Resource Orchestrator.

Note that folders on removable disks cannot be specified.

Check that there are no files or folders in the installation folder.

Check that the necessary disk space can be secured on the drive for installation.

For the amount of disk space necessary for Resource Orchestrator, refer to "1.3.2.4 Static Disk Space" and "1.3.2.5 Dynamic Disk Space".

- Port Number

When Resource Orchestrator is installed, the port numbers used by it will automatically be set in the services file of the system. So usually, there is no need to pay attention to port numbers.

If the port numbers used by Resource Orchestrator are being used for other applications, a message indicating that the numbers are in use is displayed, and installation will stop.

In that case, describe the entries for the port numbers used by Resource Orchestrator in the services file using numbers not used by other software, and then start the installer.

For details on port numbers, refer to "6.3.1.2 Changing Port Numbers" in the "ServerView Resource Coordinator VE Setup Guide".

- Checking the Admin LAN and NIC Status

Decide the network (IP addresses) to be used for the admin LAN.

Check that the NIC used for communication with the admin LAN is enabled.

For details on admin LANs, refer to "3.3 Preparations for Network Environments".

Note

Nullifying Firewall Settings for Ports to be used by Resource Orchestrator

When installing Resource Orchestrator on systems with active firewalls, in order to enable the manager to communicate with agents correctly, disable the firewall settings for the port numbers to be used for communication.

(<Browse> is disabled.)

6. Enter Windows volume license authentication information, and click <Next>>.

When cloning is not used, as the license authentication information is not necessary, click <Next>> without selecting "Use the cloning feature of this product".

When using cloning functions, specify the following information depending on type of Windows that will be used, and click <Next>>.

- For Windows Server 2003

Product Key

Enter the Windows product key for the computer the agent is to be installed on.

Confirm Product Key

Enter the Windows product key again to confirm it.

- For Windows Server 2008

License authentication method

Select the license authentication method from Key Management Service (KMS) and Multiple Activation Key (MAK).

When Key Management Service (KMS) is selected

KMS host

Enter the host name of the KMS host name, and the computer name or IP address.

When using Domain Name Service (DNS) to automatically find the KMS host, this is not necessary.

When Multiple Activation Key (MAK) is selected

The MAK key

Enter the MAK key for the computer the agent is to be installed on.

Confirm Multiple Activation Key

Enter the MAK key again to confirm it.

Proxy server used for activation

Enter the host name or IP address of the proxy server.

When the proxy server has a port number, enter the port number.

Administrator's Password

Enter the administrator password for the computer the agent is to be installed on.



If an incorrect value is entered for "Product Key", "Key Management Service host", "The MAK Key", or "Proxy server used for activation" on the [License Authentication] window, cloning will be unable to be used.

Check that the correct values have been entered.

7. The [Start Copying Files] window will be displayed, so check that there are no mistakes in the contents displayed on the window, and then click <Install>>.

Copying of files will start.

To change the contents, click <<Back>.

The Resource Orchestrator setup completion window will be displayed.

8. Click <Finish> and close the window.



Note

Corrective Action for Installation Failure

Installation may stop due to the following reasons:

- System errors or processing errors such as system failure
- An error due to mistakes in operation requirements, or aborting of operations by users

Perform the following corrective actions:

Open "Add or Remove Programs" from the Windows Control Panel, and when "ServerView Resource Orchestrator Agent" is displayed, uninstall it and then install the agent again.

For details on uninstallation, refer to "4.4 Uninstalling the Agent".



Information

For Windows Server 2008, select "Programs and Features" from the Windows Control Panel.

When "ServerView Resource Orchestrator Agent" is not displayed, install it again.

4.2.2 Installation [Linux/VMware/Xen/Oracle VM]

This section explains the procedure for agent installation.



Note

When using VMware ESXi, Resource Orchestrator agents cannot be installed.

Install ServerView ESXi CIM Provider agents.

The installation time for this software is around one minute.

Before installing, check that "Pre-Installation Preparation and Checks" in "4.2 Installing the Agent" has been performed.

1. Log in to the system with OS administrator privileges (root).

Boot the managed server that Resource Orchestrator is to be installed on in multi-user mode, and then log in to the system using root.

2. Insert the Resource Orchestrator DVD-ROM and mount it if necessary.

Then, execute the following command:

```
# cd DVD-ROM_mount_point/Linux/agent <RETURN>
```

Move to the directory where the installer is stored.

3. Execute the agent installer, using the rcxagtinstall command.

```
# ./rcxagtinstall <RETURN>
ServerView Resource Orchestrator V2.3.0

Copyright FUJITSU LIMITED 2007-2011

This program will install ServerView Resource Orchestrator Agent on your system.
```

4. As the license agreement is displayed, check the content and enter "y" if you agree.

5. Enter the IP address of the admin server.

When the admin server has multiple IP addresses, specify the IP address used for communication with managed servers.

Example

```
Please input the IP address of the admin server [0-9,.] 192.168.1.2 <RETURN>
```

In the event that the IP address format is not correct, a message requesting re-entry will be displayed.

Remove the cause of the error, and then enter the IP address again.

6. As the following message is displayed, to continue the installation, enter "y", to discontinue the installation "n" or "q".

```
Do you want to continue the installation of this software? [y,n,?,q]
```

Enter "y" and the installation will start.

7. When installation is completed successfully, the following message will be displayed.

```
INFO : ServerView Resource Orchestrator Agent was installed successfully.
```

Note

- Corrective Action for Installation Failure

If installation fails, execute the following command, delete the packages from the environment in which installation failed, and then perform installation again.

```
# cd DVD-ROM_mount_point/Linux/agent <RETURN>  
# ./rcxagtuninstall <RETURN>
```

- Nullifying Firewall Settings for Ports to be used by Resource Orchestrator

When installing Resource Orchestrator on systems with active firewalls, in order to enable the manager to communicate with agents correctly, disable the firewall settings for the port numbers to be used for communication.

Example

[VMware]

```
# /usr/sbin/esxcfg-firewall -openPort 23458,tcp,in,"nfagent" <RETURN>
```

For the port numbers used by Resource Orchestrator and required software, refer to "Appendix C Port List" of the "ServerView Resource Coordinator VE Setup Guide".

However, when port numbers have been changed by editing the services file during installation of Resource Orchestrator, replace the default port numbers listed in "Appendix C Port List" in the "ServerView Resource Coordinator VE Setup Guide" with the port numbers changed during installation.

[Xen]

When modifying the firewall configuration of the admin OS, change the admin OS iptables to permit access to the ports used on the admin OS.

4.3 Uninstalling the Manager

The uninstallation of managers is explained in the following sections.

Pre-uninstallation Advisory Notes

When Resource Orchestrator is uninstalled, the following are deleted:

- Imported L-Server templates
- Address set resources and network resources
- L-Servers, system images, and cloning images

When L-Servers created using Resource Orchestrator and the storage folders for L-Servers, system images and cloning images collected using Resource Orchestrator have not been changed from the default values, all collected system images and cloning images will be deleted.

If the images are necessary, before uninstalling Resource Orchestrator back up (copy) the folder below to another folder.

[Windows]

Installation_folder\ScwPro\depot

[Linux]

/var/opt/FJSVscw-deploysv/depot

- Definition File

The definition files created when using Resource Orchestrator are deleted.

If the images are necessary, before uninstalling Resource Orchestrator back up (copy) the folder below to another folder.

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvmr/customize_data

- Certificates

When operating managers in cluster environments, back up (copy) certificates before performing uninstallation.

Manager certificates are stored in the following folders:

[Windows]

Drive_name\RCoordinator\certificate

[Linux]

Mount_point_of_the_shared_disk/RCoordinator/

- Security files to be used for issuing commands using the Navisphere CLI

4.3.1 Uninstallation [Windows]

Use the following procedure to uninstall the manager.

Before uninstalling, check that "[Pre-uninstallation Advisory Notes](#)" in "4.3 Uninstalling the Manager" has been performed.

1. Log on to Windows as the administrator.

Log on to the system from which the manager is to be uninstalled. Log on as a user belonging to the local Administrators group.

2. Delete the manager using the following method.

Open "Add or Remove Programs" from the Windows Control Panel, and select "ServerView Resource Orchestrator Manager" and delete it from the [Add or Remove Programs] window.



Information

For Windows Server 2008, select "Programs and Features" from the Windows Control Panel.

3. The [Confirm Uninstall] dialog will be displayed, then click <OK>.

Information

The services of Resource Coordinator VE are automatically stopped and deleted.

4. When uninstallation is complete, the InstallShield Wizard window will be displayed, then click <Finish>.

The start-up account created during installation is not automatically deleted.

When the account is not necessary, delete it. However, do not delete the account if it is also used for other purposes.

Information

Deletion Methods for Windows User Accounts

Open "Management" from "Administrative Tools" on the Windows "Control Panel", and then select [Local Users and Groups]-[Users].

Right-click the user account to be deleted, and select [Delete].

Note

After uninstallation, the *installation_folder* (default: C:\Program Files\Resource Orchestrator) will remain. When the folder is unnecessary, delete it manually.

When uninstalling, certificates are backed up in the following folders. When installing a manager again and using the same certificates, save the backed up certificates in the following folders.

- *Installation_folder*\back\site\certificate
- *Installation_folder*\back\domain\certificate

When the certificates backed up during uninstallation are unnecessary, delete them manually.

4.3.2 Uninstallation [Linux]

Use the following procedure to uninstall the manager.

Before uninstalling, check that "[Pre-uninstallation Advisory Notes](#)" in "4.3 Uninstalling the Manager" has been performed.

1. Log in to the system with OS administrator privileges (root).

Log in to the managed server from which Resource Orchestrator will be uninstalled, using root.

2. Execute the rcxuninstall command, and start the uninstaller.

```
# /opt/FJSVrcvmr/bin/rcxuninstall <RETURN>
```

Starting the uninstaller displays the following message which explains that before uninstallation the Resource Coordinator VE services will be automatically stopped.

```
Any Resource Orchestrator service that is still running will be stopped and removed.  
Do you want to continue ? [y,n,?,q]
```

3. Enter "y" and the uninstallation will start.

- When uninstallation is completed successfully, the following message is displayed.

```
INFO : ServerView Resource Orchestrator Manager was uninstalled successfully.
```

- If uninstallation fails, the following message will be displayed.

```
ERROR : Uninstalling "Package_name" was failed.
```

If uninstallation fails, use the rpm command to remove the packages given in the message, and start the process from 1. again.

```
# rpm -e Package_name <RETURN>
```

Note

- When the PATH variable has been configured to enable execution of UpdateAdvisor (Middleware) command from a user-defined location, performing uninstallation will delete any patches that have been applied to Resource Orchestrator so there is no need to return it to the state prior to application.

When the PATH variable has not been configured, return it to the state prior to application before performing uninstallation.

- If a manager is uninstalled and then reinstalled without agents being deleted, it will not be able to communicate with agents used before uninstallation.

In this case, the certificates to indicate that it is the same manager are necessary.

After installation, manager certificates are stored in the following directory:

```
/etc/opt/FJSVrcvmr/opt/FJSVssmgr/current/certificate
```

When uninstalling the manager, the certificates are backed up in the following directory.

When reinstalling a manager and using the same certificates, copy the backed up certificates to the above folder.

```
/var/tmp/back/site/certificate
```

When the certificates backed up during uninstallation are unnecessary, delete them manually.

When operating managers in cluster environments, back up the certificates as indicated in the preparations for uninstallation.

When reinstalling a manager in a cluster environment and using the same certificates, save the backed up certificates from the primary node in the folders above.

- After uninstallation, the installation directories below may remain. Delete the remaining directories manually.
 - /opt/FJSVrcvmr
 - /opt/FJSVscw-common
 - /opt/FJSVscw-tftpsv
 - /opt/FJSVscw-pxesv
 - /opt/FJSVscw-deploysv
 - /opt/FJSVscw-utils
 - /opt/FJSVrcvhb
 - /etc/opt/FJSVrcvmr
 - /etc/opt/FJSVscw-common
 - /etc/opt/FJSVscw-tftpsv
 - /etc/opt/FJSVscw-pxesv
 - /etc/opt/FJSVscw-deploysv
 - /etc/opt/FJSVscw-utils
 - /etc/opt/FJSVrcvhb
 - /var/opt/FJSVrcvmr

- /var/opt/FJSVscw-common
- /var/opt/FJSVscw-tftpsv
- /var/opt/FJSVscw-pxesv
- /var/opt/FJSVscw-deploysv
- /var/opt/FJSVscw-utils
- /var/opt/FJSVrcvhb

4.4 Uninstalling the Agent

This section explains the procedure for agent uninstallation.

4.4.1 Uninstallation [Windows/Hyper-V]

The procedure for agent uninstallation is as follows:

1. Log on to Windows as the administrator.

Log on to the system from which the agent is to be uninstalled. Log on as a user belonging to the local Administrators group.

2. Delete the agent using the following method.

Open "Add or Remove Programs" from the Windows Control Panel, and select "ServerView Resource Orchestrator Agent" and delete it from the [Add or Remove Programs] window.

Information

For Windows Server 2008, select "Programs and Features" from the Windows Control Panel.

3. The [Confirm Uninstall] dialog will be displayed, then click <OK>.

Information

The services of Resource Coordinator VE are automatically stopped and deleted.

4. When uninstallation is complete, the InstallShield Wizard window will be displayed, then click <Finish>.

Note

- Any updates that have been applied to Resource Coordinator VE will be deleted during uninstallation.
There is no need to remove updates before performing uninstallation.
- After uninstallation, the installation_folder (default: C:\Program Files\Resource Orchestrator) may remain. In that case, delete the folder manually.
- When uninstallation is stopped due to errors (system errors or processing errors such as system failure) or cancellation by users, resolve the causes of any problems, and then attempt uninstallation again.

If uninstallation fails even when repeated, the executable program used for uninstallation may have become damaged somehow.

In this case, set the Resource Orchestrator DVD-ROM, open the command prompt and execute the following command:

```
>"DVD-ROM_Drive\Windows\agent\win\setup.exe" /z"UNINSTALL" <RETURN>
```

Open "Add or Remove Programs" from the Windows Control Panel, and if "ServerView Resource Orchestrator Agent" is not displayed on the [Add or Remove Programs] window, delete any remaining resources manually.

Information

For Windows Server 2008, select "Programs and Features" from the Windows Control Panel.

4.4.2 Uninstallation [Linux/VMware/Xen/Oracle VM]

The procedure for agent uninstallation is as follows:

Note

When using VMware ESXi, Resource Orchestrator agents cannot be uninstalled.

Uninstall ServerView ESXi CIM Provider agents.

1. Log in to the system as the OS administrator (root).

Log in to the managed server from which Resource Orchestrator will be uninstalled, using root.

2. Execute the `rcxagtuninstall` command.

Executing this command performs uninstallation, and automatically deletes the packages of Resource Orchestrator.

```
# /opt/FJSVrcxat/bin/rcxagtuninstall <RETURN>
```

When uninstallation is completed successfully, the following message is displayed.

```
INFO : ServerView Resource Orchestrator Agent was uninstalled successfully.
```

When uninstallation fails, the following message is displayed.

```
ERROR : Uninstalling Package_name was failed.
```

Information

When the uninstaller of Resource Orchestrator is started, Resource Orchestrator's services are stopped automatically.

3. If uninstallation fails, use the `rpm` command to remove the packages given in the message, and start the process from 1. again.

```
# rpm -e Package_name <RETURN>
```

Note

- When the `PATH` variable has been configured to enable execution of UpdateAdvisor (Middleware) command from a user-defined location, performing uninstallation will delete any patches that have been applied to Resource Orchestrator so there is no need to return it to the state prior to application.

When the `PATH` variable has not been configured, return it to the state prior to application before performing uninstallation.

- After uninstallation, the installation directories and files below may remain. In that case, delete the remaining directories and files manually.

- Directories
 - `/opt/systemcastwizard`
 - `/opt/FJSVnrm`
 - `/opt/FJSVrcxat`

- /opt/FJSVssagt
 - /etc/opt/FJSVnrmp
 - /etc/opt/FJSVrcxat
 - /etc/opt/FJSVssagt
 - /var/opt/systemcastwizard
 - /var/opt/FJSVnrmp
 - /var/opt/FJSVrcxat
 - /var/opt/FJSVssagt
 - File
 - /boot/clcomp2.dat
 - /etc/init.d/scwagent
 - /etc/scwagent.conf
-

Chapter 5 Setup

This chapter explains how to set up Resource Orchestrator.

5.1 Setup Procedure

This section explains the setup procedure for Resource Orchestrator.

Resource Orchestrator manages resources and allocates them to L-Servers. Resources must first be registered in Resource Orchestrator.

Resource Orchestrator is setup using the following procedure:

1. Register resources
2. Register resources in a resource pool
3. Create an L-Server template

5.2 Registering a Resource

This section explains how to register a resource in Resource Orchestrator.

For details on configuration modification, registration release, and deletion of resources registered in resource pools, refer to "[A.3 Resource Operations](#)".

5.2.1 Managed Resources

The following resources can be registered in Resource Orchestrator:

- VIOM
- Storage management software
- VM management software
- Chassis
- Managed server
- LAN switch
- Power monitoring device
- Storage resources
- Network resources
- Address set resources
- Virtual image resources
- Physical image resources

Chassis, managed server, LAN switch, VIOM, VM management software, and power monitoring device are resources shared with RCVE (Resource Coordinator VE). Storage management software, virtual storage resources, network resources, and address set resources can be registered with Resource Orchestrator.

Use the following procedure to register resources:

Table 5.1 Registration Order of Resources

Registration Order	Resources that can be Registered	Method of Registration	Necessity of Registration Based on L-Server Type	
			Physical	VM
1	VIOM	Refer to "6.1.1 Registering VIOM Coordination" in the "ServerView Resource Coordinator VE Setup Guide".	Yes (*1)	Yes (*2)

Registration Order	Resources that can be Registered	Method of Registration	Necessity of Registration Based on L-Server Type	
			Physical	VM
2	VM management software	For details, refer to "5.2.2 VM Management Software" .	No	Yes
3	Storage management software	For details, refer to "5.2.3 Storage Management Software" .	Yes	Yes (*3)
4	Chassis	Refer to "6.1.2 Registering Chassis" in the "ServerView Resource Coordinator VE Setup Guide" .	Yes (*1)	Yes (*1)
5	Managed server	<p>For details, refer to "6.1.3 Registering Managed Servers" in the "ServerView Resource Coordinator VE Setup Guide".</p> <p>When performing admin LAN NIC redundancy and registering a physical server, check "Use Admin LAN redundancy" in the "Register Server" dialog when registering the server.</p> <p>Set a different subnet address for the admin LAN used by the managed servers from the one for the admin LAN used by the physical L-Servers.</p> <p>When creating a virtual L-Server</p> <p>For servers not using server management software, in order to create a virtual L-Server, it is necessary to enter the configuration information (CPU core count, CPU clock speed, memory capacity, etc.) of such servers in the definition file beforehand.</p> <p>For details, refer to "5.2.6 Servers Not Using Server Management Software".</p> <p>[Oracle VM] Roles are registered on VM hosts of Virtual Machine Server.</p>	Yes	Yes
6	LAN switch blades	For details, refer to "6.1.4.1 Registering LAN Switch Blades" in the "ServerView Resource Coordinator VE Setup Guide" .	Yes (*1)	Yes (*1)
7	LAN switch	For details, refer to "6.1.4 Registering LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide" .	Yes (*4)	Yes (*4)
8	Virtual images	For details, refer to "5.3.6 Virtual Image Resources" .	No	Yes (*5)
9	Physical images	For details, refer to "5.3.7 Physical Image Resources" .	Yes (*6)	No
10	Power monitoring device	For details, refer to "6.1.6 Registering Power Monitoring Devices" in the "ServerView Resource Coordinator VE Setup Guide" .	Yes (*7)	Yes (*7)

Yes: Required

No: Not Required

Optional: Register the resource when needed.

*1: Register when using blade servers.

*2: Register when using VIOM's Virtual I/O on VM hosts.

*3: Register when using storage management software.

*4: Register when using rack mount servers.

*5: Register when using virtual images (templates) that are created using VM management software.

*6: Register when using a cloning image (physical image) collected using RCVE.

*7: Register when monitoring power consumption.

The following resources do not have to be registered at this point.

- Storage resources

By registering storage management software or VM management software, the storage resources will automatically be detected as virtual storage resources and disk resources. For details, refer to ["5.2.4 Storage Resources"](#).

- Network resources

Specify a network pool when creating a network resource. For details, refer to ["5.2.5 Network Resources"](#).

- Address set resources

Creates and registers an address set resource specifying the address pool. For details, refer to "[5.3.5 Address Set Resources](#)".

- Physical image resources

When collecting cloning images from physical L-Servers, the cloning images are automatically stored in image pools.

For details, refer to "[6.6.1 Collecting a Cloning Image](#)".

Information

For details on configuration modification and deletion of resources shared with RCVE (chassis, managed servers, LAN switches, VIOM, VM management software, and power monitoring devices), refer to "6.3 Modifying Settings" and "6.4 Deleting Resources" in the "ServerView Resource Coordinator VE Setup Guide".

Execute the rcxadm storagemgr command to register storage management software and release the registration. For details on the command, refer to "1.7.1 rcxadm storagemgr" in the "ServerView Resource Orchestrator Reference Guide".

5.2.2 VM Management Software

Resource Orchestrator manages a server (with storage and networks) with defined logical specifications (number of CPUs, memory capacity, disk capacity, number of NICs, etc.) as an L-Server. In order to manage a virtual machine as an L-Server, VM management software must be registered in Resource Orchestrator.

The following VM management software can be registered in Resource Orchestrator.

- VMware vCenter Server
- System Center Virtual Machine Manager
- Oracle VM Manager

Note

In Disaster Recovery environments, multiple occurrences of the same virtual machine name may cause failures of the import of configuration information.

Avoid setting the same virtual machine name for machines.

For details on how to register VM management software, refer to "6.1.5 Registering VM Management Software" in the "ServerView Resource Coordinator VE Setup Guide".

[Hyper-V]

An administrator account registered in Resource Orchestrator is not a local account on a server on which SCVMM is installed, but a domain administrator account that the server belongs to. Specify the account to register in the following format:

<i>Domain_name\Administrator_account_name</i>

Note

It is necessary to first set up the following items for VM management software before registering it in Resource Orchestrator.

For details on how to set up VM management software, refer to the VM management software manual.

[Xen]

When using RHEL5-Xen, it is not necessary to register VM management software.

[VMware]

- Volumes have been created
- Zoning and affinity have been set

- I/O virtualization is controlled by RCVE and VIOM
- VMware ESX has been set to recognize VMFS
- Dynamic assignment is performed using VMFS

For details, refer to "Appendix A Server Virtualization Products" of the "ServerView Resource Coordinator VE Setup Guide", and the VM host manual.

When performing redundancy of L-Servers, perform settings for high availability functions (such as VMware HA) of server virtualization software in advance.

For details, refer to the manual of server virtualization software.

[Hyper-V]

- The configuration enables use of SAN environments on VM hosts
- I/O virtualization is controlled by RCVE and VIOM
- Volumes have been created
- Zoning and affinity have been set
- MSFC has been added to VM hosts
- A SAN volume has been configured as a cluster disk
- A cluster disk has been added as a shared cluster volume

All created L-Servers are located on a cluster as high availability VMs.

For details, refer to the MSFC help.

[Oracle VM]

- Volumes have been created
- Zoning and affinity have been set
- I/O virtualization is controlled by RCVE and VIOM
- A storage and a repository have been added as a shared cluster volume
- A server pool has been created
- A VM host has been registered in a server pool
- A storage repository has been registered in a server pool
- A VM guest can be created using a server pool
- An image exists in a server pool

For details, refer to "Appendix A Server Virtualization Products" of the "ServerView Resource Coordinator VE Setup Guide", and the VM host manual.

When performing redundancy of L-Servers, perform settings for high availability functions (such as HA) of server virtualization software in advance.

For details, refer to the manual of server virtualization software.



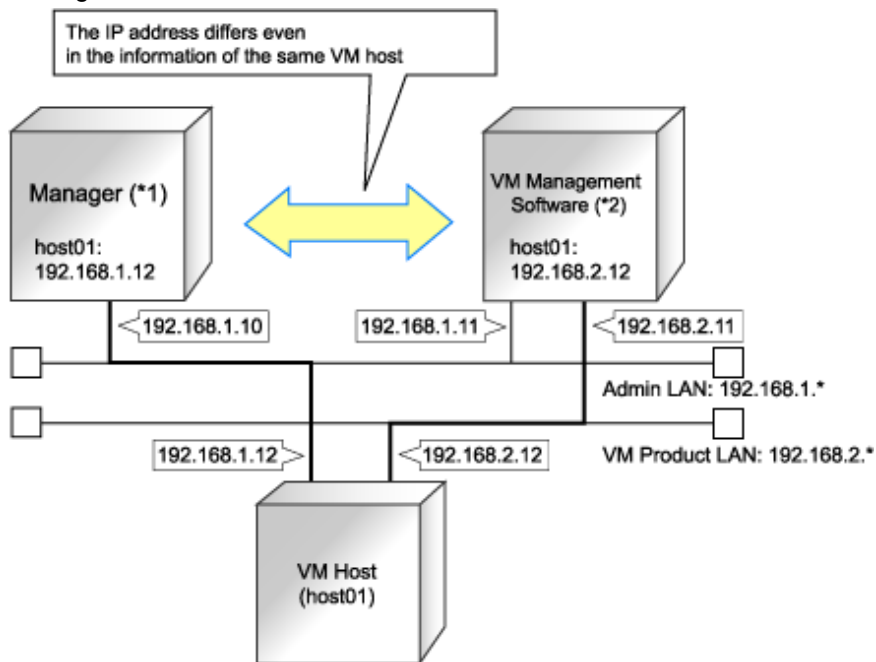
Information



VM Host Relation Definition File

Depending on the network configuration and network settings of VM management software and VM hosts, the VM host IP address retained by Resource Orchestrator may not match the VM host IP address retained by VM management software. If those IP addresses differ, the functions for coordinating with VM management software will be unavailable because Resource Orchestrator cannot associate the VM management software with the VM host. A definition file must be created to associate VM management software with a VM host. Use the UTF-8 character code for definition files.

Figure 5.1 Configuration When the IP Address Information of VM Hosts Differ Between the Manager and VM Management Software



- *1: When the VM host is a rack mount server or another maker's server, only the admin LAN IP address of the VM host can be obtained.
- *2: Depending on the VM management product, an IP address that differs from that of the admin LAN of the VM host may be obtained.

Location of the Definition File

[Windows]
Installation_folder\Manager\etc\customize_data

[Linux]
 /etc/opt/FJSVrcvnr/customize_data

Definition File Name

vmhost_ip_addresses.rcxprop

Definition File Format

In the definition file, information for a single VM host is entered on each line. Each line is entered in the following format.

admin_lan_ip = *other_lan_ip*[,*other_lan_ip*..]

Definition File Items

- *admin_lan_ip*
Specify the IP address of the admin LAN of the VM host.
- *other_lan_ip*
Specify an IP address other than the IP address of the admin LAN of a VM host that has been registered with VM management software. Multiple IP addresses can be specified, separated using commas (",").

[Oracle VM]
 When specifying a host name instead of an IP address for IP address specification during registration of an Oracle VM Server with Oracle VM Manager, specify the host name.

Example Definition File

An example definition file is indicated below.

```
# Oracle VM Server
192.168.0.10 = 192.168.10.10
```

```
192.168.0.11 = 192.168.10.11,172.16.0.11
192.168.0.12 = 192.168.10.12,host01
```

5.2.3 Storage Management Software

In the following cases, it is necessary to register storage management software with Resource Orchestrator for coordination.

- When the server type is "Physical"
- When using RHEL5-Xen as server virtualization software



For storage management software, only PRIMECLUSTER GDS can be coordinated, when using RHEL5-Xen.

Use the following procedure to register storage management software:

1. Decide the storage environment.
2. Configure the storage environment using storage management software which can be registered.

The following storage management software can be registered with Resource Orchestrator:

- ETERNUS SF Storage Cruiser
- Data ONTAP
- PRIMECLUSTER GDS
- EMC Navisphere Manager
- EMC Solutions Enabler

For details on configuration of storage environments, refer to "[F.1 System Configuration](#)".

3. When registering EMC Navisphere Manager or EMC Solutions Enabler as storage management software, it is necessary to specify the installation folder of Navisphere CLI or SYMCLI in the definition file for EMC storage.

Storage Location of the Definition File for EMC Storage

[Windows]

Installation_folder\Manager\sys\usm\etc

[Linux]

/opt/FJSVrcvnr/sys/usm/etc

Definition File Name for EMC Storage

emcpath.conf

Definition File Format for EMC Storage

The format of the definition file for EMC storage is as follows:

When registering EMC Navisphere Manager as storage management software, modify the line beginning with "naviseccli".

```
naviseccli=Navisphere_CLI_installation_folder
```

When registering EMC Solutions Enabler for storage management software, modify the line beginning with "symcli".

```
symcli=SYMCLI_installation_folder
```

[Windows]

Use "\\" for the file separator. Do not modify the line beginning with "secfilepath".

Create Storage Connection Definition Files

[Windows]

```
naviseccli=C:\\Program Files\\EMC\\Navisphere CLI
secfilepath=..\\..\\..\\etc\\storage\\emc
symcli=C:\\Program Files\\EMC\\SYMCLI\\bin
```

[Linux]

```
naviseccli=/opt/Navisphere/bin
secfilepath=/etc/opt/FJSVrcvmr/storage/emc
symcli=/opt/symcli/bin
```

4. Register storage management software for coordination with Resource Orchestrator.

Execute the rcxadm storagemgr register command to register storage management software with Resource Orchestrator.

For details on the rcxadm storagemgr register command, refer to "1.7.1 rcxadm storagemgr" in the "ServerView Resource Orchestrator Reference Guide".

5.2.4 Storage Resources

By registering storage management software or VM management software, information regarding storage controlled by the storage management software or VM management software will be obtained automatically and detected as storage resources.

- Virtual storage resources

Disk resources can be created from virtual storage resources.

RAID groups and other devices controlled by storage management software, and file systems for VM guests controlled by VM management software can be managed as virtual storage resources.

- Disk resources

Disks created in advance using storage management software can be managed as disk resources.

It is necessary to register detected virtual storage resources and disk resources in the storage pool.

For details on how to register to the storage pool, refer to "5.3.3 Storage Resources".

When addition or modification of storage is performed using storage management software or VM management software, periodic queries are made to the storage management software or VM management software to detect changes to the configuration/status of storage. The interval between regular updates varies according to the number of storage resources.

By right-clicking a storage resource on the RC console orchestration tree and selecting [Update] on the displayed menu, the configuration/status of the storage management software and VM management software is refreshed without waiting for the regular update.

After that, perform registration in the storage pool.

Definition File for Combining Ports of SAN Storage

[Windows/Linux]

Create the following definition file in advance, then define the combination of the ports of storage units used when accessing the L-Server disk.

In Resource Orchestrator, LUN masking on the ports of storage units is configured by the definition file combining ports for SAN storage. When a storage unit is ETERNUS, zoning for the Fibre Channel switch is configured using the definition file combining ports for SAN storage.

Also give a definition in the file when adding storage units, and storage resources to resource pools.

Storage Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvmr/customize_data

Definition File Name

storage_portset.rcxprop

Definition File Format

Describe storage information for each device in one line using the following format. Use of line breaks is not possible.

```
storage_unit_ipaddr,"portX:portY","portX:portY",...
```

Definition File Items

- When using ETERNUS storage

- storage_unit_ipaddr

Specify IP addresses of operation management LAN ports of ETERNUS storage which are managed by ESC.
When the same IP address is specified in multiple lines, the first defined line is valid.

- Portset

A pair of FC-CA ports of ETERNUS storage used when accessing an L-Server disk, represented using the WWPN of the FC-CA ports.

Specify a pair of FC-CA ports using two WWPNs (16 digit hexadecimal numbers) separated with colons (":"). Up to 64 combinations can be specified.

If there is trouble with the ETERNUS storage controller, in order to avoid blocking both of the FC-CA ports used for L-Server, do not use combinations of ports on the same controller.

WWPNs of FC-CA ports which are not connected using Fibre Channel cable cannot be specified.
Already defined WWPNs cannot be specified for another portset.

LUN masking and zoning are configured by the combination of the following HBAs and storage units. Check that Fibre Channel cables are connected between the ports of HBAs and storage units.

- HBA Port1 and the port of the storage unit defined first
- HBA Port2 and the port of the storage unit defined second



In Resource Orchestrator, access paths are defined in the following order.

- The port of the storage unit defined on portX and HBA Port1
- The port of the storage unit defined on portY and HBA Port2

- When using EMC CLARiiON storage

- storage_unit_ipaddr

Specify the IP address of SP of EMC CLARiiON storage.

When the same IP address is specified in multiple lines, the first defined line is valid.

- Portset

A pair of SP ports of EMC CLARiiON storage used when accessing an L-Server disk, represented using a SP port name.

Specify a pair of SP ports using two SP port names separated with colons (":"). Up to 64 combinations can be specified.

The two ports specified here should be selected from the SP ports of different SPs. When using SP ports on the same SP of EMC CLARiiON storage, if there is trouble with the SP, the SP ports used by L-Servers may not be available.

SP ports which are not connected using Fibre Channel cables cannot be specified.

Already defined SP port names cannot be specified for another portset.

- When using EMC Symmetrix DMX storage

- storage_unit_ipaddr

Specify the Symmetrix ID of EMC Symmetrix DMX storage.

When the same Symmetrix ID is specified in multiple lines, the first defined line is valid.

- Portset

A pair of ports of EMC Symmetrix DMX storage that is used when accessing an L-Server disk, represented using the pair of a director number and a port number.

Specify a pair of ports using two port names separated with colons (":"). Up to 64 combinations can be specified.

The two ports specified here should be selected from the ports of different directors. When using ports on the same EMC Symmetrix DMX storage director, if there is trouble with the director, the ports used by L-Servers may not be available.

The ports not connected using Fibre Channel cables cannot be specified.

The pair of an already defined director name and port number cannot be specified for another portset.



Example

An example definition file is indicated below.

- When using ETERNUS storage

```
192.168.1.24,"500000E0D00C7006:500000E0D00C7086","500000E0D00C7086:500000E0D00C7087"
```

- When using EMC CLARiiON storage

```
192.168.1.24,"SPAPort0:SPBPort0"
```

- When using EMC Symmetrix DMX storage

```
000192601264,"07GPort1:08GPort1"
```

Format Selection for the Names of Virtual Storage Resources and Disk Resources Managed by ESC

The format of the names of virtual storage resources and disk resources managed by ESC can be selected. When the definition file has been edited, restart the manager.

Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

Definition File Name

storage.rcxprop

Definition File Format

In the definition file, the items to set are entered on individual lines. Each line is entered in the following format.

```
Item specified = Value specified
```

Definition File Items

- ETERNUS_VOLUME_NAME_TO_DISK_NAME

Select the format of the name of disk resources managed by ESC.

When "true" is specified for the value, the volume name of ESC is used as the disk resource name. If the format of the volume name is unavailable for the format of the disk resource name, Resource Orchestrator automatically sets a disk resource name that conforms

to the volume name. Even if "true" has been specified, when ESC does not support the volume name, the combination of the IP address of ESC, the RAID group number, and the volume number will be used as the disk resource name.

When "false" is specified for the value, the combination of the IP address of ESC, the RAID group number, and the volume number will be used as the disk resource name.

If not specified, "false" is set.

- ETERNUS_RAIDGROUP_NAME_TO_VSTORAGE_NAME

Select the format of the name of virtual storage resources managed by ESC.

When "true" is specified for the value, the RAID group name of ESC is used as the disk resource name. If the format of the RAID group name is unavailable for the format of the virtual storage resource name, Resource Orchestrator automatically set a virtual storage resource name that conforms to the RAID group name. Even if "true" has been specified, when ESC does not support the RAID group name, the combination of the IP address of ESC and the RAID group number will be used as the virtual storage resource name.

When "false" is specified for the value, the combination of the IP address of ESC and the RAID group number will be used as the virtual storage resource name.

If not specified, "false" is set.

Example Definition File

An example definition file is indicated below.

```
ETERNUS_VOLUME_NAME_TO_DISK_NAME = true
ETERNUS_RAIDGROUP_NAME_TO_VSTORAGE_NAME = true
```

5.2.5 Network Resources

To register a network resource, specify a network pool when creating the network resource.

Configuration is necessary for each network of the destination for connection.

For physical L-Servers, network resources for the admin LAN and public LAN are necessary.

For virtual L-Servers, network resources for the public LAN are necessary.

For details, refer to "[5.3.4 Network Resources](#)".

Prerequisites for Resource Orchestrator Operation

The prerequisites for the network environment, VM host, and physical server used to run Resource Orchestrator differ depending on the L-Server used.

When using physical L-Servers, refer to "[F.4 Pre-setup Preparations \(Network\)](#)".

When using virtual L-Servers, refer to the setup section of "[Appendix G Configuration of Server Virtualization Software](#)".

Automatic Network Configuration

By creating network resources in advance, if the NIC and network resources are connected when an L-Server is created, the following settings matching the network resource definition will be registered automatically.

Details of auto configuration differ depending on L-Server type.

When using physical L-Servers, refer to "[F.6.1 Automatic Network Configuration](#)".

When using virtual L-Servers, refer to the setup section of the server virtualization software used in "[Appendix G Configuration of Server Virtualization Software](#)".

When using IBP

When using IBP, it is necessary to create IBP uplink set for the public LAN and the admin LAN in advance.

- For physical L-Servers

For details, refer to "F.4 Pre-setup Preparations (Network)".

- For virtual L-Servers

When using virtual L-Servers, connect the IBP uplink sets used for the public LAN and admin LAN to the VM host regardless of VIOM, after creating each IBP uplink set.

It is not necessary to combine the name of the uplink set and the name of the network resource.

Network Definition File for iSCSI Boot

[Windows/Linux]

Create the following file in advance to define the network information used for iSCSI boot.

The network information is linked with the iSCSI boot information which is registered using the iSCSI boot operation command (rcxadm iscsictl). For details, refer to "2.9 iSCSI Boot Information" in the "ServerView Resource Orchestrator Reference Guide".

Storage Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvmt/customize_data

Definition File Name

- User Groups

iscsi_user_group_name.rcxprop

- Common to System

iscsi.rcxprop

Definition File Format

In the definition file, an item to define is entered on each line. Enter the items in the following format.

<i>Variable = Value</i>

When adding comments, start with a number sign("#").

Definition File Items

Table 5.2 Network Definition File Items for iSCSI boot

Variable	Meaning	Value
server_model. <i>model_name</i> .boot_nic	Specify the server model name and NIC to be booted using iSCSI. Multiple NICs can be specified. The following models can be specified: - BX620 - BX920 - BX922 - BX924 - BX960 - RX300 When setting the default, specify an asterisk ("*").	Specify the items in the following format. NIC[<i>index</i>] <i>index</i> is an integer starting from 1.

Example

```
#Server Section
server_model.BX922.boot_nic = NIC1
server_model.BX924.boot_nic = NIC1,NIC2
server_model.*.boot_nic = NIC1,NIC2
server_model.RX300. boot_nic = NIC1,NIC2
```

- The entries are evaluated in the order they are added. When the same entry is found, the evaluation will be performed on the first one.
- When setting the default, specify an asterisk ("*").

When Using Link Aggregation

When using link aggregation, configure link aggregation on the LAN switch blade in advance. For details on configuration of link aggregation, refer to the manual of the LAN switch blade.

When creating a network resource, specify the uplink port of the port channel as the external connection port of the network resource.

For details, refer to "[Appendix M Using Link Aggregation](#)".

5.2.6 Servers Not Using Server Management Software

To create a virtual L-Server, create the definition file, define the configuration information (CPU core count, CPU clock speed, memory capacity, etc.), and then register the server as a managed server. If the target server has been registered with Resource Orchestrator before creation of the definition file, or when modifying the configuration information (CPU core count, CPU clock speed, memory capacity, etc.) described in the definition file, create or edit the definition file first, then register the hardware information with Resource Orchestrator again. For details, refer to "[1.9.3 Hardware Maintenance](#)".

Note

When there are differences between the values in the definition file and the actual configuration information of the server, creation or starting of the virtual L-Server may fail, or the virtual machine may be deployed using incorrect CPU and memory information.

Be sure to confirm that the values entered in the definition file and the actual configuration information of the server are the same.

Storage Location of the Definition File

[Windows]
Installation_folder\Manager\etc\customize_data

[Linux]
/etc/opt/FJSVrcvmt/customize_data

Definition File Name

server_spec.rcxprop

Character code

[Windows]
- Shift-JIS

[Linux]
- UTF-8

Line break code

[Windows]
- CR/LF

[Linux]

- LF

Definition File Format

- In the first line of the definition file, be sure to enter the following text:

```
ServerSpec,V1.0
```

- In the definition file, enter the configuration information (CPU core count, CPU clock speed, memory capacity, etc.), separated by commas (",").

When defining 2 or more servers, use line breaks.

Each line is entered in the following format.

```
physical_server, cpu_core_count, cpu_clock, memory_size[, cpu_type]
```

- Spaces between data and commas (",") are ignored.

If there is duplicated configuration information (CPU core count, CPU clock speed, memory capacity, etc.) for the same `physical_server`, the values that appear first will be used.

- When adding comments, start with a number sign("#").

Definition File Items

`physical_server`

Enter the same physical server name as the one entered when registering a managed server.

`cpu_core_count`

Enter the total number of physical CPU cores.

Enter an integer between 0 and 999.

If 0 is entered, a hyphen ("-") will be displayed in the General information of the Resource Details window, indicating that no virtual L-Server will be created.

`cpu_clock`

Enter the CPU frequency.

Enter an integer between 0 and 999999.

Megahertz is used for the unit. Enter 1,000 MHz for 1 GHz, for example.

If 0 is entered, a hyphen ("-") will be displayed in the General information of the Resource Details window, indicating that no virtual L-Server will be created.

`memory_size`

Enter the total memory size.

Enter an integer between 0 and 999999999.

Megabytes is used for the unit. Enter 1,024 MB for 1 GB, for example.

If 0 is entered, a hyphen ("-") will be displayed in the General information of the Resource Details window, indicating that no virtual L-Server will be created.

`cpu_type`

Enter the CPU type.

The string must be composed of alphanumeric characters and symbols (ASCII characters 0x20 to 0x7e), except for commas (","), and can be up to 64 characters long.

When omitted, a hyphen ("-") is displayed.

Example

An example definition file is indicated below.

```
ServerSpec,V1.0

#####
# server_spec.rcxprop
#
#All Rights Reserved, Copyright(C) FUJITSU LIMITED 2011
#####
#
# physical_server, cpu_core_count, cpu_clock, memory_size, cpu_type
#

server001, 8, 3160, 4096, Intel(R) Xeon(R)
server002, 8, 2660, 12288, Intel(R) Xeon(R)
server003, 2, 2000, 65536
server004, 4, 4000, 4096, Intel(R) Xeon(R) Processor E5501
```

5.3 Registering to a Resource Pool

This section explains how to register a resource managed by Resource Orchestrator to a resource pool.

A resource pool is a type of resource folder displayed on the orchestration tree of RC console, which stores the resources for selection when creating or adding L-Servers.

A resource pool type is specified when creating a resource pool, and only resources of a specific type are stored in each type of resource pool. When installing Resource Orchestrator, one resource pool is created for each resource pool type. For details on operating multiple resource pools, refer to "[Appendix A Resource Pools](#)".

This section explains how to register resource pool types or resources to a resource pool.

Table 5.3 Registering Resources to Resource Pools Based on Resource Type

Resource Pool Types	Type of Resources Stored in the Resource Pool	Method of Registration to the Resource Pool	Necessity of Registration Based on L-Server Type	
			Physical	VM
VM pool	VM host resources	For details, refer to " 5.3.1 VM Host Resources ".	No	Yes
Server pool	Physical server resources	For details, refer to " 5.3.2 Physical Server Resources ".	Yes	No
Storage pool	Virtual storage resources or disk resources	For details, refer to " 5.3.3 Storage Resources ".	Yes	Yes
Network pool	Network resource	For details, refer to " 5.3.4 Network Resources ".	Yes	Yes
Address pool	Address set resource	For details, refer to " 5.3.5 Address Set Resources ".	Yes	Yes (*1)
Image pool	Image resources The following two types: - Virtual image resource An image that is created using a template from a VM management software for VM guest creation, or	- For details on how to register an image that uses a template from VM management software, refer to " 5.3.6 Virtual Image Resources ". - For details on how to register a cloning image that was	Yes (*2)	Yes (*3)

Resource Pool Types	Type of Resources Stored in the Resource Pool	Method of Registration to the Resource Pool	Necessity of Registration Based on L-Server Type	
			Physical	VM
	<p>that is collected as a cloning image from an L-Server.</p> <ul style="list-style-type: none"> - Physical image resource An image that uses a cloning image collected by cloning a physical server in RCVE. 	<p>collected using RCVE, refer to "5.3.7 Physical Image Resources".</p> <ul style="list-style-type: none"> - For details on how to collect cloning images from an L-Server, refer to "6.6.1 Collecting a Cloning Image". 		

Yes: Required

No: Not Required

*1: When using RHEL5-Xen, it is necessary to register MAC addresses.

*2: When collecting cloning images from L-Servers, the cloning images are automatically stored in image pools.

*3: When using templates, register them to image pools.

Information

For details on configuration modification, registration release, and deletion of resources registered in resource pools, refer to ["A.3 Resource Operations"](#).

5.3.1 VM Host Resources

This section explains how to register a VM host in a VM pool.

Moving an L-Server (migration) is only possible between VM hosts belonging to the same cluster group, when two or more cluster groups are registered in the same VM pool.

Use the following procedure to register a VM host in a VM pool:

1. In the RC console orchestration tree, right-click the target VM pool, and select [Register Resources] from the popup menu.
The [Register Resources] dialog is displayed.

2. Select the VM host to register.

The list of the VM hosts that can be registered is displayed in the resource list. Select the VM host that you want to register using the "Select" checkbox, or select all VM host resources displayed in the resource list by checking <Select all>.

3. Click <OK>.

The VM host resource is registered.

5.3.2 Physical Server Resources

This section explains how to register a physical server in a server pool.

Use the following procedure to register a physical server in a server pool:

1. In the RC console orchestration tree, right-click the server pool, and select [Register Resources] from the popup menu.
The [Register Resources] dialog is displayed.

2. Select the physical server to register.

The list of the physical servers that can be registered is displayed in the resource list. Select the physical server that you want to register using the "Select" checkbox, or select all registered physical servers displayed in the resource list by checking <Select all>.

Note

When the "Display servers with OS installed" checkbox is checked, physical servers with OS's installed are displayed in the resource list. However, physical servers with OS's installed cannot be used for creating L-Servers.

Do not check the "Display servers with OS installed" checkbox.

3. Click <OK>.

The physical server is registered.

5.3.3 Storage Resources

This section explains how to register a storage resource in a storage pool.

Use the following procedure to register a storage resource: To register iSCSI boot disks, use the iSCSI boot operation command (rcxadm iscsictl).

Note

If iSCSI boot information already registered is specified, the registered information continues to exist.

If the registered information is changed, delete the iSCSI boot information using the unregister subcommand, and then register the iSCSI boot information by using the register subcommand again.

1. In the RC console orchestration tree, right-click the target storage pool, and select [Register Resources] from the popup menu. The [Register Resources] dialog is displayed.
2. Select the storage resource to register from "Resources".

Resources

Virtual storage

When creating a specified size of disk automatically from the virtual storage during L-Server creation, select "Virtual storage".

When "Virtual Storage" is selected, the virtual storage resources which can be registered will be displayed in the resource list.

Select the virtual storage resource which you want to register using the "Select" checkbox of the resources, or select all registered virtual storage resources by checking <Select all>.

Note

Virtual storage resources cannot be selected for EMC storage.

Disk resource

When using a disk that has been created in advance as an L-Server, select "Disk resource".

When the following items are specified as search conditions, the list for the relevant disk resources which can be registered is displayed.

Virtual storage

Select a virtual storage where there is a disk that has been created in advance.

Size

Enter the size of the disk resource.

Minimum value

Enter the lowest value of the disk size to be searched as a number with up to one decimal place, in units of gigabytes. Check the "Minimum value" checkbox, and enter a value lower than the maximum value.

Maximum value

Enter the highest value of the disk size to be searched as a number with up to one decimal place, in units of gigabytes. Check the "Maximum value" checkbox, and enter a value higher than the minimum value.

Depending on the value of the second decimal place of the disk size, matching disks may not be able to be displayed in the result. For search conditions, specify a size allowing for errors.

Select the disk resource which you want to register using the "Select" checkbox of the displayed disk resources, or select all registered disk resources by checking <Select all>.

3. Click <OK>.

The storage resource is registered.



When using a LUN that has been created in advance and a LUN for iSCSI boot as a disk resource, if the L-Server is deleted or disks are deleted from L-Servers, the content of disks will remain (is not deleted).

When the disk resource is registered in a global pool, it is possible to be allocated to unspecified users, so caution is necessary.

When using a LUN that has been created in advance as a disk resource, it is recommended to operate the LUN in a local pool, and delete data on the disk during deletion of L-Servers or detachment of disks.

Use the following methods to delete the data on disks.

- Using an OS, perform disk formatting while the L-Server is connected
- Using a function of the storage, perform disk formatting (For ETERNUS)
- Create a LUN again

5.3.4 Network Resources

This section explains how to create a network resource and register the resource in a network pool.

Network resources can be created using the following methods:

- Create new network resources

Refer to "[Create New Network Resources](#)".

- Create network resources using already registered admin LAN subnets

Refer to "[Create Network Resources Using Already Registered Admin LAN Subnets](#)".

The network resource for the admin LAN that is directly connected from the manager is automatically created with the values of "AdminLan" for the network resource name and "1" for the VLAN ID.

To change these values, delete "AdminLan", and then create a new network resource following the procedure provided in "[Create Network Resources Using Already Registered Admin LAN Subnets](#)".

Create New Network Resources

Use the following procedure to create a new network resource and register it in a network pool:

1. In the RC console orchestration tree, right-click the target network pool, and select [Create Resource]-[New] from the popup menu. The [Create a network resource] dialog is displayed.

2. Enter the items below, and click <OK>.

Network resource name

Enter a name for the network resource.

When specifying "Admin LAN" for the type, enter up to 16 characters beginning with an alphabetical character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), periods ("."), or hyphens ("-").

When specifying something other than "Admin LAN" for the type, enter up to 16 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), periods ("."), or hyphens ("-").

Type

Set the network resources type to create using the following option buttons:

- Public LAN
- Admin LAN
- iSCSI boot



Note

When creating the public LAN, a network resource name and a VLAN ID must be entered.

- When creating a network resource for the admin LAN, a network resource name, a VLAN ID, a subnet address, and a subnet mask must be entered.
- When creating a network resource for iSCSI boot, a network resource name, a VLAN ID, a subnet address, and a subnet mask must be entered.

VLAN ID/Uplink port settings

Perform the settings for VLAN IDs and external connection ports.

Clicking <Setting> displays the [Define VLAN ID/Uplink port settings] dialog.

Specify the VLAN ID to allocate to the LAN switch blade and virtual switch. Select a VLAN ID allocated to the external port of the LAN switch blade, or enter a number. Specify a pre-designed VLAN ID.

Enter an integer between "1" and "4094".

- For external networks including blade servers
Select the VLAN ID of an external port.
- For internal networks or external networks with rack mount servers only
Enter a VLAN ID.

When selecting the "Filter ports by VLAN ID" checkbox with an ID specified, the next time an external connection port is configured, the displayed information is filtered.

VLAN ID/Uplink port settings (Select/Chassis/LAN Switch/Port/VLAN type) (Optional)

If you connect an external network to an L-Server, perform the settings for the internal ports and virtual switches of the LAN switch blade to enable communication for the specified ports.

Clicking <Setting> displays the [Define VLAN ID/Uplink port settings] dialog.

Specify the external connection port to use when automatically setting external networks, including blade servers.

Check the checkbox for the external connection port that was designed/configured beforehand. Select two ports to make a pair. If there are multiple chassis, select the ports for all the chassis to use.

When specifying a port in a link aggregation configuration, perform the following:

- Confirm the settings of the LAN switch blade in advance, and select one or more ports for which link aggregation has been configured.

- If the target port is not displayed in the external connection port list, clear the "Filter ports by VLAN ID" checkbox. Regardless of the VLAN ID, the ports available for external connections on the LAN switch blade are displayed.

When the "Filter ports by VLAN ID" checkbox is not selected, the following information is displayed:

- Chassis name
- Switch name
- Port number
- Untagged VLAN/Tagged VLAN
 - When no VLAN is set
A hyphen ("-") is displayed.
 - When multiple VLANs are set
The VLANs are displayed, separated by commas (",").
 - When one VLAN is set
The VLAN ID is displayed.

Do not specify for internal networks or external networks with rack mount servers only.

Subnet settings (Optional)

This setting can be omitted if "Public LAN" is specified for the type.

Enter if you want to automatically set a network and IP address for the NIC connected to the network resource when deploying an image on an L-Server. IP addresses included in subnet addresses are allocated to L-Servers, but it is possible to specify a range of addresses to exclude. Clicking <Add> will display the "Define start and end IP addresses" dialog, specify the range of IP addresses to exclude, and click <Add>. To reactivate excluded IP addresses, check the appropriate checkboxes on the list, and click <Delete>. Clicking <OK> displays the original dialog with the entered settings.

Network addresses and broadcast addresses are automatically excluded.

Information

If a subnet address is set for a network resource, the IP address can be automatically set when deploying an image to an L-Server. If no subnet address is set, the DHCP settings are adopted.

Subnet address/mask

Enter the subnet address and subnet mask to set using the "*xxx.xxx.xxx.xxx*" format.

The maximum value for a subnet mask is 255.255.255.255 (32bit mask) and the minimum value is 255.255.0.0 (16bit mask).

However, 255.255.255.254 cannot be specified.

Note

When creating a physical L-Server, specify a different subnet from admin LAN for the public LAN subnet.

When creating physical L-Servers, the IP address for the default admin LAN must be registered as an exclusive IP address for allocation. The default admin LAN is created after installation of Resource Orchestrator. If the IP address is not registered, it may conflict with the IP addresses of devices that are not managed by Resource Orchestrator.

Default gateway (Optional)

This setting can be omitted if something other than "Admin LAN" is selected.

Enter the IP address for the default gateway to use when communicating externally of the subnet.

Exclusion IP range (Optional)

IP addresses that are being used for other devices but you do not want to automatically allocate to an L-Server (because of plans for future use) can be specified.

Note

Of the IP addresses specified for the Subnet address/mask, the following addresses are automatically excluded from the target of allocation. They cannot be specified for Exclusion IP range.

- Admin server
- Managed server
- Network address and broadcast address

Set the IP addresses of the unregistered servers that are detected as excluded IP addresses.

When excluding other IP addresses, such as admin IP addresses of VM management software or LAN switch blades, set them as excluded IP addresses.

Information

A network resource for the admin LAN is automatically created as the management network that is specified when installing Resource Orchestrator.

When using two or more management networks, create two or more network resources for admin LANs.

It is not necessary to register admin LAN subnets of the server resource tree.

For details on how to register admin LAN subnets, refer to "6.1.7 Registering Admin LAN Subnets [Windows]" in the "ServerView Resource Coordinator VE Setup Guide".

Label (Optional)

A custom label can be defined for the network resource. User-defined labels make it easier to identify the resource.

Enter up to 32 alphanumeric characters or symbols.

Comment (Optional)

A custom comment can be defined for the network resource. For example, registering detailed work content, troubleshooting, and recovery procedures can speed up recovery.

Enter up to 256 alphanumeric characters or symbols.

The network resource is created and registered in a network pool.

Create Network Resources Using Already Registered Admin LAN Subnets

Use the following procedure to create a network resource using an admin LAN subnet, and register it in a network pool:

1. In the RC console orchestration tree, right-click the target network pool, and select [Create Resource]-[Using existing admin subnet] from the popup menu.
The [Create a network resource] dialog is displayed.
2. Enter the items below, and click <OK>.

Network resource name

Clicking <Select> displays the [Select a subnet for the admin LAN] dialog.

Select an already configured admin LAN subnet.

When the selected admin LAN subnet has no name, enter the name of a network resource for "Network resource name".

Enter up to 32 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), periods ("."), or hyphens ("-").

Click <OK>.

Type

"Admin LAN" is displayed.

VLAN ID/Uplink port settings

Refer to "VLAN ID/Uplink port settings" of "[Create New Network Resources](#)".

Subnet settings (Optional)

Refer to "Subnet settings" of "[Create New Network Resources](#)".

Label (Optional)

Refer to "Label" of "[Create New Network Resources](#)".

Comment (Optional)

Refer to "Comment" of "[Create New Network Resources](#)".

The network resource is created and registered in a network pool.

5.3.5 Address Set Resources

This section explains how to create an address set resource and register the resource in an address pool.

In the following cases, it is necessary to create address set resources and register them in the address pool:

- When creating physical L-Servers

- For blade servers

For WWNs and MAC addresses, it is necessary to create address set resources and register them in the address pool.

- For rack mount servers

For WWNs, it is necessary to create address set resources and register them in the address pool.

It is not necessary to create or register address set resources, since MAC addresses allocated to network adapters of physical servers are used.

- When creating an L-Server with the server type "RHEL-Xen"

For MAC addresses, it is necessary to create address set resources and register them in the address pool.

Use the following procedure to create an address set resource and register it in an address pool:

Registration in Address Pools (WWNs)

To register a WWN in an address pool, execute the `rcxadm addrset create` command.

For details on the `rcxadm addrset create` command, refer to "1.3.8 `rcxadm addrset`" in the "ServerView Resource Orchestrator Reference Guide".

Registration in Address Pools (MAC addresses)

To register a MAC address in an address pool, execute the `rcxadm addrset create` command.

For details on the `rcxadm addrset create` command, refer to "1.3.8 `rcxadm addrset`" in the "ServerView Resource Orchestrator Reference Guide".

An address set resource will be created and registered in the address pool.

5.3.6 Virtual Image Resources

This section explains how to register a cloning image to a resource pool.

When an image (template) has been created in advance using VM management software, register it to the image pool using the following procedure:

1. In the RC console orchestration tree, right-click the target image pool, and select [Register Resources] from the popup menu.
The [Register Resources] dialog is displayed.
2. Select the cloning image to register and click <OK>.
The cloning image is registered.

Note

For images (templates) created in advance using VM management software, change the name of a template as follows to enable Resource Orchestrator to process it:

- Delete any characters other than alphanumerical characters and underscores ("_").
- Ensure an alphabetic character is used for the first character.

5.3.7 Physical Image Resources

This section explains how to register a cloning image that was collected using RCVE to a resource pool.

1. In the RC console orchestration tree, right-click the target image pool, and select [Register Resources] from the popup menu.
The [Register Resources] dialog is displayed.
2. Select the cloning image to register and click <OK>.
The cloning image is registered.

5.4 L-Server Template

This section explains how to create an L-Server template.

An L-Server template comprises pre-defined specifications (number of CPUs, memory capacity, disk capacity, number of NICs, etc.) for an L-Server. Use the following XML format.

To create an L-Server template, export the provided sample L-Server template and edit the exported template. A new L-Server template can be created by importing the edited template.

Note

Use the UTF-8 character code for L-Server templates.

5.4.1 Exporting a Template

This section explains how to export an L-Server template.

Use the following procedure to export an L-Server template:

1. Select the RC console orchestration tree.
On the [Template List] tab, right-click the L-Server template to export and select [Export] from the popup menu.
Displays the [File Download] dialog.
2. Click <Save>.
The L-Server template is exported.

From the command-line, execute `rcxadm template export`.

For details on the `rcxadm template export` command, refer to "1.5.1 rcxadm template" in the "ServerView Resource Orchestrator Reference Guide".

5.4.2 Editing a Template

This section explains how to edit an L-Server template.

For details on the XML definition of L-Server templates, refer to "2.2 L-Server Template" in the "ServerView Resource Orchestrator Reference Guide", and manually edit the template.

If a template is imported without editing the L-Server template name (LServerTemplate name) of the L-Server template file, the content of the existing L-Server template is overwritten. If an L-Server template is imported after the name is edited from when it was exported, the L-Server template is added.

5.4.3 Importing a Template

This section explains how to import an L-Server template.

Use the following procedure to import an L-Server template:

1. Select [File]-[L-Server Template]-[Import] from the RC console menu.
2. Specify the file name, and click <OK>.

The L-Server template is imported.

When a registered L-Server template name is included in the specified file, a warning dialog is displayed to confirm whether or not to overwrite the L-Server template.

When overwriting it, click <OK>.

When not overwriting it, click <Cancel> and return to the dialog to specify the file name.

From the command-line, execute `rcxadm template import`.

For details on the `rcxadm template import` command, refer to "1.5.1 rcxadm template" in the "ServerView Resource Orchestrator Reference Guide".

5.4.4 Deleting a Template

This section explains how to delete an L-Server template.

L-Server templates that are no longer required, including the sample template, can be deleted.

Use the following method to delete an L-Server template:

On the [Template List] tab, right-click the L-Server template to delete, and select [Delete] from the popup menu.

From the command-line, execute `rcxadm template delete`.

For details on the `rcxadm template delete` command, refer to "1.5.1 rcxadm template" in the "ServerView Resource Orchestrator Reference Guide".

Chapter 6 L-Servers

This chapter explains the details of L-Server creation and operation.

For an overview of the functions, refer to "[1.2.2 Logical Server \(L-Server\)](#)" and "[1.2.3 Creating an L-Server](#)".

L-Servers can be created using the following two methods:

- Creation using an L-Server template (Resources are automatically selected from a resource pool.)
- Creation without using an L-Server template (Specify resources or resource pools.)

Creation Using an L-Server Template

Use the following procedure to create an L-Server using an L-Server template:

- When cloning images are not stored in image pools, or when not using cloning images which have been already registered
 1. Select an L-Server template. Specify "None" for images.
For details, refer to "[6.1 Creation Using an L-Server Template](#)".
 2. Install an OS manually.
As an L-Server with no OS installed is created, install an OS manually.
For details, refer to "[6.1.1 Manual OS Installation](#)".
- When cloning images are stored in image pools
 1. Select an L-Server template. Specify a cloning image to deploy.
An L-Server on which a cloning image has been deployed is created.
For details, refer to "[6.1 Creation Using an L-Server Template](#)".

Creation Without Using an L-Server Template

For details on how to create an L-Server specifying individual specifications without an L-Server template, refer to "[Appendix D L-Server Parameter Details](#)".



When using Linux for a physical L-Server, and iSCSI storage for a system disk, an L-Server cannot be created using a cloning image.

When using RHEL5-Xen, L-Server creation and operation using the RC console cannot be performed. For details, refer to "[G.3.5 Creating an L-Server](#)".



[Windows/Linux]

For details on physical L-Servers, refer to "[F.7 Creating an L-Server](#)".

[VMware]

For details on VMware, refer to "[G.1.5 Creating an L-Server](#)".

[Hyper-V]

For details on Hyper-V, refer to "[G.2.5 Creating an L-Server](#)".

[Oracle VM]

For details on Oracle VM, refer to "[G.4.5 Creating an L-Server](#)".

Linking L-Servers with Configured Physical Servers or Virtual Machines

Configured physical servers and virtual machines can be managed by linking them with L-Servers.

The management scope and the scope of use as an L-Server varies depending on the resources used by the configured physical server or virtual machine.

For details, refer to "[Appendix L Linking L-Servers with Configured Physical Servers or Virtual Machines](#)".

6.1 Creation Using an L-Server Template

This section explains how to create an L-Server using an L-Server template.

Use the following procedure to create an L-Server using an L-Server template:

1. Select the RC console orchestration tree. Select an L-Server template on the [Template List] tab of the Main Panel, and click <Create>.

The [Create an L-Server] dialog is displayed.

2. On the [General] tab of the [Create an L-Server] dialog, set the following items.

Name

Enter a name for the L-Server.

- For virtual L-Servers

[VMware] [Hyper-V]

Enter up to 64 characters beginning with an alphabetical character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), periods ("."), and hyphens ("-").

[Xen] [Oracle VM]

Periods (".") cannot be used.

[Oracle VM]

Enter an L-Server name using 32 characters or less.

- For physical L-Servers

Enter up to 64 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), or hyphens ("-").

Destination folder

Select a resource folder or a tenant folder to store L-Servers.

Template

Specify an L-Server template created in "[5.4 L-Server Template](#)".

The L-Server template specified from the [Template List] tab is displayed. Check the specifications (CPU performance, memory capacity, disk capacity (multiple)) for the L-Server to create.

- For physical

Model name, disk capacity (multiple) are displayed.

- For virtual

CPU performance, memory capacity, and disk capacity (multiple) are displayed.

Image

Specify a cloning image to deploy.

Clicking <Select> displays the [Select a Cloning Image] dialog.

To manually install an operating system, select "None".

When "None" is selected, it is necessary to select the OS type on the [Server] tab.

For details, refer to "[D.2 \[Server\] Tab](#)".

If you select "Deploy" from "Image deployment", the parameters for the operating system must also be specified.

For details on the items that must be set, refer to "D.5 [OS] Tab".

Note

When creating an L-Server specifying a cloning image, if the OS of a cloning image is Linux, the L-Server is created using the user name and password used when the cloning image was created.

It is recommended to change the password after creating an L-Server to maintain security.

Information

For virtual L-Servers, and creation of an L-Server using an L-Server template, specification of individual specifications, or execution of a command is performed, even if the size of the system disk is specified in advance, if the specified size differs from the size of the deployed cloning image, the size will be changed to that of the deployed cloning image.

[VMware] [Hyper-V]

Depending on the server virtualization software used, some restrictions may apply to the operating systems that parameters can be set for and the prerequisites for performing the settings. For details, refer to the server virtualization software manual.

Basic software (OS) that can be used on an L-Server is limited to software supported by the server virtualization software.

The image to deploy can be specified when creating an L-Server. Image deployment for Resource Orchestrator uses the following functions of the server virtualization software:

Table 6.1 Functions Used when Deploying Images

Server Virtualization Software	Function
VMware vSphere (TM) 4 VMware vSphere (TM) 4.1	Template, guest OS customization
Microsoft(R) System Center Virtual Machine Manager 2008 R2	Template, guest OS operating system profile

Resource allocation

When creating an L-Server for which only a configuration definition exists, check the "None (Definition only)" checkbox.

When an L-Server for which only a configuration definition has been created is started, resources will be allocated.

For details, refer to "6.9.2.1 Allocating Resources".

Network (NIC)

Select a network resource to connect to the NIC of the L-Server.

A list of the NICs defined in the L-Server template is displayed. Select the network to connect to each NIC from the "Network to connect" column.

Clicking <Select> in the "Network to connect", displays the [Select a Network Resource] dialog.

The following items are displayed in the [Select a Network Resource] dialog. Select the network resource to connect.

- Name (Label)
- Admin LAN
- Subnet address
- Number of addresses (Unused/Total)

For physical L-Servers, the network connection can be selected in addition to these items.

- Connect

Specify when connecting network resources.

- Do not connect

Specify when not connecting network resources, only creating a configuration definition.

Note

The network (NIC) number corresponds to a NIC number (NICIndex) + 1 that is defined in L-Server templates.

[Oracle VM]

One or more networks must be specified.

Label (Optional)

A custom label can be defined for the L-Server. User-defined labels make it easier to identify the server.

Enter up to 32 alphanumeric characters or symbols.

Comment (Optional)

A custom comment can be defined for the L-Server. For example, registering detailed work content, troubleshooting, and recovery procedures can speed up the recovery of affected applications when a problem occurs.

Enter up to 256 alphanumeric characters or symbols.

3. Click <OK>.

The L-Server is created.

Point

Association of an L-Server Name with a VM Guest Name

When installing an operating system manually in the L-Server or using the management console of server virtualization software, select the L-Server in the orchestration tree, and operate the VM for the *Guest_name* displayed in [Resource Details].

The following name is automatically allocated for *Guest_name*:

L-Server_name - *Number*

Number is automatically set by Resource Orchestrator to avoid naming overlaps on server virtualization software if an L-Server with the same name is created during "Appendix B Resource Folders and Tenants" operations.

For operation without *numbering*, refer to "Numbering VM names" in "Table 6.4 List of Items Specified in the Definition File" of "6.9.1 Installation". However, L-Servers with the same name cannot be created. Avoid using the same L-Server name more than once.

Note

- When creating an L-Server, log off ETERNUSmgr of ETERNUS storage registered on ESC.
- When operating NetApp storage in cluster environments and operating a partial system due to system trouble, perform the operation after recovering the NetApp storage and returning the system to cluster operation.
- When the status of the VM host and virtual storage is one other than "normal", the resource will be excluded from L-Server allocation regardless of its available space.
- When operating a VM host in a cluster system, create an L-Server with the storage resources shared between VM hosts specified.
L-Server cannot be created using storage resources that are not shared between VM hosts.
- Depending on the "None (Definition only)" checkbox, the power status of an L-Server after its creation is as follows.

Table 6.2 L-Server Power Status after Creation

	When Checked	When not Checked
Physical L-Server	Powered OFF	Powered ON
Virtual L-Server	Powered OFF	Powered OFF

For details on how to start an L-Server, refer to "[6.2.1 Starting an L-Server](#)".

6.1.1 Manual OS Installation

This section explains how to manually install an operating system on an L-Server.

The procedure differs depending on whether the L-Server is physical or virtual.

For details on how to install the operating system on a physical L-Server, refer to "[F.7.1 Manual OS Installation](#)".

When installing an OS on a virtual L-Server, the installation method differs depending on the server virtualization software used.

Refer to "[Appendix G Configuration of Server Virtualization Software](#)".

6.2 Power Operations

This section explains the power operations of L-Servers.

6.2.1 Starting an L-Server

This section explains how to startup an L-Server.

Right-click the target L-Server in the orchestration tree, and select [Power]-[ON] from the popup menu.

In the displayed confirmation dialog, click <OK>.

The L-Server is started.

On an L-Server for which only a configuration definition has been created (defined), server and disk resources will be allocated, and after image deployment is performed (when a cloning image has been specified), the L-Server will be started.

On an L-Server which has been released (preserved), server resources will be allocated and started.

For details on the statuses when configuration definitions have been created (defined), servers have been released (preserved), and resources have been allocated (allocated), refer to "[6.9 Allocating and Releasing Resources](#)".

From the command-line, execute `rcxadm lserver start`.

For details on the `rcxadm lserver start` command, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".



-
- From virtual L-Servers to which resources have been allocated (allocated) or from which servers have been released (preserved), a startup command is sent out to VM guests even in the following cases.
 - CPU or memory resources of the VM host on which VM guests are located are running out, and the destination VM host does not exist (When "Boot Location" is "Relocate at startup")
 - CPU or memory resources of the VM host on which VM guests are placed are running out (When "Boot Location" is "Fixed")

As sufficient CPU or memory resources cannot be secured on the VM host, an error will occur during L-Server startup. In this case, confirm the output message, and then take corrective action.

- When using tenants to segregate resources, the startup of L-Servers may be limited.

For details, refer to "[1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants](#)".

[VMware]

- When starting the L-Server, sufficient overhead memory may not be secured, and starting of the L-Server may fail.

In this case, confirm the output message, and then take corrective action.

6.2.2 Stopping an L-Server

This section explains how to stop an L-Server.

Right-click the target L-Server in the orchestration tree, and select [Power]-[OFF] from the popup menu.

In the displayed confirmation dialog, click <OK>.

The L-Server is stopped.

To perform a forced stop, select [Power]-[OFF (Forced)], and click <OK> in the displayed confirmation dialog.

For L-Servers for which "Resource release" setting is configured, server resources are released. For details on "Resource release", refer to "D.2 [Server] Tab".

From the command-line, execute `rcxadm lserver stop`.

For details on the `rcxadm lserver stop` command, refer to the "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".



If no OS is installed on the L-Server, the L-Server may not be stopped. In that case, perform a forced stop.

[Oracle VM]

Depending on the presence or absence of the `VirtualizationMethod` attribute and the PV (Paravirtualized) driver of VM guests, stopping operations may cause a forced stop, and a forced stopping operation cause a stop.

6.2.3 Restarting an L-Server

This section explains how to restart an L-Server.

Right-click the target L-Server in the orchestration tree, and select [Power]-[Reboot] from the popup menu.

In the displayed confirmation dialog, click <OK>.

The L-Server is restarted.

To perform a forced reboot, select [Power]-[Reboot (Forced)], click <OK> in the displayed confirmation dialog.

From the command-line, execute `rcxadm lserver restart`.

For details on the `rcxadm lserver restart` command, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".



- If no OS is installed on the L-Server, the L-Server may not be restarted. In that case, perform a forced restart.

[Oracle VM]

- Depending on the presence or absence of the `VirtualizationMethod` attribute and the PV (Paravirtualized) driver of VM guests, restarting operations may cause a forced restart, and a forced restarting operation cause a restart.

6.2.4 Batch Power Operation of L-Servers in Resource Folders

This section explains the batch power operations of L-Servers in resource folders.

When performing batch power operation of L-Server in resource folders, configure the startup priority settings for L-Servers in advance.

For priority order settings, configure from "Startup priority" of the [Modify an L-Server] dialog, or [Server] tab of the [Create an L-Server] dialog.

For details, refer to "Appendix D L-Server Parameter Details".

Starting an L-Server in a Resource Folder

Use the following procedure to start an L-Server in a resource folder.

1. Right-click the target resource folder or tenant folder in the orchestration tree, and select [Power]-[ON] from the popup menu.

A list of L-Servers that are targets of the power operation is displayed.

In the range 1 to 256, smaller values indicate higher priority.

2. In the displayed confirmation dialog, click <OK>.

L-Servers in a resource folder are started in the order of priority.

When the following conditions are met on an L-Server with a configuration definition already been created (defined), the L-Server will not be the target of powering on.

- The cloning image is specified
- Boot disks (system volumes) are dynamically created from virtual storage

When an L-Server uses resources in another tenant, the L-Server will not be the target of powering on.

From the command-line, execute `rcxadm folder start`.

For details on the `rcxadm folder start` command, refer to "1.3.7 `rcxadm folder`" in the "ServerView Resource Orchestrator Reference Guide".

Stopping an L-Server in a Resource Folder

Use the following procedure to stop an L-Server in a resource folder.

1. Right-click the target resource folder or tenant folder in the orchestration tree, and select [Power]-[OFF] from the popup menu.

A list of L-Servers that are targets of the power operation is displayed.

The display order is in ascending order of priority.

2. In the displayed confirmation dialog, click <OK>.

L-Servers in a resource folder are stopped in the order of priority.

From the command line, execute `rcxadm folder stop`.

For details on the `rcxadm folder stop` command, refer to "1.3.7 `rcxadm folder`" in the "ServerView Resource Orchestrator Reference Guide".

Restarting an L-Server in a Resource Folder

Use the following procedure to restart an L-Server in a resource folder.

1. Right-click the target resource folder or tenant folder in the orchestration tree, and select [Power]-[Reboot] from the popup menu.

A list of L-Servers that are targets of the power operation is displayed.

The display order is in descending order of priority.

2. In the displayed confirmation dialog, click <OK>.

L-Servers in a resource folder are restarted in the order of priority.

From the command-line, execute `rcxadm folder restart`.

For details on the `rcxadm folder restart` command, refer to "1.3.7 `rcxadm folder`" in the "ServerView Resource Orchestrator Reference Guide".

6.3 Modifying an L-Server

This section explains how to perform L-Server configuration changes.

Attachment and detachment of networks cannot be performed for virtual L-Servers.

Point

- Resource Orchestrator makes periodic queries to VM management software.
 - When the configuration of a virtual machine is modified using VM management software, periodic queries will reflect the changes on the virtual machines used by a virtual L-Server.
 - When addition, modification, or deletion of storage is performed using VM management software, changes to the configuration/status of storage of the virtual L-Server are detected.
- Resource Orchestrator makes periodic queries to storage devices.

When changes are made to storage using storage management software, the changes to the status of the storage on the physical L-Server are detected.

On virtual L-Servers, the following information is updated:

- L-Server name (*1)
- CPU performance
- Number of CPUs
- Memory size (*2)
- VM Management Software Specific Information
- OS Type
- Server Redundancy (*3)
- The number of disks
- Disk index
- Disk capacity
- Device path
- Usage
- Type

*1: Confirm the following for the virtual L-Server name and the VM name:

- When use of the same name is configured for both a virtual L-Server and a VM, performing the following operations makes the L-Server name match the VM name.
 - Creating an L-Server
 - Changing L-Server name basic information
- When use of the same name is configured for both a virtual L-Server and a VM, performing the following operations makes the L-Server name match the VM name when VM information changes are detected.
 - Changing labels and comments of L-Server basic information
 - Changing L-Server specifications

For the configuration to use the same name for both a virtual L-Server and a VM machine, refer to "[Table 6.4 List of Items Specified in the Definition File](#)" of "6.9.1 Installation".

*2: When using VMware as VM management software, the value to be reflected varies depending on the memory limit settings.

When Unlimited is set for the memory limit, the specified memory size is reflected.

When a particular value is specified for memory limit, that value is reflected.

*3: Updated only when VMware FT is configured or released.

When attaching and detaching disks from a virtual machine are performed consecutively on VM management software, an event log regarding Storage Migration is output.

Note

Network information and physical L-Servers are not updated.

When attachment or detachment of disks is performed using storage management software, the changes to the configuration of storage on the physical L-Server is not detected.

- For the created physical L-Server, reflect attachment or detachment of disks using the following procedure:
 - When a disk has been attached
 1. Detach the disk from the physical server using the storage management software.
When the physical server is powered on, it is necessary to change the status of the disk to detach into unused in advance.
 2. Attach the disk to the physical L-Server.
For details, refer to "[6.3.3 Attaching and Detaching Disks](#)".
 - When a disk has been detached
Detach the disk from the physical L-Server.
For details, refer to "[6.3.3 Attaching and Detaching Disks](#)".
- For a physical L-Server linked with a configured physical server, reflect attachment or detachment of disks using the following procedure:
 - When a disk has been attached or detached
 1. Cancel the link between the physical server and the physical L-Server.
For details, refer to "[L.6 Reverting L-Servers](#)".
 2. Create a link between the physical server and the physical L-Server.
For details, refer to "[L.4 Installation](#)".

6.3.1 Modifying Specifications

This section explains how to modify L-Server specifications. Use the following procedure to modify L-Server specifications:

Note

- Immediately after a snapshot is restored, there may be differences between the configuration of VM guests managed by L-Server and those managed by VM management software.
The differences in VM guest configuration are reflected on the configuration of the L-Server by periodic queries made to the VM management software.
For details on reflection of L-Server configuration by periodic queries, refer to "[6.3 Modifying an L-Server](#)".
 - The items for which specifications can be changed differ depending on whether the L-Server is physical or virtual.
 - When VMware FT has been configured on a virtual machine linked with a virtual L-Server, server redundancy settings cannot be modified.
1. Right-click the target L-Server in the orchestration tree, and select [Change Settings]-[Modify Specification] from the popup menu.
The [Modify an L-Server] dialog is displayed.
 2. Adjust the values in the [Modify an L-Server] dialog, and click <OK>.
The current values for each item are displayed in the [Modify an L-Server] dialog. Items that have been changed are indicated with an asterisk ("*") in front of the item.

The following items can be changed when the power status of the virtual L-Server is not ON.

- CPU performance

- Number of CPUs
- Memory Size
- OS Type

[Oracle VM]

The OS type cannot be changed.

Note

[VMware]

When the memory size is changed, the following items of the virtual machine are changed.

- Memory limit
- Memory Size

However, when the limit value of memory for the virtual machine has been set to "Unlimited", the following item of the virtual machine is changed.

- Memory Size

When changing the memory limit setting, use the VM management software to do so. (*1)

For details on the configuration method, refer to the manual of the VM management software.

[Hyper-V]

Changing memory sizes for virtual L-Servers with the following configuration is not possible.

- When dynamic memory has been configured for the VM guest corresponding to the virtual L-Server to modify

When changing the memory size, use the VM management software to do so. (*1)

*1: The modified value is reflected on the configuration of the L-Server by periodic queries made to the VM management software.

For details on reflection of L-Server configuration by periodic queries, refer to "[6.3 Modifying an L-Server](#)".

The following items can be changed when the power status of the physical L-Server is not ON.

- Boot mode

From the command-line, execute rcxadm lserver modify.

For details on the rcxadm lserver modify command, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".

6.3.2 Modifying the Basic Information

This section explains how to modify the basic information of L-Servers. Use the following procedure to modify the basic information of L-Servers:

Note

- Immediately after a snapshot is restored, there may be differences between the configuration of VM guests managed by L-Server and those managed by VM management software.
The differences in VM guest configuration are reflected on the configuration of the L-Server by periodic queries made to the VM management software.
For details on reflection of L-Server configuration by periodic queries, refer to "[6.3 Modifying an L-Server](#)".
- Changing an L-Server name changes the VM guest name on server virtualization software as well.
For associating an L-Server name with a VM guest name, refer to "[Association of an L-Server Name with a VM Guest Name](#)" in "6.1 Creation Using an L-Server Template".

- To change an L-Server name, the L-Server must be stopped.

When the L-Server power status is on, the L-Server name cannot be changed.

1. Right-click the target L-Server in the orchestration tree, and select [Change Settings]-[Basic Information] from the popup menu.

The [Resource Change Setting] dialog is displayed.

2. In the [Resource Change Setting] dialog, edit the items you want to modify, and click <OK>.

The basic information of the L-Server is modified.

From the command-line, execute `rcxadm lserver modify`.

For details on the `rcxadm lserver modify` command, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".

6.3.3 Attaching and Detaching Disks

This section explains how to modify the disk configuration of an L-Server.



Immediately after a snapshot is restored, there may be differences between the configuration of VM guests managed by L-Server and those managed by VM management software.

The differences in VM guest configuration are reflected on the configuration of the L-Server by periodic queries made to the VM management software.

For details on reflection of L-Server configuration by periodic queries, refer to "6.3 Modifying an L-Server".

If the disk configuration of a virtual machine is modified using VM management software, attaching and detaching disks to and from virtual L-Servers will be disabled.

[VMware]

- When changed to use a device path other than the following:
 - SCSI:0:0 - SCSI:0:6
 - SCSI:0:8 - SCSI:0:14
 - SCSI:1:0 - SCSI:1:6
 - SCSI:1:8 - SCSI:1:14
 - SCSI:2:0 - SCSI:2:6
 - SCSI:2:8 - SCSI:2:14
 - SCSI:3:0 - SCSI:3:6
 - SCSI:3:8 - SCSI:3:14
- When changed to use a non-VMFS path through device or Raw Device Mapping

[Hyper-V]

- When changed to use a device path other than the following:
 - IDE:0:0
 - SCSI:0:1 - SCSI:0:14
 - SCSI:1:0 - SCSI:1:14
 - SCSI:2:0 - SCSI:2:14
 - SCSI:3:0 - SCSI:3:14
- When changed to use a path through disk or difference disk

- Note that changing the device path for the system disk enables deletion of disks for all disks.

Once a virtual L-Server is created, do not change the device path of the system disk using VM management software as doing so results in the following behavior.

- A hyphen ("-") is displayed for "Usage" in the "Disk Information" displayed on the [Resource Details] tab on the RC console.
- Reduction of the size of the system disk will be possible.

When changing the disk type using the same device path from VM management software, perform the following procedure.

1. Delete a disk from the virtual machine using VM management software.
2. Confirm that the disk deleted in 1. has been deleted as disk information of the L-Server on the RC console.
3. On VM management software, add a disk to the virtual machine.

Here, changing the disk type refers to the following:

- Switching from a virtual disk to Raw Device Mapping, a pass-through disk, or a difference disk
- Switching Raw Device Mapping, a pass-through disk, or a difference disk to a virtual disk



Prerequisites

For physical L-Servers, attachment and detachment of disks is only possible when using SAN boot.

Attaching a disk

Use the following procedure to attach a disk to an L-Server:

1. Right-click the target L-Server in the orchestration tree, and select [Change Settings]-[Attach Disk] from the popup menu. The [Attach a New Disk] dialog is displayed.
2. Enter the items below, and click <OK>.

Size

Enter the disk size of the additional disk as a number with up to one decimal place, in units of gigabytes. "10" is initially displayed.

Share

Specify whether the disk is shared between multiple L-Servers or it is restricted to a single L-Server.

- Do not share

Specify when restricting the disk to one L-Server.

- Share

Specify when sharing the disk between multiple L-Servers.



Note

System disks cannot be shared.



Resource type

Specify the disk to allocate to the L-Server.

Select from the following items.

- Automatic

Select the appropriate resources, and allocate storage pools and virtual storage resources or disk resources to the L-Server. Set "Automatic" for the default value.

- Storage pool
Select the appropriate resources, and allocate storage pools to the L-Server.
- Virtual storage
Displays virtual storage resources such as VMFS, RAID groups or aggregates as a list.
Select from the displayed virtual storage resources.
Create the specified size of disk resources from the specified virtual storage resource, and allocate them to the L-Server.
- Disk
Assign the LUN created in advance to the L-Server.
When specifying search conditions, the relevant disk resource list is displayed.
Select from the displayed disk resources.
The specified disk resources are allocated to the L-Server.

Search conditions

Storage pool

Select the storage pool of the storage destination of the disk resource.

Search size

Enter the lowest value of the disk size to be searched as a number with up to one decimal place, in units of gigabytes.

Allocation/Shared status

Specify the status to allocate to the L-Server. Specify the status, when selecting Shared for the shared settings.

- Unallocated

Specify when selecting a disk resource which is not allocated to another L-Server.

- Shared disk

Specify a disk resource for which is configured to share is set for the other L-Server.

Allocated L-Server

Specify when a shared configuration has already been performed, and specify the disk to be shared.

3. Make the disk available following the disk attachment procedure provided by the OS.

From the command-line, execute `rcxadm lserver attach`.

For details on the `rcxadm lserver attach` command, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".



Information

[VMware] [Hyper-V]

Data disks are connected to the L-Server as SCSI disks. They are not connected as IDE disks.

[Oracle VM]

Specify the following items when connecting data disks to an L-Server.

- When the L-Server is an HVM (Hardware Virtualized Machine)
 - System volume: `hda`
 - Data disks (First to seventh): `sda` to `sdg`
- When the L-Server is a PVM (Para-Virtualized Machine)
 - System volume: `xvda`

- Data disks (First to fifty-ninth): xvdb to xvdbh

Note

- When an L-Server is powered on, the disk to be attached to must be recognized by the L-Server. Follow the procedure provided by the OS.
- When using physical L-Servers, disks or networks cannot be attached to the L-Server that is using iSCSI boot.

Information

Physical L-Server Data Disk for iSCSI Boot

- When using ETERNUS storage
Using storage management software, the data disk can be accessed from managed servers by defining LUNs of the iSCSI boot disk and of the data disk in the same Affinity group.
- When using NetApp storage
Using storage management software, the data disk can be accessed from managed servers by defining LUNs of iSCSI boot disk and of the data disk in the same igroup.

Detaching a Disk

When using virtual L-Servers, the power of the L-Server must be off to detach a disk.

Use the following procedure to detach a disk allocated to an L-Server:

1. Right-click the target L-Server in the orchestration tree, and select [Change Settings]-[Detach Disk] from the popup menu. The [Detach a Disk] dialog is displayed.
2. Select or enter the items below, and click <OK>.

Resource List

Select the disk resource to remove from "Resource List". Disk resources other than system disks are displayed in the list.

Detach disks

When detaching disks, check the "Detach disks." checkbox.

Detach disks when the L-Server is running (For physical L-Servers)

When detaching disks while the L-Server is powered on, check the "Detach disks when the L-Server is running." checkbox.

Note

- When using virtual L-Servers, the content of detached disks will be deleted. After confirming the advisory notes in the displayed dialog, check the "Detach disks." checkbox.
- When using physical L-Servers, if disks are detached while the server is powered on, it is necessary to change the status of the disk into unused in advance. After confirming the advisory notes in the displayed dialog, check the "Detach disks when the L-Server is running." checkbox.
- When the disk resource is a LUN created in advance, it is recommended to delete the data on the disk, as the data is not deleted when the disk is detached. For details on how to delete data on the disks, refer to the cautionary notes of "5.3.3 Storage Resources".
- When using physical L-Servers, disks or networks cannot be detached from the L-Server that iSCSI boot is being adopted.

From the command-line, execute `rcxadm lserver detach`.

To detach a disk from an L-Server while the power of the L-Server is on, specify the `-online` option command.

For details on the `rcxadm lserver detach` command, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

[Hyper-V]

When changing the configuration, a maximum of up to four disks can be specified at one time.

To perform addition of five or more disks, please perform an additional configuration change.

6.3.4 Sharing Disks Between L-Servers

This section explains how to share disks between multiple L-Servers.

Prerequisites

- Sharing of disks is possible when the managed servers and storage are shared using Fibre Channel connections.
- First disk (System Volume) cannot be shared between L-Servers.
- Control of simultaneous access to shared disks is performed by other applications, such as cluster systems.
- Only shared disk resources that are connected to L-Servers can be connected to other L-Server as shared disks.
- Disk sharing between L-Servers is only possible for physical L-Servers that are use SAN boot.

Installation

Use the following procedure to create new L-Servers and to share disks between L-Servers:

- Creating an L-Server (First server)

Create an L-Server, referring to "[Appendix D L-Server Parameter Details](#)". Select "Share" on the [Disk] tab.

When creating an L-Server using the `rcxadm lserver create` command, specify the `Shared` tag in the L-Server XML file. For details, refer to "1.3.1 `rcxadm lserver`" and "2.3.1 For Physical L-Servers" in the "ServerView Resource Orchestrator Reference Guide".

- Creating an L-Server (For a second or later server)

1. Create an L-Server. In this case, select the following:

- Select the disk to allocate to the L-Server.
- Check the "Shared disk" checkbox.
- Select the first L-Server created in "Creating an L-Server (For a first server)" as "Allocated L-Server".

When specifying these items as search conditions, connected shared disks can be filtered. For details, refer to "[D.3.1 When "Physical" is Selected for \[Server type\]](#)".

Attaching Shared Disks

Use the following procedure to attach disk resources to L-Servers created in advance and to share the disks:

- Attaching shared disks to the first L-Server

To attach disks, use the procedure of "Attach new disks" in "[6.3.3 Attaching and Detaching Disks](#)". Select "Share" on the [Disk] tab.

- Attaching disks to share for a second (or later) L-Server

To attach disks, use the procedure of "Attach new disks" in "[6.3.3 Attaching and Detaching Disks](#)".

- Select the disk to allocate to the L-Server.
- Check the "Shared disk" checkbox.

- Select the first L-Server to which the shared disks have been attached as the "Allocated L-Server".

When specifying these items as search conditions, connected shared disks can be filtered. For details, refer to "D.3.1 When "Physical" is Selected for [Server type]".

6.3.5 Modifying Network Resource Settings

This section explains how to modify network resource settings.

The following items can be modified.

Table 6.3 Network Resource Items for Modification

Operation	L-Server Status						
	Physical L-Server			Physical L-Server (iSCSI Boot)	Virtual L-Server		
	Defined	Preserved	Allocated	All	Defined	Preserved	Allocated
IP address change (Admin LAN/Public LAN) (*1)	Yes	Yes	Yes	Yes	Yes (*2)	-	-
Changing network resources to connect to a NIC or a NIC group	Yes	Yes	Yes	-	Yes (*2)	-	-
NIC addition and deletion	Yes (*3)	-	-	-	Yes (*2)	-	-
Changing untagged VLAN settings (use/not use)	Yes	Yes	Yes	-	-	-	-
Adding or deleting network resources to connect to a NIC or a NIC group	Yes	Yes	Yes	-	-	-	-
Redundancy modification (Example: Changing the combination of NIC1 and 2 to NIC3 and 4)	Yes	Yes	Yes	-	-	-	-
Redundancy addition (Example: Changing NIC1 to the combination of NIC1 and 2)	Yes	Yes	Yes	-	-	-	-
Redundancy deletion (Example: Changing the combination of NIC1 and 2 to NIC1 only)	Yes	Yes	Yes	-	-	-	-

*1: Changing IP addresses across subnets is not possible.

*2: IP addresses and network resources of virtual L-Servers can only be changed when the server's status is "defined".

*3: NICs that include admin LAN resources cannot be deleted.

Note

- Modifications to L-Server specifications have no effect on the settings of the OS installed on the L-Server. Modify the network settings of the OS referring to the IP address and network information of the modified L-Server.
- For physical L-Servers, the position of the NIC used for the admin LAN cannot be changed.

Use the following procedure to change network settings.

1. The [Modify L-Server's definition] dialog is displayed.

- When the L-Server status is "defined"

Right-click the target L-Server in the orchestration tree, and select [Change Settings]-[Definition] from the popup menu.

- When resources have not been allocated (preserved) or have been allocated (allocated) to the L-Server

Right-click the target L-Server in the orchestration tree, and select [Change Settings]-[Network Configuration] from the popup menu.

2. Enter the items below, and click <OK>.

Network to connect

Click <Select> to select a network resource that is connected to a NIC or a NIC group.

IP address

Enter an IP address to set for the L-Server. If the IP address is not entered, an IP address is automatically allocated to the L-Server.

For physical L-Servers, the following items can be modified.

NIC

Clicking <Add> adds a NIC. In the [Add a NIC] dialog, select the number of the NIC to use. When performing redundancy for the NIC, select the pair of NICs to use. Also, select the number of network resources to connect to a NIC group created in advance.

Clicking <Delete> deletes a NIC.

If the status of an L-Server is "preserved" or "allocated", <OK> will be activated when the number of NICs agrees with the number specified at the creation of the L-Server. When <OK> is not activated, click <Add> to configure undefined NICs.

Untagged VLAN

Select whether or not to use untagged VLAN for a NIC or a NIC group.

From the command-line, execute the `rcxadm lserver modify` command.

For details on the `rcxadm lserver modify` command, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

6.4 Using the L-Server Console

This section explains how to use peripheral devices from an L-Server.

When installing an OS after creating an L-Server and performing L-Server maintenance, the L-Server console can be obtained.

When performing usual operations, or the console cannot be obtained, log in to an L-Server through the network.



Example

Network Connection Example

[Windows]

Remote desktop connection

[Linux]
SSH connection

Prerequisites for Console Connections

When using a console connection, the prerequisites differ depending on the server type of the L-Server used.

- For physical L-Servers

When the hardware is PRIMERGY, and the iRMC video console redirection function can be used, connection to the console is possible.

Note

For console connection, use functions of ServerView Operations Manager. For details on ServerView Operations Manager, refer to "[1.3.2.2 Required Software](#)".

- For virtual L-Servers

On VMware and Hyper-V, when an admin client is installed, and communication between admin clients and VM hosts is possible, connection of the console is possible.

Note

For console connection, use admin client functions. Check if the console connection is possible from the admin client in advance.

[Hyper-V]

Admin clients must be in the same domain as SCVMM or VM hosts. Microsoft(R) System Center Virtual Machine Manager 2008 R2 VMM management console must be installed.

Console

This chapter explains the L-Server console connection.

Use the following procedure to connect the console:

1. Right-click the target L-Server in the orchestration tree, and select [Console Screen] from the popup menu.

When using virtual L-Servers, click <OK> in the displayed confirmation dialog.

The L-Server console window is displayed in another window.

Note

- Starting the RC console turns the L-Server "ON" when the selected L-Server was "OFF".
- When using virtual L-Servers, it is necessary to permit the starting of the console screen using the policy settings of Java Plug-in.

Use the following procedure to permit the starting of the console screen:

1. When starting of the console screen is not allowed, the [Download] dialog of the Java policy setup script is displayed.
2. Click <OK>.

The Java policy setup script is downloaded. Save the file.

3. Execute the Java policy setup script to configure the settings for permitting the console screen startup.
4. After performing the configuration, close the web browser.

Log in to Resource Orchestrator again using a web browser, and the console screen can then be started from the RC console.

- For physical L-Servers, when opening the L-Server console screen at the second time or later, a window for iRMC management may be opened instead of the console screen.

If an iRMC management screen is displayed, after logging in to the iRMC, start the console screen again.

For details, refer to "When Opening the Physical L-Server Console Screen, the iRMC Management Window may be Opened." in "4.3 Operations for Creating or Starting L-Servers" of the "ServerView Resource Orchestrator Reference Guide".

6.5 Deleting an L-Server

This section explains how to delete an L-Server. To delete an L-Server the L-Server must be stopped.

If an L-Server is deleted, the resources allocated to the L-Server are automatically made available for reuse.

1. Right-click the target L-Server in the orchestration tree, and select [Delete] from the popup menu.
The [Delete an L-Server] dialog is displayed.
2. Click <OK>.
The target L-Server is deleted.



When deleting an L-Server, log off from the ETERNUSmgr of ETERNUS storage registered on ESC.

When operating NetApp storage in cluster environments and operating a partial system due to system trouble, perform the operation after recovering the NetApp storage and returning the system to cluster operation.

When the disk resource is a LUN created in advance or a LUN for iSCSI boot, it is recommended to delete the data on the disk, as the data is not deleted when deleting an L-Server to which the disk resource is allocated. For details on how to delete data on the disks, refer to the cautionary notes of "5.3.3 Storage Resources".

From the command-line, execute `rcxadm lserver delete`.

For details on the `rcxadm lserver delete` command, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".

6.6 Cloning Images

This section explains how to collect and delete cloning images.

6.6.1 Collecting a Cloning Image

This section explains how to collect cloning images.

Use the following methods to collect cloning images:

- Collect cloning images from L-Servers with an OS installed
- Collect cloning images from templates of server virtualization software



For physical L-Servers, agents must be registered before collecting cloning images.

For details, refer to "F.7.2 Cloning Images".

Use the following procedure to collect cloning images:

Collecting Cloning Images from L-Servers with an OS Installed

After installing an OS, right-click the target L-Server in the orchestration tree, and select [Cloning]-[Collect] from the popup menu. The [Collect a Cloning Image] dialog is displayed. In the [Collect a Cloning Image] dialog, set the following items.



For physical L-Servers, the target L-Server must be operating when cloning images are being collected.

Cloning images cannot be collected from a physical L-Server on which a VM host has been installed.

For virtual L-Servers, the target L-Server must be stopped when cloning images are being collected.

Cloning Image Name

New

Enter a name to identify the collected cloning image.

For a cloning image name, enter a character string, beginning with an alphabetic character (upper or lower case), and containing up to 32 alphanumeric characters (upper or lower case) and underscores ("_").

Update

Select when specifying the same name as that of a cloning image which has already been collected. Select the cloning image from the list.

For cloning images with the same name, the number that can be retained is the number of cloning image versions.

By default, the number of cloning image versions is 3.

Image location (For Virtual L-Servers)

Select the storage location for cloning images. Clicking <Select> displays the [Select a Location for this Image] dialog.

Select the storage location, and click <OK>.

Destination Pool

Select the image pool to register cloning images in.

Comment (Optional)

Enter a comment that identifies the cloning image.

Up to 128 characters other than percent signs ("%"), back slashes ("\ cant be specified.

Click <OK>.

Cloning images are stored in image pools.

From the command-line, execute `rcxadm image create`. For details on the `rcxadm image create` command, refer to "1.4.1 `rcxadm image`" in the "ServerView Resource Orchestrator Reference Guide".

Cloning images (identifiable by their name attribute) can be managed by image version.

Collecting Cloning Images from Templates of Server Virtualization Software

For details, refer to "[5.3.6 Virtual Image Resources](#)".



- When using MAC license authentication for activation of Windows Server 2008 images, Sysprep can be executed a maximum of three times. Since Sysprep is executed when creating L-Server with images specified or when collecting cloning images, collection of cloning images and creation of L-Servers with images specified cannot be performed more than four times. Therefore, it is recommended not to collect cloning images from L-Servers which have had cloning images deployed, but to collect them from a dedicated master server.

- The network parameter auto-configuration function defined in a cloning image cannot be used for Resource Orchestrator.

When the target server of cloning image collection has a redundant NIC configured, release redundancy and then perform collection.

The disk area necessary for extraction cannot be checked from collected cloning images.

For this reason, include the disk size in the cloning image name or the comment, and check the necessary disk area is available before extracting images.

[VMware]

For details on how to collect cloning images on VMware, refer to "[Collecting Cloning Images](#)" of "G.1.5 Creating an L-Server".

[Hyper-V]

For details on how to collect cloning images on Hyper-V, refer to "[Collecting Cloning Images](#)" of "G.2.5 Creating an L-Server".

[Xen]

For details on how to collect cloning images on RHEL5-Xen, refer to "3. Collecting Cloning Images" in [Create a Master L-Server](#) of "G.3.5 Creating an L-Server".

[Oracle VM]

For details on how to collect cloning images on Oracle VM, refer to "[Collect Cloning Images](#)" in "G.4.5 Creating an L-Server".



Point

[VMware]

When "Default" is specified in the [Collect a Cloning Image] dialog, it is assumed that the virtual storage resource containing the L-Server for collecting cloning images has been specified.

[Hyper-V]

Images are stored in the SCVMM library.

Specify a library which has sufficient available disk space to store the collected images.

When "Default" is specified in the [Collect a Cloning Image] dialog, selection is made from libraries registered with SCVMM, but collection of images may fail as the available disk space of libraries is not managed by SCVMM.

[Xen]

When "Automatic" is specified in the destination where images are stored during the cloning image collection, the virtual storage is automatically selected from the same storage pool as the virtual storage containing the target L-Server for collecting cloning images.

[Oracle VM]

The storage location for images which was specified in the [Collect a Cloning Image] dialog is disabled.

It is assumed that the virtual storage resource containing the L-Server for collecting cloning images has been specified.

A given cloning image (identified by its name attribute) can be managed by image version.

If a cloning image is created using VM management software, it can be used as is.

6.6.2 Viewing a Cloning Image

This section explains how to view cloning images.

By selecting the target image pool from the orchestration tree, and displaying the [Resource List] tab, the registered cloning images can be confirmed.

[Oracle VM]

When an Oracle VM image is selected in the Orchestration tree to display the [Resource Details] tab, the [OS] under [Image Information] is not displayed.

From the command-line, execute `rcxadm image list`. For details on the `rcxadm image list` command, refer to "1.4.1 `rcxadm image`" in the "ServerView Resource Orchestrator Reference Guide".

6.6.3 Unregistering a Cloning Image

This section explains how to unregister cloning images.

Use the following procedure to unregister cloning images.

1. Right-click the target image pool in the orchestration tree, and select [Unregister] from the popup menu.

The [Unregister a Resource] dialog is displayed.

2. Click <OK>.

The cloning image is unregistered.

From the command-line, execute `rcxadm pool unregister`. For details on the `rcxadm pool unregister` command, refer to "1.3.6 `rcxadm pool`" in the "ServerView Resource Orchestrator Reference Guide".



Note

- When unregistering a cloning image, *a numeric value* is added at the end of the image name to change its name as follows:

Image name after unregistration: <i>Image_name_before_unregistration_Numeric_value</i>

The image name will not be changed after unregistration.

- After unregistering, image names may be changed. To identify an image without its name, use the combination of the collection date and comment.

Record the collection date and comment to prepare for reuse. The `rcxadm image list` command can be used for checking before unregistration.

- As image names will be changed, execute the `rcxadm image list` command to check the creation time and comment before performing unregistration. Images can be identified using this method.

For details on the `rcxadm image list` command, refer to "1.4.1 `rcxadm image`" in the "ServerView Resource Orchestrator Reference Guide".

- Unregistered images of virtual L-Servers can be used in the same way as when they are collected from templates of server virtualization software.

For details, refer to "6.6.1 [Collecting a Cloning Image](#)".

6.6.4 Deleting a Cloning Image

This section explains how to delete cloning images.

Use the following procedure to delete cloning images:

1. Select the target image pool on the orchestration tree.

The [Resource List] tab is displayed.

2. Right-click the target cloning image in the image pool, and select [Delete] from the popup menu.

3. Click <OK>.

The cloning image is deleted.

The `rcxadm image delete` command is executed. For details on the `rcxadm image delete` command, refer to "1.4.1 `rcxadm image`" in the "ServerView Resource Orchestrator Reference Guide".



Note

[Hyper-V]

For details on how to delete Hyper-V cloning images in Hyper-V environments, refer to "G.2.5 Creating an L-Server" of "[Deleting cloning images](#)".

6.7 Snapshots, and Backup and Restoration of L-Servers

This section explains how to perform snapshots, and backup and restore of an L-Server.

6.7.1 Snapshot

This section provides an overview of snapshots for L-Servers.

Snapshot is the function that saves the state and configuration of an L-Server disk at the time the snapshot is taken. When using virtual L-Servers, the snapshot function of server virtualization software is used.

Restoring a collected snapshot restores the following L-Server parameters to their state when the snapshot was taken.

- Number of CPUs
- CPU performance
- CPU Shares
- Memory size
- Memory Shares
- OS type
- Configuration and size of the disk
- Network
- OS Settings



Information

The following parameters cannot be restored using the snapshot function of the server virtualization software. Therefore, change L-Server specifications to restore those parameters using their values at the time the snapshot was taken.

[VMware]

- CPU Reserved
- CPU Shares
- Memory Reserved
- Memory Shares

[Hyper-V]

- OS type

These parameters may return to their values at the time that the snapshot was taken even when the restoration process is aborted. Check the L-Server parameters, and modify the specifications as necessary.



Note

If the OS of the L-Server is Linux, the user name and password used when collecting the snapshot will be saved.

It is recommended to change the password after collecting a snapshot to maintain security.

[VMware]

CPU reservation performance and memory reservation capacity are not restored. Changing this value may prevent an L-Server from starting, depending on the amount of resources used by other VM guests on the same VM host.

If multiple snapshots are collected of the same L-Server, the snapshots are managed by automatically adding version numbers to the snapshot file name starting from 1. If the number of snapshot versions exceeds the limit (standard limit is 3), the oldest snapshot will be deleted. Use a command to change the maximum number of snapshot versions. For details on the command, refer to the "1.7.2 rcxadm imagemgr" in the "ServerView Resource Orchestrator Reference Guide".

To collect a snapshot, it is recommended that the power of the L-Server is "OFF" to avoid any inconsistencies occurring in the data and file system on the disk.

When collecting a snapshot from an L-Server that is running, the L-Server must be configured in advance for live collection of snapshots.

For details on the settings required to collect a snapshot when the server is running, refer to the manual of the server virtualization software.

For details on the command, refer to the "1.4.1 rcxadm image" in the "ServerView Resource Orchestrator Reference Guide".

Note

Immediately after a snapshot is restored, there may be differences between the configuration of VM guests managed by L-Server and those managed by VM management software.

The differences in VM guest configuration are reflected on the configuration of the L-Server by periodic queries made to the VM management software.

For details on reflection of L-Server configuration by periodic queries, refer to "6.3 Modifying an L-Server".

[Windows/Linux]

When using physical L-Servers, snapshots cannot be used.

[Hyper-V]

When using Hyper-V, refer to "G.2.7 Advisory Notes for Hyper-V Usage".

[Xen]

When using RHEL5-Xen, snapshots cannot be used.

Collect L-Server snapshots using PRIMECLUSTER GDS. For details, refer to "G.3.7 Advisory Notes for RHEL5-Xen Usage".

[Oracle VM]

When using Oracle VM, snapshots cannot be used.

Information

The snapshot function provided by server virtualization software records the disk from the last update. Consequently, when a disk failure occurs, the snapshot function becomes unavailable at the same time. Snapshot can be used as a corrective measure for problems such as the following:

Example

- For recovery when a problems occurs with the applied patch
- For recovery when a problem occurs when changing operating system parameters

Collection

This section explains how to collect a snapshot.

1. Right-click the target L-Server in the orchestration tree, and select [Snapshot]-[Collect] from the popup menu.

The [Create a Snapshot] dialog is displayed.

2. Enter the items below, and click <OK>.

Comment

Enter a comment that identifies the snapshot.
Enter up to 128 alphanumeric characters or symbols.

The snapshot is collected.

From the command-line, execute rcxadm image snapshot.

For details on the rcxadm image snapshot command, refer to "1.4.1 rcxadm image" in the "ServerView Resource Orchestrator Reference Guide".

Restoration

This section explains how to restore a snapshot.

To restore a snapshot, the L-Server must be stopped.

1. Right-click the target L-Server in the orchestration tree, and select [Snapshot]-[Restore] from the popup menu.
The [Restore a Snapshot] dialog is displayed.
2. Select the version of the snapshot to restore, and click <OK>.

The snapshot is restored.

Execute the rcxadm image restore command.

For details on the rcxadm image restore command, refer to "1.4.1 rcxadm image" in the "ServerView Resource Orchestrator Reference Guide".



In the following cases, the specifications of the L-Server will not be modified. Use the server virtualization software to make changes as necessary.

- When the VM guest corresponding to the L-Server to be restored has been migrated to a VM host that is not registered with Resource Orchestrator
- When restoring a snapshot which was taken using:
 - Resource Orchestrator V2.2.2 or earlier
 - Resource Orchestrator V.2.3.0 without the following patches applied:
 - T005433WP-03 [Windows]
 - T005567LP-01 [Linux]

Deletion

This section explains how to delete unnecessary snapshots.

1. Right-click the target L-Server in the orchestration tree, and select [Snapshot]-[Delete] from the popup menu.
The [Delete a Snapshot] dialog is displayed.
2. Select the version of the snapshot to delete, and click <OK>.

The snapshot is deleted.

The rcxadm image delete command is executed.

For details on the rcxadm image delete command, refer to "1.4.1 rcxadm image" in the "ServerView Resource Orchestrator Reference Guide".

6.7.2 Backup and Restore

This section explains how to back up and restore L-Servers.

These functions are only provided for physical L-Servers.

Backup and restore of L-Servers is the function for performing backup and restoration of L-Server system images.

If multiple backups of the same L-Server are collected, the backups are managed by automatically adding version numbers to the backup file name starting from 1. If the number of snapshot versions exceeds the limit (standard limit is 3), the oldest snapshot will be deleted.



To back up and restore L-Server system images, the following conditions must be met:

- For backup
 - The status of the L-Server is that in which resources have already been allocated (allocated)
 - The L-Server has been started
 - An agent on the L-Server has already been registered
- For restoration
 - The status of the L-Server is that in which resources have already been allocated (allocated)

Use the following procedure for backup and restoration of system images:

Backup

1. Right-click the target L-Server in the orchestration tree, and select [Backup/Restore]-[Backup] from the popup menu. The [Backup System Image] dialog is displayed.
2. Configure the settings in the [Backup System Image] dialog as necessary.
3. Click <OK>.

System images will be backed up.

From the command-line, execute `rcxadm image backup`.

For details, refer to "4.1 rcxadm image" in the "ServerView Resource Coordinator VE Command Reference".

Restoration

1. Right-click the target L-Server in the orchestration tree, and select [Backup/Restore]-[Restore] from the popup menu. The [Restore System Image] dialog is displayed.
2. Configure the settings in the [Restore System Image] dialog as necessary.
3. Click <OK>.

System images will be restored.

From the command-line, execute the `rcxadm image restore` command.

For details, refer to "4.1 rcxadm image" in the "ServerView Resource Coordinator VE Command Reference".

Deleting a Backup

This section explains how to delete unnecessary backups of system images.

1. Right-click the target L-Server in the orchestration tree, and select [Backup/Restore]-[Delete a Backup] from the popup menu. The [Delete System Image] dialog is displayed.

2. Select the version of the backup to delete, and click <OK>.

The backup of the system image is deleted.

The rxcadm image delete command is executed.

For details, refer to "4.1 rxcadm image" in the "ServerView Resource Coordinator VE Command Reference".

6.8 Moving an L-Server Between Servers (Migration)

This section explains how to move (migrate) an L-Server between servers.

When using physical L-Servers, moving between servers (migration) cannot be used.

Use the following procedure to migrate between servers:

1. Right-click the target L-Server in the orchestration tree, and select [Migrate VM Guest] from the popup menu.
The [Migrate an L-Server] dialog is displayed.
2. Select the destination VM host from the destination VM host list, and click <OK>. Only the VM hosts available for migration are displayed in the destination list.

From the command-line, execute rxcadm lserver migrate.

For details on the rxcadm lserver migrate command, refer to "1.3.1 rxcadm lserver" in the "ServerView Resource Orchestrator Reference Guide".



Select a destination VM host with available CPU capacity and memory. If there is insufficient CPU capacity or memory, migration between servers or starting of L-Servers may fail.

When specifying "Automatic selection" in the [Migrate an L-Server] dialog, the migration movement differs depending on the value of the "Resource type" for "VM Host" specified when creating the L-Server. This also applies to L-Servers for which overcommit settings have been configured.

- When "Automatic" is specified for "Resource type"

The migration is performed with a destination VM host selected from accessible VM pools.

In environments using overcommit, depending on whether or not overcommit settings have been configured for the L-Server, the migration is performed differently as follows:

- For L-Servers with overcommit configured

The migration is performed with a destination VM host selected from accessible resource pools with overcommit configured.

- For L-Servers without overcommit configured

The migration is performed with a destination VM host selected from accessible resource pools without overcommit configured.

- When "VM Pool" is specified for "Resource type"

The migration is performed with a destination VM host selected from a VM pool.

For environments using overcommit, the same overcommit settings must be configured for both the L-Server and VM pools.

- When "VM Host" is specified for "Resource type"

The migration will fail because the destination does not exist. For environments not using overcommit, the same overcommit settings must be configured for both the L-Server and the VM pool which the VM host belongs to.

Perform one of the following:

- Select a VM host from the list of the destination VM hosts, then perform the operation again.
- In the [Modify an L-Server] dialog, change the value for "VM host" to "Automatic", then perform server migration again.
- In the [Modify an L-Server] dialog, change the value for "VM host" to "Pool", and check the resources to be allocated, then perform server migration again when necessary.

- In the [Modify an L-Server] dialog, change the value for "VM host" to "VM host", and check the resources to be allocated, then perform server migration again when necessary.

If a VM host is specified for the destination VM host, the migration between servers will be performed regardless of whether or not overcommit has been configured.

The information set on the VM host to use can be checked using the following methods:

- Select the target L-Server in the orchestration tree, and check "Preserved resource" in the [Resource List] tab
- Select the target L-Server in the orchestration tree, and check "Current resource" in the [Resource Details] tab

[VMware]

When performing movement between servers (migration), refer to "[G.1.2 Pre-setup Preparations](#)".



Information

When using virtual L-Servers, the VM Home Position of RCVE can be used for migration.

For details, refer to "7.3 VM Home Position" in the "ServerView Resource Coordinator VE Operation Guide".

6.9 Allocating and Releasing Resources

This section explains how to allocate resources to, and release resources from, L-Servers.

Even if there are no resources to allocate to L-Servers, flexible configuration and operation, such as creating only L-Server definitions in advance, is possible.

Configure the following settings, when creating an L-Server.

- Create an L-Server definition

If only creating an L-Server definition, configure "None (Definition only)", when creating an L-Server.

For details, refer to "[D.1 \[General\] Tab](#)".

Only IP addresses/MAC addresses/WWNs are allocated to the created L-Server, and "[defined]" is displayed.

- Automatically release server resources for L-Servers

If releasing server resources when the L-Server is turned off, set "Resource release" during L-Server creation.

For details, refer to "[D.2 \[Server\] Tab](#)".

When the power of an L-Server for which this setting are configured is turned off, "[preserved]" is displayed.



Note

When sharing resources on the same physical server between L-Servers using the usage change function, set "Resource release" on the L-Server where the server resource is allocated.

When the server resources are allocated to the L-Server for which "Resource release" is not configured, the server resources cannot be shared.

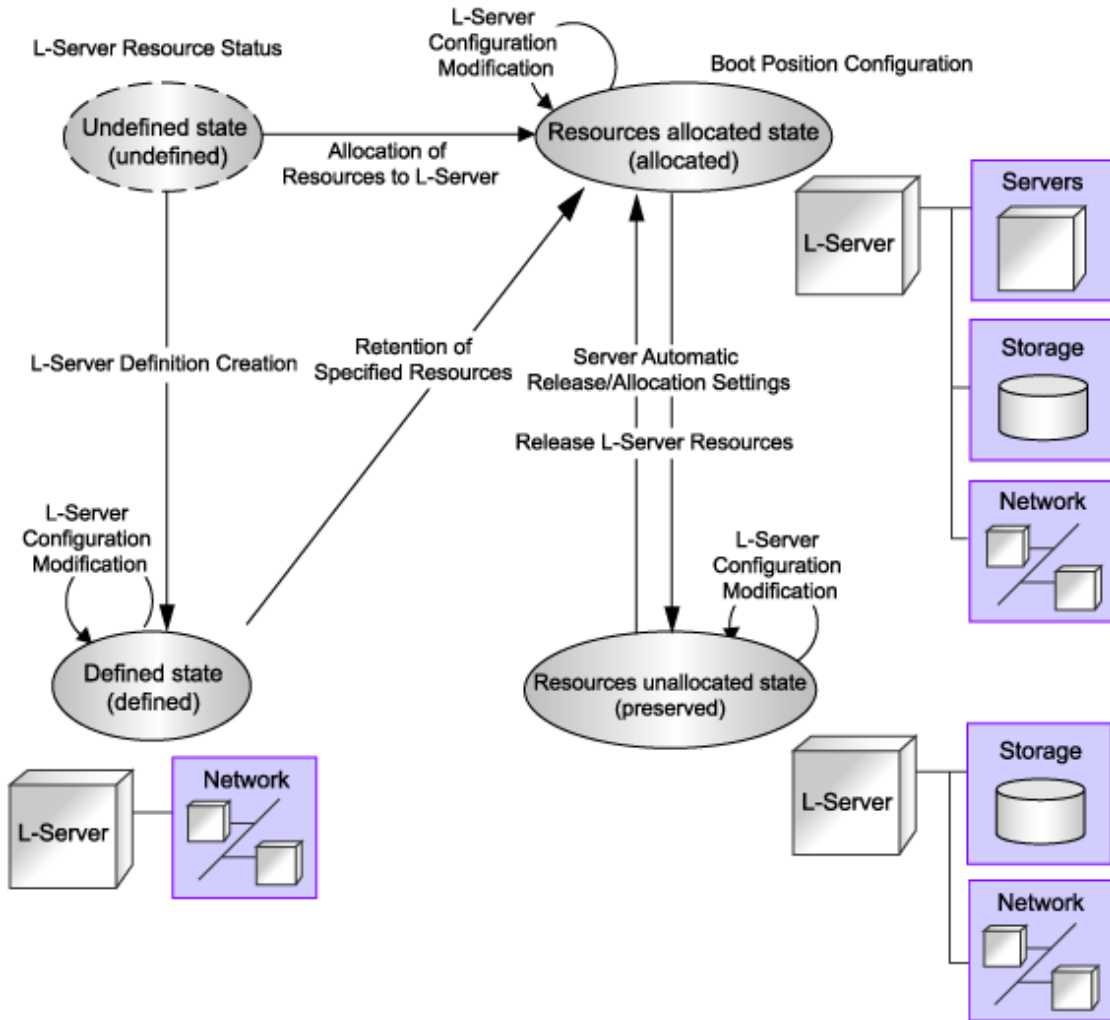


Note

For an L-Server from which VM guests have been deleted using server virtualization software, "unknown" is displayed for the resource allocation status.

For details, refer to "The Status of an L-Server is Displayed as unknown, and "Message number 67154" or "Message number 67178" is Displayed Even if Operations Other Than L-Server Deletion are Performed." in "4.4 General Operations for L-Servers" of the "ServerView Resource Orchestrator Reference Guide".

Figure 6.1 State Transition of L-Servers



L-Servers can be deleted when their status is something other than "undefined" (specifications have not been defined).

Modifying Configuration Definition Information

To modify an L-Server for which a configuration definition has been created (defined), use the following procedure.

1. Right-click the target L-Server in the orchestration tree, and select [Change Settings]-[Definition] from the popup menu.

The [Modify L-Server's definition] dialog is displayed.

2. In the [Modify L-Server's definition] dialog, edit the items you want to modify, and click <OK>.

The configuration definition information is modified.

From the command-line, execute `rcxadm lserver modify`.

For details on the `rcxadm lserver modify` command, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".

6.9.1 Installation

By setting the values in the following definition file in advance, it is possible to change L-Server related behaviors and default values displayed on the [General] tab and [Server] tab when creating an L-Server.

For the values for L-Server templates, when an L-Server template does not have values configured, the values of the definition file are adopted.

When creating an L-Server using commands, if the XML file of the L-Server does not have values configured, the values of the definition file are adopted.

Use the UTF-8 character code for definition files.

Location of the Definition File

[Windows]
Installation_folder\Manager\etc\customize_data

[Linux]
 /etc/opt/FJSVrcvmr/customize_data

Definition File Name

L_server.rcxprop

Definition File Format

Describe the definition file in individual lines as below:

<i>Key = Value</i>

Definition File Items

Specify the following items.

Table 6.4 List of Items Specified in the Definition File

Items	Key	Value	Remarks
Allocating Resources	allocate_after_create	true false	When also allocating resources during L-Server creation, specify "true". When only creating an L-Server definition, specify "false". If left blank, "true" is set. It will be set using the default values of "Resource allocation" on the [General] tab.
Repurpose	auto_preserved	true false	When releasing server resources while an L-Server is turned off, specify "true". When not releasing server resources while an L-Server is turned off, specify "false". If left blank, "false" is set. It will be set as the default value of "Resource release" on the [Server] tab. It can be specified using an L-Server template.
Numbering VM names	vm_name_suffix	true false	When using VM names in the format of " <i>Virtual_L-Server_Name-Number</i> ", specify "true". For details on numbering, refer to the "Point Association of an L-Server Name with a VM Guest Name" in " 6.1 Creation Using an L-Server Template ". When using the same name for both a virtual L-Server and a VM when not using numbering, specify "false". If left blank, "true" is set. Switching the value for this item does not automatically change existing virtual L-Server names or VM names. This item only affects when creating a virtual L-Server, when modifying general information/specifications of a virtual L-Server, and when creating a link between a configured virtual machine and an L-Server. The names of L-Servers created with "false" set for this item will automatically change when VM names are

Items	Key	Value	Remarks
			changed. However, the VM name must conform to the naming conventions for L-Servers.

6.9.2 Operations

This section explains how to allocate resources to, and release resources from, L-Servers.

6.9.2.1 Allocating Resources

When an L-Server is started, resources are allocated to it.

For details on how to start an L-Server, refer to "[6.2.1 Starting an L-Server](#)".

Server and disk resources are allocated to the L-Server, when an L-Server is first started. When cloning images are specified, deployment of images will be also performed.

When server resources of L-Servers have been released, server resources will be allocated.

6.9.2.2 Releasing Resources

When stopping an L-Server, server resources will be released.

For details on how to stop an L-Server, refer to "[6.2.2 Stopping an L-Server](#)".

Methods for releasing server resources differ depending on whether the server is a physical L-Server or virtual L-Server.

- Physical L-Server

The physical server that was used for the L-Server will be released.

- Virtual L-Server

VM guests which are created on VM hosts are excluded from the target for calculation of the total amount of VM host usage.

6.10 Changing Physical Server Usage

This section explains how to change physical server usage.

Changing server usage is the function for preparing more L-Servers than physical servers and is used by switching the startup L-Server. This function enables effective use of server resources as the physical server can be changed depending on the time period and situation.

The boot disk and IP address of the L-Server are stored, even while other L-Servers use the physical server.

This function can be used, when an L-Server is actually a physical server. When using virtual machines, multiple L-Servers can be located on a single VM host without any specific configuration, giving the same effects as changing the physical server.

The following two methods are available:

- Method 1: Use multiple L-Servers, switching between them, on a single physical server

The physical server which starts the L-Server is always the same.

- Method 2: Use multiple L-Servers, switching between them, on unused physical servers in a server pool

The physical server allocated to the L-Server will change depending on the available spare servers in a server pool.

6.10.1 Configuring L-Servers for Usage Change

This section explains how to change L-Server settings for usage change.

The operations differ depending on whether the configuration definition has already been created (defined), or if resources have already been allocated (allocated).

When the status of an L-Server is that a configuration definition has already been created (defined), refer to "[6.10.2 When only the Configuration Definition \(defined\) is Created](#)".

When the status of an L-Server is that resources have already been allocated (allocated), refer to "[6.10.3 When Resources are Already Allocated \(allocated\)](#)".

6.10.2 When only the Configuration Definition (defined) is Created

Settings

Repeat the following procedure the same number of times as the number of physical servers which are used for usage change.

1. Create and register each resource

Create and register each resource. Perform resource creation and registration, referring to "[5.2 Registering a Resource](#)" and "[5.3 Registering to a Resource Pool](#)".

2. Create an L-Server

Create an L-Server for which only the configuration definitions have already been created (defined), using the procedure in "[6.1 Creation Using an L-Server Template](#)" or "[Appendix D L-Server Parameter Details](#)".

Perform the following configuration:

- Set "Deploy" for image deployment from the select a cloning image section of the [General] tab.
- Check the "None (Definition only)" checkbox on the [General] tab.
- Check the "Automatic (when powered off)" checkbox of "Resource release" on the [Server] tab.

Operation

The operation method is shown below.

- For method 1.

Usage can be changed by repeating the following procedure.

1. Check the physical server and L-Server of the source L-Server for usage change

Check the physical server and L-Server of the source L-Server for usage change.

2. Stop the source L-Server for usage change

Stop L-Servers operating on physical servers which are required for change usage.

For details, refer to "[6.2.2 Stopping an L-Server](#)".

3. Start the destination L-Server for usage change

Start the destination L-Server for usage change.

For details, refer to "[6.2.1 Starting an L-Server](#)".

After changing the configuration, the L-Server before changing cannot be operated, until the new L-Server has finished starting.

- For method 2.

Usage can be changed by repeating the following procedure.

1. Confirm a server pool

Confirm whether an unused physical server exists in the server pool.

2. Start the destination L-Server for usage change

Start the destination L-Server for usage change.

For details, refer to "[6.2.1 Starting an L-Server](#)".

After changing the configuration, the L-Server before changing cannot be operated, until the new L-Server has finished starting.

6.10.3 When Resources are Already Allocated (allocated)

Settings

Perform 1. the same number of times as the number of physical servers which are used for usage change.

1. Create and register each resource

Create and register each resource. Perform resource creation and registration, referring to ["5.2 Registering a Resource"](#) and ["5.3 Registering to a Resource Pool"](#).

2. Creating an L-Server (First server)

Create an L-Server to which resources are already allocated (allocated), using the procedure in ["6.1 Creation Using an L-Server Template"](#) or ["Appendix D L-Server Parameter Details"](#).

Perform the following configuration:

- Set "Deploy" for image deployment from the select a cloning image section of the [General] tab.
- Do not check the "None (Definition only)" checkbox from the [General] tab.
- Check the "Automatic (when powered off)" checkbox of "Resource release" on the [Server] tab.

3. Change L-Server configuration

- For method 1.

Repeat the following procedure the same number of times as the number of physical servers which are used for usage change.

1. Create and register each resource

Create and register each resource. Perform resource creation and registration, referring to ["5.2 Registering a Resource"](#) and ["5.3 Registering to a Resource Pool"](#).

2. Create an L-Server

Create an L-Server to which resources are already allocated (allocated), using the procedure in ["6.1 Creation Using an L-Server Template"](#) or ["Appendix D L-Server Parameter Details"](#).

Perform the following configuration:

- Set "Deploy" for image deployment from the select a cloning image section of the [General] tab.
- Do not check the "None (Definition only)" checkbox on the [General] tab.
- Check the "Automatic (when powered off)" checkbox of "Resource release" on the [Server] tab.

3. Release the resources of the source L-Server for usage change

Resources are released while the resource details of the source L-Server for usage change are preserved.

For details, refer to ["6.9.2.2 Releasing Resources"](#).

- For method 2.

Repeat the following procedure the same number of times as the number of physical servers which are used for usage change.

1. Create and register each resource

Create and register each resource. Perform resource creation and registration, referring to ["5.2 Registering a Resource"](#) and ["5.3 Registering to a Resource Pool"](#).

2. Create an L-Server

Create an L-Server to which resources are already allocated (allocated), using the procedure in ["6.1 Creation Using an L-Server Template"](#) or ["Appendix D L-Server Parameter Details"](#).

Perform the following configuration:

- Set "Deploy" for image deployment from the select a cloning image section of the [General] tab.
- Do not check the "None (Definition only)" checkbox on the [General] tab.
- Check the "Automatic (when powered off)" checkbox of "Resource release" on the [Server] tab.

3. Confirm a server pool

Confirm whether an unused physical server exists in the server pool.

When an L-Server is allocated to all physical servers in the specified server pool, release a physical server from an L-Server.

4. Release the resources of the source L-Server for usage change

Resources are released while the resource details of the source L-Server for usage change are preserved.

For details, refer to "[6.9.2.2 Releasing Resources](#)".

Operation

The methods for operating physical servers after usage changes are as follow.

Perform the procedure before performing any operations.

- For method 1.

Usage can be changed by repeating the following procedure.

1. Confirm the physical servers to use

2. Stop the source L-Server for usage change

Stop L-Servers operating on physical servers which are required for change usage.

For details, refer to "[6.2.2 Stopping an L-Server](#)".

3. Start the destination L-Server for usage change

Start the destination L-Server for usage change.

For details, refer to "[6.2.1 Starting an L-Server](#)".

After changing the configuration, the L-Server before changing cannot be operated, until the new L-Server has finished starting.

- For method 2.

Usage can be changed by repeating the following procedure.

1. Confirm a server pool

Confirm whether an unused physical server exists in the server pool.

2. Start the destination L-Server for usage change

Start the destination L-Server for usage change.

For details, refer to "[6.2.1 Starting an L-Server](#)".

After changing the configuration, the L-Server before changing cannot be operated, until the new L-Server has finished starting.

6.10.4 Operation

The methods for operating physical servers after usage changes are as follow.

Perform the procedure given in "[6.10.1 Configuring L-Servers for Usage Change](#)" before performing any operations.

- For method 1.

Usage can be changed by repeating the following procedure.

1. Stop the source L-Server for usage change

Stop L-Servers operating on physical servers which are required for change usage.

For details, refer to "[6.2.2 Stopping an L-Server](#)".

2. Start the destination L-Server for usage change

Start the destination L-Server for usage change.

For details, refer to "[6.2.1 Starting an L-Server](#)".

After changing the configuration, the L-Server before changing cannot be operated, until the new L-Server has finished starting.

- For method 2.

Usage can be changed by repeating the following procedure.

1. Confirm a server pool

Confirm whether an unused physical server exists in the server pool.

2. Start the destination L-Server for usage change

Start the destination L-Server for usage change.

For details, refer to "[6.2.1 Starting an L-Server](#)".

After changing the configuration, the L-Server before changing cannot be operated, until the new L-Server has finished starting.



Point

- Usage cannot be changed, while the L-Server is stopped temporarily during L-Server restart.
- When power operation has been performed directly on the physical server using the RC console or commands, without performing power operation of the L-Server, the L-Server which was last operated will start.
- If the last L-Server that was operated has already been started on another physical server, its status will change so there is no boot disk and it will fail to start.

6.10.5 Releasing Configuration

1. Change L-Server configuration for fixed operation

Clear the "Automatic (when powered off)" checkbox of "Resource release" in the [Modify an L-Server] dialog, and click <OK>.

For details, refer to "[6.3.1 Modifying Specifications](#)".

2. Delete unnecessary L-Servers

When unnecessary L-Servers exist, use the procedure in "[6.5 Deleting an L-Server](#)" to delete them.

Appendix A Resource Pools

This appendix explains how to add new resource pools, and delete or modify existing resource pools.

For an overview of the functions, refer to "[1.2.1 Resource Pool](#)".

A.1 Overview

This function manages all the resources allocated when creating an L-Server.

A resource pool is a type of resource folder that exists in the orchestration tree, and has the following features that differ from regular folders:

- Pools are selected as resources when creating or adding L-Servers.
- By specifying a resource type when creating a resource pool, only resources of the same type will be stored in that resource pool.
- The total size of the resources in the resource pool and the free space are calculated and displayed. The converted number of L-Servers for the specified L-Server template is also displayed.
- By default, a resource pool is automatically created for each resource pool type.
- In default resource pools which are created automatically, VM hosts of different server virtualization software can be stored in VM pools. In a VM pool where there are various server virtualization software products, if the following is specified, Resource Orchestrator will select the appropriate VM host from the VM pool, and create an L-Server.
 - When creating an L-Server using an L-Server template, specify the VM type.
 - When creating individual specifications for an L-Server, specify the VM type on the [Server] tab.
- Resource pools can be used with user/role management to restrict the users that can use them.
- By setting a priority for multiple resource pools, you can set the order for automatically selecting the required resources when creating an L-Server.

For details on resource pool types and the resources that are stored, refer to "[Table 1.2 Resource Pool Types](#)" in "[1.2.1 Resource Pool](#)".

Moving an L-Server (migration) is only possible between VM hosts belonging to the same cluster group, when two or more cluster groups are registered in the same VM pool.

A.2 Resource Pool Operations

This section explains how to perform resource pool operations.

Creating a Resource Pool

Use the following procedure to create resource pools.

1. Right-click the root folder or a resource folder in the orchestration tree, and select [Create]-[Pool] from the popup menu.

The [Create a Pool] dialog is displayed.

2. In the [Create a Pool] dialog, set the following items, and click <OK>.

Name

Enter a name for the resource pool.

Enter up to 32 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores (" _"), or hyphens (" -").

Type

Select the type of the resource pool.

- VM pool
- Server pool

- Storage pool
- Network pool
- Address pool
- Image pool

Priority

Select the priority of the resource pool for automatically selecting a resource when creating an L-Server.
Select a value between "1" and "10". Smaller values indicate a higher priority. "5" is selected by default.

Label

Enter a label for the resource pool.
Enter up to 32 alphanumeric characters or symbols.

Comment

Enter any comments for the resource pool.
Enter up to 256 alphanumeric characters or symbols.

The created resource pool is displayed in the orchestration tree.

Modifying a Resource Pool

Use the following procedure to change resource pool configurations.

1. Right-click the target resource pool in the orchestration tree, and select [Change Settings]-[Basic Information] from the popup menu.
The [Change Setting for a Pool] dialog is displayed.
2. In the [Change Setting for a Pool] dialog, edit the items you want to modify, and click <OK>.
The resource pool setting information is modified.

Moving a Resource Pool

Use the following procedure to move a resource pool to another resource folder.

1. Right-click the target resource pool in the orchestration tree, and select [Move to Folder] from the popup menu.
The [Move a Pool] dialog is displayed.
2. In the [Move a Pool] dialog, select the destination resource folder.
3. Click <OK>.

The target resource pool is moved to the destination resource folder.

When using tenants to segregate resources, movement of resources may be limited.

For details, refer to "[1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants](#)".

Deleting a Resource Pool

Use the following procedure to delete resource pools.

When a resource pool is deleted, the resources in that resource pool are also deleted. It is recommended that you move the resources in the resource pool to another resource pool in advance.

1. Right-click the target resource pool in the orchestration tree, and select [Delete] from the popup menu.

The name of the resource pool to delete is displayed in the [Delete a Pool] dialog.

If resources are registered in the resource pool to delete, a list of those resources is displayed in "All Resources". Confirm the list, and check the "Delete All Resources" checkbox.

2. Click <OK>.

The target resource pool is deleted.

A.3 Resource Operations

This section explains how to perform resource operations with resource pools.

Registration

Use the following procedure to register a resource to a resource pool:

1. Right-click the target resource pool in the orchestration tree, and select [Register Resources] from the popup menu.
The [Register Resources] dialog is displayed.
2. Check the "Select" checkbox of the resources to register in the [Register Resources] dialog, and click <OK>.
The resources are registered in the resource pool.

Modifying a Resource

Use the following procedure to modify a resource registered in a resource pool.

1. Right-click the target resource in the orchestration tree, and select [Change Settings]-[Basic Information] from the popup menu.
The [Resource Change Setting] dialog is displayed.
2. In the [Resource Change Setting] dialog, edit the items you want to modify, and click <OK>.
The resource settings are modified.



Note

When changing the subnet information for the L-Server to a different subnet, if there are managed servers in the subnets to be changed, "Subnet address/mask" cannot be changed.

When changing "Subnet address/mask", refer to "[Modifying When There are Managed Servers on the Subnet](#)".

Modifying When There are Managed Servers on the Subnet

When there are managed servers on the subnet, use the following procedure to change the network address or subnet mask:

1. Register the tenant admin LAN resource information which has the network address or subnet mask after changing.
2. Change the destination for connection on the admin LAN of all L-Servers belonging to the subnet before changing.
3. Delete the tenant admin LAN used before the change, when necessary.

Modifying Network Resource Specifications

The availability of modification for each item depending on the network resource type is shown below:

Table A.1 Modification Availability Range List

Category	Items	Admin LAN Network Resources Directly Connecting with Manager	Network Resources of Additionally Created Admin LAN	Network Resources of iSCSI or Public LAN
Basic Information	Network Resource Name	Yes	Yes	Yes

Category	Items	Admin LAN Network Resources Directly Connecting with Manager	Network Resources of Additionally Created Admin LAN	Network Resources of iSCSI or Public LAN
	Label	Yes	Yes	Yes
	Comment	Yes	Yes	Yes
Connection Information	VLAN ID	No	No	No
	External Connection Port	Yes (*3)	Yes (*3)	Yes (*3)
	Automatic configuration	No	No	No
Subnet Information	Subnet Address/Subnet Mask	Yes (*1, *2)	Yes (*1)	Yes
	IP Address to Exclude	Yes	Yes	Yes
	Default Gateway	Yes (*2)	Yes	Yes
Network Resource Type	-	No	No	No

Yes: Modification is possible

No: Modification is not possible

*1: The subnet address and subnet mask of admin LAN can be changed, when there are no physical servers using the network resources of the target of modification.

*2: Modification can be performed by executing the `rcxadm mgrctl modify` command.

*3: When one or more external networks exist, the only operation that can be performed for external connection ports is addition of external connection ports attached to a target external network. Deleting and changing of external connection ports cannot be performed.

Use the following procedure to change network resource specifications.

1. Right-click the target network resource in the orchestration tree, and select [Change Settings]-[Modify Specification] from the popup menu.

The [Modify a network resource] dialog is displayed.

2. In the [Modify a network resource] dialog, edit the items you want to modify, and click <OK>.

The network resource is changed.

Adding external connection ports of an attached chassis

When one or more external networks exist, addition of external connection ports of a chassis attached to a target external network is possible.

Use this function when adding network resources by attaching chassis.

The procedure for adding external connection ports is shown below.

1. Register chassis

Register a chassis as a resource of Resource Orchestrator.

Refer to "6.1.2 Registering Chassis" in the "ServerView Resource Coordinator VE Setup Guide".

2. Register LAN switch blades

Register a LAN switch blade as a resource of Resource Orchestrator.

For details, refer to "6.1.4.1 Registering LAN Switch Blades" in the "ServerView Resource Coordinator VE Setup Guide".

3. Configure a VLAN for external ports of LAN switch blades

For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

4. Adding external connection ports

Add external connection ports.

- a. Right-click the target network resource in the orchestration tree, and select [Change Settings]-[Modify Specification] from the popup menu.

The [Modify a network resource] dialog is displayed.

- b. In the [Modify a network resource] dialog, click <Setting>.

The [Uplink port settings] dialog is displayed.

- c. In the [Uplink port settings] dialog, checking the "Filter ports by VLAN ID" checkbox displays a blank checkbox for the external connection port of the chassis attached at 1.

Check the checkbox for the external connection port, and click <OK>.

5. In the [Modify a network resource] dialog, click <OK>.

An external connection port is added.



Note

The default gateway address of an admin LAN resource which is the same subnet address as that of the manager cannot be changed.

When changing the number of the IP address to use after changing the subnet addresses or subnet masks, the IP address for L-Server is also automatically changed.

As the OS configuration installed on an L-Server is not changed, manually change it to match the detailed information of the L-Server.

Moving a Resource

Use the following procedure to move a resource to another resource pool.

1. Right-click the target resource in the orchestration tree, and select [Move to Pool] from the popup menu.
The [Move a Resource] dialog is displayed.
2. In "Destination Pool" in the [Move a Resource] dialog, select the destination resource pool for the resource, and click <OK>.
The target resource is moved to the selected resource pool.

When using tenants to segregate resources, movement of resources may be limited.

For details, refer to "[1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants](#)".



Note

When the disk resource to be moved is a LUN created in advance, it is recommended to delete the data on the disk beforehand. For details on how to delete data on the disks, refer to the cautionary notes of "[5.3.3 Storage Resources](#)".

Unregistration

Use the following procedure to unregister a resource registered in a resource pool.

1. Right-click the target resource in the orchestration tree, and select [Unregister] from the popup menu.
The [Unregister a Resource] dialog is displayed.
2. Click <OK>.

Deleting a Resource

Use the following procedure to delete a resource registered in a resource pool.

1. Right-click the target resource in the orchestration tree, and select [Delete] from the popup menu.
The [Delete a Resource] dialog is displayed.
2. Click <OK>.

Note

When there are managed servers on the subnet to be deleted, the subnet information cannot be deleted.
After deleting the managed server, delete the subnet information.

A.4 Viewing a Resource Pool

The resource list and pool list display the resource folders, total size of resources, and free space available.

In the L-Server list, when the server is a physical L-Server, the physical server for the L-Server is displayed.

When the server is a virtual L-Server, the name of the VM host where the L-Server operates is displayed.

When selecting the "Allocation information" checkbox, resources that have been allocated and resources in use are displayed.

For the already allocated resources, the following information is displayed, depending on the status of resource allocation.

- allocated
Resource name
- preserved
Resource name + "(preserved)"
- defined
"(defined)"

For resources in use, the resources configured as "Physical server" or "VM host" are displayed as icon + resource name.

When the "Configuration information" checkbox is selected, CPU performance, memory size, NIC numbers, disk numbers, and model names are displayed.

If you select the [Resource List] tab with a resource pool selected in the orchestration tree, a list of information for the resources that belong to the resource pool are displayed.

If you select the [Resource Details] tab, detailed information such as the total size of data and free space in the resource pool is displayed.

Also, if you select the [Available Pool] tab, a list of the resource pools that the user has usage rights for and the resources that belong to those pools is displayed.

Note

When the following conditions are met, the capacity reserved for failover is displayed in "CPU Capacity" and "Memory Capacity" under "VM Host List" and "Capacity" on the [Resource Details] tab. For VM hosts for which the HA function is unavailable, or for operations with no reservation for failover, a hyphen ("-") is displayed.

- When the HA function provided by server virtualization software is available for the VM hosts and, CPU capacity and memory capacity are reserved for failover

If the VM host does not meet the following conditions, free space will be displayed as 0.

- The power status is "ON".
- The status is "normal".
- Maintenance mode has not been set.
- Maintenance mode has not been set for the server virtualization software.

[VMware]

- For VM hosts for which standby mode has been set by server virtualization software, calculation results are displayed for free space even when the status is "stop".

In Resource Details for the VM host, and when using the command (`rcxadm pool list -name Pool_name`), the total CPU capacity is displayed in the format of $CPU_performance * CPU_core_count$. *CPU performance* is displayed as a number truncated to one decimal place. Therefore, depending on the value of the second decimal place of CPU performance, CPU capacity may not match the actual free CPU capacity.

Max. number of possible L-Servers View

This section explains how to display the converted number of L-Servers that can be created with VM pools, server pools, and storage pools.

1. Left-click the target VM pool in the orchestration tree, and select the [Resource List] tab.
2. In the "Template" selection list, select the L-Server template to convert.
3. Click <OK>.
 - The number of L-Servers that can be created is displayed in "Number of creatable L-Servers".

Note

- When the status of the VM host and virtual storage is one other than "normal", the resource will be excluded from L-Server allocation regardless of its available space. (*1)

However, a value corresponding to the available space of the resource will be displayed for the L-Server converted number.

- When using physical L-Servers, the L-Server converted number of virtual storage is an estimate, and an error may occur during L-Server creation.
- The available space on resources and the space displayed for the number of L-Servers that can be created are calculated as follows: (*2)
 - CPU, memory

$\text{Total_resource_capacity (*3)} - (\text{Total_of_resources_used_for_virtual_machines (*4)}) - \text{Reservation_capacity_for_the_VM_host (the capacity reserved for the HA function enabled on the VM software) (*5)}$

- Addresses and available space on the network

$\text{Total_resource_capacity} - (\text{Total_of_resources_used_for_L-Server (*6)})$

- Free storage space

$\text{Total_resource_capacity} - (\text{Total_of_resources_used_for_L-Server (*6)} + \text{Total_of_images (*7)})$

- Number of L-Servers that can be created

The following smallest value is displayed:

- Free CPU capacity / the CPU capacity specified in the L-Server template selected from the "Template" select list
- Free memory size / the memory size specified in the L-Server template selected from the "Template" select list (*8)
- Free storage capacity / the storage capacity specified in the L-Server template selected from the "Template" select list

*1:

[VMware]

The VM hosts for which standby mode has been set by server virtualization software are excluded from the targets of L-Server deployment, and other VM hosts in the same cluster become the deployment target location.

*2: For the resource pool (VM pool) configured as a resource pool for overcommit, the capacity is calculated according to the overcommit configuration file.

When configured to calculate using a maximum value, free CPU capacity/memory size are calculated based on the CPU performance/memory size of the virtual machine.

[VMware]

When configured to calculate using a reservation value, free CPU capacity/memory size are calculated based on the CPU performance/memory size reserved for the virtual machine. The number of L-Servers that can be created is calculated based on the CPU reservation performance and the memory reservation capacity specified in the L-Server template.

When the free capacity for VM pools is configured to be calculated using a maximum value, for the virtual machine for which limit values of CPU/memory has been set to "Unlimited" using VM management software, the calculation is performed assuming the following values as the maximum values:

- When no limit has been set for CPU performance
The physical CPU performance on the VM host is used
- When no limit has been set for memory size
The memory size set for the virtual machine

[Hyper-V]

When configured to calculate using a reservation value, the values referred to for calculation vary depending on the dynamic memory settings for the virtual machine, as follow:

- When dynamic memory is enabled
Free CPU capacity/memory size are calculated based on the CPU performance/startup memory size reserved for the virtual machine.
- When the dynamic memory is disabled
Free CPU capacity/memory size are calculated based on the CPU performance/memory size reserved for the virtual machine.

In addition, the number of L-Servers that can be created is calculated based on the CPU reservation performance and the memory reservation capacity specified in the L-Server template, regardless of the settings in the overcommit configuration file.

*3: This does not include the overhead used for the VM host.

*4: This includes not only the resources for active virtual machines, but also those of resources of stopped virtual machines.

[VMware]

This includes the overhead memory used for the virtual machine.

The resources of VMware FT secondary virtual machines are included.

*5:

[VMware]

This is the resource capacity secured when VMware HA admission control is enabled. This is calculated according to the policy of the admission control. Formulas for individual policies are as follows:

- When the policy is share
Total_resource_capacity (*3) multiplied by the share (%)
- When the policy is the VM host corresponding to the spare server
Total_resource_capacity (*3) multiplied by 100 (%)
- When the policy is a VM host not corresponding to the spare server
Total_resource_capacity (*3) multiplied by 0 (%)
- When the policy is a slot (the reservation capacity for the VM host is not secured.)
Total_resource_capacity (*3) multiplied by 0 (%)

*6: This includes not only the resources for active L-Servers, but also those of resources of stopped L-Servers.

*7: Images include cloning images and snapshots. However, the size of images is not displayed.

[Xen]

When using RHEL5-Xen for the managed server, refer to "[G.3.7 Advisory Notes for RHEL5-Xen Usage](#)".

*8:

[VMware]

This does not include the overhead memory allocated when creating a virtual machine from an L-Server template.
Therefore, the displayed number of L-Servers may not be able to be created.

Appendix B Resource Folders and Tenants

This appendix explains resource folders, which are used when managing a large number of resources or when you want to divide resources according to certain conditions.

For an overview of the functions, refer to "[1.2.7 Managing Multiple Resources Using Resource Folders](#)".

B.1 Overview

Resource folders are used when managing a large number of resources or when you want to divide resources according to certain conditions.

Resource folders can be created in the orchestration tree or the server resource tree.

Resource folders created in the orchestration tree can store the following resources:

- L-Server
- Resource Pools
- Resource Folders
- Tenant Folders

Resource folders created in the server resource tree can store the following resources:

- Chassis
- Servers (that are not stored in a chassis)
- Resource Folders

Resources stored in resource folders can be freely placed.

Using hierarchical folders, other resource folders can be stored in the resource folders.

Using resource folders enable you to do the following:

- Since the number of resources handled at once is reduced, it becomes easier to select resources
- Resources can be categorized in detail

Also, in the orchestration tree, the access scope of roles can be restricted and used in combinations to restrict the resource folders that can be accessed for each administrator. This enables you to do the following:

- Divide the management scope for each administrator
- Link with roles to prevent erroneous operations from being performed on resources outside of the scope of operation privileges

When the access scope is limited to a single resource folder, that resource folder is called the "home folder". By setting a home folder, a folder does not need to be specified for the various operations that normally require a resource folder to be specified.

Resources that can be Registered

Resource folders are managed according to their resource folder type. The resources that can be registered for each resource folder type are indicated below.

Table B.1 Resource Folder Types and Resources that can be Registered

Resource Folder Types	Resources that can be Registered
Orchestration (lserver)	L-Server
	Resource pools
Server (server)	Chassis
	Servers

B.2 Resource Folders

This section explains the operations for the resource folders of Resource Orchestrator.

B.2.1 Creating a Resource Folder

This section explains how to create resource folders.

1. Right-click the target resource folder in the tree, and select [Create]-[Folder] from the popup menu.

The [Create a Folder] dialog is displayed.

2. In the [Create a Folder] dialog, set the following items.

Name

Enter a name for the resource folder.

Enter up to 32 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), or hyphens ("-").

Label

Enter a label for the resource folder.

Enter up to 32 alphanumeric characters or symbols.

Comment

Enter any comments for the resource folder.

Enter up to 256 alphanumeric characters or symbols.

3. Click <OK>.

The created resource folder is displayed in the tree.

From the command-line, execute the rcxadm folder create command.

For details on the rcxadm folder create command, refer to "1.3.7 rcxadm folder" in the "ServerView Resource Orchestrator Reference Guide".

B.2.2 Viewing a Resource Folder

This section explains how resource folders are displayed.

Resource folders are displayed in the following format:

Resource_folder_name (label)

When *label* is not set, only *resource_folder_name* is displayed.

If you select the [Resource List] tab with a target resource folder selected in the tree, a list of information for the resources that belong to the resource folder are displayed.

If you select the [Resource Details] tab, detailed information for the resource folder is displayed.

The displayed resource folders differ according to the privileges of the user.

- Users that can access all resources

All resource folders are displayed in the tree.

- Users that have their access scope restricted by their role

Only the resource folders that the user has view privileges for are displayed in the tree.

From the command-line, execute rcxadm folder list or rcxadm folder show.

For details on the rcxadm folder list and rcxadm folder show command, refer to "1.3.7 rcxadm folder" in the "ServerView Resource Orchestrator Reference Guide".

B.2.3 Modifying the Basic Information

This section explains how to modify the basic information (folder name, label, comment) of resource folders.

1. Right-click the target resource folder in the tree, and select [Change Folder Settings]-[Basic Information] from the popup menu.
The [Folder Change Setting] dialog is displayed.
2. In the [Folder Change Setting] dialog, edit the items you want to modify.
3. Click <OK>.

The basic information of the resource folder is modified.

From the command-line, execute the rcxadm folder modify command.

For details on the rcxadm folder modify command, refer to "1.3.7 rcxadm folder" in the "ServerView Resource Orchestrator Reference Guide".

B.2.4 Deleting Resource Folders

This section explains how to delete resource folders.

The procedure for deleting resource folders differs according to the resource folder type.

For Orchestration (lserver)

1. Right-click the target resource folder in the orchestration tree, and select [Delete] from the popup menu.
The [Delete a Folder] dialog is displayed.
2. The name of the resource folder to delete is displayed in the [Delete a Folder] dialog.
If resource folders or resources are included in the resource folder to delete, a list of them is displayed in "All Resources".
Confirm the list, and check the "Delete All Resources" checkbox.



When the "Delete All Resources" checkbox is checked, the <OK> button will be enabled.

3. Click <OK>.
The target resource folder is deleted.

From the command-line, execute rcxadm folder delete.

For details on the rcxadm folder delete command, refer to "1.3.7 rcxadm folder" in the "ServerView Resource Orchestrator Reference Guide".

For Server (server)

1. Right-click the target resource folder in the server tree, and select [Delete] from the popup menu.
The [Delete a Folder] dialog is displayed.
2. Click <OK>.
The target resource folder is deleted.

From the command-line, execute rcxadm folder delete.

For details on the rcxadm folder delete command, refer to "1.3.7 rcxadm folder" in the "ServerView Resource Orchestrator Reference Guide".



Note

If physical servers or chassis are registered in a resource folder, the resource folder cannot be deleted. Delete the folder after moving or deleting all physical servers and chassis from the target resource folder.

B.2.5 Moving a Resource

This section explains how to move a resource between resource folders.

1. Right-click the target resource in the tree, and select [Move to Folder] from the popup menu.

The [Move a Resource] or [Move a Pool] dialog is displayed.

2. In the [Move a Resource] or [Move a Pool] dialog, select the destination resource folder.
3. Click <OK>.

The target resource is moved to the destination resource folder.

When using tenants to segregate resources, movement of resources may be limited.

For details, refer to "[1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants](#)".

When the resource is an L-Server, execute `rcxadm lserver move`.

For details on the command, refer to the "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

B.2.6 Moving Resource Folders

This section explains how to move a resource folder.

Use the following procedure to move a resource to another resource folder.

1. Right-click the target resource folder in the orchestration tree, and select [Move to Folder] from the popup menu.

The [Move a Folder] dialog is displayed.

2. In the [Move a Folder] dialog, select the destination resource folder.
3. Click <OK>.

The target resource folder is moved to the destination resource folder.

In this case, resources in the resource folder are also moved to the destination resource folder.

When using tenants to segregate resources, movement of resources may be limited.

For details, refer to "[1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants](#)".

From the command-line, execute `rcxadm folder move`.

For details on the `rcxadm folder move` command, refer to the "1.3.7 `rcxadm folder`" in the "ServerView Resource Orchestrator Reference Guide".

B.3 Tenants

This section explains how to operate a tenant.

Tenants are composed of tenant folders and resource pools to store tenant resources, and users and user groups to manage tenants.

B.3.1 Creating a Tenant Folder

This section explains how to create a tenant folder.

When creating tenant folders, perform the operation with the special administrator (supervisor) role.

1. Right-click the root folder in the orchestration tree, and select [Create]-[Tenant] from the popup menu.

The [Create a Tenant] dialog is displayed.

2. On the [Tenant] tab of the [Create a Tenant] dialog, set the following items.

Name

Enter a name for the tenant folder.

Enter up to 32 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), or hyphens ("-").

User information

User group

Enter the name of the user group to register to the tenant folder.

The specified user group is created.

Enter up to 32 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), or hyphens ("-").

User name

Enter the user name to register to the user group.

The privileges of the user created are "Administrator".

Enter up to 32 characters beginning with an alphabetical character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), periods ("."), and hyphens ("-").

Password

Enter the password of the user name.

The string must be composed of alphanumeric characters (upper or lower case) and symbols, and can be up to 16 characters long.

Confirm password

Enter the password again.

Label

Enter a label for the resource folder.

Enter up to 32 alphanumeric characters or symbols.

Comment

Enter any comments for the resource folder.

Enter up to 256 alphanumeric characters or symbols.

3. On the [Pool] tab of the [Create a Tenant] dialog, set the following items.

Local pool information

When using a local pool, create a local pool under the tenant folder.

Clicking <Add> displays the [Add a Local Pool] dialog.

Enter the following items:

- Name
- Type
- Priority

Available global pool information

When using a global pool, a global pool is created in a tenant folder.

Clicking <Add> displays the [Add Global Pools] dialog.

Select the pool type of the global pool to add from "Pool type", and select a global pool from the list.

4. Click <OK>.

The created tenant folder is displayed in the tree.

From the command-line, execute the rcxadm tenant create command.

For details on the rcxadm tenant create command, refer to "1.3.11 rcxadm tenant" in the "ServerView Resource Orchestrator Reference Guide".

Point

When creating a tenant folder, batch creation of resource pools, resource folders, users, and user groups are performed, but resources are not registered. Register resources, referring to "5.3 Registering to a Resource Pool".

Note

- You cannot specify a registered user for a user group and a user.
- Tenants cannot be created when a folder belonging to a tenant is selected.
- When using directory services to manage users, the methods to create a user and a user group are different.

For details, refer to "C.4 User Management Using Directory Service".

Information

When creating a tenant folder using the RC console, the default value can be changed.

To change the default value in tenant folder creation, modify the tenant folder creation default definition file.

Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data\tenant_config.xml

[Linux]

/etc/opt/FJSVrcvmr/customize_data/tenant_config.xml

Definition File Format

```
<?xml version='1.0' encoding='utf-8'?>
<Tenant>
  <Pools>
    <Pool name="Resource Pool Name" type="Resource Pool Type">
      <Priority>Priority</Priority>
    </Pool>
  </Pools>
  <GlobalPoolLinks>
    <GlobalPoolLink>Global Pool Name</GlobalPoolLink>
  </GlobalPoolLinks>
</Tenant>
```

Table B.2 List of Items Specified in Initial Values of Definition File for Tenant Folder Creation

Element Name	Description	Remarks (Possible Values, Examples)
Resource Pool Name (Pool name)	Name of the resource pool to create in the tenant folder	Specify the name of the resource pool to create in the tenant folder. For the resource pool name, enter a character string beginning with an alphanumeric character, and containing up to 32 alphanumeric characters, underscores (" _"), and hyphens ("-").

Element Name	Description	Remarks (Possible Values, Examples)
		If other values are configured, an error occurs when <OK> is clicked in the tenant creation window.
Resource Pool Type (Pool type)	Resource Pool Types	Specify the type of the resource pool to create in the tenant folder. It can be specified using the following methods: <ul style="list-style-type: none"> - vm (VM pool) - server (Server pool) - storage (Storage pool) - network (Network pool) - address (Address pool) - image (Image pool) If other values are configured, "undefined" is displayed on the tenant creation window, and an error occurs when <OK> is clicked.
Priority (Priority)	Resource pool priority	Specify the priority for the resource pool. For the priority order, specify a number between 1 and 10. If the other values are configured, an error occurs when <OK> is clicked in the tenant creation window.
Global Pool Name (GlobalPoolLink)	Name of the global pool	Specify the name of the global pool to use inside the tenant folder, using the hierarchy described as follows: <i>/Resource_folder_name/Global_pool_name</i> The global pool names are not displayed in the tenant creation window, in the following cases: <ul style="list-style-type: none"> - When a resource pool which does not exist is specified - When something other than a resource pool is specified

Example Definition File

An example definition file is indicated below.

```
<?xml version='1.0' encoding='utf-8'?>
<Tenant>
  <Pools>
    <Pool name="TenantVMHostPool" type="vm">
      <Priority>5</Priority>
    </Pool>
    <Pool name="TenantServerPool" type="server">
      <Priority>5</Priority>
    </Pool>
    <Pool name="TenantStoragePool" type="storage">
      <Priority>5</Priority>
    </Pool>
    <Pool name="TenantNetworkPool" type="network">
      <Priority>5</Priority>
    </Pool>
    <Pool name="TenantAddressPool" type="address">
      <Priority>5</Priority>
    </Pool>
    <Pool name="TenantImagePool" type="image">
      <Priority>5</Priority>
    </Pool>
  </Pools>
</Tenant>
```



```

<GlobalPoolLinks>
  <GlobalPoolLink>/VMHostPool</GlobalPoolLink>
  <GlobalPoolLink>/ServerPool</GlobalPoolLink>
  <GlobalPoolLink>/StoragePool</GlobalPoolLink>
  <GlobalPoolLink>/NetworkPool</GlobalPoolLink>
  <GlobalPoolLink>/AddressPool</GlobalPoolLink>
  <GlobalPoolLink>/ImagePool</GlobalPoolLink>
</GlobalPoolLinks>
</Tenant>

```

Sample Definition File

Sample definition files that have appropriate resource pools configured for each operation form are provided.

Copy the sample definition files relevant to the tenant operations, to the storage location for the definition files.

- Installation directories

[Windows]

Installation_folder\Manager\etc\files\tenant_config_samples

[Linux]

/etc/opt/FJSVrcvmr/files/tenant_config_samples

- Sample Definition File

- Tenants where combinations of virtual and physical L-Servers are operated

lserver_multi/tenant_config.xml

- Tenants on which physical L-Servers are operated

lserver_physical/tenant_config.xml

- Tenants on which virtual L-Servers are operated

lserver_vm/tenant_config.xml

- Tenants which do not use resource pools

pool_nothing/tenant_config.xml

B.3.2 Viewing a Tenant Folder

This section explains how to view a tenant folder.

Tenant folders are displayed in the following format:

tenant_folder_name (*label*)

When *label* is not set, only *tenant_folder_name* is displayed.

If you select the [Resource List] tab with a target tenant folder selected in the orchestration tree, a list of information for the resources belonging to that tenant folder are displayed.

If you select the [Resource Details] tab, detailed information for the tenant folder is displayed.

The displayed tenant folders differ according to the privileges of the user.

- Users that can access all resources

All tenant folders are displayed in the tree.

- Users that have their access scope restricted by their role

Only the tenant folders that the user has privileges to view are displayed in the tree.

From the command-line, execute `rcxadm tenant list` or `rcxadm tenant show`.

For details on the `rcxadm tenant list` and `rcxadm tenant show` command, refer to "1.3.11 rcxadm tenant" in the "ServerView Resource Orchestrator Reference Guide".

B.3.3 Modifying the Basic Information

This section explains how to modify the basic information (tenant folder name, label, and comment) of tenant folders.

Modifying the basic information of tenant folders

1. Right-click the tenant folder in the orchestration tree, and select [Change Settings]-[Basic Information] from the popup menu.
The [Modify Tenant Information] dialog is displayed.
2. In the [Modify Tenant Information] dialog, edit the items you want to modify, and click <OK>.
The basic information of the tenant folder is modified.

From the command-line, execute the rxcadm tenant modify command.

For details on the rxcadm tenant modify command, refer to "1.3.11 rxcadm tenant" in the "ServerView Resource Orchestrator Reference Guide".

Changing settings for global pools

Explains how to change the global pool to register in the tenant folder.

1. Right-click the tenant folder in the orchestration tree, and select [Change Settings]-[Global pool] from the popup menu.
The [Modify Accessible Global Pools] dialog is displayed.
2. In the [Modify Accessible Global Pools] dialog, click <Add>, or after selecting the global pool for deletion, click <Delete> to change the global pool's settings.
3. Click <OK>.
The basic information of the global pool of the target tenant folder is modified.

From the command-line, execute the rxcadm tenant modify command.

For details on the rxcadm tenant modify command, refer to "1.3.11 rxcadm tenant" in the "ServerView Resource Orchestrator Reference Guide".

B.3.4 Deleting Tenant Folders

This section explains how to delete a tenant folder.

When a tenant folder is deleted, the resources in that tenant folder are also deleted.

Either move the resources in the tenant folder to another tenant folder in advance, or delete the tenant folder after deleting the resources.

1. Right-click the tenant folder in the orchestration tree, and select [Delete] from the popup menu.
The [Delete a Tenant] dialog is displayed.
2. The name of the tenant folder to be deleted is displayed in the [Delete a Tenant] dialog.
If resources are included in the target tenant folder to be deleted, a list of those resources is displayed in "Associated resources".
Confirm the list, and check the "Delete this tenant." checkbox.



When the "Delete this tenant." checkbox is checked, the <OK> button will be enabled.

3. Click <OK>.
The tenant folder and the user groups and users belonging to it are deleted. When the user groups and users also have roles for other tenant folders, they are not deleted.

From the command-line, execute rxcadm tenant delete.

For details on the rcxadm tenant delete command, refer to "1.3.11 rcxadm tenant" in the "ServerView Resource Orchestrator Reference Guide".



When an L-Server is created in a tenant folder, deleting the tenant folder will also delete the L-Server. For details on how to delete an L-Server, refer to the cautionary notes of "[6.5 Deleting an L-Server](#)".

B.3.5 Moving a Tenant Folder

This section explains how to move a tenant folder.

Use the following procedure to move a tenant folder to another resource folder.

1. Right-click the tenant folder to move in the orchestration tree, and select [Move to Folder] from the popup menu.
The [Move a Tenant] dialog is displayed.
2. In the [Move a Tenant] dialog, select the destination resource folder.
3. Click <OK>.

The tenant folder is moved to the destination resource folder.

In this case, resources in the tenant folder are also moved to the destination.

From the command-line, execute rcxadm tenant move.

For details on the rcxadm tenant move command, refer to "1.3.11 rcxadm tenant" in the "ServerView Resource Orchestrator Reference Guide".

Appendix C Roles and User Groups

This appendix explains roles and user groups. For an overview of the functions, refer to "[1.2.8 Restricting Access Using Roles and User Groups](#)" and "[1.2.9 Sharing and Dividing Resources Between Multiple Departments Using Tenants](#)".

C.1 Roles

This section explains roles.

Refer to the following descriptions, for details on the role and access scope settings for users and user groups.

- When using the internal authentication function
"1.6 User Operations" of the "ServerView Resource Orchestrator Reference Guide"
- When using the directory service
"C.4 User Management Using Directory Service"

By specifying a combination of role and access scope for the target user or user group, the access privileges are restricted. The access scope is restricted by specifying resource folders, resource pools, or resources in the orchestration tree.

For the following users, only orchestration tree can be used since resources that can be referred are restricted. Switchover to other trees is not possible.

- Users with restricted access
- Users for which service administrative roles are configured

For details on trees, refer to "[2.1 RC Console](#)".

Roles are specified from the following role names:

Table C.1 Operation Scope of Roles

Resource Types	Available Operations	Role Names								
		Basic Roles				Service Administrative Role			Infrastructure Administrative Role	
		supervis or (special administrator)	administ rator (administ rator)	operator (operato r)	monitor (monitor)	service_ admin (service administ rator)	lserver_ operator (L- Server operator)	lserver_ monitor (L- Server monitor)	infra_ad min (infrastru cture administ rator)	infra_op erator (infrastru cture operator)
L-Server	Creation/ Modification/ Movement/ Deletion	Yes	Yes	No	No	Yes	No	No	No	No
	Power Operation/ Obtaining the Console Screen	Yes	Yes	Yes	No	Yes	Yes	No	No	No
	Snapshot	Yes	Yes	Yes	No	Yes	Yes	No	No	No
	Backup	Yes	Yes	Yes	No	Yes	Yes	No	No	No
	Image Collection	Yes	Yes	Yes	No	Yes	Yes	No	No	No

Resource Types	Available Operations	Role Names								
		Basic Roles				Service Administrative Role			Infrastructure Administrative Role	
		supervis or (special administrator)	administ rator (adminis trator)	operator (operator)	monitor (monitor)	service_admin (service administrator)	lserver_operator (L-Server operator)	lserver_monitor (L-Server monitor)	infra_admin (infrastructure administrator)	infra_op erator (infrastructure operator)
	Image Deployment/ Deletion	Yes	Yes	No	No	Yes	No	No	No	No
	Migration	Yes	Yes	No	No	No	No	No	Yes	No
	Changing of Server Usage	Yes	Yes	Yes (*1)	No	Yes	Yes (*1)	No	No	No
	Conversion	Yes	Yes	No	No	No	No	No	No	No
	Reversion	Yes	Yes	No	No	No	No	No	No	No
	Monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Image/ Snapshot	Collection	Yes	Yes	Yes	No	Yes	Yes	No	No	No
	Modification/ Movement	Yes (*2)	Yes (*2)	No	No	No	No	No	No	No
	Deletion	Yes (*2)	Yes (*2)	No	No	No	No	No	No	No
	Monitoring	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	No	No
Resource Pool	Creation/ Modification/ Movement/ Deletion	Yes	Yes	No	No	No	No	No	Yes	No
	Resource Registration/ Deletion	Yes (*3)	Yes (*3)	No	No	No	No	No	Yes (*3)	No
	Monitoring	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Physical Server	Registration/ Deletion	Yes (*4)	Yes (*4)	No	No	No	No	No	Yes (*4)	No
	Power Operations (*5)	Yes (*2)	Yes (*2)	Yes (*2)	No	No	No	No	Yes (*2)	Yes (*2)
	Maintenance Mode Settings	Yes (*2)	Yes (*2)	No	No	No	No	No	Yes (*2)	No
	Monitoring	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	Yes (*2)	Yes (*2)
VM Host	Registration/ Deletion	Yes (*4)	Yes (*4)	No	No	No	No	No	Yes (*4)	No
	Power Operations	Yes (*2)	Yes (*2)	Yes (*2)	No	No	No	No	Yes (*2)	Yes (*2)
	Maintenance Mode Settings	Yes (*2)	Yes (*2)	No	No	No	No	No	Yes (*2)	No

Resource Types	Available Operations	Role Names								
		Basic Roles				Service Administrative Role			Infrastructure Administrative Role	
		supervis or (special administrator)	administ rator (adminis trator)	operator (operator)	monitor (monitor)	service_ admin (service administ rator)	lserver_ operator (L- Server operator)	lserver_ monitor (L- Server monitor)	infra_ ad min (infrastru cture administ rator)	infra_ op erator (infrastru cture operator)
	Monitoring	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	Yes (*2)	Yes (*2)
Storage	Registration/ Modification/ Deletion of Storage Management Software	Yes	Yes	No	No	No	No	No	Yes	No
	Monitoring	Yes (*2)	Yes	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	Yes (*2)	Yes (*2)
Network	Creation/ Modification/ Deletion	Yes (*2)	Yes (*4)	No	No	No	No	No	Yes (*2)	No
	Monitoring	Yes (*2)	Yes (*4)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	Yes (*2)	Yes (*2)
Address	Creation/ Modification/ Deletion	Yes (*2)	Yes	No	No	No	No	No	Yes (*2)	No
Image	Collection	Yes	Yes	Yes	No	Yes	Yes	No	No	No
	Modification/ Movement	Yes (*2)	Yes (*2)	No	No	No	No	No	No	No
	Deletion	Yes (*2)	Yes (*2)	No	No	No	No	No	No	No
	Monitoring	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	No	No
Chassis	Creation/ Modification/ Deletion	Yes (*2)	Yes (*4)	No	No	No	No	No	Yes (*2)	No
	Power Operations	Yes (*2)	Yes (*4)	Yes (*2)	Yes (*2)	No	No	No	Yes (*2)	Yes (*2)
	Monitoring	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	Yes (*2)	Yes (*2)
Power Monitoring Device	Creation/ Modification/ Deletion	Yes (*2)	Yes (*2)	No	No	No	No	No	Yes	No
	Monitoring	Yes (*2)	Yes (*2)	Yes (*2)	Yes (*2)	No	No	No	Yes (*2)	Yes (*2)
Pre-configuration	-	Yes	Yes	No	No	No	No	No	Yes	No

Resource Types	Available Operations	Role Names								
		Basic Roles				Service Administrative Role			Infrastructure Administrative Role	
		supervis or (special administrator)	administ rator (adminis trator)	operator (operato r)	monitor (monitor)	service_ admin (service administ rator)	lserver_ operator (L- Server operator)	lserver_ monitor (L- Server monitor)	infra_ ad min (infrastru cture administ rator)	infra_ op erator (infrastru cture operator)
Resource Folders	Creation/ Modification/ Movement/ Deletion	Yes	Yes	No	No	Yes	No	No	Yes	No
	Monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tenant Folders	Creation/ Modification/ Deletion	Yes	No	No	No	No	No	No	No	No
	Monitoring	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
L-Server Template	Import/ Modification/ Deletion	Yes	Yes	No	No	No	No	No	Yes	No
	Export	Yes	Yes	Yes	No	No	No	No	Yes	Yes
	Download	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
	Viewing	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Users	Changing your own password	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Addition/ Modification/ Deletion of Users in a User Group You Belong To	Yes	Yes	No	No	Yes	No	No	Yes	No
	Addition/ Modification/ Deletion of Users in a User Group You do not Belong To	Yes	No	No	No	No	No	No	No	No
	Viewing	Yes	Yes	No	No	Yes	No	No	Yes	No
User Groups	Creation/ Modification/ Deletion	Yes	No	No	No	No	No	No	No	No
	Viewing	Yes	No	No	No	No	No	No	No	No

Yes: Operation can be performed.

No: Operation cannot be performed.

*1: Operation is only possible when L-Server attributes have been configured in advance.

*2: When the access scopes for users and user groups to operate are restricted, select the registered resources in the resource pool from the orchestration tree.

For details on access scopes, refer to "1.6 User Operations" in the "ServerView Resource Orchestrator Reference Guide".

*3: Users whose access scopes are not restricted should perform resource registration.

*4: When an access scope is configured, other users and user groups cannot perform operations from trees other than the orchestration

tree. Select resources registered in the resource pool from the orchestration tree, and operate them.
For details on access scopes, refer to "1.6 User Operations" in the "ServerView Resource Orchestrator Reference Guide".
*5: The power operations are also available from BladeViewer.

Note

When resource folders and resources specified in the access scope of a user are deleted, they are also deleted from the access scope of the user.

When all resource folders and resources specified in the access scope of a user are deleted, the access scope configured for the user group is adopted for the access scope of the user.

And when all resource folders and resources specified in the access scope of a user group are deleted, all users belonging to the user group will not be able to access to any of the resources.

Adding Settings

This section explains how to add role settings.

The default setting is "supervisor". Specify the role to allocate to the access scope. For details, refer to the following:

- When using the internal authentication function
"1.6 User Operations" of the "ServerView Resource Orchestrator Reference Guide"
- When using the directory service
["C.4 User Management Using Directory Service"](#)

Execute the rxcadm usergroup modify command.

For details on the command, refer to "1.6.2 rxcadm usergroup" in the "ServerView Resource Orchestrator Reference Guide".

C.2 User Groups

This section explains user groups.

Only users with the special administrator role can create user groups.

For details on the command, refer to "1.6.2 rxcadm usergroup" in the "ServerView Resource Orchestrator Reference Guide".

When using the directory service, refer to ["C.4 User Management Using Directory Service"](#).

C.2.1 Creating a User Group

This section explains how to create user groups.

Use the following procedure to create user groups:

1. In the RC console, select [Settings]-[User Groups].
The [User Groups] dialog is displayed.
2. In the [User Groups] dialog, click <Add>.
The [Register User Group] dialog is displayed.
3. In the [Register User Group] dialog, set the following items.

Group name

Enter a character string beginning with an alphanumeric character and containing up to 32 alphanumeric characters, underscores (" _"), and hyphens ("-").

Scopes/Roles

After clicking <Add>, select the access scope and role type to set for the user group.

Label (Optional)

Enter a label for the user group.

Enter up to 32 alphanumeric characters or symbols.

Comment (Optional)

Enter any comments for the resource folder.

Enter up to 256 alphanumeric characters or symbols.

4. Click <OK>.

The user group is created.

Execute the `rcxadm usergroup create` command.

For details on the `rcxadm usergroup create` command, refer to "1.6.2 `rcxadm usergroup`" in the "ServerView Resource Orchestrator Reference Guide".



When using directory services, user groups cannot be managed using the RC console.

For details on how to create a user group, refer to "[C.4 User Management Using Directory Service](#)".

C.2.2 Viewing a User Group

This section explains how to view a user group.

Use the following procedure to view a registered user group.

1. In the RC console, select [Settings]-[User Groups].

The [User Groups] dialog is displayed.

A list of user groups (user groups and user accounts) is displayed.

From the command-line, execute `rcxadm usergroup list` or `rcxadm usergroup show`.

For details, refer to "1.6.2 `rcxadm usergroup`" in the "ServerView Resource Orchestrator Reference Guide".



When using directory services, user groups cannot be managed using the RC console.

For details on how to display user groups, refer to "[C.4 User Management Using Directory Service](#)".

C.2.3 Modifying a User Group

This section explains how to modify user groups.

Use the following procedure to modify user group settings:

1. In the RC console, select [Settings]-[User Groups].

The [User Groups] dialog is displayed.

2. In the [User Groups] dialog, select the user group to modify, and click <Modify>.

The [Modify User Group] dialog is displayed.

3. In the [Modify User Group] dialog, edit the items you want to modify.

4. Click <OK>.

The user group information is modified.

Execute the `rcxadm usergroup modify` command.

For details on the `rcxadm usergroup modify` command, refer to "1.6.2 `rcxadm usergroup`" in the "ServerView Resource Orchestrator Reference Guide".



When using directory services, user groups cannot be managed using the RC console.

For details on how to modify user groups, refer to "[C.4 User Management Using Directory Service](#)".

C.2.4 Deleting a User Group

This section explains how to delete user groups.

You cannot delete a user group if it has users registered.

Before deleting the user group, move all the users that belong to the user group to another user group or delete them.

Use the following procedure to delete user groups:

1. In the RC console, select [Settings]-[User Groups].

The [User Groups] dialog is displayed.

2. In the [User Groups] dialog, select the user group to delete, and click <Delete>.

The [Delete User Group] dialog is displayed.

3. Click <OK>.

The user group information is deleted.

From the command-line, execute `rcxadm usergroup delete`.

For details on the `rcxadm usergroup delete` command, refer to "1.6.2 `rcxadm usergroup`" in the "ServerView Resource Orchestrator Reference Guide".



When using directory services, user groups cannot be managed using the RC console.

For details on how to delete user groups, refer to "[C.4 User Management Using Directory Service](#)".

C.3 User Accounts

Only users with the special administrator or administrator role can create user accounts.

When using the directory service, refer to "[C.4 User Management Using Directory Service](#)".

C.3.1 Register a User Account

This section explains how to register user accounts.

Use the following procedure to register a user account:

1. In the RC console, select [Settings]-[User Accounts].

The [User Accounts] dialog is displayed.

2. In the [User Accounts] dialog, click <Add>.

The [Register User Account] dialog is displayed.

3. In the [Register User Account] dialog, set the following items.

User name

Enter a character string beginning with an alphanumeric character and containing up to 32 alphanumeric characters, underscores ("_"), hyphens ("-"), and periods (".").

User group names are case-sensitive.

Password (Confirm password)

The string must be composed of alphanumeric characters and symbols, and can be up to 16 characters long.

User group

Select the user group to configure for the user account from the already created user group.

Scopes/Roles (Optional)

Resource

Select the scope of access to set for the user account.

Role

Select the role to set for the user account.

Label (Optional)

Enter a label for the user account.

Enter up to 32 alphanumeric characters or symbols.

Comment (Optional)

Enter any comments for the resource folder.

Enter up to 256 alphanumeric characters or symbols.

4. Click <OK>.

The user account is displayed.

Execute the rcxadm user create command.

For details, refer to "1.6.1 rcxadm user" in the "ServerView Resource Orchestrator Reference Guide".



Note

When using directory services, users cannot be managed using the RC console.

For details on how to register user accounts, refer to "[C.4 User Management Using Directory Service](#)".

C.3.2 Viewing a User Account

This section explains how to view user accounts.

Use the following procedure to view a registered user account.

1. In the RC console, select [Settings]-[User Accounts].

The [User Accounts] dialog is displayed.

A list of user accounts (user names and user groups) is displayed.

From the command-line, execute rcxadm user list or rcxadm user show.

For details, refer to "1.6.1 rcxadm user" in the "ServerView Resource Orchestrator Reference Guide".



Note

When using directory services, users cannot be managed using the RC console.

For details on how to display users, refer to "[C.4 User Management Using Directory Service](#)".

C.3.3 Modifying a User Account

This section explains how to modify user accounts and passwords.

User Accounts

Use the following procedure to modify a user account:

1. In the RC console, select [Settings]-[User Accounts].
The [User Accounts] dialog is displayed.
2. In the [User Accounts] dialog, select the user account you want to modify, and click <Modify>.
The [Modify User Account] dialog is displayed.
3. In the [Modify User Account] dialog, edit the items you want to modify, and click <OK>.
The user account is modified.

Password

Use the following procedure to change the password of the logged-in user.

1. On the RC console, select [Settings]-[Change Password].
The [Change Password] dialog is displayed.
2. In the [Change Password] dialog, enter the necessary items to change passwords.
Current password
Enter the current password.
New password
Enter the new password.
Confirm password
Enter the new password again to confirm it.
Click <OK>.
The password is changed.

Execute the rcxadm user modify command.

For details, refer to "1.6.1 rcxadm user" in the "ServerView Resource Orchestrator Reference Guide".



When using directory services, users cannot be managed using the RC console.

For details on how to modify users, refer to "[C.4 User Management Using Directory Service](#)".

C.3.4 Deleting a User Account

This section explains how to delete user accounts.

Use the following procedure to delete a user account:

1. In the RC console, select [Settings]-[User Accounts].
The [User Accounts] dialog is displayed.

2. In the [User Accounts] dialog, select the user account you want to delete, and click <Delete>.

The [Delete User Account] dialog is displayed.
3. In the [Delete User Account] dialog, check the user account you want to delete, and click <OK>.

The user account is deleted.

From the command-line, execute `rcxadm user delete`.

For details, refer to "1.6.1 rcxadm user" in the "ServerView Resource Orchestrator Reference Guide".



Note

When using directory services, users cannot be managed using the RC console.

For details on how to delete users, refer to "[C.4 User Management Using Directory Service](#)".

C.4 User Management Using Directory Service

This section explains how to manage users using the directory service.

In Resource Orchestrator, users can be managed using the directory service as an external authentication function.

Resource Orchestrator provides functions to register, modify, and delete the directory service.

The following resources can be registered in Resource Orchestrator:

- Active Directory(Windows Server 2003 and Windows Server 2008)
- LDAP service (hereinafter OpenDS) attached to ServerView Operations Manager for Windows
- OpenLDAP V2.3 or later

C.4.1 Installation Method

This section explains the installation method of user management using the directory service.

1. Configure the directory service.

When the directory service has already been configured, it is not necessary to perform configuration again.

2. Stop the Resource Orchestrator manager.

For details on how to stop the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

3. Register the resource information and the standard roles of Resource Orchestrator for the directory service.

Register the ldif file in the directory service.

The ldif file is stored in the following location:

[Windows]

`Installation_folder\Manager\etc\files`

[Linux]

`/etc/opt/FJSVrcvnr/files`

Check the necessary ldif file, referring to the following list.

Table C.2 Directory Service Idif File Name

Directory Service	Idif File Name
Active Directory	RORActiveDirectory.ldif
OpenDS	ROROpenDS.ldif
OpenLDAP	ROROpenLDAP.ldif

Use the following procedure to register the ldif file in the directory service.

- When using Active Directory

1. When using SSL encrypted communication between Active Directory and the manager, create an SSL communication environment. An SSL communication environment is necessary to register user information using the ldifde command of Active Directory. An SSL certification environment is also necessary for performing Single Sign-On operations with ServerView Operations Manager.

For details on how to import the server certificates of Active Directory, refer to "H.3 Single Sign-On" in the "ServerView Resource Coordinator VE Setup Guide".

2. Copy the RORActiveDirectory.ldif file in the work folder on Windows to operate the Active Directory.
3. When the base name (dc=example,dc=local) in the ldif file is different from the base name of the Active Directory, modify the base name using an editor.
4. Modify the host name for the ldif file manager.
Change the "ManagerHostname" part to the manager host name. A host name is the name displayed using the hostname command.
5. Replace the "RcxManager" part in the ldif file using the administrative user name specified during installation of Resource Orchestrator.
6. Open the command prompt of Windows, and move to the work folder where RORActiveDirectory.ldif is stored.
7. Execute the ldifde command of Windows, and import the ldif file data.



Example

```
>ldifde -i -e -k -t 636 -f RORActiveDirectory.ldif <RETURN>
```

For details on the ldifde command, refer to the Active Directory manual.

8. The default password for the administrative user is "rcxman@123".
Change the password appropriately.
9. When performing Single Sign-On operations with ServerView Operations Manager, user definitions are necessary for ServerView Operations Manager. For details on how to add user definitions for ServerView Operations Manager, perform settings for Single Sign-On referring to the following manual:
- "Integrating ServerView user management into Microsoft Active Directory" of the "ServerView Suite User Management in ServerView"

- When using OpenDS

1. Import the SSL certificate.
For details on how to import certificates, refer to "H.3 Single Sign-On" of the "ServerView Resource Coordinator VE Setup Guide".
2. Copy ROROpenDS.ldif to the work directory on the system to operate OpenDS.
3. Modify the host name for the ldif file manager.
Change the "ManagerHostname" part to the manager host name. A host name is the name displayed using the hostname command.
4. Replace the "RcxManager" part in the ldif file using the administrative user name specified during installation of Resource Orchestrator.
5. Change the value of the userPassword attribute in the entry of the product privileged user in the ldif file (dn: the block of cn=product_privileged_user_name,ou=users,dc=fujitsu,dc=com) to the product privileged user password.

- Execute the ldapmodify command, and import ROROpenDS.ldif.

[Windows]

```
>"OpenDS_installation_folder\bat\ldapmodify.bat" -p Port_number -f Idif_file -D Administrator_user_DN -w Password  
-c <RETURN>
```

[Linux]

```
# "OpenDS_installation_directory/bin/ldapmodify" -p Port_number -f Idif_file -D Administrator_user_DN -w Password  
-c <RETURN>
```



Example

```
>"C:\Program Files\Fujitsu\ServerView Suite\opends\bat\ldapmodify.bat" -p 1473 -f ROROpenDS.ldif -D "cn=Directory  
Manager" -w admin -c <RETURN>
```

For details on the ldapmodify command, refer to the OpenDS manual.

- When performing Single Sign-On operations with ServerView Operations Manager, specify users who are already defined in ServerView Operations Manager as the user information of Resource Orchestrator.

An example ldif file is given below.



Example

```
dn:  
cn=administrator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=Depart  
ments,ou=SVS,dc=fujitsu,dc=com  
changetype: add  
objectclass: top  
objectclass: groupofnames  
cn: administrator  
member: cn=ServerView Administrator,ou=users,dc=fujitsu,dc=com  
  
dn:  
cn=operator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=Department  
s,ou=SVS,dc=fujitsu,dc=com  
changetype: add  
objectclass: top  
objectclass: groupofnames  
cn: operator  
member: cn=ServerView Operator,ou=users,dc=fujitsu,dc=com  
  
dn:  
cn=monitor,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=Departments  
,ou=SVS,dc=fujitsu,dc=com  
changetype: add  
objectclass: top  
objectclass: groupofnames  
cn: monitor  
member: cn=ServerView Monitor,ou=users,dc=fujitsu,dc=com  
  
dn: cn=administrators,ou=ROR,ou=UserGroups,ou=SVS,dc=fujitsu,dc=com  
changetype: add  
objectclass: top  
objectclass: groupofnames  
cn: administrators  
member: cn=ServerView Administrator,ou=users,dc=fujitsu,dc=com
```

```

dn: cn=operators,ou=ROR,ou=UserGroups,ou=SVS,dc=fujitsu,dc=com
changetype: add
objectclass: top
objectclass: groupofnames
cn: operators
member: cn=ServerView Operator,ou=users,dc=fujitsu,dc=com

dn: cn=monitors,ou=ROR,ou=UserGroups,ou=SVS,dc=fujitsu,dc=com
changetype: add
objectclass: top
objectclass: groupofnames
cn: monitors
member: cn=ServerView Monitor,ou=users,dc=fujitsu,dc=com

```

When users of Resource Orchestrator log in to ServerView Operations Manager, user definitions are necessary for ServerView Operations Manager. For details on how to add user definitions for ServerView Operations Manager, perform settings for Single Sign-On referring to the following manual:

- "Integrating ServerView user management into Microsoft Active Directory" of the "ServerView Suite User Management in ServerView"

For OpenDS, perform settings for Single Sign-On referring to the setting procedure of Active Directory.

- When using OpenLDAP

1. Create the following entries for an OpenLDAP environment.

- Base (Root) entry

(dc=example,dc=local)

- Entry for an organization unit (ou) to allocate user information to

(ou=Users,dc=example,dc=local)

The "dc=example,dc=local" part is the base name. Replace the base name based on your actual environment.

2. Copy ROROpenLDAP.ldif to the work directory on the Linux system on which will operate OpenLDAP.
3. When the base name (dc=example,dc=local) in the ldif file is different from the base name (suffix) of OpenLDAP, modify the base name using an editor.
4. Modify the host name for the ldif file manager.

Change the "ManagerHostname" part to the manager host name. A host name is the name displayed using the hostname command.
5. Replace the "RcxManager" part in the ldif file using the administrative user name specified during installation of Resource Orchestrator. Replace the password at the same time.
6. Execute the ldapadd command of OpenLDAP, and import LDIF.



Example

```
>ldapadd -f ROROpenLDAP.ldif -x -D "cn=Manager,dc=example,dc=local" -w mypasswd -c <RETURN>
```

For details on the ldapadd command, refer to the OpenLDAP manual.

The following information is registered in the directory service.

- The administrative user to be specified during installation
- Role information
 - administrator (*1)

- operator(*1)
- monitor(*1)
- service_admin
- lserver_operator
- lserver_monitor
- infra_admin
- infra_operator
- Administrative information
- Resource information
- Default user group information
 - supervisor
 - Administrative

*1: Shared with ServerView Operations Manager for Windows. When registration has been completed, registration is not possible.

4. Configure the access authority for the administrative user specified during installation of Resource Orchestrator.
5. Register the user information.

Register the user information in the directory service using the directory service client function.

When the directory service has already been installed, perform additional registration when the user necessary for Resource Orchestrator operations does not exist.

Use the following object classes.

Table C.3 Object Class

Directory Service	Object Class	Attribute used for the Login user ID
Active Directory	user	cn or uid samAccountName is used when performing the Single Sign-On operation with ServerView Operations Manager
OpenDS	inetOrgPerson	cn or uid uid is used when performing the Single Sign-On operation with ServerView Operations Manager
OpenLDAP	inetOrgPerson	cn or uid

6. Register the directory service as an external authentication function of Resource Orchestrator.

To register the directory service, execute the `rcxadm authctl` command.

For details on the `rcxadm authctl` command, refer to "1.7.10 `rcxadm authctl`" in the "ServerView Resource Orchestrator Reference Guide".

Example

- When using Active Directory

```
>rcxadm authctl register -ip 192.168.1.1 -port 636 -base dc=example,dc=local -bind
cn=Administrator,cn=Users,dc=example,dc=local -method SSL -passwd mypasswd -auth ldap <RETURN>
```

- When using OpenDS

```
>rcxadm authctl register -ip 192.168.1.1 -port 1474 -base dc=fujitsu,dc=com -bind "cn=Directory Manager" -method SSL -passwd admin -auth serverview <RETURN>
```

- When using OpenLDAP

```
>rcxadm authctl register -ip 192.168.1.1 -port 636 -base dc=example,dc=local -bind cn=manager,dc=example,dc=local -method SSL -passwd mypasswd -auth ldap <RETURN>
```

7. Start the Resource Orchestrator manager.

For details on how to start the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

8. Reflect the resource information in the directory server on the resource information managed by Resource Orchestrator.

To reflect the resource information, execute the `rcxadm authctl sync` command.

For details on the `rcxadm authctl sync` command, refer to "1.7.10 rcxadm authctl" in the "ServerView Resource Orchestrator Reference Guide".

9. Create a user group.

- a. Create a user group in the following location:

`ou=ROR,ou=Usergroup,ou=SVS,dc=fujitsu,dc=com`
(replace `dc=fujitsu,dc=com` to Base DN.)

- b. Allocate an already registered user in the directory service as a member of user group.



For OpenDS or OpenLDAP, it is necessary to register more than 1 user group member when creating a user group.

10. Configure roles for users.

Configure roles for users. Here, an example of roles is explained using the case where allocating the Monitor1 role for the scope Folder1 to the user `myuser001` in the Active Directory.

- a. Display the [Active Directory Users and Computers] window from "Administrative Tools" of the Windows Control Panel.
- b. Extract the `SVS(ou=SVS,dc=example,dc=local)` tree, and then expand Departments - ROR - Manager Host Name, which is the lower hierarchy of the manager host name.
- c. In the lower hierarchy of the orchestration tree, there is a "Folder1" which indicates the resource Folder1. In the next lower hierarchy, there is a user group entry named "AuthorizationRoles".
- d. In the lower hierarchy of "AuthorizationRoles", create a user group entry named "monitor". Specify a unique value for the group name.
- e. Configure the user `"cn=myuser001,cn=Users,dc=example,dc=local"` as this member.
To configure roles for a user group, configure the user group using this procedure.

C.4.2 Operation Method

This section explains the operation method of user management using the directory service.

Users cannot be managed using the `rcxadm user` command, the `rcxadm usergroup` command, or the RC console.

It is necessary to add or change users or entries on the directory service side.

For details on adding, modifying, deleting, or referring to entries, refer to the documentation of the directory services.

Login

Users can only log in when there are users roles and access scopes are allocated in Resource Orchestrator, and the user information is in the directory service.

Add a user

Use the following procedure to add a user:

1. In the directory service, add a user.
2. After adding a user to the directory service, it is necessary to add the user to the user group and allocate a role. Refer to "[Changing roles of users and user groups](#)".

Change the user password

Use the directory service client function to change the password.

The user password cannot be changed using the `rcxadm user` command or the RC console.

Modify a user name

Use the following procedure to change the user name.

1. In the directory service, modify the user name (DN).
2. When using OpenDS or OpenLDAP, the following operations are necessary:
Change the name of the member (value of member attribute) of the user group that the user to be changed belongs to, and the user group of roles which the user to be changed belongs to.

Delete a user

Use the following procedure to delete a user:

1. In the directory service, delete a user.
2. When using OpenDS or OpenLDAP, the following operations are necessary:
Delete the relevant user from the user group that the user to be deleted belongs to, and the user group which the user to be deleted belongs to.

Create, modify, and delete user groups

Create a user group under the following entries in the tree of the directory service.

```
ou=ROR,ou=Usergroups,ou=SVS,dc=example,dc=local
```

The "`dc=example,dc=local`" part is the base name. Replace the base name based on your actual environment.

Create a user group directly under the entry above using the directory service client function.



Note

- The user group is a different user group from "Users" in the directory service.
- For OpenDS or OpenLDAP, it is necessary to register more than 1 user group member when creating a user group.

View a user group

Check the following entries of the `ldif` file using the client functions of directory services.

```
ou=ROR,ou=Usergroups,ou=SVS,dc=example,dc=local
```

Replace the base name based on your actual environment.

Changing roles of users and user groups

Confirm the following entries.

```
cn=Role_name,ou=AuthorizationRoles,ou=Resource_name,ou=Manager_host_name,ou=ROR,ou=Departments,ou=SVS,dc=example,dc=local
```

When the resource name is in the hierarchy of resource folders, the base name is as follows:

```
ou=AuthorizationRoles,ou=Resource_name,ou=SecondFolder,ou=TopFolder,ou=OrchestrationTree,ou=Manager_host_name,ou=ROR,ou=Departments,ou=SVS,dc=example,dc=local
```

Replace the base name based on your actual environment.

Under this ou=AuthorizationRoles, create a role name if there are no groups for the role name to allocate.

Create a role name using one of the following role names for the RDN.

- cn=supervisor
- cn=adminiator
- cn=operator
- cn=monitor
- cn=service_admin
- cn=lserver_operator
- cn=lserver_monitor
- cn=infra_admin
- cn=infra_operator

Specify the Distinguished Name (DN) of users or user groups, as members (member attribute values) of the role for allocation.



Example

When allocating the user group "myoperator" as an operator role to /TopFolder

1. Under the following entries, confirm if a user group entry called operator" exists.

```
ou=AuthorizationRoles,ou=TopFolder,ou=OrchestrationTree,ou=MyMgrHost,ou=ROR,ou=Departments,ou=SVS,dc=example,dc=local
```

2. Create a user group using the RDN "cn=operator" under the entries created in step 1.

- The ldif file when using Active Directory

```
cn=operator,  
ou=AuthorizationRoles,ou=TopFolder,ou=OrchestrationTree,ou=MyMgrHost,ou=ROR,ou=Departments,ou=SVS,dc=example,dc=local  
changetype: add  
objectclass: top  
objectclass: group  
cn: operator  
instancetype: 4
```

```
groupType: 2
member: cn=myoperator,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local
```

- The ldif file when using OpenDS or OpenLDAP

```
cn=operator,
ou=AuthorizationRoles,ou=TopFolder,ou=OrchestrationTree,ou=MyMgrHost,ou=ROR,ou=Departments,
ou=SVS,dc=example,dc=local
changetype: add
objectclass: top
objectclass: groupofnames
cn: operator
member: cn=myoperator,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local
```

C.4.3 User information maintenance

This section explains how to maintain user information.

User information backup

Back up the user information as an ldif file, using the export function of the directory service.

User information restoration

Restore the user information as an ldif file, using the import function of the directory service.

Change the password for the directory service administrative user

Change the password for the directory service administrative user using the following procedure.

1. Change the administrative password for the directory service.
2. Execute the `rcxadm authctl modify` command to change the administrative user password of the directory service to be retained as the connection information.

Switchover to an Internal Authentication Function, when Stopping the Directory Service due to an Error

When the directory service is stopped due to an error, use the following procedure to perform switchover to the internal authentication function, and restoration.

1. Stop the Resource Orchestrator manager.
For details on how to stop the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".
2. The directory service registration is released.
Execute the `rcxadm authctl unregister` command to unregister the directory service.
For details on the command, refer to "1.7.10 rcxadm authctl" in the "ServerView Resource Orchestrator Reference Guide".
3. Start the Resource Orchestrator manager.
For details on how to start the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".
4. The directory service is restored.
5. Stop the Resource Orchestrator manager.
For details on how to stop the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

6. The directory service is registered.

Execute the `rcxadm authctl register` command to register the directory service.

For details on the command, refer to "1.7.10 `rcxadm authctl`" in the "ServerView Resource Orchestrator Reference Guide".

7. Start the Resource Orchestrator manager.

For details on how to start the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

Restoration When Resource Orchestrator Stops due to an Error

Use the following procedure to perform restoration after Resource Orchestrator stops due to an error:

1. Restore the backup data of Resource Orchestrator.

For details on how to restore, refer to "[Appendix E Backup and Restoration of Admin Servers](#)".

2. Start the Resource Orchestrator manager.

For details on how to start the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

C.4.4 Shift Information from the Internal Authentication Function to Directory Service

This section explains the method for shifting to user management from internal authentication function using the directory service.

Shifting to Active Directory

1. When using SSL encrypted communication between Active Directory and the manager, create an SSL communication environment. An SSL communication environment is necessary to register user information using the `ldifde` command of Active Directory. An SSL certification environment is also necessary for performing Single Sign-On operations with ServerView Operations Manager.

For details on how to import the server certificates of Active Directory, refer to "H.3 Single Sign-On" in the "ServerView Resource Coordinator VE Setup Guide".

2. Modify the `ldif` file defining the initial resource information and the standard roles of Resource Orchestrator, based on your actual environment. The `ldif` file is stored in the installation media or in the following location:

[Windows]

`Installation_folder\Manager\etc\files`

[Linux]

`/etc/opt/FJSVrcvnr/files`

The `ldif` file of the Active Directory is "RORActiveDirectory.ldif".

- a. Change the base name part in `ldif` file to match the name of the Active Directory.
 - b. Change the "ManagerHostname" part to the manager host name. A host name is the name displayed using the `hostname` command.
 - c. Delete the entry of `RcxManager(cn=RcxManager,cn=users,dc=example,dc=local)` and the group it belongs to (`cn=Administrative,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local`).
3. Export the user information from the internal authentication function in LDIF format.

Example

```
>rcxadm user list -format ldif > myusers.ldif<RETURN>
>rcxadm usergroup list -format ldif > myusergroups.ldif<RETURN>
```

4. For Active Directory, modify the Ldif file for the user and user group information exported in step 3.
 - a. Change the base name part of each entry to match the name of the Active Directory.
 - b. Change the role names specified for "ou=AuthorizationRoles".

Table C.4 Role Name Modification

Before	After
admin	administrator
lserver_admin	service_admin

Change the role names for the dn and the cn attribute values.

- c. Check that a hyphen ("-") and blank line have been added between two entries (the entry in which "changetype: modify" is specified under dn). If they have not been added, please add them.
5. Use the ldifde command to register the Ldif file modified in step 2. in Active Directory.

Example

```
>ldifde -i -e -k -t 636 -f RORActiveDirectory.ldif <RETURN>
```

For details on the ldifde command, refer to the documentation of Active Directory.

6. Stop the Resource Orchestrator manager.

For details on how to stop the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".
7. Register the Active Directory as an external authentication function of Resource Orchestrator.

Example

```
>rcxadm authctl register -ip 192.168.1.1 -port 636 -base dc=example,dc=local -bind
cn=Administrator,cn=Users,dc=example,dc=local -method SSL -passwd mypasswd -auth ldap <RETURN>
```

8. Start the Resource Orchestrator manager.

For details on how to start the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".
9. Reflect the resource information in the directory server on the resource information managed by Resource Orchestrator.

To reflect the resource information, execute the rcxadm authctl sync command. For details on the command, refer to "1.7.10 rcxadm authctl" in the "ServerView Resource Orchestrator Reference Guide".
10. Use the ldifde command in Active Directory to register the Ldif file modified in steps 3. to 4.

Example

```
>ldifde -i -e -k -t 636 -f myusers.ldif <RETURN>
>ldifde -i -e -k -t 636 -f myusergroups.ldif <RETURN>
```

The initial password for each user type is as follows.

Table C.5 Default Passwords

Users	Default Passwords
Privileged user of product	rcxman@123
General user	rcxuser@123

11. Modify the user password registered in step 10. to the appropriate values.
12. When performing Single Sign-On operations with ServerView Operations Manager, user definitions are necessary for ServerView Operations Manager. For details on how to add user definitions for ServerView Operations Manager, perform settings for Single Sign-On referring to the following manual:
 - "Integrating ServerView user management into Microsoft Active Directory" of the "ServerView Suite User Management in ServerView"

Shifting to OpenDS or OpenLDAP

1. Import the SSL certificate.
 - When using OpenDS

Refer to "H.3 Single Sign-On" of the "ServerView Resource Coordinator VE Setup Guide".
 - When using OpenLDAP

Import the OpenLDAP server certificate. Configure the SSL certificate if necessary.

Example

[Windows]

```
>"Installation_folder\Manager\runtime\jre6\bin\keytool.exe" -importcert -alias ror_ldap -trustcacerts -file Certificate_path -keystore "Insatallation_folder\Manager\runtime\jre6\lib\security\cacerts" <RETURN>
```

[Linux]

```
# /opt/FJSVrcvmr/runtime/jre6/bin/keytool -importcert -alias ror_ldap -trustcacerts -file Certificate_path -keystore /opt/FJSVrcvmr/runtime/jre6/lib/security/cacerts <RETURN>
```

2. Modify the ldif file defining the initial resource information and the standard roles of Resource Orchestrator, based on your actual environment. The ldif file is stored in the installation media or in the following location:

[Windows]

Installation_folder\Manager\etc\files

[Linux]

/etc/opt/FJSVrcvmr/files

Check the necessary ldif file, referring to the following list.

Table C.6 Idif File Modification

Directory Service	ldif File
OpenDS	ROROpenDS.ldif
OpenLDAP	ROROpenLDAP.ldif

- a. Modify the base name part of the ldif file to match the base name of the directory service.
 - b. Change the "ManagerHostname" part to the manager host name. A host name is the name displayed using the hostname command.
 - c. Delete the entry of RcxManager(cn=RcxManager,ou=users,dc=example,dc=local) and its belonging group (cn=Administrative,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local).
3. Export the user and user group information from the internal authentication function in LDIF format.

Example


```
>rcxadm user list -format ldif> myusers.ldif <RETURN>
>rcxadm usergroup list -format ldif> myusergroups.ldif <RETURN>
```

The ldif file for Active Directory is output.

4. For OpenDS or OpenLDAP, modify the ldif file for the user information exported in step 3.
 - a. Modify the base part in each entry to match the base name of the directory service.

The OpenDS base name is "dc=fujitsu,dc=com", if it has not been changed after installation of ServerView Operations Manager.
 - b. Delete the following attributes:
 - samAccountName
 - userAccountControl
 - unicodePwd
 - instanceType
 - groupType
 - c. Add the following attributes to the user entry:
 - sn
 - uid (Set the same values as cn attributes.)
 - userPassword
 - d. Modify the values of the objectclass attribute.
 - Modify "user" to "inetOrgPerson".
 - Modify "group" to "groupofnames".
 - e. Modify "cn=Users" of "cn=User name,cn=Users,dc=fujitsu,dc=com" to "ou=Users".
 - f. Modify the two entries that include the same role name.

In each user entry, the dn of role name including "ou=AuthorizationRoles" is described in the sequence of two blocks. Add "member: cn=nil" to the bottom of the first block.
 - g. Change the name, when the first parts of role names before "ou=AuthorizationRoles" are as follows:

Table C.7 Role Name Modification

Before	After
admin	administrator
lserver_admin	service_admin

Change the role names for the dn and the cn attribute values.



Example

- Initial Settings (The Active Directory ldif file)

```
# User
dn: cn=user01,cn=Users,dc=example,dc=local # Change cn=Users to ou=Users.
changetype: add
objectclass: user # objectclass: Change to inetOrgPerson.
cn: user01
samAccountName: user01 # Delete this line.
userAccountControl: 512 # Delete this line.
```

```

unicodePwd:: IgByAGMAeAB1AHMAZQByAEAAMQAYADMAIgA=          # Delete this line.
                                                         #Add sn,uid, and userPassword Add an attribute.

# Roles
dn:
cn=admin,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,
dc=example,dc=local # Change admin to administrator.
changetype: add
objectclass: group          # Change to objectclass: groupofnames.
cn= admin                  # Change to Administrator.
samAccountName: admin      # Delete this line.
instanceType: 4           # Delete this line.
groupType: 2              # Delete this line.
                           # Add "member: cn=nil".
dn:
cn=admin,
ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,dc=example,dc=local
changetype: modify
add: member
member: cn=user01,cn=Users,dc=example,dc=local # Change cn=Users to ou=Users.

```

- Edited Settings (The ldif file for OpenDS and OpenLDAP)

```

# User
dn: cn=user01,ou=Users,dc=example,dc=local
changetype: add
objectclass: inetOrgPerson
cn: user01
sn: user01
uid: user01
userPassword: mypassword

# Roles
dn:
cn=administrator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,dc=example,dc=local
changetype: add
objectclass: groupofnames
cn: administrator
member: cn=nil

dn:
cn=administrator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,dc=example,dc=local
changetype: modify
add: member
member: cn=user01,ou=Users,dc=example,dc=local

```

-
5. For OpenDS or OpenLDAP, modify the ldif file for the user group information exported in step 3.

- a. Modify the base part in each entry to match the base name of the directory service.

The OpenDS base name is "dc=fujitsu,dc=com", if it has not been changed after installation of ServerView Operations Manager.

- b. Delete the following attributes:

- samAccountName
- instanceType
- groupType

- c. Modify the values of the objectclass attribute.
 - Modify "group" to "groupofnames".
- d. Change the value "cn=Users" of "cn=User name,cn=Users,dc=example,dc=local" of the member attribute to "ou=Users".
- e. Modify the two entries that include the same user group name.

In each user group entry, the dn is described in the sequence of two blocks. Add "member: cn=nil" to the bottom of the first block.
- f. Modify the two entries that include the same role name.

In each user group entry, the dn of role name including "ou=AuthorizationRoles" is described in the sequence of two blocks. Add "member: cn=nil" to the bottom of the first block.
- g. Change the role names specified for "ou=AuthorizationRoles".

Table C.8 Role Name Modification

Before	After
admin	administrator
lserver_admin	service_admin

Change the role names for the dn and the cn attribute values.



Example

- Initial Settings (The Active Directory Idif file)

```
# UserGroup
dn: cn=group01,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local
changetype: add
objectclass: group # Change to objectclass: groupofnames.
cn: group01
samAccountName: group01 # Delete this line.
instanceType: 4 # Delete this line.
groupType: 2 # Delete this line.
# Add "member: cn=nil".

dn: cn=group01,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local
changetype: modify
add: member
member: cn=user01,cn=Users,dc=example,dc=local # Change cn=Users to ou=Users.
member: cn=user02,cn=Users,dc=example,dc=local # Change cn=Users to ou=Users.

# Roles
dn: cn=admin,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,
dc=example,dc=local # Change admin to administrator.
changetype: add
objectclass: group # Change to objectclass: groupofnames.
cn= admin # Change admin to administrator.
instanceType: 4 # Delete this line.
groupType: 2 # Delete this line.
# Add "member: cn=nil".
dn: cn=admin,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,
dc=example,dc=local # Delete this line.
changetype: modify
add: member
member: cn=group01,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local
```

- Edited Settings (The Idif file for OpenDS and OpenLDAP)

```

# UserGroup
dn: cn=group01,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local
changetype: add
objectclass: groupofnames
cn: group01
member: cn=nil

dn: cn=group01,ou=ROR,ou=UserGroups,ou=SVS,dc=example,dc=local
changetype: modify
add: member
member: cn=user01,ou=Users,dc=example,dc=local
member: cn=user02,ou=Users,dc=example,dc=local

# Roles
dn:
cn=administrator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,dc=example,dc=local
changetype: add
objectclass: groupofnames
cn: administrator
member: cn=nil

dn:
cn=administrator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=SVS,dc=example,dc=local
changetype: modify
add: member
member: cn=user01,ou=ROR,ou=Users,dc=example,dc=local

```

6. Register the Idif file modified in 2. in the directory service, using the directory service client function.

For details on commands, refer to the document of each directory service.

[Windows]

```
>"OpenDS_installation_folder\bat\ldapmodify.bat" -p Port_number -f Idif_file -D Administrator_user_DN -w Password <RETURN>
```

[Linux]

```
# "OpenDS_installation_folder/bin/ldapmodify" -p Port_number -f Idif_file -D Administrator_user_DN -w Password <RETURN>
```

Example

- When using OpenDS

```
>"C:\Program Files\Fujitsu\ServerView Suite\opens\bat\ldapmodify.bat" -p 1473 -f ROROpenDS.ldif -D "cn=Directory Manager" -w admin -c <RETURN>
```

- When using OpenLDAP

```
>ldapadd -f ROROpenLDAP.ldif -x -D "cn=Manager,dc=example,dc=local" -w passwd <RETURN>
```

7. Stop the Resource Orchestrator manager.

For details on how to stop the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

8. Register OpenDS or OpenLDAP as an external authentication function of Resource Orchestrator.

Example

- When using OpenDS

```
>rcxadm authctl register -ip 192.168.1.1 -port 1474 -base dc=fujitsu,dc=com -bind "cn=Directory Manager"
-method SSL -passwd admin -auth serverview <RETURN>
```

- When using OpenLDAP

```
>rcxadm authctl register -ip 192.168.1.1 -port 636 -base dc=example,dc=local -bind
cn=manager,dc=example,dc=local -method SSL -passwd mypasswd -auth ldap <RETURN>
```

9. Start the Resource Orchestrator manager.

For details on how to start the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

10. Reflect the resource information in the directory server on the resource information managed by Resource Orchestrator.

To reflect the resource information, execute the rcxadm authctl sync command.

For details on the command, refer to "1.7.10 rcxadm authctl" in the "ServerView Resource Orchestrator Reference Guide".

11. Register the ldif files modified in steps 3 - 5 in the directory service using the directory service client function.

For details on commands, refer to the document of each directory service.

[Windows]

```
>"OpenDS_installation_folder\bat\ldapmodify.bat" -p Port_number -f ldif_file -D Administrator_user_DN -w Password
<RETURN>
```

[Linux]

```
>"OpenDS_installation_folder/bin/ldapmodify" -p Port_number -f ldif_file -D Administrator_user_DN -w Password
<RETURN>
```

Example

- When using OpenDS

```
>"C:\Program Files\Fujitsu\ServerView Suite\opens\bat\ldapmodify.bat" -p 1473 -f myusers.ldif -D
"cn=Directory Manager" -w admin -c <RETURN>
>"C:\Program Files\Fujitsu\ServerView Suite\opens\bat\ldapmodify.bat" -p 1473 -f myusergroup.ldif -D
"cn=Directory Manager" -w admin -c <RETURN>
```

- When using OpenLDAP

```
>ldapadd -f myusers.ldif -x -D "cn=Manager,dc=example,dc=local" -w passwd<RETURN>
>ldapadd -f myusergroups.ldif -x -D "cn=Manager,dc=example,dc=local" -w passwd<RETURN>
```

12. For OpenDS, when performing Single Sign-On operations with ServerView Operations Manager, specify users who are already defined in ServerView Operations Manager as the user information of Resource Orchestrator.

An example ldif file is given below.

Example

```
dn:
cn=administrator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=Departments,
ou=SVS,dc=fujitsu,dc=com

changetype: add
objectclass: top
objectclass: groupofnames
cn: administrator
member: cn=ServerView Administrator,ou=users,dc=fujitsu,dc=com

dn:
cn=operator,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=Departments,ou=SV
S,dc=fujitsu,dc=com
changetype: add
objectclass: top
objectclass: groupofnames
cn: operator
member: cn=ServerView Operator,ou=users,dc=fujitsu,dc=com

dn:
cn=monitor,ou=AuthorizationRoles,ou=OrchestrationTree,ou=myhost,ou=ROR,ou=Departments,ou=SVS
,dc=fujitsu,dc=com
changetype: add
objectclass: top
objectclass: groupofnames
cn: monitor
member: cn=ServerView Monitor,ou=users,dc=fujitsu,dc=com

dn: cn=administrators,ou=ROR,ou=UserGroups,ou=SVS,dc=fujitsu,dc=com
changetype: add
objectclass: top
objectclass: groupofnames
cn: administrators
member: cn=ServerView Administrator,ou=users,dc=fujitsu,dc=com

dn: cn=operators,ou=ROR,ou=UserGroups,ou=SVS,dc=fujitsu,dc=com
changetype: add
objectclass: top
objectclass: groupofnames
cn: operators
member: cn=ServerView Operator,ou=users,dc=fujitsu,dc=com

dn: cn=monitors,ou=ROR,ou=UserGroups,ou=SVS,dc=fujitsu,dc=com
changetype: add
objectclass: top
objectclass: groupofnames
cn: monitors
member: cn=ServerView Monitor,ou=users,dc=fujitsu,dc=com
```



When users of Resource Orchestrator log in to ServerView Operations Manager, user definitions are necessary for ServerView Operations Manager. For details on how to add user definitions for ServerView Operations Manager, perform settings for Single Sign-On referring to the following manual:

- "Integrating ServerView user management into Microsoft Active Directory" of the "ServerView Suite User Management in ServerView"

For OpenDS, perform settings for Single Sign-On referring to the setting procedure of Active Directory.

Appendix D L-Server Parameter Details

This appendix explains how to configure an L-Server allocated with server, storage, and network specifications without using an L-Server template.

Use the following procedure to create L-Servers:

1. Right-click the target resource folder in the orchestration tree, and select [Create]-[L-Server] from the popup menu. The [Create an L-Server] dialog is displayed.
2. Set the items required in each tab, and click <OK> to create the L-Server.



Each item has an upper limit. The creation of an L-Server may fail depending on the availability of resource pools, the hardware configuration, and the VM management software specifications.

[Xen]

When using RHEL5-Xen, L-Server creation cannot be performed using the RC console. Use the rcxadm lserver command.

For details on the command, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".

D.1 [General] Tab

Name

Enter a name for the L-Server.

- For virtual L-Servers

[VMware] [Hyper-V]

Enter up to 64 characters beginning with an alphabetical character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), periods ("."), and hyphens ("-").

[Xen] [Oracle VM]

Periods (".") cannot be used.

[Oracle VM]

Enter an L-Server name using 32 characters or less.



Do not enter more than 32 characters.

- For physical L-Servers

Enter up to 64 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), or hyphens ("-").

Destination folder

Select a resource folder or a tenant folder to store L-Servers.

Template

Specify "None" in the selection list.

Server type

Enter the type of server for the L-Server to be created.

When creating a physical L-Server, select "Physical". When creating a virtual L-Server, select "VM".

When "VM" is selected for the server type, select the VM type on the [Server] tab.

However, when an image is selected, Resource Orchestrator will automatically select the VM type that matches the image, so selection is not necessary when selecting the server type.

Image

Specify a cloning image to deploy. Clicking <Select> displays the [Select a Cloning Image] dialog.

Select the cloning image to deploy to the L-Server, specifying "Deploy" in "Image deployment" on the [Select a Cloning Image] dialog.

The available cloning images are displayed in the selection list.

Specifying "Do not deploy" in "Image deployment" will create an empty server without an operating system installed.

[Oracle VM]

L-Servers cannot be created with "Do not deploy" specified in "Image deployment".

Information

When a cloning image is specified, the sizes of system disks of virtual L-Servers will be changed into the size of when the cloning image was deployed.

Note

When using a Windows image for multiple languages (English/Japanese Language Pack), manually select the language version when deploying the cloning image.

Resource allocation

When creating an L-Server for which only a configuration definition exists, check the "None (Definition only)" checkbox.

When allocating resources for an L-Server for which only a configuration definition was created, refer to "[6.9.2.1 Allocating Resources](#)".

Network (NIC)

If "None" is specified in "Template", the <Add> and <Delete> buttons are displayed.

Clicking <Add> adds a network. Perform settings based on the physical server the L-Server will be located on.

Clicking <Delete> deletes the network in the last line of the list.

When "Physical" is selected for the server type, the admin LAN will be displayed in network (NIC) number 1.

When selecting a NIC other than number 1 during physical server registration, specify the correct NICs for the admin LAN or public LAN, and the network resources of the destination for connection.

When not using the public LAN, select "not connected".

[Hyper-V]

When a guest OS that Hyper-V supports is specified for the OS type, a converged network adapter will be added to VM.

When another OS has been selected, an emulated network adapter will be added.

When using a converged network adapter, it is necessary to install a virtual guest service on the guest OS.

For details on virtual guest service installation, refer to the Help of SCVMM.

When creating an L-Server or changing the configuration, a maximum of four networks (NICs) can be specified at one time. To perform addition of five or more NICs, please perform an additional configuration change.

IP addresses can be automatically configured, on the following guest OS's on which the integrated services are installed.

- Microsoft(R) Windows Server(R) 2008 R2
- Microsoft(R) Windows Server(R) 2008
- Microsoft(R) Windows Server(R) 2003 R2
- Microsoft(R) Windows Server(R) 2003
- Microsoft(R) Windows(R) 7
- Microsoft(R) Windows Vista(R)
- Microsoft(R) Windows(R) XP

[Oracle VM]

One or more networks must be defined.

Label (Optional)

Enter a label for the L-Server.

Enter up to 32 alphanumeric characters or symbols.

Comment (Optional)

Enter any comments for the L-Server.

Enter up to 256 alphanumeric characters or symbols.

D.2 [Server] Tab

The entry parameters on the [Server] tab change based on whether "Physical" or "VM" is selected for the server type on the [General] tab.



When creating an L-Server with the "Automatic (when powered off)" checkbox of Release when powered off on the [General] tab selected (and without selecting the "None (Definition only)" checkbox of Resource allocation), the status of the L-Server is the following:

Physical L-Server: All resources are allocated (allocated)

Virtual L-Server: No servers are allocated (preserved)

D.2.1 When "Physical" is Selected for [Server type]

Model

Enter the name of the model to allocate to the L-Server.

Specifications

The specifications of the physical server are displayed.

When "Automatic" or "Pool" is selected for "Physical server", a hyphen ("-") will be displayed in each parameter.

Physical server

Select the physical server to allocate to the L-Server.

Clicking <Select> displays the [Select a Server Resource] dialog.

Select one of "Automatic", "Pool", or "Server" in "Resource type".

The default is "Automatic".

- When "Pool" is selected

A list of server pools which can be selected is displayed.

In the server pool list, the server pool name and the number of servers (unused/total) are displayed.

Select the server pool from the server pool list.

- When "Server" is selected

The list of the physical servers that can be selected is displayed.

In the physical server list, server names, model names, CPU performance, memory size, and NIC numbers are displayed.

Select the physical server to use from the physical server list.

When creating an L-Server for which only a configuration definition has been created, a physical server not allocated to the L-Server can be selected from the list.

When the "Currently unusable" checkbox is checked, failed physical servers and physical servers that have inconsistencies in their admin LAN network configurations are displayed in the list.

When the "Busy" checkbox is checked, the following physical servers are displayed in the list:

- Physical servers already allocated to other L-Servers
- Physical servers already assigned as spare servers
- Physical servers with an OS installed

Note

Depending on the settings for admin LAN network resources, the [Select a Server Resource] dialog will display the following information.

- When admin LAN network resources are unset

Depending on the selected physical server or the server pool, admin LAN network resources are automatically set.

For details on the resources automatically set, refer to the [General] tab or the [Network] tab.

- When admin LAN network resources have been set

Physical servers or server pools matching the admin LAN network settings that are set on the [General] tab or the [Network] tab are displayed.

When not filtering resources using admin LAN network settings, open the [Select a Server Resource] dialog after deleting the settings.

Resource release

Specify whether or not to release the physical server allocated to the L-Server when the power is turned off.

If the "Automatic (when powered off)" checkbox is checked, the server is released when the power is turned off.

Note

When resources of the same servers are shared due to a change in usage, make sure to set "Resource release" for the L-Server they are allocated to.

When the server resources are allocated to the L-Server for which "Resource release" is not configured, the server resources cannot be shared.

Boot Location

Enter whether the physical location of the server to allocate to the L-Server can be changed.

When unselecting the "Automatic (when powered off)" checkbox of "Resource release", the location will be "Fixed".

- Fixed

Starts the L-Server on the same physical server that was operated last time.

- Relocate at startup

Automatically selects the optimal physical server when the L-Server is started.

Even when "Physical server" is specified, the L-Server may operate on a separate physical server from the second time it is started.

Server Recovery

Specify the server redundancy to allocate to the L-Server. To enable redundancy, select the "HA" checkbox.

When selecting the "HA" checkbox, the "Use a low spec server" checkbox of "Spare server specs", and <Select> of "Spare server pool" will be enabled.

Spare server specs

This section specifies the selection method of spare server.

When the "Use a low spec server" checkbox is selected, physical servers with models matching that in the L-Server definition are selected as spare servers.

For details on how to select a spare server, refer to "[I.1.1 L-Server High Availability](#)".

Spare server pool

Select the spare server pool.

Clicking <Select> displays the [Select a Server Resource] dialog.

Specify the server pool that the physical server to use for automatic switchover is registered in.

When a problem occurs on the physical server, recovery is performed by automatically switching to another physical server in the same resource pool that is operating normally.

For details on how to perform switchover to spare servers, refer to "[I.1.1 L-Server High Availability](#)".

Address pool (WWN / MAC)

Select an address pool.

Clicking <Select> displays the [Select an Address Resource] dialog.

Select "Automatic" or "Pool". The default is "Automatic".

When selecting "Pool", select from the registered address pool.

Specify the virtual WWN obtained from the I/O Virtualization Option and the address pool of the registered MAC address.

VIOM will be used for blades, and HBA address rename for rack mount servers.

Startup priority

With L-Servers, when performing batch power operations in a resource folder or a tenant folder, configure the priority for the L-Server.

Set a number between 1 and 256. Smaller values indicate higher priority. If omitted, "128" is set.

When not performing batch power operations, check the "Exclude from batch power operations" checkbox.

Boot mode

Specify the L-Server boot method.

- Default

Specify this mode when performing the boot from the disk connected to the L-Server.

- NIC for PXE boot

Specify this mode when performing the network boot using PXE (Preboot eXecution Environment).

- Network for PXE boot

Select the network resource for PXE boot, from the network resources defined in the L-Server.



Note

PXE boot is unavailable on networks that use tagged VLAN settings.

For network boot, select network resources for which tags are not configured.

When performing a network boot on the admin LAN

When the DHCP service used by the PXE boot server is configured to receive DHCP requests from other clients, the following functions cannot be used.

- Backup and Restore
- Creation of a physical L-Server with images selected
- Deployment and collection of cloning images

D.2.2 When "VM" is Selected for [Server type]

VM type

Select the VM type for the L-Server to be created.

It is not necessary to specify this when deploying an image, because the VM type of the image is used.

Number of CPUs

Enter the number of server CPUs to allocate to the L-Server. Enter an integer between 1 and 8.

[Oracle VM]

The range that can be entered differs depending on the OS type of VM guests.

- Windows

An integer between 1 and 8

- Linux

An integer between 1 and 32

[Hyper-V]

Enter an integer between 1 and 4.

CPU performance

Enter the server CPU speed to allocate to the L-Server. Enter a number with up to one decimal place, in units of gigahertz. A number between 0.1 and 8 can be specified.

The value entered here is used to determine the CPU ratio to allocate to the L-Server out of the clock speed of the physical CPU of the VM host. If VM hosts with different types of physical CPUs are registered in the VM pool, the actual processing performance may differ according to the allocated VM host.

[VMware]

For VM guests on VMware, set the CPU performance for the limit value and 0 for the reserved value.



Information

For details on limit values and reserved values of CPUs, refer to the "vSphere Resource Management Guide" of VMware.

Refer to the relevant version of document, referring to the following URL:

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

[Hyper-V]

CPU performance is realized through the resource settings of VM guests and VM hosts.

When the SCVMM management console or a Hyper-V manager is used to change the resource reservation of a VM guest or VM host, there is a chance that the creation or starting of VM guests may fail, or the expected performance may not be obtained.

Please do not change VM guest and VM host resource reservations when L-Servers have been created.

[Oracle VM]

Specify the size within the range of 0.3 to *the resource size of the hardware on which the VM hosts operate*.

Memory

Enter the memory capacity to allocate to the L-Server. Enter a number with up to one decimal place, in units of gigabytes. A number between 0.1 and 255 can be specified.

[VMware]

For VM guests on VMware, set memory size for the limit and reserved values.

[Oracle VM]

The size of resources of hardware where VM hosts operate can be specified.

Information

For details on limit values and reserved values of CPUs, refer to the "vSphere Resource Management Guide" of VMware.

Refer to the relevant version of document, referring to the following URL:

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

OS

Specify the type of operating system to allocate to the L-Server. It is not necessary to specify this when deploying an image, because the OS type of the image is used. The OS type can be changed after the OS installation.

[Hyper-V]

If an unsupported OS type is specified, there is a chance that installation may fail or the OS of the VM guest may not operate correctly. Additionally, if an incorrect OS type is specified, there is a chance that image collection or L-Server creation for a specified image may fail, and a guest OS may start but hang while awaiting entry. This occurs because Microsoft's Sysprep cannot be processed correctly during personalization processing.

The OS types displayed in the list are the guest OS's which can be specified on the SCVMM management console.

Resource Orchestrator displays all guest OS's in the list in order not to limit user selection, however this does not mean that all guest OS's are supported by SCVMM.

Hyper-V does not support some server type settings such as number of CPUs depending on the OS type. When an incorrect OS type and server type are selected, operation is not guaranteed.

Additionally, even when a service pack is not listed in the OS type list, it may be necessary to install the service pack.

When a guest OS that Hyper-V supports is specified for the OS type, a converged network adapter will be added to VM.

When a different OS has been selected, an emulated network adapter will be added.

For details on the guest OS's supported by SCVMM, refer to the Help of SCVMM.

For details on the guest OS's supported by Hyper-V, refer to the following Microsoft web site.

Microsoft web site

URL: <http://www.microsoft.com/windowsserver2008/en/us/hyperv-supported-guest-os.aspx> (As of July 2011)

[Oracle VM]

The OS type cannot be changed.

VM host (Optional)

Individually specify the resources to allocate to the L-Server.

Clicking <Select> displays the [Select a VM host] dialog.

Specify a VM host or VM pool. If you do not specify a VM host or VM pool, a VM host that can create an L-Server is automatically searched for from the VM pool. If there are multiple VM pools, the VM host is searched for, beginning with the VM pool with the highest priority.

Resource release

Specify whether add the CPU and memory of the VM guests allocated to the L-Server to the total of the VM pool, when the power of the L-Server is OFF.

When the "Automatic (when powered off)" checkbox is checked, the CPU and memory of VM guests allocated to L-Servers cannot be calculated as the total usage amount of VM pools.

Boot Location

Enter whether the physical location of the server to allocate to the L-Server can be changed.

- Fixed

Starts the L-Server on the same VM host that operated last time. Move the L-Server between servers to start it on a separate VM host.

- Relocate at startup

Automatically selects the optimal VM host when the L-Server is started. When "VM host" is specified, select VM hosts from the range.

Server Recovery

Specify the server redundancy to allocate to the L-Server. To enable redundancy, select the "HA" checkbox.

The following operations are performed if you select the "HA" checkbox.

[VMware] [Oracle VM]

Selecting the "HA" checkbox locates the HA function on an enabled VM host.

When there is no VM host for which the HA function has been enabled, the L-Server cannot be started.

When a problem occurs on the physical server that the VM host is operating on, the virtual machine can be recovered by restarting it on a VM host that is operating normally.

If the "HA" checkbox is not selected, the HA function will be preferentially located on a disabled VM host.

Even if the "HA" checkbox is not selected, the HA function will place a VM guest on an enabled VM host in the following cases:

- The HA function is not located on a disabled VM host
- There is no available CPU or memory

If the HA function is located on an enabled VM host, the HA function of the server virtualization software will be enabled.

[Hyper-V]

In Hyper-V environments this setting is ignored, and VM guests are always located on clustered VM hosts.

Exclusion

Enter when not operating the virtual machine on the same VM host as another virtual machine.

For example, when performing load-balanced work using multiple virtual machines, you can set exclusive operation to ensure that the work continues in a degenerate state because only one virtual machine stops when a physical server fails. Specify an L-Server name or resource folder name that you have operating privileges for.

The virtual machine of the specified L-Server is allocated to different physical servers.

If you specify a resource folder name, one's own L-Server can be included in the resource folder. In the following cases, the L-Server may be allocated to the same physical server, regardless of whether exclusive operation is specified:

- If no other VM hosts that meet the conditions for exclusive operation can be found, such as when there are no VM hosts in the VM pool that have enough free space to install an L-Server
- If the HA function or automatic re-installation function (examples: VMware HA or VMware DRS) of the VM product is enabled



Note

When an operation that puts a resource that has been configured for exclusive operation outside the access scope of users, the name of the resource will only be displayed on the screen for changing specifications or definitions.

Startup priority

With L-Servers, when performing batch power operations in a resource folder or a tenant folder, configure the priority for the L-Server.

Set a number between 1 and 256. Smaller values indicate higher priority. If omitted, "128" is set.

When not performing batch power operations, check the "Exclude from batch power operations" checkbox.

D.3 [Disk] Tab

The entry parameters on the [Disk] tab change based on whether "Physical" or "VM" is selected for the server type on the [General] tab.

D.3.1 When "Physical" is Selected for [Server type]

Disk type

Select a disk type.

- SAN

Select when using SAN storage.

- iSCSI

Select when using iSCSI storage.

Disks

Clicking <Add> displays the [Disk Definitions] dialog.

Specify the following items for each disk:

Size

Enter a number with up to one decimal place, in units of gigabytes. Values of 0.1 or larger can be specified.

Share

Specify whether the disk is shared between multiple L-Servers or it is restricted to a single L-Server.

- Do not share

Specify when restricting it to one L-Server.

- Share

Specify when sharing the disk between multiple L-Servers.



System disks cannot be shared.

Resource type

Specify the disk to allocate to the L-Server.

Select from the following items.

- Automatic

Select a suitable virtual storage resource from those registered in the appropriate storage pool. Create the specified size of disk resources, and allocate them to the L-Server. Set "Automatic" for the default value.

- Storage pool

Select a virtual storage resource registered in the specified storage pool. Create the specified size of disk resources, and allocate them to the L-Server.

- Virtual storage

Displays virtual storage resources such as VMFS, RAID groups or aggregates as a list.

Select from the displayed virtual storage resources.

Create the specified size of disk resources from the specified virtual storage resource, and allocate them to the L-Server.

- Disk

Assign the LUN created in advance to the L-Server.

When specifying search conditions, the relevant disk resource list is displayed.

Select from the displayed disk resources.

The specified disk resources are allocated to the L-Server.

Search conditions

Storage pool

Select the storage pool of the storage destination of the disk resource.

Search size

Enter the lowest value of the disk size to be searched as a number with up to one decimal place, in units of gigabytes.

Allocation/Shared status

Specify the status to allocate to the L-Server. Specify the status, when selecting Shared for the shared settings.

- Unallocated

Specify when selecting a disk resource which is not allocated to another L-Server.

- Shared disk

Specify a disk resource for which is configured to share is set for the other L-Server.

Allocated L-Server

Specify when a shared configuration has already been performed, and specify the disk to be shared.

D.3.2 When "VM" is Selected for [Server type]

Disks

Click <Add>, and specify the following items for each disk.

Size

Enter a number with up to one decimal place, in units of gigabytes. Values of 0.1 or larger can be specified.

[VMware] [Hyper-V]

Specify a number between 0.1 and 2048.

[Oracle VM]

Specify the size within the range of 1 to *the resource size of the hardware on which the VM hosts operate*.

Resource type

Select virtual storage from the resource pool to create the disk resource.

[Hyper-V]

When creating an L-Server or changing the configuration, a maximum of four disks can be specified at one time.

To perform addition of five or more disks, please perform an additional configuration change.

[Oracle VM]

The total size of resources is not displayed for the virtual storage in the resource list.

D.4 [Network] Tab

The entry parameters on the [Network] tab change based on whether "Physical" or "VM" is selected for the server type on the [General] tab.

D.4.1 When "Physical" is Selected for [Server type]

Specify the following items.

NIC

Configure the NIC to connect.

Clicking <Modify> displays the [NIC Definitions] dialog.

If <OK> is clicked while a network resource is selected, the network resource to connect is displayed.

Network to connect

Select a network resource to connect.

IP address (Optional)

Specify the IP address to allocate to the L-Server. This should be entered for direct specification of the IP address to be allocated to the L-Server. The specified IP address will be converted to the IP address of the physical server during creation of the L-Server.

Untagged VLAN

When not configuring a VLAN, check this checkbox.

Only one VLAN can be selected in the same NIC or NIC group.

Clicking <Add> displays the [Add a NIC] dialog.

Configure the number of the network to connect with the NIC.

NIC

Select the NIC for connection from the selection list.

Setup redundant NIC

When performing NIC redundancy, check the "Setup redundant NIC" checkbox, and select another NIC pair from the list to make redundant.

Number of connecting networks

Specify the number of the network to connect with the NIC.



[Windows/Linux]

When creating a physical L-Server, even if a DNS server is specified, the IP address will not be automatically configured on the created guest OS.

The IP address and DNS server to be configured on the guest OS must either be manually configured by the user or configured using DHCP during L-Server creation.

Check the IP address to allocate to the L-Server using the GUI or a command, and configure it on the guest OS.

The IP address allocated to the L-Server can also be checked from the [Resource Details] tab of the RC console.

From the command-line, execute `rcxadm lserver show`.

For details on the `rcxadm lserver show` command, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

The IP address to be allocated to a physical L-Server must be unique. An IP address is required for each L-Server used.

D.4.2 When "VM" is Selected for [Server type]

Specify the following items.

Network to connect

Configure a network resource to connect.

Clicking <Select> displays the [Select a Network Resource] dialog.

If <OK> is clicked while a network resource is selected, the network resource to connect is displayed.

IP address (Optional)

Specify the IP address to allocate to the L-Server. To manually specify the IP address to allocate to the L-Server, enter the IP address.

DNS Server

Specify the DNS server.



Note

[Hyper-V]

IP addresses can be automatically configured, in the following guest OS's on which the integrated services are installed.

- Microsoft(R) Windows Server(R) 2008 R2
- Microsoft(R) Windows Server(R) 2008
- Microsoft(R) Windows Server(R) 2003 R2
- Microsoft(R) Windows Server(R) 2003
- Microsoft(R) Windows(R) 7
- Microsoft(R) Windows Vista(R)
- Microsoft(R) Windows(R) XP

D.5 [OS] Tab

Enter the parameters to set for the OS when creating the L-Server. This setting is valid only if an image is specified in the [General] tab.

When using an L-Server with the server type "Physical", refer to "[F.7.3 \[OS\] Tab Configuration](#)".

For virtual L-Servers, refer to "[OS] tab configuration" of "[Appendix G Configuration of Server Virtualization Software](#)".

The setting process is performed the first time the L-Server is started. If an image name is not specified, it is not necessary to enter all these items.



Information

[VMware] [Hyper-V]

OS Property Definition File

By setting the default values in an OS property definition file in advance, the default values of the information on the [OS] tab, etc. are generated when creating an L-Server. Use the UTF-8 character code for OS property definition files.

Use the OS property definition file for VM products.

It is necessary to indicate the required parameters between VM management software in the definition files.

Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvmr/customize_data

Definition File Name

The definition file name can be used by dividing into definitions that are available for each user group and definitions that are common to the system. If the key of the definition file common to the system is the same as a definition file for a user group, priority is given to the values indicated in the definition file for the user group.

- For User Groups

os_setting_user_group_name.rcxprop

- Common to System

os_setting.rcxprop

Definition File Format

In the definition file, an item to define is entered on each line. Each line is entered in the following format.

Key = Value

Definition File Items

[VMware]

Refer to "[Table G.4 List of Settings](#)" in "G.1.6 [OS] Tab Configuration".

[Hyper-V]

Refer to "[Table G.9 List of Settings](#)" in "G.2.6 [OS] Tab Configuration".

[Oracle VM]

Refer to "[G.4.6 \[OS\] Tab Configuration](#)".



Appendix E Backup and Restoration of Admin Servers

This section explains how to back up and restore the admin server.

E.1 Overview

By backing up the resources of Resource Orchestrator listed below, it is possible to restore the admin server even if files needed to boot the OS are deleted, or files of the manager are deleted from the installation folder making it impossible to boot this software, or other mistakes made by system administrators result in damage to the system.

It is recommended that you create a backup once a system using Resource Orchestrator has been configured, and after the registration, modification, or deletion of resources. By backing up those resources periodically, the environment can be restored to its previous state (when the backup was created).

E.1.1 Managed Resources and Update Timing

The resource files managed by Resource Orchestrator are as shown below:

- Configuration definition information of Resource Orchestrator (database of the Resource Orchestrator manager)
- System images and cloning images (files in the image file storage folder)

Table E.1 Backup Targets and Update Timing

Target Resources	When Setting up a System	When Backup is Necessary	Necessity of Stopping Managers	Remarks
Certificates	Yes	None	Not Required	-
Session encryption keys	Yes	After password saving (after execution of the rcxlogin -save command)	Not Required	-
System images and cloning images	Yes	After addition, deletion, and modification of Physical L-Server images	Not Required	Backup of system images and cloning images of virtual L-Servers are performed as a part of virtual machine backup operations. Perform backup operations of virtual machines using the corresponding functions of VM management software.
Configuration definition information	Yes	After creation, registration, modification, unregistration, and deletion of L-Servers and resources	Not Required	-
Information related to ServerView Deployment Manager	Yes	After addition, deletion, and modification of physical images After registration and unregistration of physical L-Servers After registration and unregistration of VM hosts	Required	Stopping and collecting from the manager is necessary.
Definition files	Yes	Modification of definition files	Not Required	-
Image management information	Yes	After rcxadm imagemgr command operations	Not Required	-

Backup operations are necessary at the timing listed in "Table E.1 Backup Targets and Update Timing", and after the following maintenance operations.

After backup, only when the following hardware configuration and configuration changes have not been performed, is it possible to perform restoration.

When performing hardware configuration or configuration changes, perform backup again.

- Replacement of a chassis, LAN switch, managed server, or power monitoring device hardware
- Replacement of the NIC of a managed server
- LAN connections between managed servers and LAN switches
- Server switchover or takeover (*1)
- Creation, deletion, and modification of physical L-Servers (*2)
- Attaching and detaching physical L-Server disks

*1: If failback has been performed after server switchover, restore can be performed.

*2: Even if the virtual L-Server has been operated after backing up of the admin server, recovery can be performed after restoring the admin server. For details, refer to "[E.4 Restoring L-Servers after Restoration of the Admin Server](#)".

Physical L-Server operations made after backup cannot be recovered. In this case, backup the admin server again.



Note

The configuration definition information managed by Resource Orchestrator is the target of backup and restore.

System images, cloning images (files in the image file storage folder), VM management software, and VM guests consisting of VM hosts and L-Servers or virtual disks are not the target of backup and restore. Perform backup and restore another way.

E.1.2 Backing Up the Admin Server

This section explains backup of the admin server.

The following two types of backup operations can be performed.

Backup after Environment Creation

After environment creation, back up all of the management information (Resource Orchestrator resources on the admin server) using the following procedure:

For details, refer to "[E.2.1 Backing Up All Management Information](#)".

1. Back up certificates and session encryption keys
2. Back up system images and cloning images
3. Backup the configuration definition information (using the backup and restore command)
4. Back up the definition files
5. Confirm image settings

Periodical Backup and the Backup of Configuration Definition Information

There are backup methods such as periodical backup operations in short intervals (such as backup performed once every hour) and backup performed repeatedly whenever the configuration definition information is updated.

For details, refer to "[E.2.2 Backing up Configuration Definition Information](#)".

E.1.3 Restoring the Admin Server

Restore backed up resources to the admin server using the following procedure:

For details, refer to "[E.3 Restoring the Admin Server](#)".

1. Reinstall the manager and restore the certificates and session encryption keys
2. Restore system images and cloning images
3. Restore the configuration definition information (using the backup and restore command)
4. Restore the definition files
5. Restore image management information

When collecting backups periodically or after registering, modifying, or deleting resources, it is not necessary to collect all resources. It is usual to back up configuration definition information. When resources other than configuration definition information are updated, collect all resources of Resource Orchestrator on the admin server.

Information

Recovery can be performed by first backing up the entire admin server disk, and then restoring it.

In clustered manager configurations, the disk shared between cluster nodes should also be backed up and restored.

When backing up Resource Orchestrator resources after backing up the entire disk of the admin server, restore the entire disk of the admin server and then perform steps 2. - 6. in "[E.3 Restoring the Admin Server](#)" and restore system images, cloning images, and configuration definition information.

E.1.4 Backup and Restore Commands

Use the backup and restore commands to perform backup and restoration of configuration definition information (the database of Resource Orchestrator manager).

The Backup and Restore commands support online backup, which is the backup of managers without stopping them.

After restoration, the status is the same as immediately after the backup operation.

For details on the command, refer to "1.8 Backup and Restoration Operations for Configuration Definition Information" in the "ServerView Resource Orchestrator Reference Guide".

Note

Execution Timing for the Backup and Restore Command

When executing the backup and restoration commands, take care regarding the following points:

- Do not back up or restore the admin server while performing creation, deletion, modification of L-Servers and resources, server switchover, failback, backup or restoration of system images, or collection or deployment of cloning images. When a periodical backup operation is performed without stopping the manager, if a conflict between the backup operation and the operations mentioned above occurs, the backup operation will be postponed until the operation is completed.
-

E.2 Backing Up the Admin Server

This section explains how to back up the admin server.

For the admin server, the following two types of backup operations can be performed.



- Backup after environment creation
For details, refer to "[E.2.1 Backing Up All Management Information](#)".
- Periodical backup and the backup of configuration definition information

There are backup methods such as periodical backup operations in short intervals (such as backup performed once every hour) and backup performed repeatedly whenever the configuration definition information is updated.

For details, refer to "[E.2.2 Backing up Configuration Definition Information](#)".

Before starting periodical backup, it is necessary to decide the following items:

Table E.2 Backup Setting Items and What to decide

Items	What to Decide
Frequency of Backing Up All Management Information	<p>Decide how often you want to back up all of the management information.</p> <p> Example</p> <p>.....</p> <p>After setting up a system</p> <p>03:00 A.M. of the 1st day of every month</p> <p>.....</p>
Frequency of Periodical Backup	<p>Specify how often you want to back up the configuration definition file.</p> <p> Example</p> <p>.....</p> <p>Once every hour</p> <p>.....</p>
Backup Destination	<p>Decide the disk on which the backup data will be stored.</p> <p>It is recommended to specify a different disk from the one that Resource Orchestrator is installed on.</p> <p>For details on the free disk space necessary for backups, refer to the notes in "E.2.1 Backing Up All Management Information".</p>

Backup Destination

The backup destination for configuration definition information can be defined beforehand. Define the following:

Storage location for the tuning parameter file

[Windows]
Installation_folder\Manager\etc\customize_data

[Linux]
 /etc/opt/FJSVrcxmr/customize_data

The name for the tuning parameter file

manager_backup.rcxprop

The format of the tuning parameter file

Set the following parameter in the tuning parameter file:

```
backup_dir=Backup_destination_folder
```

If this tuning parameter file is omitted, the backup data will be saved in the following folder:

[Windows]
Installation_folder\Manager\var\backup

[Linux]
 /var/opt/FJSVrcxmr/backup

For details, refer to "E.2.2 Backing up Configuration Definition Information".

Note

- Backup files of the admin server should be stored on external storage media to prevent the backup data from being corrupted due to server failure.

- From the second and successive backups, there are no problems even if backed up folders and configuration definition information from the last time are deleted. Delete earlier backups when disk space constraints make it necessary to do so.
- While the following operations are being performed, do not execute backup:
 - Creation, registration, modification, unregistration, and deletion of L-Servers
 - Creation, modification, and deletion of resources
 - Server switchover and failback
 - Backup and restore of system images
 - Collection and deployment of cloning images

When a periodical backup operation is performed without stopping the manager, if a conflict between the backup operation and the operations mentioned above occurs, the backup operation will be postponed until the operation is completed.

- When operating managers in cluster environments, change the names of folders to copy to those of the folders on the shared disk. For details on the folder name of the shared disk, refer to "Appendix B Manager Cluster Operation Settings and Deletion" of the "ServerView Resource Coordinator VE Installation Guide".
- When logging the operations, back up the log file referring to "5.3 Retention" in the "ServerView Resource Orchestrator Reference Guide".

E.2.1 Backing Up All Management Information

This section explains the backup operation after configuring a system using Resource Orchestrator.

1. Back up certificates and session encryption keys

Copy the folder containing the certificates to another folder.

Regarding the folder where the certificates are stored, refer to "[4.3.1 Uninstallation \[Windows\]](#)" and "[4.3.2 Uninstallation \[Linux\]](#)".

Backup of the session encryption key is only required if passwords were saved using the `-save` option of the `rcxlogin` command. This step is not required if no password has been saved, or if passwords are to be saved again after re-installation.

For details on the `rcxlogin` command, refer to "2.1 `rcxlogin`" in the "ServerView Resource Coordinator VE Command Reference".

When backing up the session encryption keys, copy the following folder to another folder.

[Windows]

`Installation_folder\Manager\rails\config\rcx_secret.key`

[Linux]

`/etc/opt/FJSVrcvnr/rails/config/rcx_secret.key`

As saved passwords are stored in the home directory of the OS user account for which the password was saved using the `rcxlogin` command, it is also recommended to back up of the contents of the home directory.

2. Back up system images and cloning images

Copy the folder used to store system images and cloning images to another folder.

For details on folders, refer to "2. Backing up system and cloning images" in "B.2 Backup" in the "ServerView Resource Coordinator VE Operation Guide".

- Back up system images

For details on how to back up system images, refer to "[6.7.2 Backup and Restore](#)".

- Collecting cloning images

For details on how to collect cloning images, refer to "[6.6 Cloning Images](#)".

3. Back up virtual machines of VM management software

For details on how to perform backup, refer to the manual of the VM management software.

4. Back up configuration definition information

Execute the following commands to write configuration definition information. Specify a directory or folder to write the configuration definition information and the version XML to.

Specify the directory or folder using `-dir`. If the specified directory or folder does not exist, an error occurs.

For details on the `rcxbackup` command, refer to "1.8.1 `rcxbackup`" in the "ServerView Resource Orchestrator Reference Guide".

[Windows]

```
Installation_folder\Manager\bin\rcxbackup
```

[Linux]

```
/opt/FJSVrcvnr/bin/rcxbackup
```

```
>rcxbackup [-dir dirname] [[-immediate]][-timeout value] <RETURN>
```

Backup files are created in the specified folder, using the following format:

Format

```
Host_name_YYYYMMDD_HHMM.jar
```

Date/Time format

YYYYMMDD indicates when the configuration definition information was backed up.

Item	Value
YYYY	Year
MMDD	Month and date
HHMM	Time

Note

- When this command is executed while Resource Orchestrator is being operated, command execution will be postponed until the operation is complete.
- The file size of backup files varies depending on the number of resources defined in the configuration definition information. The backup file for a configuration managing 1,000 VM guests requires less than 2 MB. Use this size as a guide when you prepare the file. Although this file is created as a compressed file, a decompressed file is temporarily created during the backup process. Therefore, sufficient free space for the decompressed file (e.g. approximately 150 MB for 1,000 VM guests) is necessary.

5. Back up information related to SystemcastWizard

a. Stop the manager

Stop the Resource Orchestrator manager. For details on how to stop the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

b. Back up information related to SystemcastWizard

Back up information related to SystemcastWizard.

[Windows]

Back up the following in an arbitrary folder.

Copy files and databases, and use a registry editor to export all the following keys from the registry.

Table E.3 List of Back up Targets Related to SystemcastWizard

No	Overview	Targets of backup and restoration
1	Registry (*1)	HKEY_LOCAL_MACHINE\SOFTWARE\Fujitsu\SystemcastWizard(32bitOS) HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Fujitsu \SystemcastWizard(64bitOS)
2	Databases	<i>Installation_folder</i> \ScwPro\scwdb\scwdb1.mdb <i>Installation_folder</i> \ScwPro\scwdb\scwdb1.mdw
3	DHCP configuration information file	<i>Installation_folder</i> \ScwPro\bin\ipTable.dat
4	IP address configuration file	<i>Installation_folder</i> \ScwPro\bin\localipaddress.txt
5	AWWN definition file (*2)	<i>Installation_folder</i> \ScwPro\tftp\rcbootimg\awwn_XXX.XXX.XXX.XXX.cfg(*3) <i>Installation_folder</i> \ScwPro\tftp\rcbootimg_awwn_XXX.XXX.XXX.XXX.cfg(*3)
6	BROADCAST setting file for client connection request	<i>Installation_folder</i> \ScwPro\bin\bcastaddress.txt

*1: On 64-bit OS's, redirection will be performed to Wow6432Node.

*2: No action is necessary in VIOM environments.

*3: In XXX.XXX.XXX.XXX an IP address is displayed.

[Linux]

Back up the following in an arbitrary folder.

Table E.4 List of Back up Targets Related to SystemcastWizard

No	Overview	Targets of backup and restoration
1	Configuration file	/etc/opt/FJSVscw-common/scwconf.reg
2	Databases	/var/opt/FJSVscw-deploysv/scwdb/scwdb1.db /var/opt/FJSVscw-deploysv/scwdb/scwdb2.db
3	DHCP configuration information file	/var/opt/FJSVscw-pxesv/ipTable.dat
4	Bootcfg configuration file (*1)	/etc/opt/FJSVscw-pxesv/ClientBoot/*
5	AWWN definition file (*2)	/var/opt/FJSVscw-tftpsv/tftproot/rcbootimg/awwn_XXX.XXX.XXX.XXX.cfg(*3) /var/opt/FJSVscw-tftpsv/tftproot/rcbootimg/_awwn_XXX.XXX.XXX.XXX.cfg(*3)
6	BROADCAST setting file for client connection request	/opt/FJSVscw-deploysv/sys/bcastaddress.txt

*1: All files under the directory are the target.

*2: No action is necessary in VIOM environments.

*3: In XXX.XXX.XXX.XXX an IP address is displayed.

c. Start the manager

Start the Resource Orchestrator manager. For details on how to start the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

6. Back up the definition files

The created definition files created when using Resource Orchestrator are deleted.

If the images are necessary, before uninstalling Resource Orchestrator back up (copy) the folder below to another folder.

[Windows]
Installation_folder\Manager\etc\customize_data
Installation_folder\Manager\etc\vm

[Linux]
/etc/opt/FJSVrcvnr/customize_data
/etc/opt/FJSVrcvnr/vm

7. Confirm image settings

Execute the `rcxadm imagemgr info` command to save the following image management information.

- Number of system image versions
- Number of cloning image versions
- Image file storage folder

For details on the `rcxadm imagemgr info` command, refer to "5.5 `rcxadm imagemgr`" in the "ServerView Resource Coordinator VE Command Reference".

8. Back up the directory service

When using a directory service for user management, back up the directory service.

For details on how to perform backup, refer to the manual of the directory service.

E.2.2 Backing up Configuration Definition Information

This section explains backup methods such as periodical backup operations in short intervals (Example: Backup performed every one hour) and backup performed repeatedly whenever the configuration definition information is updated.

Perform the following procedure:

1. Back up configuration definition information

Execute the following commands to write configuration definition information. Configuration definition information and the version XML are written to that directory or folder in compressed format. Specify the destination folder.

Specify the folder using `-dir`. If the specified folder does not exist, an error occurs.

For details on the `rcxbackup` command, refer to "1.8.1 `rcxbackup`" in the "ServerView Resource Orchestrator Reference Guide".

[Windows]
Installation_folder\Manager\bin\rcxbackup

[Linux]
/opt/FJSVrcvnr/bin/rcxbackup

```
>rcxbackup [-dir dirname] [[-immediate]][-timeout value] <RETURN>
```



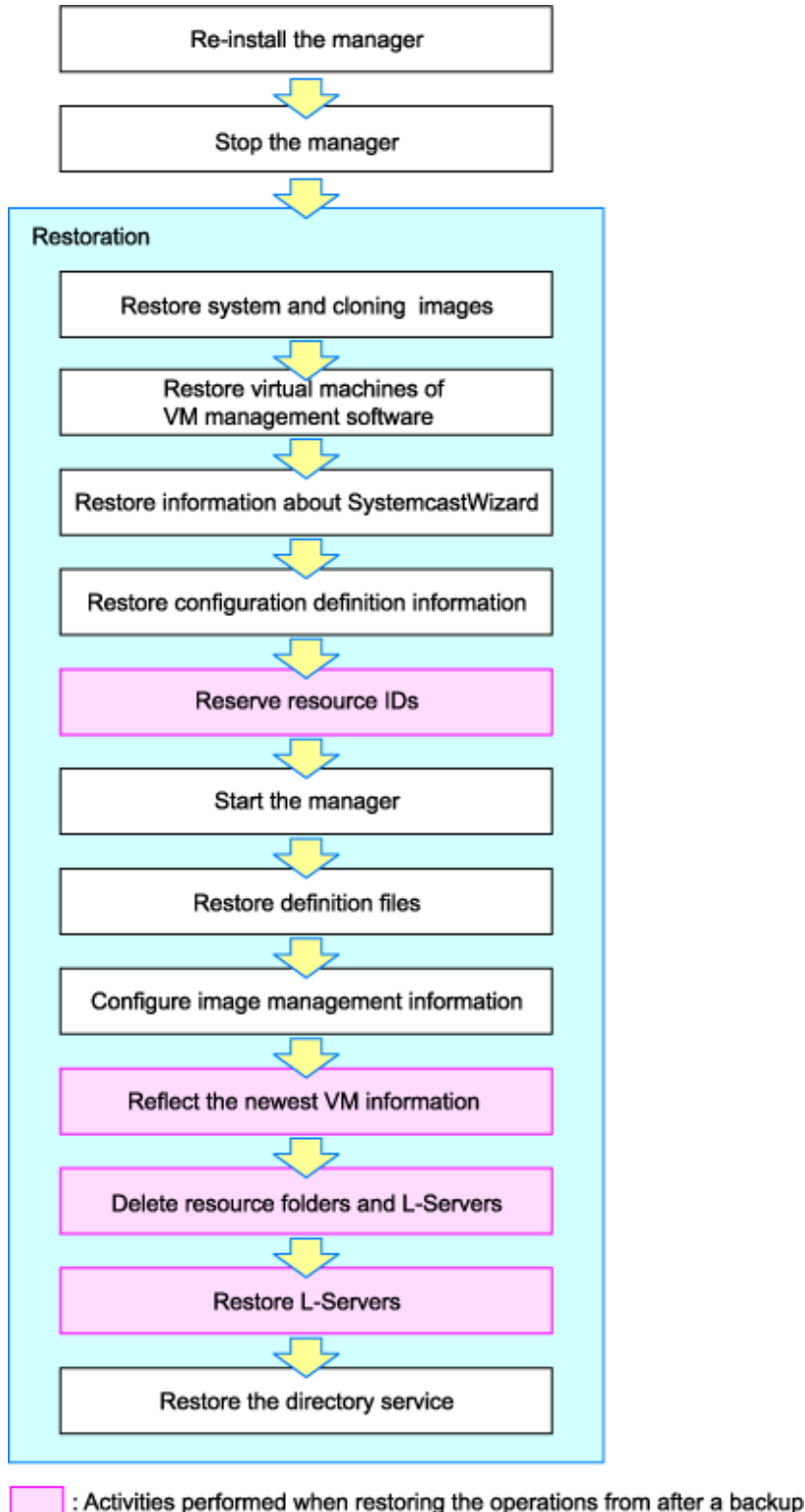
When this command is executed while Resource Orchestrator is being operated, command execution will be postponed until the operation is complete.

E.3 Restoring the Admin Server

This section explains how to restore the admin server.

Restore the admin server using the following procedure:

Figure E.1 Flow of Admin Server Restoration



Note

When operating managers in cluster environments, change the name of the folder to restore to the folder name used on the shared disk. For details on the folder name of the shared disk, refer to "Appendix B Manager Cluster Operation Settings and Deletion" of the "ServerView Resource Coordinator VE Installation Guide".

Restore the admin server using the following procedure:

1. Reinstall the manager and restore the certificates and session encryption keys

When the manager does not operate correctly due to damaged files, uninstall the manager and then reinstall it.

Note

When using HBA address rename, the procedure for uninstallation during restoration is different.

Do not perform the operation described in "1. Delete servers" in "Pre-uninstallation Advisory Notes" of "3.1.1 Preparations" in the "ServerView Resource Coordinator VE Installation Guide".

Restore certificates and session encryption keys.

When re-installing the manager, use the path for the image files storage folder confirmed during backup.

For details on how to restore the manager, refer to "4.1 Installing the Manager" and "4.3 Uninstalling the Manager".

Restoration of session encryption keys is only required if passwords were saved using the -save option of the rcxlogin command. This step is not required if no password has been saved, or if passwords are to be saved again after re-installation.

For details on the rcxlogin command, refer to "2.1 rcxlogin" in the "ServerView Resource Coordinator VE Command Reference".

To restore session encryption keys, restore the following file from the backup folder to the given destination.

[Windows]

Installation_folder\Manager\rails\config\rcx_secret.key

[Linux]

/opt/FJSVrcvnr/rails/config/rcx_secret.key

As saved passwords are stored in the home directory of the OS user account for which the password was saved, authentication may fail if the home directory contents were damaged. In that case, either restore the home directory contents or save the password again using the rcxlogin command.

Note

When reinstalling the manager, as dashboard coordination is also uninstalled when the manager is uninstalled, reinstall dashboard coordination.

For details on how to reinstall dashboard coordination, refer to "H.2.1 Setting Up Dashboard Coordination Scripts".

2. Stop the manager

Stop the manager.

For how to stop the manager, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

3. Restore system images and cloning images

Restore system images and cloning images.

Note

For details on how to restore system images and cloning images, refer to "2. Restore the system and cloning images" of "B.3 Restore" in the "ServerView Resource Coordinator VE Operation Guide".

4. Restore virtual machines of VM management software

For details on restoration, refer to the manual of the VM management software.

5. Restore information related to SystemcastWizard

[Windows]

Restore the information that was backed up to arbitrary folders to following locations.

Import backed up data by copying files and databases, and using a registry editor to import the keys that were backed up from the registry.

Table E.5 List of Restoration Targets Related to SystemcastWizard

No	Overview	Targets of backup and restoration
1	Registry (*1)	HKEY_LOCAL_MACHINE\SOFTWARE\Fujitsu\SystemcastWizard(32bitOS) HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\Fujitsu\SystemcastWizard(64bitOS)
2	Databases	<i>Installation_folder</i> \ScwPro\scwdb\scwdb1.mdb <i>Installation_folder</i> \ScwPro\scwdb\scwdb1.mdw
3	DHCP configuration information file	<i>Installation_folder</i> \ScwPro\bin\ipTable.dat
4	IP address configuration file	<i>Installation_folder</i> \ScwPro\bin\localipaddress.txt
5	AWWN definition file (*2)	<i>Installation_folder</i> \ScwPro\tftp\rcbootimg\awwn_XXX.XXX.XXX.XXX.cfg(*3) <i>Installation_folder</i> \ScwPro\tftp\rcbootimg_awwn_XXX.XXX.XXX.XXX.cfg(*3)
6	BROADCAST setting file for client connection request	<i>Installation_folder</i> \ScwPro\bin\bcastaddress.txt

*1: On 64-bit OS's, redirection will be performed to Wow6432Node.

*2: No action is necessary in VIOM environments.

*3: In XXX.XXX.XXX.XXX an IP address is displayed.

[Linux]

Restore the information that was backed up to arbitrary directories to the following locations.

Table E.6 List of Restoration Targets Related to SystemcastWizard

No	Overview	Targets of backup and restoration
1	Configuration file	/etc/opt/FJSVscw-common/scwconf.reg
2	Databases	/var/opt/FJSVscw-deploysv/scwdb/scwdb1.db /var/opt/FJSVscw-deploysv/scwdb/scwdb2.db
3	DHCP configuration information file	/var/opt/FJSVscw-pxesv/ipTable.dat
4	Bootcfg configuration file (*1)	/etc/opt/FJSVscw-pxesv/ClientBoot/*
5	AWWN definition file (*2)	/var/opt/FJSVscw-tftpsv/tftpboot/rcbootimg/awwn_XXX.XXX.XXX.XXX.cfg(*3) /var/opt/FJSVscw-tftpsv/tftpboot/rcbootimg/_awwn_XXX.XXX.XXX.XXX.cfg(*3)
6	BROADCAST setting file for client connection request	/opt/FJSVscw-deploysv/sys/bcastaddress.txt

*1: All files under the directory are the target.

*2: No action is necessary in VIOM environments.

*3: In XXX.XXX.XXX.XXX an IP address is displayed.

6. Restore configuration definition information

Restore the configuration definition information exported by following the instructions given in "[E.2.2 Backing up Configuration Definition Information](#)".

Execute the following command:

For details on the rcxrestore command, refer to "1.8.2 rcxrestore" in the "ServerView Resource Orchestrator Reference Guide".

[Windows]

Installation_folder\Manager\bin\rcxrestore

[Linux]

/opt/FJSVrcvnr/bin/rcxrestore

```
>rcxrestore -file filename <RETURN>
```



Specify the command using an absolute path.

7. Check the necessity of L-Server restoration

The procedure differs depending on whether performing operations to collect L-Server restoration logs or not.

- When performing operations to collect L-Server restoration logs

Check the necessity of restoration of L-Servers so that "E.4 Restoring L-Servers after Restoration of the Admin Server" can be performed.

Restoration may be necessary if the updated time of the L-Server restoration log file is newer than the back up time of the configuration definition information when those files are compared.

In that case, perform the reservation of resource IDs.

No restoration is necessary if the updated time of the L-Server restoration log file is older.

Reserving Resource IDs

Reserve resource IDs using the following command, avoiding overlaps with the resource ID that was used before the trouble occurred on the admin server.

```
>rcxreserveid -logdir L-Server_restoration_log <RETURN>
```



Reserving Resource IDs

Perform reservation of resource IDs only once before starting a manager for the first time after restoration.

After performing 6., if you have started the manager by mistake before performing reservation of resource IDs, perform the procedure again from 6.

For details on the rcxreserveid command, refer to "1.8.4 rcxreserveid" in the "ServerView Resource Orchestrator Reference Guide".

- When not performing operations to collect L-Server restoration logs

Proceed to the following procedure.

8. Start the manager

Start the manager.

For details on startup, refer to "5.1 Manager" in the "ServerView Resource Coordinator VE Setup Guide".

9. Restore the definition files

Restore the definition files.

Restore the information that was backed up to arbitrary folders.

[Windows]

Installation_folder\Manager\etc\customize_data

Installation_folder\Manager\etc\vm

[Linux]

/etc/opt/FJSVrcvnr/customize_data

/etc/opt/FJSVrcvnr/vm

10. Restore image management information

If the following image management information was modified at the time of backup, set the values to those that were saved when the backup was made.

- Number of system image versions
- Number of cloning image versions

Image management information can be set by executing the `rcxadm imagemgr set` command.

For details on the `rcxadm imagemgr set` command, refer to "5.5 `rcxadm imagemgr`" in the "ServerView Resource Coordinator VE Command Reference".

Note

For details on how to change the number of system image versions, refer to "6.3.1.3 Changing the Maximum Number of System Image Versions" in the "ServerView Resource Coordinator VE Setup Guide".

For details on how to change the number of cloning image versions, refer to "6.3.1.4 Changing the Maximum Number of Cloning Image Versions" in the "ServerView Resource Coordinator VE Setup Guide".

11. Reflect the newest information of VM on Resource Orchestrator using VM management software.

Check the necessity of L-Server restoration.

For details on the necessity of L-Server restoration, refer to 7.

If L-Server restoration is not necessary, proceed to 14.

If L-Server restoration is necessary, proceed to the next step.

For details on the `rcxadm vmmgr refresh` command, refer to "1.7.3 `rcxadm vmmgr`" in the "ServerView Resource Orchestrator Reference Guide".

```
>rcxadm vmmgr refresh <RETURN>
```

Wait for at least 60 seconds.

```
>rcxadm vmmgr refresh <RETURN>
```

Note

Be sure to wait for 60 seconds or more before executing the `rcxadm vmmgr refresh` command for the second time. Otherwise, the newest information of VM may not be reflected correctly.

12. Delete resource folders and L-Servers

In the list, check and then delete the resource folders and L-Servers that had been deleted before the trouble occurred on the admin server.

After checking the resources to delete using the following commands, delete them.

For details on the `rcxchkmismatch` command, refer to "1.8.5 `rcxchkmismatch`" in the "ServerView Resource Orchestrator Reference Guide".


```
>rcxchkmismatch -logdir L-Server_restoration_log <RETURN>
/folder1/l-server1
>rcxchkmismatch -logdir L-Server_restoration_log -allow del <RETURN>
```

Note

- The following L-Servers are released from the configuration definition information when the rcxrepair command is executed, and then they are registered again when imported.
 - L-Servers displayed as inconsistent with the configuration definition information when executing the rcxchkmismatch command
 - L-Servers with moved resource folders
- If the L-Server restoration log is corrupted, execute the rcxchkmismatch command specifying the -diff option to delete the L-Server according to the VM guest managed by VM management software.

If the L-Server restoration log is not accessible, perform the following procedure:

1. Execute the rcxchkmismatch -diff command.

The information of regular update information provided by VM management software and the configuration definition information are compared and the differences between them are displayed.

2. As a result of comparison with the configuration definition information, if the configuration definition information can be reflected, execute the rcxchkmismatch -allow del command to delete the information of differences between regular update information provided by VM management software and the configuration definition information.
3. If the configuration definition information cannot be reflected, manually update it according to the regular update information of the VM management software.

- When deleting an L-Server, even if the operation fails while the operation log is being collected, performing restoration will properly delete the L-Server.
- If the manager aborts while collecting an L-Server restoration log, the L-Server restoration log cannot be collected but the operation performed by VM management software may be complete.

L-Servers with virtual machines not managed by VM management software can be checked and deleted by executing the rcxchkmismatch command with the -diff option specified.

13. Operations for restoring L-Servers

Perform the L-Server restoration described in "[E.4 Restoring L-Servers after Restoration of the Admin Server](#)".

14. Restore a directory service

When using a directory service for user management, restore the directory service.

For details on how to perform restoration, refer to the manual of the directory service.

Note

- When operating managers in cluster environments, change the name of the folder to restore to the folder name used on the shared disk. For details on the folder name of the shared disk, refer to "Appendix B Manager Cluster Operation Settings and Deletion" of the "ServerView Resource Coordinator VE Installation Guide".
- When configuring a VM host as a spare server, leave the "operation" of the "SpareServer" section of the physical server to use as a hyphen ("-"). After completing restoration, configure the spare server for the target physical server from the RC console.
- While the following operations are being performed, do not execute restore:
 - Creation, registration, modification, unregistration, and deletion of L-Servers
 - Creation, modification, and deletion of resources
 - Server switchover and failback

- Backup and restore of system images
- Collection and deployment of cloning images
- When performing restoration of certificates, configuration definition information, and system images and cloning images, restore backups taken at the same point in time.
- When the following changes are made to the following hardware settings or configuration definition information after backup, restoration is not possible. Ensure backup is performed again.
 - When backing up of all management information is necessary
 - Replacement of a chassis, LAN switch blade, managed server, or power monitoring device
 - Replacement of the NIC of a managed server
 - LAN connections between managed servers and LAN switch blades
 - Snapshot collection (*1)
 - Server switchover or takeover (*2)
 - When backing up of configuration definition information again is necessary
 - Creation, deletion, and modification of physical L-Servers (*3)
 - Attaching and detaching physical L-Server disks
 - Releasing an L-Server
 - Registration, unregistration, and movement of resources to and from resource pools
 - Moving and changing resource pools

*1: If a snapshot of an L-Server is taken at a point in time between the backup and restoration of an admin server, that snapshot will not be displayed even after the L-Server is restored.

When you need to restore or delete a snapshot, use VM management software to do so.

*2: If failback has been performed after server switchover, restore can be performed.

*3: Even if the virtual L-Server has been operated after backing up of the admin server, recovery can be performed after restoring the admin server. For details, refer to "[E.4 Restoring L-Servers after Restoration of the Admin Server](#)".

Physical L-Server operations made after backup cannot be recovered. In this case, backup the admin server again.

- While performing admin server restoration, do not perform the following operations:
 - Migration of VM guests between VM hosts
 - Registration and unregistration of VM guests using VM management software
- Managed servers using HBA address rename must be restarted after being restored.
- Maintenance mode settings cannot be recovered after restoration. Set the maintenance mode in accordance with the information recorded at the time of backup.
- When an agent is registered on a managed server and when backup of system images and collection of cloning images is being used, perform either of the following after restoring the admin server.
 - Restart the managed server
 - Restart the services described in "5.2 Agent" in the "ServerView Resource Coordinator VE Setup Guide"
- Connection information of LAN switches and network maps cannot be backed up. Refer to "12.2 Preparations" in the "ServerView Resource Coordinator VE Operation Guide", register LAN switches and obtain the network information.
- VIOM coordination user names and passwords cannot be backed up. Register VIOM coordination before performing restoration. For details on operations, refer to "6.1.1 Registering VIOM Coordination" in the "ServerView Resource Coordinator VE Setup Guide".
- When using EMC CLARiiON storage, create security files to be used for issuing commands using the Navisphere CLI. For details on how to create security files, refer to "[F.3.3 When Using EMC CLARiiON Storage](#)".

E.4 Restoring L-Servers after Restoration of the Admin Server

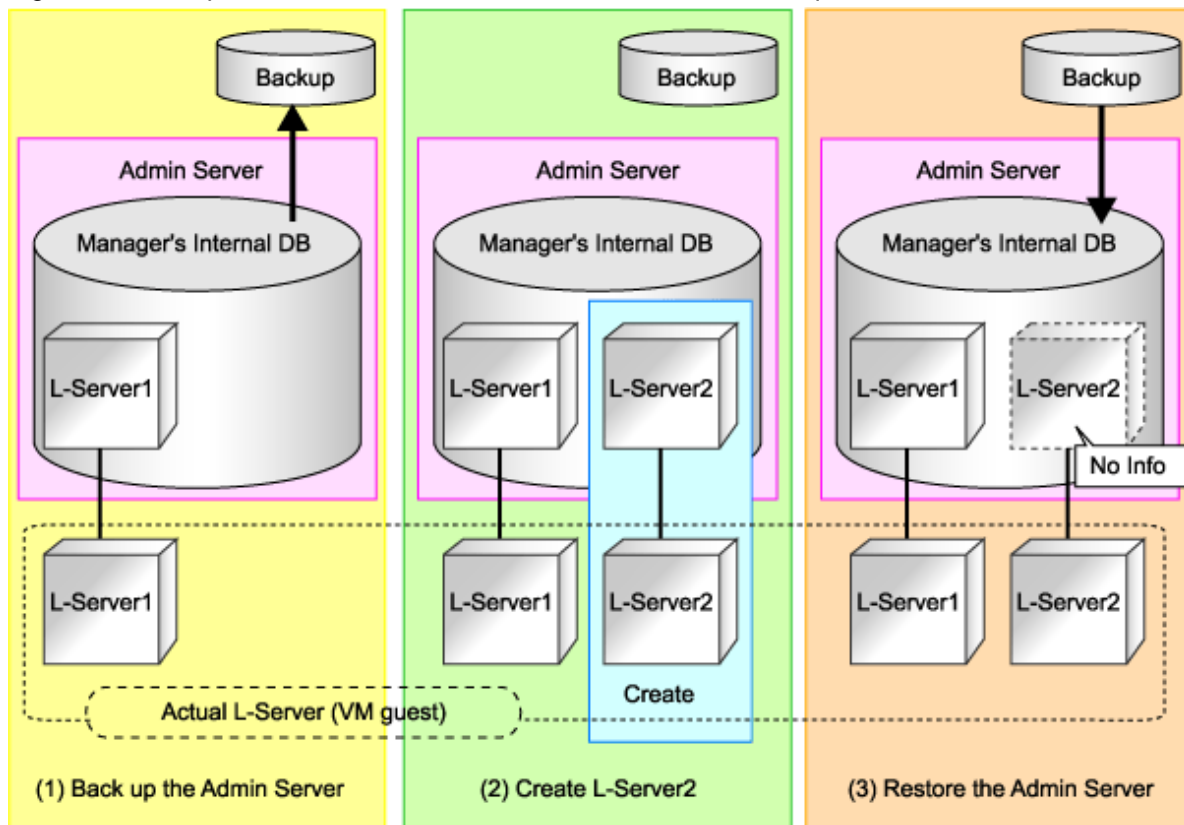
This section explains how to restore an L-Server for which management information has been lost due to restoration of the admin server.

Note

This function is available when the managed server is configured for VMware and Hyper-V environments.

When an L-Server is created between backup and restoration of the admin server, the L-Server information on Resource Orchestrator will be lost due to the restoration, and only its entity remains.

Figure E.2 Example when Restoration of L-Server Information is Required due to Admin Server Restoration



Restore the L-Server information of Resource Orchestrator using the following procedure.

Preparations

The destination to output L-Server restoration logs to must be defined before recording can be started.

Set the following tuning parameter. As L-Server restoration logs are used when an error occurs on the manager, it is recommended to save L-Server restoration logs on external media such as a disk connected to the network.

Storage location for the tuning parameter file

[Windows]
Installation_folder\Manager\etc\customize_data

[Linux]
/etc/opt/FJSVrcxmr/customize_data

The name for the tuning parameter file

manager_backup.rcxprop

The format of the tuning parameter file

Set the following parameter in the tuning parameter file:

```
apilog_enable=true
apilog_dir=Destination_directory
```

- apilog_enable

Specify to collect L-Server restoration logs.

When "true" is specified, L-Server restoration logs are collected.

When "false" is specified, they are not collected.

When omitted, no L-Server restoration logs are collected.

- apilog_dir

When this parameter is not specified, L-Server restoration logs are saved in the following directories:

[Windows]

Installation_folder\Manager\var\lserver_repair\apilog

[Linux]

/var/opt/FJSVrcrmr/lserver_repair/apilog

Format of L-Server Restoration Logs

L-Server restoration logs are saved in the following formats:

- The newest L-Server restoration log

api.log

- Old L-Server restoration logs

api_*Time_and_Date*.log

For *Time_and_Date*, the time and date when the L-Server restoration log was switched from the newest log is set.

When the file becomes larger than a certain size, the file is automatically switched to continue collecting L-Server restoration logs.



Note

- Configuration definition information cannot be restored correctly when the logs have not been recorded in the specified destination directory.

Check that the directory is accessible.

If the L-Server restoration log is not accessible, resolve the cause, and then perform the following procedure:

1. Stop the manager.
2. Back up the configuration definition information.
3. Restart the Manager.

- When checking if an L-Server restoration log has been collected correctly in the designated location after the manager has been started, create and delete a resource folder as shown below to make sure that the update date in the L-Server restoration log is updated.

```
>rcxadm folder create -name test <RETURN>
>rcxadm folder delete -name test <RETURN>
```

- In the following cases, collect the L-Server restoration log.
 - Creation, registration, modification, deletion, and movement of L-Servers

- Creation, modification, deletion(*1), and movement of resource folders

*1: Even if you delete folders after backing up the configuration definition information, the folders will not be deleted when a restore operation is performed. Delete the relevant folders after restoration is complete.

When performing the following operations, stop the manager, collect the backup, and then delete the entire folder that L-Server restoration logs were output to.

- Changing the host name of the manager OS
- After disaster recovery
- When outputting of L-Server restoration log fails during an operation

"FJSVrcx:ERROR:62559:external script apilog execution error detail" is output.

- L-Server restoration logs cannot be written directly to network drives. Create a LUN for a fibre channel or iSCSI and collect from there.

Operations

Perform the following operations in preparation for an error.

1. Back up the Resource Orchestrator manager

Back up the manager once a system using Resource Orchestrator has been configured, and after the registration, modification, or deletion of resources. And periodically back up the manager to enable restoration of the system to the previous operational state.

To back up the Resource Orchestrator manager, using the following command:

For details on the rcxbackup command, refer to "1.8.1 rcxbackup" in the "ServerView Resource Orchestrator Reference Guide".

```
>rcxbackup [-dir dirname] [[-immediate]][[-timeout value]] <RETURN>
```

2. Delete unnecessary L-Server restoration logs

Information necessary to restore L-Server created after the manager has been backed up are automatically recorded as L-Server restoration logs. L-Server restoration logs are recorded automatically when the configuration definition information is updated. The information existing before the backup performed in 1. is unnecessary. Delete such unnecessary L-Server restoration logs periodically using the following command:

For details on the rcxlogtruncate command, refer to "1.8.3 rcxlogtruncate" in the "ServerView Resource Orchestrator Reference Guide".

```
>rcxlogtruncate -dir L-Server_restoration_log_directory -date yyyymmdd_hhmm <RETURN>
```



Example

```
>rcxbackup -dir dir1 <RETURN>
```

- If the manager backup file *hostname_20110630_1000.tar.gz* is stored in *dir1*

```
>rcxlogtruncate -dir dir2 -date 20110630_1000 <RETURN>
```

Delete L-Server restoration logs before 2011/06/30 10:00, when the last backup was performed.



Point

Save L-Server restoration logs using external media in preparation for the event that the hard disk that Resource Orchestrator is installed on is damaged.

Operations for restoring the admin server

If the manager does not operate correctly due to damaged files or other problems on the admin server, restore the backed up Resource Orchestrator manager.

For details, refer to "E.3 Restoring the Admin Server".

Note

If an L-Server restoration log is corrupted, restore it using the following procedure:

1. Execute the `rcxchkmismatch -diff` command.

When the `rcxchkmismatch -diff` command is executed, the information of regular update information of VM management software and the configuration definition information are compared, and the differences between them displayed.

2. As a result of the comparison, if there is no problem with reflecting configuration definition information, execute the `rcxchkmismatch -allow del` command to delete the information of differences between the regular update information of VM management software and the configuration definition information.
3. If the configuration definition information cannot be reflected, manually update it according to the regular update information of the VM management software.

Operations for restoring L-Servers

If the information of a created L-Server has been lost, restore it using the following procedure:

1. Output information necessary for restoring L-Servers

Compare information between L-Server restoration logs and configuration definition information, and identify information requiring restoration.

When restoration of configuration definition information is necessary, create an import file (in XML format) for restoration.

Start the manager, then execute the `rcxrepair` command.

For details on the `rcxrepair` command, refer to "1.8.6 rcxrepair" in the "ServerView Resource Orchestrator Reference Guide".

```
>rcxrepair -logdir L-Server_restoration_log -dryrun <RETURN>
folder create -name /tenant1
folder create -name /tenant1/folder1
L-Server create -name /tenant1/folder1/l-server1
>rcxrepair -logdir L-Server_restoration_log -dir
Output_destination_of_resource_definition_information <RETURN>
```

Note

If an error occurs when executing the `rcxrepair` command, execute the `rcxrestore` command again.

For details on the `rcxrestore` command, refer to "1.8.2 rcxrestore" in the "ServerView Resource Orchestrator Reference Guide".

2. Re-create tenants

When tenants are included in the configuration definition information checked in 1. and their restoration is necessary, create those tenants again.

3. Restore configuration definition information

For the configuration definition information checked in 1., when configuration information for other than the re-created tenants in 2. are output, restore the configuration definition information using the following command:

For details on the `rcxadm config` command, refer to "1.7.11 `rcxadm config`" in the "ServerView Resource Orchestrator Reference Guide".

```
>rcxadm config import -dir  
Destination_directory_for_restored_configuration_definition_information <RETURN>
```

4. Delete unnecessary folders

If you have deleted folders after performing backup, those folders will remain on the restored system. Delete unnecessary folders using the following command:

```
>rcxadm folder delete -name folder1 <RETURN>
```

 **Note**

Configuration definition information cannot be restored correctly when the logs have not been recorded in the specified destination directory.

Check that the directory is accessible.

Appendix F Configuration when Creating a Physical L-Server

This section explains how to perform configuration when creating a physical L-Server.

F.1 System Configuration

This section explains system configuration when creating a physical L-Server.

Prerequisites

To create a physical L-Server, Virtual I/O using HBA address rename or VIOM is required.

For details on HBA address rename, refer to "6.2.2 Configuring HBA address rename" in the "ServerView Resource Coordinator VE Setup Guide".

For details on VIOM, refer to the ServerView Virtual-IO Manager manual.

Usage methods of HBA address rename or VIOM differ depending on the manager OS and the hardware of managed servers used to configure a physical L-Server.

Table F.1 Available Combinations of Manager OS and Hardware for Managed Servers

	Blade Servers	Rack Mount Servers
Windows	VIOM	HBA address rename
Linux	Usage is not possible	HBA address rename



Note

When the manager OS is Linux and hardware for a managed server is a blade server, a physical L-Server cannot be created.

Use a Windows environment for the manager.

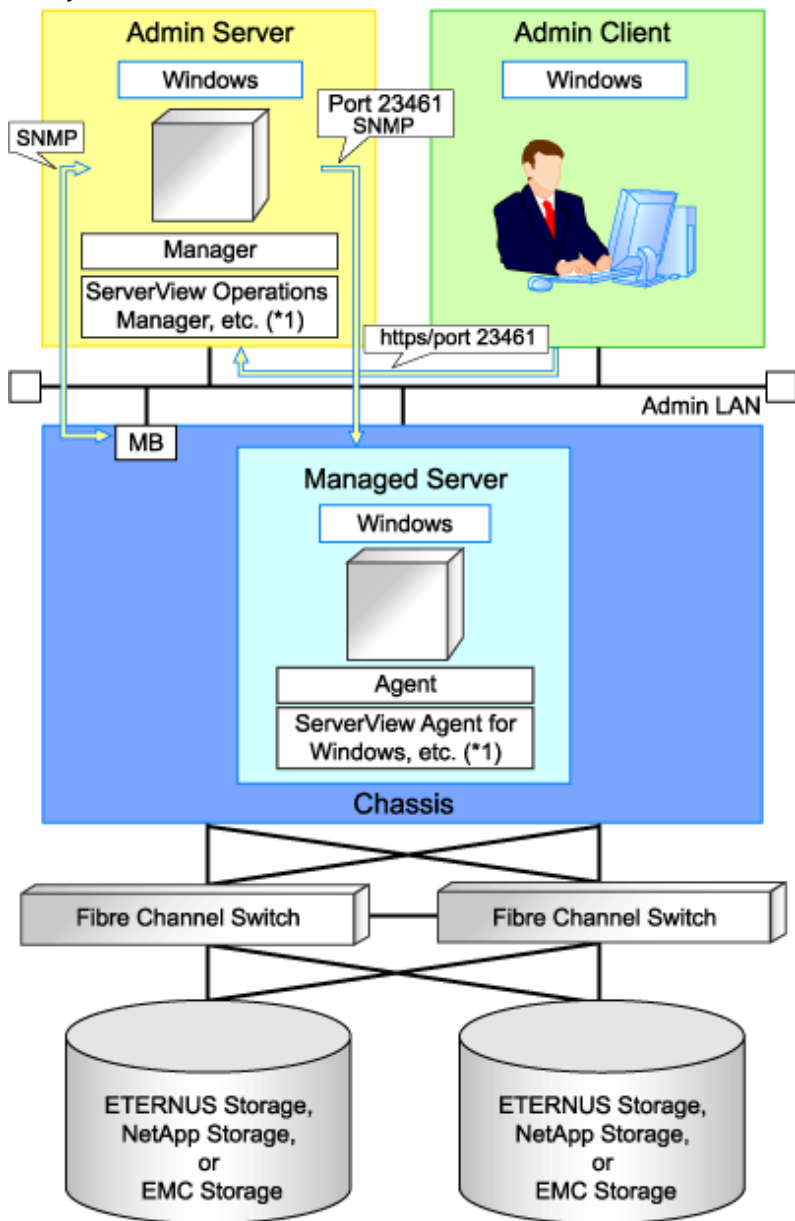
When using iSCSI boot, VIOM is required in the server environment.

Example of System Configuration using VIOM's Virtual I/O

An example system configuration for L-Server creation using Virtual I/O by VIOM is given below.

Install ServerView Virtual-IO Manager on the admin server.

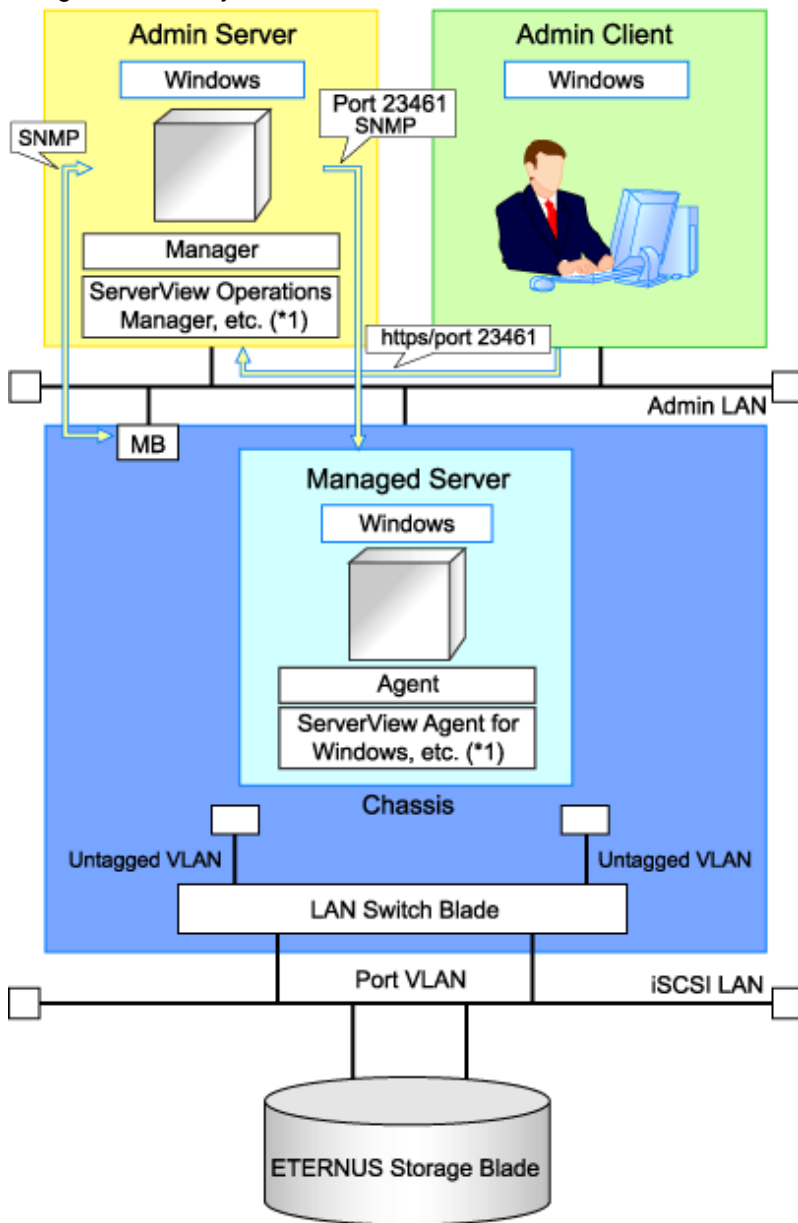
Figure F.1 Example of System Configuration for L-Server Creation in a SAN Storage Environment using Virtual I/O by VIOM



MB: Management Blade

*1: For details on required software, refer to "[1.3.2.2 Required Software](#)".

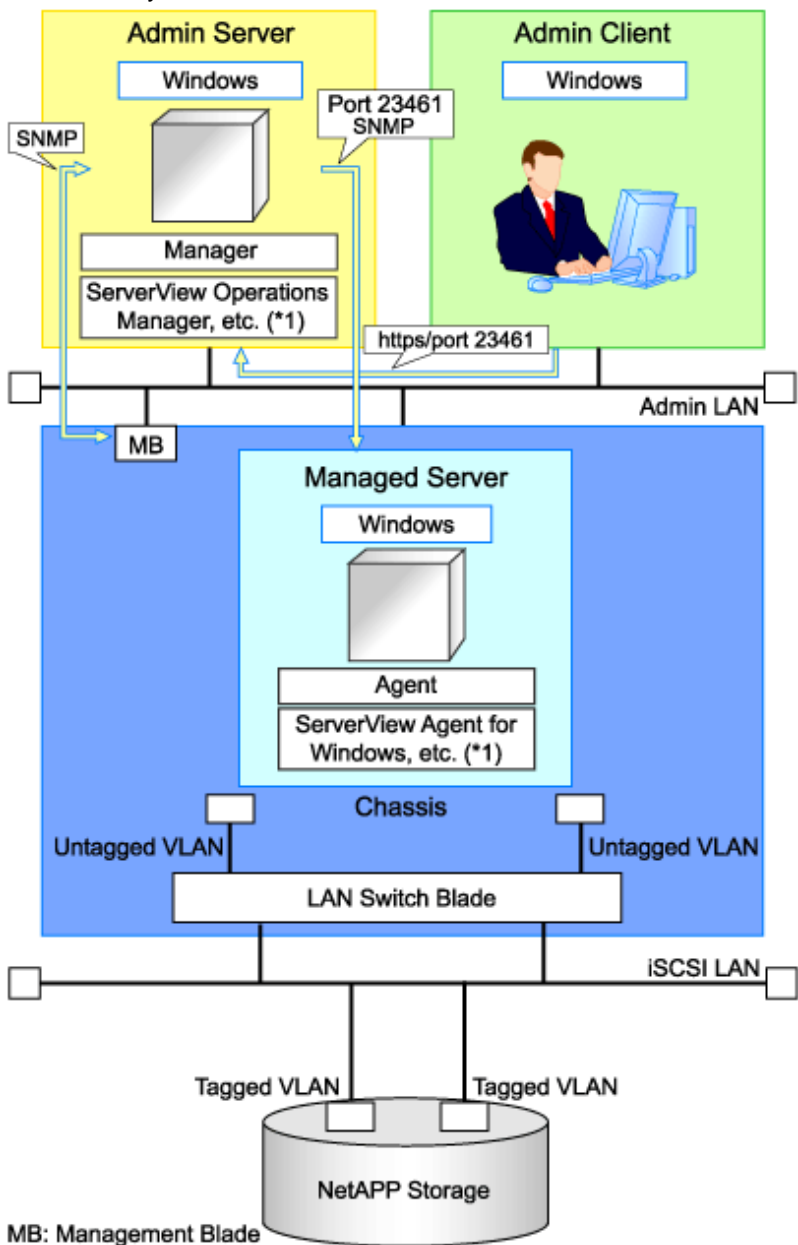
Figure F.2 Example of System Configuration for L-Server Creation in an ETERNUS-iSCSI Storage Environment using Virtual I/O by VIOM



MB: Management Blade

*1: For details on required software, refer to "[1.3.2.2 Required Software](#)".

Figure F.3 Example of System Configuration for L-Server Creation in a NetApp-iSCSI Storage Environment using Virtual I/O by VIOM



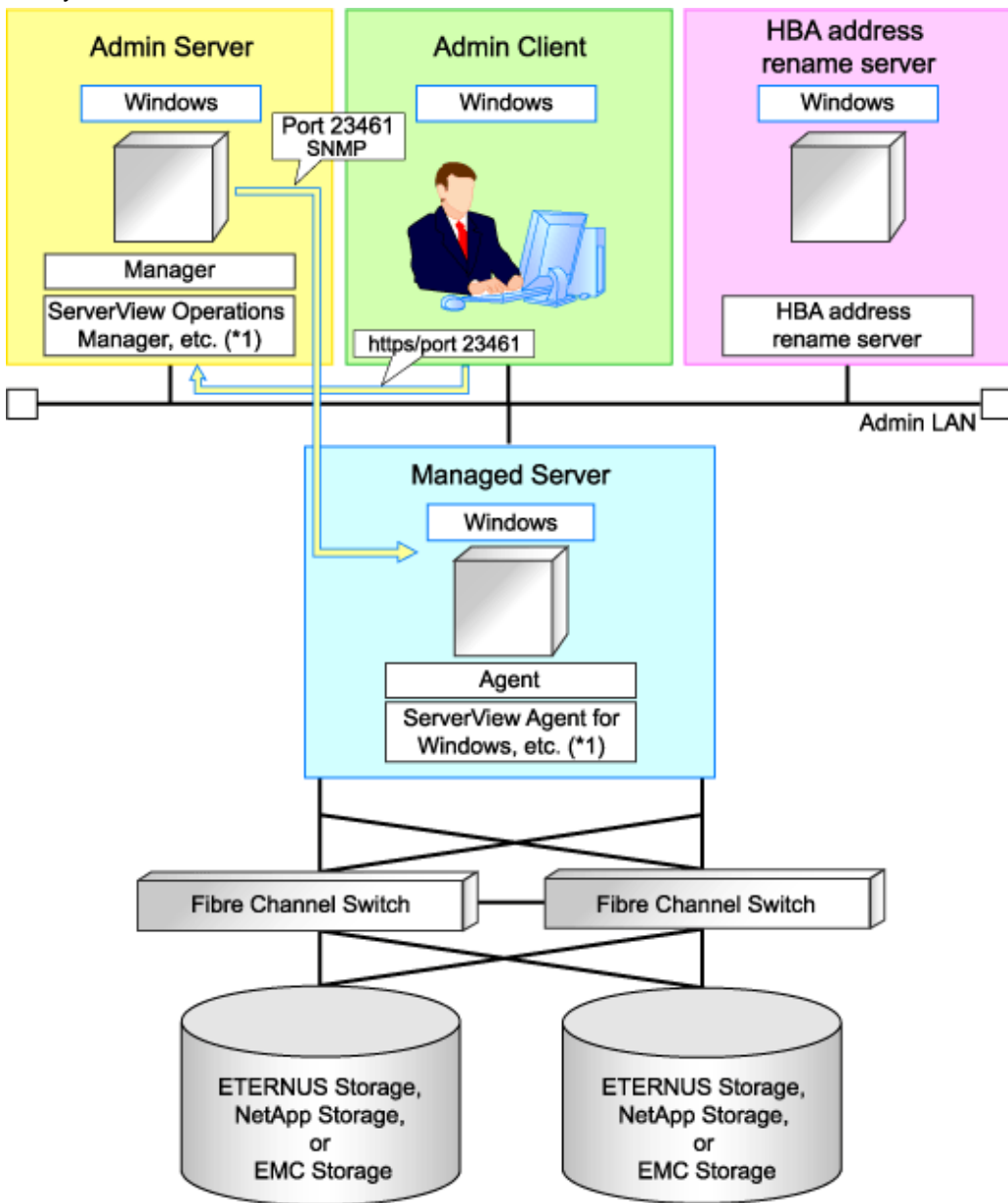
*1: For details on required software, refer to "1.3.2.2 Required Software".

Example of System Configuration using Virtual I/O by HBA address rename

An example of system configuration for L-Server creation using Virtual I/O by HBA address rename is given below.

Prepare a server to configure the HBA address rename setup service.

Figure F.4 Example of System Configuration for L-Server Creation in a SAN Storage Environment using Virtual I/O by HBA address rename



*1: For details on required software, refer to "[1.3.2.2 Required Software](#)".

Simplifying Network Settings

Network settings can be easily configured by Resource Orchestrator when creating L-Servers.

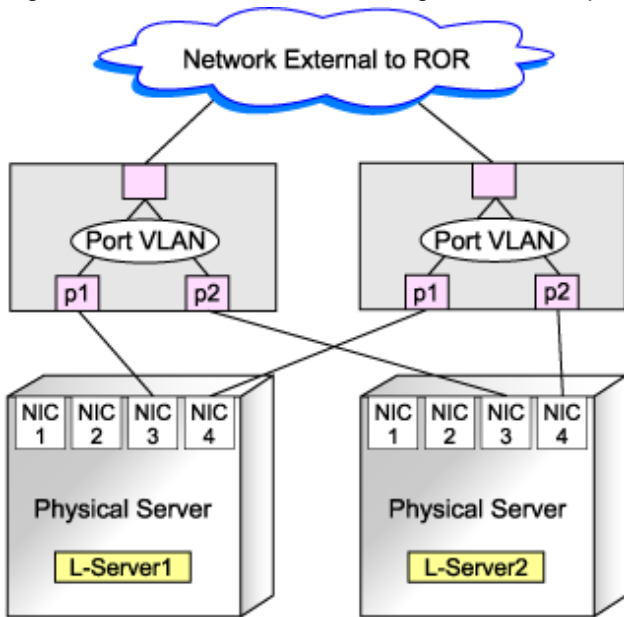
Depending on the conditions, such as hardware (blade servers or rack mount servers) and the presence or absence of network redundancy for L-Servers, the setting ranges of networks differ.

For details, refer to "[1.2.6 Simplifying Network Settings](#)".

Network Configuration Example

An example of network configuration when a physical server is used as an L-Server is given below:

Figure F.5 LAN Switch Blade Configuration Example Using Network Resources



F.2 Pre-setup Preparations (Servers)

This section explains preparations for server setup when creating a physical L-Server.

When creating a physical L-Server, it is necessary to configure the following VIOM settings as well as performing the server environment definition and configuration given in "3.1 Preparations for Server Environments".

When using Virtual I/O by VIOM

- Install VIOM

For details on how to install VIOM, refer to the ServerView Virtual-IO Manager manual.

Note

When installing VIOM, do not configure virtual MAC addresses or Range for WWNs.

- Settings for ServerView Operations Manager

Add blade servers for use as managed servers to the ServerView server list.

For details, refer to the ServerView Virtual-IO Manager manual.

- Configure VIOM

For VIOM, register chassis as managed servers.

Select chassis, and configure VIOM by clicking <Manage Chassis> on the [Setup] tab.

For details, refer to "When using VIOM (SAN boot)" of "3.5 Configuring the Server Environment" in the "ServerView Resource Coordinator VE Setup Guide".

Note

Configure a valid FC-HBA BIOS in the system BIOS.

Configure FC-HBA BIOS, referring to "3.5 Configuring the Server Environment" in the "ServerView Resource Coordinator VE Setup Guide".

- When using SAN boot by HBA address rename

- BIOS settings of managed servers

Refer to "3.5 Configuring the Server Environment" in the "ServerView Resource Coordinator VE Setup Guide".

- When using VIOM (SAN boot)
- When using VIOM (iSCSI boot)

When using Virtual I/O by HBA address rename

- BIOS settings of managed servers

Refer to "3.5 Configuring the Server Environment" in the "ServerView Resource Coordinator VE Setup Guide".

- When using SAN boot by HBA address rename

Configuration Using PXE Boot

When using PXE boot, the server for boot must be located and configured.



Note

PXE boot is unavailable on networks that use tagged VLAN settings.

Do not configure tagged VLANs for PXE boot servers.

F.3 Pre-setup Preparations (Storage)

This section explains how to prepare storage when configuring a physical server for use as an L-Server.

This section explains details on the configuration necessary when using storage units from a physical L-Server.

Prerequisites When Creating L-Servers Using Physical Servers

For details, refer to "[1.2.10 Simplifying Storage Settings](#)".

Regarding Storage Configuration

For details, refer to "[1.2.10 Simplifying Storage Settings](#)".

Preparations for storage environments

The settings necessary when using storage environments are performed using the following flow.

1. Storage Unit Configuration

When using ETERNUS storage, refer to "[ETERNUS Storage Configuration](#)" of "F.3.1 When Using ETERNUS Storage".

When using the NetApp FAS series/V series, refer to "[NetApp FAS Storage Configuration](#)" of "F.3.2 When Using NetApp FAS Storage".

When using EMC CLARiiON storage, refer to "[EMC CLARiiON Storage Configuration](#)" of "F.3.3 When Using EMC CLARiiON Storage".

When using EMC Symmetrix DMX storage, refer to "[EMC Symmetrix DMX Storage Configuration](#)" of "F.3.4 When Using EMC Symmetrix DMX Storage".

2. Fibre Channel Switch Configuration

For details on how to connect ETERNUS storage to Fibre Channel switches, refer to "[When Connecting ETERNUS Storage to Fibre Channel Switches](#)" of "F.3.1 When Using ETERNUS Storage".

For details on how to connect NetApp storage to Fibre Channel switches, refer to "[When Connecting NetApp Storage to Fibre Channel Switches](#)" of "F.3.2 When Using NetApp FAS Storage".

When connecting EMC CLARiiON storage to Fibre Channel switches, refer to "[When Connecting EMC CLARiiON Storage to Fibre Channel Switches](#)" of "F.3.3 When Using EMC CLARiiON Storage".

When using EMC Symmetrix DMX storage with Fibre Channel switches, refer to "[When Connecting EMC Symmetrix DMX Storage to Fibre Channel Switches](#)" of "F.3.4 When Using EMC Symmetrix DMX Storage".

F.3.1 When Using ETERNUS Storage

This section explains how to configure ETERNUS storage.

ETERNUS Storage Configuration

Resource Orchestrator manages only ETERNUS registered on ESC. Register the target ETERNUS on ESC.

For details on how to register to ESC, refer to the "ETERNUS SF Storage Cruiser User's Guide" of version 14.2 or later.

URL: http://software.fujitsu.com/jp/manual/manualindex/P10000250e.html (As of July 2011)

Note

- Definition of ETERNUS hot spares or RAID groups is not possible in Resource Orchestrator. Define hot spares and RAID groups using ETERNUSmgr or other software.
- Resource Orchestrator supports access path settings on the FC-CA ports of ETERNUS connected using Fabric connections. It is necessary to select "Fabric connection" in the settings of the connection method of ETERNUS FC-CA ports.
- Resource Orchestrator uses ETERNUS host affinity to enable recognition of LUNs by servers. Therefore, for affinity mode settings of ETERNUS FC-CA ports, "ON" must be selected.

When Connecting ETERNUS Storage to Fibre Channel Switches

When creating a disk from an ETERNUS RAID group, configure one-to-one WWPN zoning for the Fibre Channel switch registered on ESC. Therefore, it is necessary to register the Fibre Channel switch connected to ETERNUS and all Fibre Channel switches connected to it using a cascade connection on ESC.

For details on how to register to ESC, refer to the "ETERNUS SF Storage Cruiser User's Guide" of version 14.2 or later.

Zoning settings may not have been configured for Fibre Channel switches. When zoning is not configured, ensure that temporary zoning is configured, since there is a chance that one-to-one WWPN zoning settings cannot be configured. For details on how to perform configuration, refer to the ESC manual.

Note

When creating a physical L-Server, configure an access path by creating a dynamic LUN from RAID groups satisfying the conditions.

The access path cannot be configured, as there are no LUNs before a physical L-Server is created.

A server can be registered on ESC, but on ESC, access paths and Storage Volume Configuration Navigator cannot be used.

When Using iSCSI Boot

Define the following using ESC or ETERNUSmgr. Regarding the defined information, register a disk on a resource, using the operation command (rcxadm iscsictl) for iSCSI boot.

- LUN used for iSCSI boot and LUN mapping

Note

If iSCSI boot information already registered is specified, the registered information continues to exist.

If the registered information is changed, delete the iSCSI boot information using the unregister subcommand, and then register the iSCSI boot information by using the register subcommand again.

The definition information registered using the operation command (rcxadm iscsictl) for iSCSI boot is as follows:

For details, refer to "2.9 iSCSI Boot Information" in the "ServerView Resource Orchestrator Reference Guide".

- Storage information
 - IP address of the storage port used for iSCSI
 - Storage port IQN name used for iSCSI
- Server information
 - IP address of the server used for iSCSI
 - Server IQN name used for iSCSI
- Disk information
 - LUN disk size used for iSCSI boot
- Authentication information for iSCSI

F.3.2 When Using NetApp FAS Storage

This section explains how to configure NetApp storage.

NetApp FAS Storage Configuration

- **For Fibre Channel Connections**

Use the following procedure to configure NetApp FAS series/V series settings:

1. Initial Configuration

Set the password of the Data ONTAP root account (using more than one character) and the admin IP address of Data ONTAP, referring to the "Data ONTAP Software Setup Guide" manual.

Note

- Resource Orchestrator uses the NetApp FAS series/V series which is not registered on storage management software such as DataFabric Manager.
- Only one admin IP address can be registered for the NetApp FAS series/ V series on Resource Orchestrator.

2. Configuration of SSL

Configure SSL, referring to the "Data ONTAP System Administration Guide" manual.

For Data ONTAP7.3, execute the following command on the Data ONTAP that is to be managed:


```
>secureadmin setup ssl <RETURN>
>options tls.enable on <RETURN>
>secureadmin enable ssl <RETURN>
```

3. Creating aggregates

Create more than one aggregate, referring to the "Data ONTAP Storage Management Guide" manual.

Set any desired number when subdividing the management, such as when managing by users.

Aggregates can be added later.

4. Fibre Channel Connection Environment Settings

Configure the following settings, referring to the "Data ONTAP Block Access Management Guide for iSCSI and FC" manual.

- Configure the license settings of the Fibre Channel service.
- Confirm the port settings, and configure the FC port for connection with the managed server as the target port.

5. Creation of portset

Refer to the "Data ONTAP Block Access Management Guide for iSCSI and FC" manual, and create more than one portset which combines FC ports used for access to the L-Server disk.

Up to two port numbers can be set up per portset.

When using NetApp storage with multiple controllers, create it combining the FC ports of the different controllers.

Use the following name for the portset name:

```
rcx-portsetNN(*1)
```

*1: For *NN*, specify a number from 00 - 99



- For the FC port to register in a portset, specify an FC port which is not registered in another portset.
- Specify the FC port the Fibre Channel cable was connected to.
- No portset other than the *rcx-portsetNN* is used.

- For iSCSI Connections

Perform the following operations referring to the "Data ONTAP Block Access Management Guide for iSCSI and FC":

- Creation of LUNs to connect to L-Servers
- Confirmation of storage information to register using the operation command for iSCSI boot (*rcxadm iscsictl*)

The definition information registered using the operation command (*rcxadm iscsictl*) for iSCSI boot is as follows:

For details, refer to "2.9 iSCSI Boot Information" in the "ServerView Resource Orchestrator Reference Guide".

- Storage information
 - IP address of the storage port used for iSCSI
 - Storage port IQN name used for iSCSI
- Server information
 - IP address of the server used for iSCSI
 - Server IQN name used for iSCSI
- Disk information
 - LUN disk size used for iSCSI boot
- Authentication information for iSCSI

Note

- Disks with iSCSI boot information registered may be detected as resources of registered storage management software.
Do not use the disks for iSCSI boot as the LUNs created in advance.
- If iSCSI boot information already registered is specified, the registered information continues to exist.
If the registered information is changed, delete the iSCSI boot information using the unregister subcommand, and then register the iSCSI boot information by using the register subcommand again.

When Connecting NetApp Storage to Fibre Channel Switches

In Resource Orchestrator, when creating disks from NetApp aggregates, configuration of Fibre Channel switches connected to NetApp is not performed.

It is necessary to configure one-to-one WWPN zoning for Fibre Channel switches in advance.

It is necessary to define zoning combining the fibre channel switch combining the HBA Port WWPN value based on the WWN provided by the I/O Virtualization Option and the FC port WWPN value defined in the NetApp portset used in Resource Orchestrator. For details on the configuration method, refer to the manual of the fibre channel switch.

Fibre Channel Switch Zoning Settings

Set zoning combining the WWPN value of HBA Port1 and the WWPN value of defined FC port first in portset, and combining the WWPN value of HBA Port2 and the WWPN value of defined FC port second in portset.

In the following conditions, an example command for an ETERNUS SN200 is as follows:

Conditions

- WWN value provided by the I/O Virtualization Option: "20:00:00:17:42:51:00:0x"
- WWPN value of HBA Port1: "21:00:00:17:42:51:00:0x"
- WWPN value of HBA Port2: "22:00:00:17:42:51:00:0x"
- Definition of the NetApp storage portset (rcx-portset01): "0a,0b"
- WWPN value of FC port(0a) for NetApp storage: "50:0a:09:81:88:bc:43:dc"
- WWPN value of FC port(0b) for NetApp storage: "50:0a:09:82:88:bc:43:dc"

Example Command

```
zoneCreate "f2020_a_0","50:0a:09:81:88:bc:43:dc;21:00:00:17:42:51:00:00"  
zoneCreate "f2020_b_0","50:0a:09:82:88:bc:43:dc;22:00:00:17:42:51:00:00"  
...  
zoneCreate "f2020_a_f","50:0a:09:81:88:bc:43:dc;21:01:00:17:43:50:00:0f"  
zoneCreate "f2020_b_f","50:0a:09:82:88:bc:43:dc;22:01:00:17:43:50:00:0f"  
cfgCreate "ror_cfg","f2020_a_0;f2020_b_0; ... ;f2020_a_f;f2020_b_f"  
cfgEnable "ror_cfg"  
cfgSave
```

F.3.3 When Using EMC CLARiiON Storage

This section explains how to configure EMC CLARiiON storage.

EMC CLARiiON Storage Configuration

Resource Orchestrator controls EMC CLARiiON storage through EMC Navisphere Manager.

A user ID and a password are required to use EMC Navisphere Manager.

For details on how to add a user ID, refer to the EMC Navisphere Manager manual.

In order to enhance communication security between Resource Orchestrator and EMC Navisphere Manager, security files are used for issuing Navisphere CLIs.

Create security files in the following directories of the server on which Resource Orchestrator is installed, using the command to create security files.

[Windows]

```
Installation_folder\Manager\etc\storage\emc\xxx.xxx.xxx.xxx (*1)
```

[Linux]

```
/etc/opt/FJSVrcvnr/storage/emc/xxx.xxx.xxx.xxx (*1)
```

*1: IP address of SP for EMC CLARiiON storage.

When there are multiple EMC CLARiiONS, create multiple directories.

For the user ID to execute commands to create security files, set SYSTEM for Windows, or root for Linux.

Use the following procedure to execute the command for SYSTEM users on Windows.

1. Confirm the current time of servers.
2. Set the schedule for creating the security files using the navisecli command, after the time set by the AT command in step 1.
3. Check if the security files have been created after the time scheduled in step 2., by registering storage management software.



Example

```
>C:\Program Files\Resource Orchestrator\Manager\bin>time <RETURN>
The current time is: 16:32:14.39
Enter the new time:

>C:\Program Files\Resource Orchestrator\Manager\bin>at 16:36 navisecli -AddUserSecurity -password
password -scope 0 -user administrator -secfilepath " C:\Program Files\Resource Orchestrator\Manager\etc\storage
\emc\192.168.99.101" <RETURN>
Added a new job with job ID = 1

>C:\Program Files\Resource Orchestrator\Manager\bin>time <RETURN>
The current time is: 16:36:00.79
Enter the new time:

>C:\Program Files\Resource Orchestrator\Manager\bin>rcxadm storagemgr register -name A -ip 192.168.99.101
-soft_name emcns -soft_url dummy_url_string <RETURN>
```



Information

For details on how to create security files, refer to the explanation in "-AddUserSecurity" switches of Navisphere CLI.



Note

- Hot spare definitions, definitions of RAID groups, and Traditional LUNs are not created using Resource Orchestrator. Create hot spare definitions, RAID groups and Traditional LUNs in advance.
- For details on how to create RAID Groups or Traditional LUNs, refer to the manual of EMC CLARiiON storage.
- Existing RAID Groups are also recognized as virtual storage, but RAID Groups are not recognized when they are used as hot spares.

- It is not necessary to create a Storage Group which defines LUN masking (LUN mapping), as one is automatically created when creating an L-Server.
- Pool and Thin LUN are not recognized.
- When installing an OS and a multipath driver, it is necessary to make only one access path from the server to the storage.
- It is necessary to install Resource Orchestrator and Navisphere CLI on the same server.
- Only Fibre channel connections using FC ports (target mode) are supported.
- The connection form to FC ports only supports fabric connections.
- For EMC CLARiiON storage, after installing Resource Orchestrator it is necessary to create definition files combining ports for SAN storage.

When Connecting EMC CLARiiON Storage to Fibre Channel Switches

In Resource Orchestrator, when connecting EMC CLARiiON storage, Fibre Channel switches are not configured.

It is necessary to configure one-to-one WWPN zoning for Fibre Channel switches in advance.

It is necessary to define zoning combining the fibre channel switch combining the HBA Port WWPN value based on the WWN provided by the I/O Virtualization Option and the SP port WWPN value in the EMC CLARiiON storage used in Resource Orchestrator. For details on the configuration method, refer to the manual of the fibre channel switch.

Fibre Channel Switch Zoning Settings

Set zoning combining the WWPN value of HBA Port1 and the WWPN value of the first SP port defined in the storage_portset.rcxprop definition file, and combining the WWPN value of HBA Port2 and the WWPN value of the second SP port defined in portset.

Examples of command execution for an ETERNUS SN200 are as follows:



Example

Conditions

- WWN value provided by the I/O Virtualization Option
"20:00:00:17:42:51:00:0x"
- WWPN value of HBA Port1
"21:00:00:17:42:51:00:0x"
- WWPN value of HBA Port2
"22:00:00:17:42:51:00:0x"
- WWPN value of SP port defined for the first portset
"50:0a:09:81:88:bc:43:dc"
- WWPN value of SP port defined for the first portset
"50:0a:09:82:88:bc:43:dc"

```
zoneCreate "emc_a_0","50:0a:09:81:88:bc:43:dc;21:00:00:17:42:51:00:00" <RETURN>
zoneCreate "emc_b_0","50:0a:09:82:88:bc:43:dc;22:00:00:17:42:51:00:00" <RETURN>
...
zoneCreate "emc_a_f","50:0a:09:81:88:bc:43:dc;21:01:00:17:42:50:00:0f" <RETURN>
zoneCreate "emc_b_f","50:0a:09:82:88:bc:43:dc;22:01:00:17:42:50:00:0f" <RETURN>
cfgCreate "ror_cfg","emc_a_0;emc_b_0; ... ;emc_a_f;emc_b_f" <RETURN>
```

```
cfgEnable "ror_cfg" <RETURN>
cfgSave <RETURN>
```

F.3.4 When Using EMC Symmetrix DMX Storage

This section explains how to configure EMC Symmetrix DMX storage.

EMC Symmetrix DMX Storage Configuration

Resource Orchestrator manages only EMC Symmetrix DMX registered on Solutions Enabler. Register the target EMC Symmetrix DMX on Solutions Enabler.

For details on how to register Solutions Enabler, refer to the Solutions Enabler manual.

There are the following advisory notes:

- For Resource Orchestrator, host spare definitions, DISK group definitions (corresponding to RAID groups), and open-type devices (corresponding to LUNs) are not created. Create hot spare definitions, DISK group definitions, or open-type devices in advance.

For details on how to create hot spare definitions, DISK group definitions, and open-type devices, refer to the manual of EMC Symmetrix DMX storage.

- When installing an OS and a multipath driver, it is necessary to make only one access path from the server to the storage.
- It is necessary to install Resource Orchestrator and SYMCLI in the same server.
SYMAPI Server can also be installed on a different server.
- The server to install SYMAPI Server must be able to access EMC Symmetrix DMX storage from FC-HBA.

When Connecting EMC Symmetrix DMX Storage to Fibre Channel Switches

In Resource Orchestrator, when connecting EMC Symmetrix DMX storage, Fibre Channel switches are not configured.

It is necessary to configure one-to-one WWPN zoning for Fibre Channel switches in advance.

It is necessary to define zoning combining the fibre channel switch combining the HBA Port WWPN value based on the WWN provided by the I/O Virtualization Option and the DIRECTOR port WWPN value in the EMC Symmetrix DMX storage used in Resource Orchestrator. For details on the configuration method, refer to the manual of the fibre channel switch.

Fibre Channel Switch Zoning Settings

Set zoning combining the WWPN value of HBA Port1 and the WWPN value of the first Director port defined in the storage_portset.rcxprop definition file, and combining the WWPN value of HBA Port2 and the WWPN value of the second Director port defined in portset.

Examples of command execution for an ETERNUS SN200 are as follows:



Example

Conditions

- WWN value provided by the I/O Virtualization Option
"20:00:00:17:42:51:00:0x"
- WWPN value of HBA Port1
"21:00:00:17:42:51:00:0x"
- WWPN value of HBA Port2
"22:00:00:17:42:51:00:0x"

- WWPN value of the DIRECTOR portset defined first
"50:0a:09:81:88:bc:43:dc"
- WWPN value of the DIRECTOR portset defined first
"50:0a:09:82:88:bc:43:dc"

```
zoneCreate "emc_a_0","50:0a:09:81:88:bc:43:dc;21:00:00:17:42:51:00:00" <RETURN>
zoneCreate "emc_b_0","50:0a:09:82:88:bc:43:dc;22:00:00:17:42:51:00:00" <RETURN>
...
zoneCreate "emc_a_f","50:0a:09:81:88:bc:43:dc;21:01:00:17:42:50:00:0f" <RETURN>
zoneCreate "emc_b_f","50:0a:09:82:88:bc:43:dc;22:01:00:17:42:50:00:0f" <RETURN>
cfgCreate "ror_cfg","emc_a_0;emc_b_0; ... ;emc_a_f;emc_b_f" <RETURN>
cfgEnable "ror_cfg" <RETURN>
cfgSave <RETURN>
```

F.4 Pre-setup Preparations (Network)

This section explains the preparations for setting up a network.

The network environment and physical server required to run Resource Orchestrator must satisfy the following prerequisites:

- The configuration for the admin LAN and public LAN has been designed
- The network environment for the admin LAN is configured

For details on how to design and configure a network environment, refer to the following sections of the "ServerView Resource Coordinator VE Setup Guide":

- "3.2 Defining the Network Environment"
- "3.6 Configuring the Network Environment"
- "6.1.4 Registering LAN Switches"
- "6.2.1 Configuring VLANs on LAN Switches"

Perform the following procedures if necessary.

- The configuration for the iSCSI LAN has been designed

For details on how to design and configure a network environment for iSCSI, refer to "3.2.1 Network Configuration" in the "ServerView Resource Coordinator VE Setup Guide".



Note

When using a physical L-Server, the default physical network adapter numbers available for the admin LAN are as given below.

- When not performing redundancy, "1" is available
- When performing redundancy, "1" and "2" are available

When using a NIC other than the default one, the configuration at the time of physical server registration and at L-Server creation must be the same. Thus when designing systems it is recommended that physical servers registered in the same server pool use the same NIC index.



Information

The first NIC that is available for the admin LAN can be changed.

For details, refer to "6.1.3.1 Registering Blade Servers and Partition Model Servers" in the "ServerView Resource Coordinator VE Setup Guide".

When using IBP

When using IBP, it is necessary to create IBP uplink set for the public LAN and the admin LAN in advance.

When using physical L-Servers, it is necessary to create an IBP uplink set for the public LAN and the admin LAN in advance, using VIOM.

- Public LAN

Create a network resource with the same name as the created uplink set.

- Admin LAN

Describe the name of the admin LAN uplink set in the uplink set definition file for the admin LAN.

When the definition file does not exist, define it as follows.

Storage Location of the Uplink Set Definition File for the Admin LAN

[Windows]

Installation_folder\Manager\etc\customize_data\network_ibp.rcxprop

Format of the Uplink Set Definition File for the Admin LAN

Describe the definition file in individual lines as below:

<i>Key = Value</i>

Table F.2 List of Items Specified in the Definition File

Items	Key	Value	Remarks
Presence or Absence of IBP Environment	support_ibp_mode	- true - false	If LAN switch blades are being operated using IBP firmware, specify "true". If not, specify "false". If left blank, "false" is set.
Admin LAN Settings	external_admin_net_name	The name of the admin LAN uplink set	Enabled when ibp_mode is set to "true"

When using iSCSI

When using iSCSI, create an iSCSI network definition file.

For details, refer to ["5.2.5 Network Resources"](#).

F.5 Installation

This section explains installation of the manager of ServerView Resource Orchestrator.

For details on manager installation, refer to ["4.1 Installing the Manager"](#).

F.6 Setup

The setup procedure for using a physical server used as an L-Server is as follows:

1. Register resources

a. Register VIOM coordination (for blade servers)

Refer to "6.1.1 Registering VIOM Coordination" in the "ServerView Resource Coordinator VE Setup Guide".

Note

It is not necessary to register a VIOM server profile.

When creating a physical L-Server, VIOM server profiles are automatically created.

b. Register storage management software

When storage management software is registered, RAID groups or aggregates which were created during pre-setup preparations are automatically registered in Resource Orchestrator as virtual storage resources.

Execute the `rcxadm storagemgr register` command to register storage management software with Resource Orchestrator.

For details on the `rcxadm storagemgr register` command, refer to "1.7.1 `rcxadm storagemgr`" in the "ServerView Resource Orchestrator Reference Guide".

c. Register managed servers

1. Register chassis (for blade servers)

Refer to "6.1.2 Registering Chassis" in the "ServerView Resource Coordinator VE Setup Guide".

2. Register managed servers

For details, refer to "6.1.3 Registering Managed Servers" in the "ServerView Resource Coordinator VE Setup Guide".

When performing admin LAN NIC redundancy and registering a physical server, check "Use Admin LAN redundancy" in the "Register Server" dialog when registering the server.

Specify a different subnet address for the admin LAN used by the managed servers from the one for the admin LAN used by the physical L-Servers.

Note

When not using the default NIC, specify the NIC for admin LAN during the physical server registration.

For details, refer to "'Change Admin LAN NIC Settings' checkbox" in "6.1.3.1 Registering Blade Servers and Partition Model Servers" of the "ServerView Resource Coordinator VE Setup Guide".

3. Registering LAN Switches

For details, refer to "6.1.4 Registering LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

2. Register resources in resource pools

a. Register physical server resources

1. In the RC console orchestration tree, right-click the server pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the VM host to register and click <OK>.

b. Register storage resources

1. In the RC console orchestration tree, right-click the target storage pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the storage resource or disk resource to register and click <OK>.

Note

Register a resource for iSCSI boot, using the operation command (`rcxadm iscsictl`) for iSCSI boot.

c. Register network resources

If network resources are connected when creating an L-Server, LAN switch blades will be registered automatically as the physical server that the L-Server will operate on. If an image is specified, the IP address is configured. For details, refer to "[F.6.1 Automatic Network Configuration](#)".

1. In the RC console orchestration tree, right-click the target network pool, and select [Create Resource] from the popup menu.

The [Create a network resource] dialog is displayed.

2. Enter the items necessary for network resources. For details, refer to "[5.3.4 Network Resources](#)".



Note

When the destination of a physical L-Server is a PRIMERGY BX series server and when the LAN switch to be used is a PG-SW109 or a PG-SW201, only NIC1 and NIC2 can be used.

d. Register address set resources

Creates and registers an address set resource in the address pool. For details, refer to "[5.3.5 Address Set Resources](#)".

3. Create an L-Server template

- a. Export an L-Server template

For details, refer to "[5.4.1 Exporting a Template](#)".

- b. Edit an L-Server template

For details, refer to "[5.4.2 Editing a Template](#)".

- c. Importing an L-Server template

For details, refer to "[5.4.3 Importing a Template](#)".

F.6.1 Automatic Network Configuration

If network resources are connected when creating an L-Server, LAN switch blades will be registered automatically as the blade server that the L-Server will operate on.

If an image is specified, the IP address is configured.

Specify an IP address in a different subnet from the admin LAN.

For rack mount servers, only connect network resources.

When creating a physical L-Server, the IP address cannot be automatically configured if specifying a Red Hat Enterprise Linux image. Manually configure the IP address after the image has been deployed to the L-Server.

Configuration Patterns of Physical Servers which Support Automation of Network Configuration

Configuration patterns of physical servers which support automation of network configuration are as follow:

Each configuration pattern indicates the combination of hardware and the number of LAN switch blades mounted in it. The table below provides information of the specifiable ranges of the external connection port for the network resource and the number of the physical network adapter in this combination.

Table F.3 Physical Server Configuration Pattern (for PRIMERGY BX900 S1 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
A	<ul style="list-style-type: none"> - Server blades - PRIMERGY BX920 S1 - PRIMERGY BX920 S2 - PRIMERGY BX922 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201 	2	Select one from each of LAN switch blade 1 and 2	- For PG-SW111 or PG-SW112	<p>Mount LAN switch blades on the following connection blade slots.</p> <ul style="list-style-type: none"> - When mounting 2 LAN switch blades CB1(*1), CB2(*1) - When mounting 4 LAN switch blades CB1(*1), CB2(*1), CB3, CB4
B		2	Do not specify external connection ports (Internal network)	Specify one from 1 to 4 that is connected to LAN switch blade 1 and 2	
C		4	Select one from each of LAN switch blade 1 and 2	- For PG-SW109 or PG-SW201	
D		4	Do not specify external connection ports (Internal network)	Specify either 1 or 2 that is connected to LAN switch blade 1 and 2	
E		4	Select one from each of LAN switch blade 3 and 4	- For PG-SW111 or PG-SW112 Specify one from 3 to 8 that is connected to LAN switch blade 5 and 4 - For PG-SW109 or PG-SW201 Specify either 5 or 6 that is connected to LAN switch blade 3 and 4	
F	<ul style="list-style-type: none"> - Server blades - PRIMERGY BX924 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201 	2	Select one from each of LAN switch blade 1 and 2	Specify either 1 or 2 that is connected to LAN switch blade 1 and 2	<p>Mount LAN switch blades on the following connection blade slots.</p> <ul style="list-style-type: none"> - When mounting 2 LAN switch blades CB1, CB2 - When mounting 4 LAN switch blades CB1, CB2, CB3, CB4
G		2	Do not specify external connection ports (Internal network)		
H		4	Select one from each of LAN switch blade 1 and 2	Specify either 1 or 2 that is connected to LAN switch blade 1 and 2	
I		4	Do not specify external connection ports (Internal network)		

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
J		4	Select one from each of LAN switch blade 3 and 4	<ul style="list-style-type: none"> - For PG-SW111 or PG-SW112 Specify one from 3 to 6 that is connected to LAN switch blade 3 and 4 - For PG-SW109 or PG-SW201 Specify either 3 or 4 that is connected to LAN switch blade 3 and 4 	
K	<ul style="list-style-type: none"> - Server blades - PRIMERGY BX960 S1 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201 	2	Select one from each of LAN switch blade 1 and 2	Specify one from 1, 2, 11, or 12 that is connected to LAN switch blade 1 and 2	Mount LAN switch blades on the following connection blade slots. <ul style="list-style-type: none"> - When mounting 2 LAN switch blades CB1, CB2 - When mounting 4 LAN switch blades CB1, CB2, CB3 (*2), CB4 (*2)
L		2	Do not specify external connection ports (Internal network)		
M		4	Select one from each of LAN switch blade 1 and 2	Specify one from 1, 2, 11, or 12 that is connected to LAN switch blade 1 and 2	
N		4	Do not specify external connection ports (Internal network)		
O		4	Select one from each of LAN switch blade 3 and 4	<ul style="list-style-type: none"> - For PG-SW111 or PG-SW112 Specify one from 3 to 6 that is connected to LAN switch blade 3 and 4 - For PG-SW109 or PG-SW201 Specify either 3 or 4 that is connected to LAN switch blade 3 and 4 	

*1: When installing a PG-SW109 on CB1 or CB2, set the transmission speed at the down link port of PG-SW109 to 1 Gbps. For details on how to configure the settings, refer to the corresponding hardware manual.

*2: Only configurations where LAN expansion cards are mounted in expansion slot 1 are supported.

Table F.4 Physical Server Configuration Pattern (for PRIMERGY BX400 S1 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
P	- Server blades	2	Select one from each of LAN switch blade 1 and 2	- For PG-SW111 or PG-SW112	Mount LAN switch blades on the following connection blade slots. CB1(*1,*2), CB2(*1,*2)
Q	- PRIMERGY BX920 S2 - PRIMERGY BX922 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201	2	Do not specify external connection ports (Internal network)	- For PG-SW109 or PG-SW201 Specify one from 1, 2, 5, or 6 that is connected to LAN switch blade 1 and 2	
R	- Server blades	2	Select one from each of LAN switch blade 1 and 2	- For PG-SW111 or PG-SW112	Mount LAN switch blades on the following connection blade slots. CB1(*1), CB2(*1)
S	- PRIMERGY BX924 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201	2	Do not specify external connection ports (Internal network)	- For PG-SW109 or PG-SW201 Specify one from 1 to 4 that is connected to LAN switch blade 1 and 2	

*1: The same LAN switch blade model should be mounted in CB1 and CB2.

*2: When installing a PG-SW109 on CB1 or CB2, set the transmission speed at the down link port of PG-SW109 to 1 Gbps. For details on how to configure the settings, refer to the corresponding hardware manual.

Table F.5 Physical Server Configuration Pattern (for PRIMERGY BX600 S3 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
T	- PRIMERGY BX600 series servers - LAN switch blades - PG-SW104 - PG-SW107	2	Select one from each of LAN switch blade 1 and 2	Specify one from 1 to 6 that is connected to LAN switch blade 1 and 2	Mount LAN switch blades on the following network blade slots. - When mounting 2 LAN switch blades NET1(*1), NET2(*1) - When mounting 4 LAN switch blades NET1(*1), NET2(*1), NET3(*2), NET4(*2)
U		2	Do not specify external connection ports (Internal network)		
V		4	Select one from each of LAN switch blade 1 and 2	Specify one from 1 to 6 that is connected to LAN switch blade 1 and 2	
W		4	Do not specify external connection ports (Internal network)		
X		4	Select one from each of LAN switch blade 3 and 4	Specify either 7 or 8 that is connected to LAN switch blade 3 and 4	

*1: Mount PG-SW107.

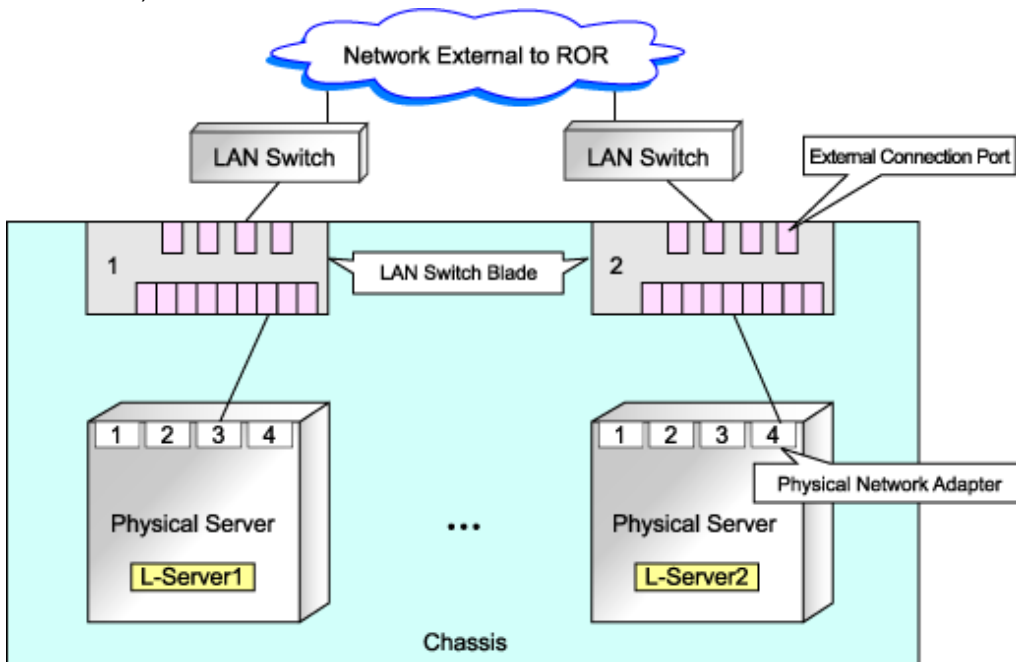
*2: Mount PG-SW104.

The NIC number of the L-Server the network resource above is allocated to is the number of the physical network adapter of the physical server.

When the LAN switch blade is in IBP mode, specify the NIC of the L-Server that network resources are allocated to as in the case when external connection ports have not been specified (internal network).

An example configuration of the pattern "A" in "Physical Server Configuration Pattern (for PRIMERGY BX900 S1 Chassis)" is given below.

Figure F.6 Configuration Example Pattern A of "Physical Server Configuration Pattern (for PRIMERGY BX900 S1 Chassis)"



F.6.2 Manual Network Configuration

When using a physical network adapter number which is different from the one used in the physical server configuration patterns, create network resources using the following procedure.

1. Create the XML file that defines network resources.

In this case, specify `auto="false"` in the Network tag.

For details on the Network tag and creation of XML files that define network resources, refer to "2.4 Network Resources" of the "ServerView Resource Orchestrator Reference Guide".

2. Execute the `rcxadm network create` command specifying the XML file created in 1.

For details on the `rcxadm network` command, refer to "1.3.5 rcxadm network" in the "ServerView Resource Orchestrator Reference Guide".

F.7 Creating an L-Server

Use the following procedure to create L-Servers:

- Creating an L-Server using an L-Server template

- When there are no cloning images, or when not using already registered cloning images

1. Create an L-Server, referring to "6.1 Creation Using an L-Server Template". In this case, select "None" for images.
2. Install an OS, referring to "F.7.1 Manual OS Installation".
3. When collecting cloning images after creating an L-Server, the cloning images are stored in the image pool. Collect cloning images, referring to "F.7.2 Cloning Images".

- When using an existing cloning image

Create an L-Server, referring to "6.1 Creation Using an L-Server Template". In this case, specify the cloning image that you want to use as an image.

- Create an L-Server specifying individual specifications

Refer to "[Appendix D L-Server Parameter Details](#)".

Configure the [OS] tab settings, referring to "[D.5 \[OS\] Tab](#)".

For details on how to install an operating system using PXE boot, refer to "[Installation of an operating system using PXE boot](#)" in "F.7.1 Manual OS Installation".

For details on L-Server network redundancy, tagged VLAN settings and untagged VLAN settings, refer to "[F.7.4 Network Redundancy and VLAN Settings of L-Servers](#)".

F.7.1 Manual OS Installation

This section explains how to manually install an operating system on an L-Server.

For manual OS installation, installation by remote console is recommended after starting the MB (Management Blade) or iRMC (Remote Management Controller) screen.

When installing an OS and a multipath driver, it is necessary to make only one access path from the server to the storage.

It is also necessary to install an agent after installing the OS, and then register it.

For details on how to install agents, refer to "[4.2 Installing the Agent](#)".

To register an agent, right-click the target L-Server in the orchestration tree, select [Register]-[Agent] from the popup menu, and click <OK>.

Installation of an operating system using PXE boot

To manually install an operating system using PXE boot, use the following procedure.



When using PXE boot, VIOM is required.

1. Create a physical L-Server, selecting "NIC for PXE boot" and "Network for PXE boot" of "Boot device priority" on the [Server] tab.

For details on the [Server] tab settings, refer to "[D.2.1 When "Physical" is Selected for \[Server type\]](#)".

2. Using the DHCP service settings of the PXE boot server, set the relevant physical L-Server so as to perform PXE boot.
3. Using PXE boot, install an OS on the physical L-Server.
4. Power OFF the physical L-Server after installing the OS.
5. In the [Modify an L-Server] dialog, change "Network for PXE boot" to "Default" under "Boot mode".
6. Using the DHCP service settings of the PXE boot server, set the relevant physical L-Server so as not to perform PXE boot.
7. Install the agent.

For details on how to install agents, refer to "[4.2 Installing the Agent](#)".

8. Register the agent.

For details on how to install agents, refer to "[Register Agents](#)" of "F.7.2 Cloning Images".

F.7.2 Cloning Images

Use the following procedure to collect cloning images:

Register Agents

It is also necessary to install an agent after installing an OS, and then register the server used by an L-Server for an agent.

Use the following procedure to register agents.

1. Right-click the target L-Server in the orchestration tree, and select [Register]-[Agent] from the popup menu.
2. In the displayed "Register Agent" dialog, click <OK>.

Collecting Cloning Images

For details on how to collect cloning images, referring to "[Collecting Cloning Images from L-Servers with an OS Installed](#)" in "6.6.1 Collecting a Cloning Image".

The network parameter auto-configuration function defined in a cloning image cannot be used for Resource Orchestrator.

When the target server of cloning image collection has a redundant NIC configured, release redundancy and then perform collection of cloning images.

F.7.3 [OS] Tab Configuration

Enter the parameters to set for the OS when creating the L-Server. This setting is valid only if an image is specified in the [General] tab. The setting process is performed the first time the L-Server is started.

If an image name is not specified, entry is not necessary.

Table F.6 List of Settings

Item	Description
Host name/Computer name	Enter the host name or computer name. [Windows] Specify up to 63 characters, including alphanumeric characters, underscores ("_"), and hyphens ("-"). The string cannot be composed solely of numbers. [Linux] Specify up to 64 characters, including alphanumeric characters, hyphens ("-"), periods ("."), and underscores ("_"). Underscores ("_") in the L-Server name will be converted to hyphens ("-"). If the basic information is not specified, the L-Server name is converted and set as indicated above.

F.7.4 Network Redundancy and VLAN Settings of L-Servers

In Resource Orchestrator, settings for an operating system, such as NIC redundancy on servers or tagged VLANs, are not performed. These settings should be made manually after creation of an L-Server.

When setting them automatically upon deployment of an OS image, prepare a script like the following, and perform collection of a cloning image with the script executed once on starting of the OS.

- According to the description in the network information file, perform settings for NIC redundancy, tagged VLANs, and IP addresses using NIC redundancy software (such as Windows Intel PROSet/Linux bonding).

For details on the specifications of the network information file, refer to "[Network Information File](#)".

Network Information File

The settings for NIC redundancy and tagged VLANs for a physical L-Server are described in the file. It is automatically transferred to a physical L-Server during creation. When the rcxadm lserver command is executed after creation of the physical L-Server, the network information file will be transferred to the L-Server.

Network Information File Storage Destination

[Windows]
Installation_folder\Resource Orchestrator\Agent\etc\net

[Linux]
/etc/opt/FJSVrcxat/net/

File Name of the Network Information File

net_info.conf

Character code

UTF-8

Line break code

[Windows]

CR/LF

[Linux]

LF

Format for the Network Information File

The formats are shown below.

Table F.7 List of Items Specified in the Network Information File

Variable	Meaning	Value
NIC[index]_MacAddress	NIC MAC address	MAC addresses, noted in hexadecimal form, separated by colons (":")
Groups	List of groups of redundant NICs	Group numbers, separated by spaces
Group[index]_NetworkLinks	NetworkLink list allocated to groups	NetworkLinkIndex separated by spaces
Group[index]_[NetworkLinkIndex]_Nics	List of NICs comprising groups	NIC numbers separated by spaces
Group[index]_[NetworkLinkIndex]_IpAddress	Group IP address	IPv4 addresses separated by periods (".")
Group [index]_[NetworkLinkIndex]_Netmask	Net masks of groups	
Group [index]_[NetworkLinkIndex]_DNSServer	DNS addresses of groups [Windows]	
Group [index]_[NetworkLinkIndex]_DefaultGateway	Default gateway	
Group [index]_[NetworkLinkIndex]_Vlanid	VLANID of NetLink allocated to the group	2-4094
Group [index]_[NetworkLinkIndex]_VlanMode	Specification of tagged VLANs or untagged VLANs	tagged or untagged
Group[index]_[NetworkLinkIndex]_ExtParams_[ParamName]	Additional group parameters For [ParamName], the parameter name specified during L-Server creation is used.	Parameter value specified by the user
SingleNics	List of non-redundant NICs in single configurations	NIC numbers separated by spaces
NIC [index]_NetworkLinks	NetworkLink list allocated to groups	NetworkLinkIndex separated by spaces
NIC [index]_[NetworkLinkIndex]_IpAddress	NIC IP addresses	IPv4 addresses separated by periods (".")
NIC [index]_[NetworkLinkIndex]_Netmask	NIC Net masks	
NIC [index]_[NetworkLinkIndex]_DNSServer	NIC DNS addresses [Windows]	
NIC [index]_[NetworkLinkIndex]_DefaultGateway	Default Gateway	

Variable	Meaning	Value
NIC [index]_[NetworkLinkIndex]_Vlanid	VLANID of NetLink allocated to NICs	2-4094
NIC [index]_[NetworkLinkIndex]_VlanMode	Specification of tagged VLANs or untagged VLANs	tagged or untagged
NIC [index]_[NetworkLinkIndex]_ExtParams_[ParamName]	Additional NIC parameters For [ParamName], the parameter name specified during L-Server creation is used.	Parameter value specified by the user
DNSServer	DNS Server [Linux]	-
Route [index]	Static routing configuration Type, destination address for packet, net mask and gateway address are specified, separated by commas.	- type: type of destination address - net: net address - host: host address - destination address: destination address for packet - mask: net mask - gateway address: gateway address

Information

When using a driver specific parameter such as GLS or Bonding for the script configuring the network, describe the information in the following files:

- Network unit parameter (describes IP addresses of monitoring targets for GLS or Bonding)

`/etc/opt/FJSSVrcvmr/customize_data/net/net_info.network_resource_name.conf`

- L-Server unit parameter (configures QoS or others to set for NICs)

`/etc/opt/FJSSVrcvmr/customize_data/l_server/net/net_info.l_server_name.conf`

When deploying L-Servers, send a network information file with content matching the L-Server name or the name of a network resource connected to the L-Server, to the destination server.

Example

```
#MAC information list of NIC equipped on Physical L-Server
NIC1_MacAddress="XX:XX:XX:XX:XX:X1"
NIC2_MacAddress="YY:YY:YY:YY:YY:Y2"
NIC3_MacAddress="XX:XX:XX:XX:XX:X3"
NIC4_MacAddress="YY:YY:YY:YY:YY:Y4"
NIC5_MacAddress="XX:XX:XX:XX:XX:X5"
NIC6_MacAddress="YY:YY:YY:YY:YY:Y6"
#####
#NIC redundancy information
#####
Groups="0 1"#Redundant group list(#0,#1 Group exist in this example)
```

```

Group0_NetworkLinks="0" #One NetworkLink exists in group 0 (index 0 only)
Group1_NetworkLinks="0 1" #Multiple NetworkLinks exist in group 1 (index 0 to 1)

#Group is written in Group_[NICGroupIndex]_[NetworkLinkIndex]
Group0_0_Nics="1 2" #Bonding NIC 1 and 2
Group0_0_IpAddress="192.168.0.1"
Group0_0_Netmask="255.255.255.0"
Group0_0_DefaultGateway="192.168.0.253"
Group0_0_Vlanid=2
Group0_0_VlanMode="tagged"
Group0_0_DNSServer="ipaddress"

Group1_0_Nics="3 4" #Bonding NIC 3 and 4
Group1_0_IpAddress="192.168.1.1"
Group1_0_Netmask="255.255.255.0"
Group1_0_Vlanid=3
Group1_0_VlanMode="tagged"

Group1_1_Nics="3 4" #Bonding NIC 3 and 4
Group1_1_IpAddress="192.168.2.1"
Group1_1_Netmask="255.255.255.0"
Group1_1_VlanMode="untagged"#Example that VLANID is not specified, since this group is untagged VLAN
Group1_1_DNSServer="ipaddress"
#####
#Non redundant NIC information
#####
SingleNics="5 6"#List of non-redundant NIC
NIC5_NetworkLinks="0" #One NetworkLink exists in NIC5(index 0 only)
NIC6_NetworkLinks="0 1" #Multiple NetworkLinks exist in NIC6(index 0 to 1)

NIC5_0_IpAddress="192.168.20.1"
NIC5_0_Netmask="255.255.255.0"
NIC5_0_VlanMode="untagged"#Example where VLANID is not specified, since this group is untagged VLAN
NIC5_0_DNSServer="ipaddress"

NIC6_0_IpAddress="192.168.30.1"
NIC6_0_Netmask="255.255.255.0"
NIC6_0_VlanMode="untagged"#Example where VLANID is not specified, since this group is untagged VLAN

NIC6_1_IpAddress="192.168.40.1"
NIC6_1_Netmask="255.255.255.0"
NIC6_1_Vlanid=40
NIC6_1_VlanMode="tagged"#Tagged VLAN
NIC6_1_DNSServer="ipaddress"
Route0=net,192.168.200.0,255.255.255.0,192.168.1.254

```

.....

F.8 Advisory Notes for Creation of Physical L-Servers

This section explains advisory notes regarding creation of physical L-Servers.

Prerequisites

To create a physical L-Server, Virtual I/O using HBA address rename or VIOM is required.

Usage methods of HBA address rename or VIOM differ depending on the manager OS and the hardware of managed servers used to configure a physical L-Server.

Table F.8 Available Combinations of Manager OS and Hardware for Managed Servers

	Blade Servers	Rack Mount Servers
Windows	VIOM	HBA address rename
Linux	Usage is not possible	HBA address rename

Deleting an L-Server

When deleting an L-Server, log out from the ETERNUSmgr of ETERNUS storage registered on ESC.

When operating NetApp storage in cluster environments and operating a partial system due to system trouble, perform the operation after recovering the NetApp storage and returning the system to cluster operation.

When the disk resource is a LUN created in advance or a LUN for iSCSI boot, it is recommended to delete the data on the disk, as the data is not deleted when deleting an L-Server to which the disk resource is allocated.

For details on how to delete data on the disks, refer to the cautionary notes of "[5.3.3 Storage Resources](#)".

L-Server Snapshots

Snapshots of L-Servers cannot be used.

Moving an L-Server between servers (migration)

Moving between servers (migration) cannot be used.

Appendix G Configuration of Server Virtualization Software

This chapter explains how to configure server virtualization software.

G.1 VMware

This section explains how to use VMware as server virtualization software.

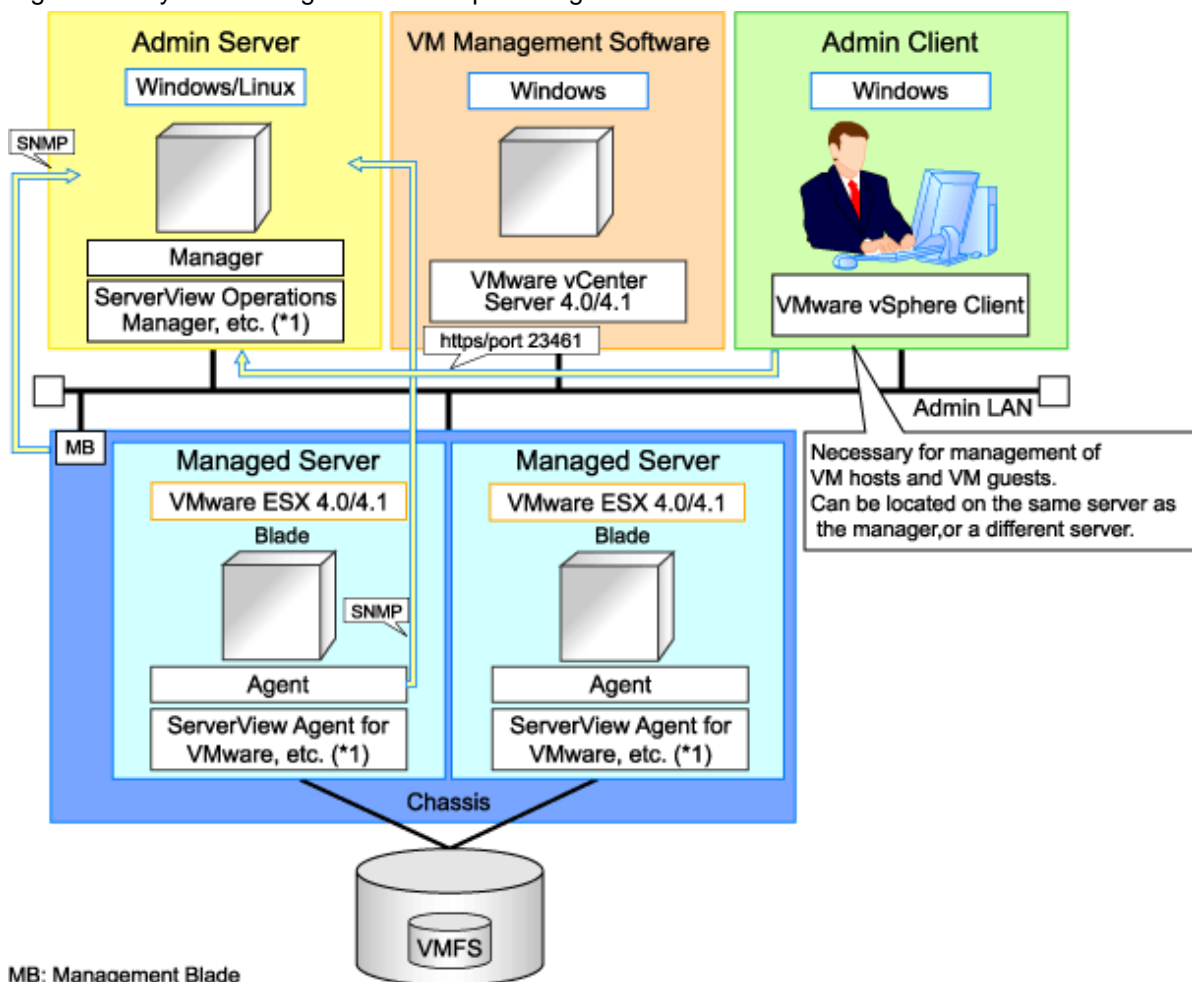
G.1.1 System Configuration

This explains how to configure VMware for use as server virtualization software.

Example of System Configuration

An example system configuration using VMware ESX is given below.

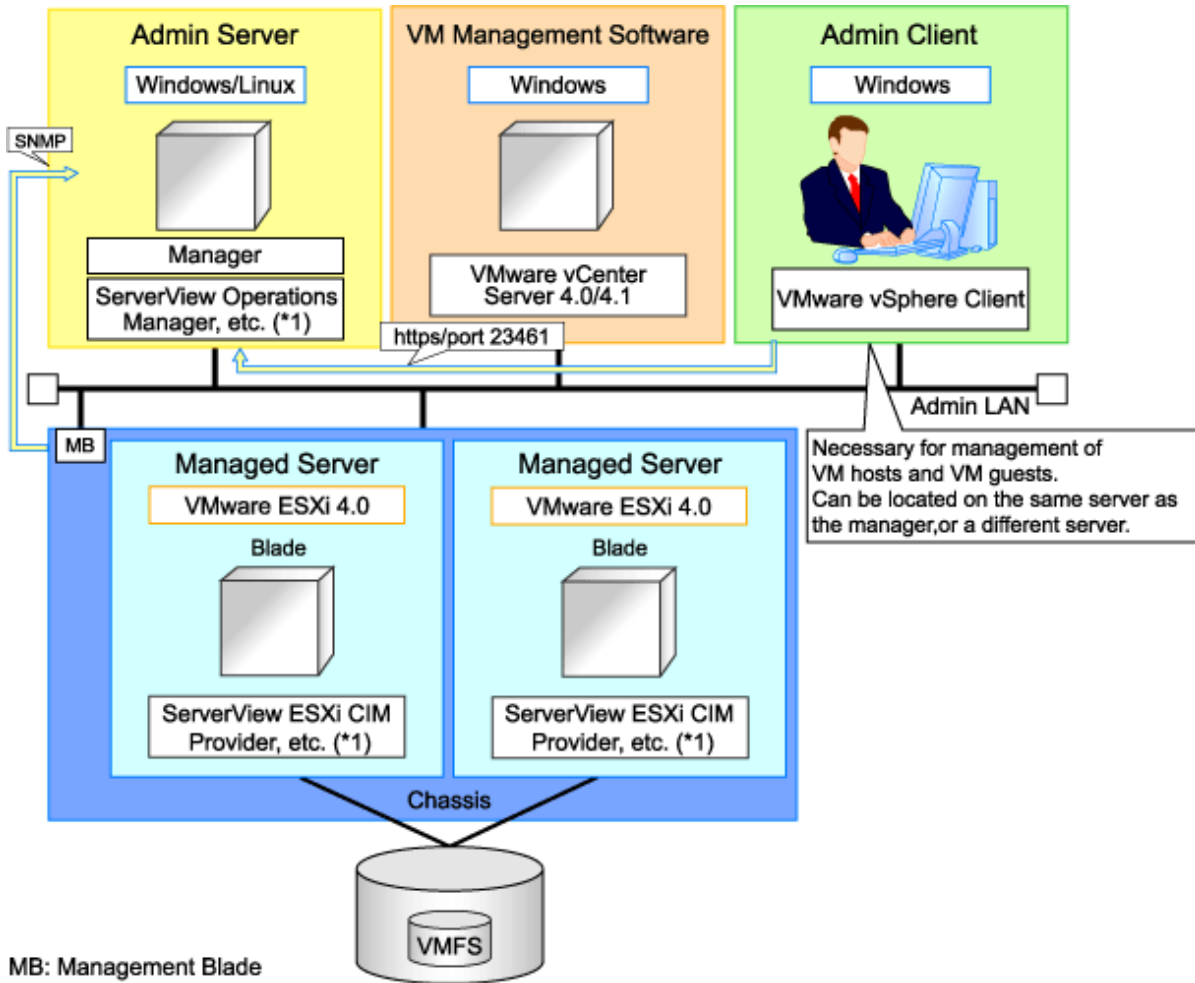
Figure G.1 System Configuration Example Using VMware ESX



*1: For details on required software, refer to "1.3.2.2 Required Software".

An example system configuration using VMware ESXi is given below.

Figure G.2 System Configuration Example Using VMware ESXi



*1: For details on required software, refer to "[1.3.2.2 Required Software](#)".

Note

For a configuration example for rack mount servers, delete the chassis and management blades from the diagram above.

Simplifying Network Settings

Network settings can be easily configured by Resource Orchestrator when creating L-Servers.

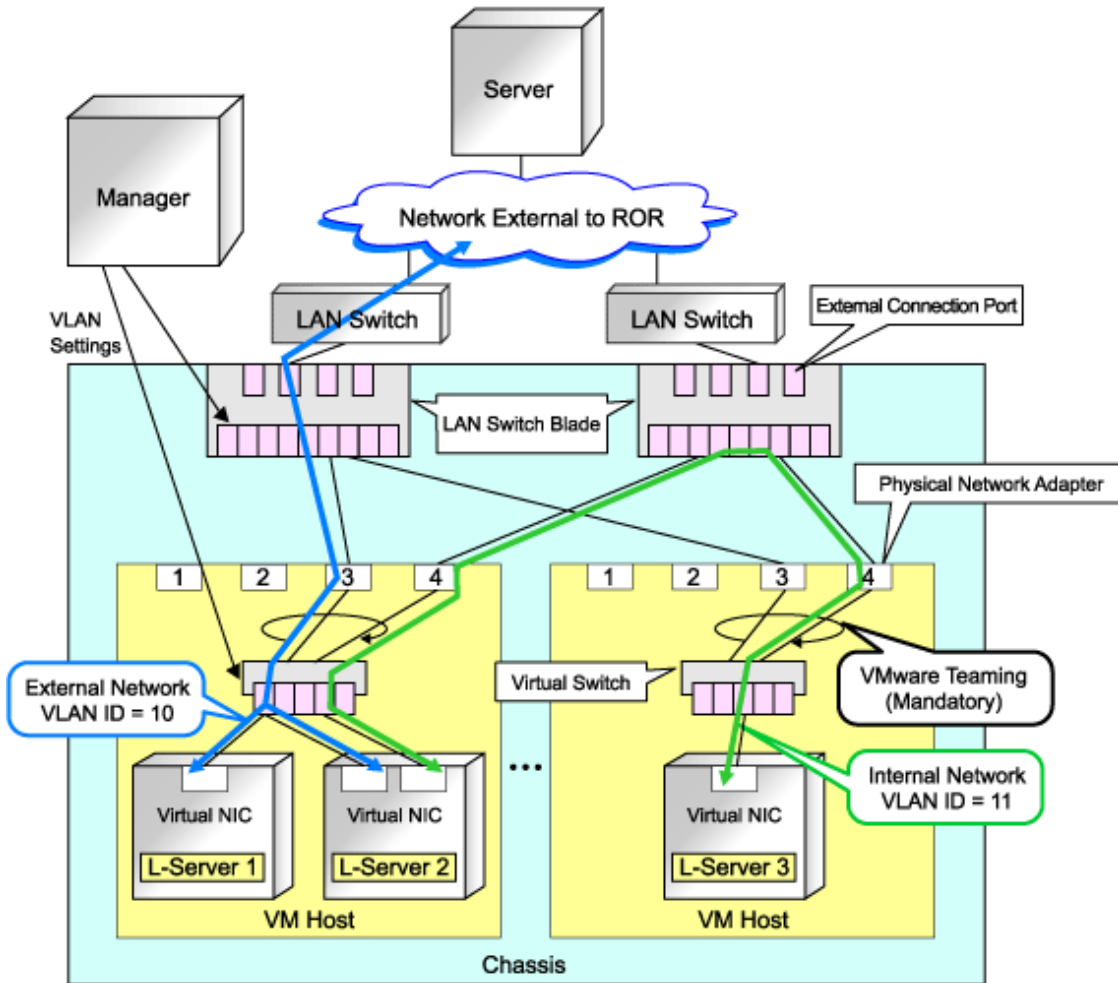
Depending on the conditions, such as hardware (blade servers or rack mount servers) and the presence or absence of network redundancy for L-Servers, the setting ranges of networks differ.

For details, refer to "[1.2.6 Simplifying Network Settings](#)".

Network Configuration Example

An example network configuration using VMware is given below:

Figure G.3 LAN Switch Blade and Virtual Switch Configuration Using Network Resources [VMware]



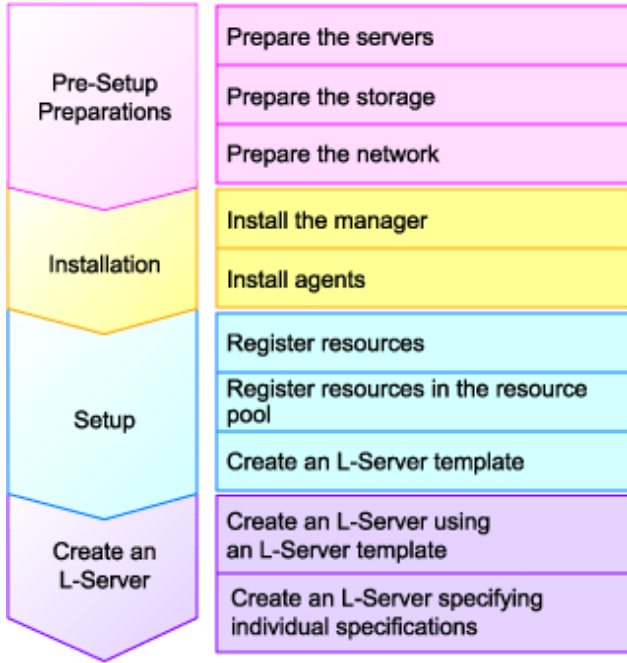
 Note

- When network settings have been performed automatically for an L-Server in a VMware environment, redundancy of virtual switches and physical network adapters will be performed using VMware Teaming.
- For Resource Orchestrator, only configure the LAN switch blades when using switch mode.
- Configure the admin LAN and the public LAN separate physically. For details, refer to "3.3 Preparations for Network Environments".

L-Server Creation Procedure

The procedure for creating L-Servers is shown below.

Figure G.4 Resource Orchestrator Setup Procedure



For details on how to prepare to setup Resource Orchestrator, refer to "G.1.2 Pre-setup Preparations".

For details on how to install Resource Orchestrator, refer to "G.1.3 Installation".

For details on how to set up Resource Orchestrator, refer to "G.1.4 Setup".

For details on how to create an L-Server, refer to "G.1.5 Creating an L-Server".

P Point

When using VMware ESX, install Resource Orchestrator agents and ServerView for VMware agents.

When using VMware ESXi, install ServerView ESXi CIM Provider agents.

G.1.2 Pre-setup Preparations

Pre-setup preparations are required to create and manage VMware virtual machines as L-Servers of Resource Orchestrator.

For details on pre-setup preparations for VMware environments, refer to the VMware manual.

Pre-setup Preparations (Servers)

In addition to the operations in "3.1 Preparations for Server Environments", the following operations are necessary.

- Configure VIOM

When using I/O virtualization, configuration of VIOM is necessary.

- Install and configure VMware ESX

When installing an OS on a physical server, refer to the server virtualization software manual.

When installing a VM host in an L-Server, refer to "Appendix K Installation of VM Hosts on Physical L-Servers".

- Install and configure VMware vCenter Server

Necessary for management of VM hosts and L-Servers.

It is necessary to install the Microsoft Sysprep tools for VMware vCenter Server to enable collection of L-Server cloning images. For details on how to install the Microsoft Sysprep tools, refer to the installation section of "vSphere Basic System Administration" of VMware.

Refer to the relevant version of document, referring to the following URL:

vSphere Basic System Administration

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

- Configure VMware clusters

When performing movement between servers (migration), register the source and destination VM hosts for migration in the same cluster.

When not performing redundancy of L-Servers, it is not necessary to enable VMware HA or VMware DRS.

- Design and configure VMware HA

When performing redundancy of L-Servers, VMware HA configuration must be done in advance.

- Design and configure VMware DPM, VMware DRS, VMware FT, and VMware Storage VMotion

When using VMware DPM, VMware DRS, VMware FT, or VMware Storage VMotion, configure them in advance using VMware vCenter Server.

For details, refer to the VMware manual.

 **Information**

When performing inter-cluster movement (migration), for VMware this means inter-resource pool movement (migration). Moving an L-Server (migration) is only possible in the same cluster (the same resource pool) because resource pools of VMware are not managed in Resource Orchestrator. For details on resource pools of VMware, refer to the "vSphere Resource Management Guide" of VMware.

Refer to the relevant version of document, referring to the following URL:

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

Pre-setup Preparations (Storage)

Confirm the following:

- Volumes to allocate to VMware ESX have been already created
- Zoning and affinity have been set
- VMware ESX has been configured to recognize a VMFS datastore

Pre-setup Preparations (Network)

Confirm the following:

- The configuration for the admin LAN and public LAN has been designed
- The network environment for the admin LAN is configured
- The virtual switch to connect to the admin LAN has been designed and configured

When using IBP

When using virtual L-Servers, connect the IBP uplink sets used for the public LAN and admin LAN to the VM host regardless of VIOM, after creating each IBP uplink set.

It is not necessary to use the same name for the uplink set and the name of the network resource.

Point

- For VMware virtual switches, configuration is not necessary as they are automatically configured by Resource Orchestrator.
- When performing movement between servers (migration), configure the VMkernel port group for VMotion on each host.
- For details on how to configure the VMkernel port group, refer to the information in "vSphere Basic System Administration" of VMware.

Refer to the relevant version of document, referring to the following URL:

vSphere Basic System Administration

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

When Using Distributed Virtual Switch (VMware vDS)

In Resource Orchestrator, the NICs of VM guests and port groups can be connected to the port groups of a distributed virtual switch (VMware vDS). The port groups of the distributed virtual switch should be configured beforehand manually.

When using VMware vDS, the following preparation is necessary:

1. Create port groups of the distributed virtual switch

Refer to the VMware manual, and create them manually.

2. Define the correspondence of the port groups of the distributed virtual switch and VLAN IDs

Create the distributed virtual network definition file shown below, and associate the port groups and the VLAN IDs:

Storage Location of Distributed Virtual Network Definition Files

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvmr/customize_data

Distributed Virtual Network Definition File Name

vnetwork_vmware.rcxprop

File Format for Distributed Virtual Network Definitions

Describe the distributed virtual network definition file in individual lines in the following format:

```
"Port_group_name_of_Distributed_Virtual_Switch"=VLAN ID[,VLAN ID...]
```

For the VLAN ID, an integer between 1 and 4094 can be specified. When specifying a sequence of numbers, use a hyphen ("-") such as in "1-4094".

Example

```
"Network A"=10  
"Network B"=21,22,23  
"Network C"=100-200,300-400,500
```

- Spaces before and after equal signs ("=") and commas (",") are ignored.
- Describe the port group name of the distributed virtual switch correctly, as entry is case sensitive.
- Use the UTF-8 character code.

- When there are multiple lines with the same distributed virtual switch port group name, all specified lines are valid.
 - When the same VLAN ID is used in lines where the port group names of different distributed virtual switches are described, the VLAN ID in the first line is valid.
3. Place the distributed virtual switch usage configuration file

Place the distributed virtual switch use configuration file. Create the following folder and place an empty file in it.

Storage Location of Distributed Virtual Network Switch Usage Configuration File

[Windows]
Installation_folder\Manager\etc\vm

[Linux]
 /etc/opt/FJSVrcvnr/vm

Distributed Virtual Network Switch Usage Configuration File Name

vds_vc

G.1.3 Installation

Installing the Manager

Install the Resource Orchestrator manager. For details on manager installation, refer to "[4.1 Installing the Manager](#)".

Install agents

Install Resource Orchestrator agents on managed servers. For details on how to install agents, refer to "[4.2.2 Installation \[Linux/VMware/Xen/Oracle VMJ\]](#)".

G.1.4 Setup

The setup procedure when using VMware as server virtualization software is as follows:

1. Register resources
 - a. Register VM management software

When registering VM management software, VMFS datastores which are created in advance during pre-setup preparations, are automatically registered in Resource Orchestrator as virtual storage resources.

For details on how to register VM management software, refer to "6.1.5 Registering VM Management Software" in the "ServerView Resource Coordinator VE Setup Guide".
 - b. Register managed servers
 1. Register chassis

Refer to "6.1.2 Registering Chassis" in the "ServerView Resource Coordinator VE Setup Guide".
 2. Register managed servers (within chassis)

For details, refer to "6.1.3 Registering Managed Servers" in the "ServerView Resource Coordinator VE Setup Guide".
 3. Register LAN switch blades

For details, refer to "6.1.4.1 Registering LAN Switch Blades" in the "ServerView Resource Coordinator VE Setup Guide".
 - c. Network resources

To register a network resource, specify a network pool when creating the network resource.

By creating network resources in advance, if the NIC and network resources are connected when an L-Server is created, the following settings matching the network resource definition will be registered automatically.

Information

For details on automatic configuration of network resources, refer to "[Automatic Network Configuration](#)".

When using VMware vDS, refer to "[When Using Distributed Virtual Switch \(VMware vDS\)](#)" in "G.1.2 Pre-setup Preparations".

2. Register resources in resource pools

a. Register VM host resources

1. In the RC console orchestration tree, right-click the target VM pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the VM host to register and click <OK>.

b. Register virtual storage resources

1. In the RC console orchestration tree, right-click the target storage pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the virtual storage resource to register and click <OK>.

c. Register network resources

If the NIC and network resources are connected when an L-Server is created, the settings matching the network resource definition will be registered automatically for the VM host that the L-Server will operate on. For details, refer to "[Automatic Network Configuration](#)".

1. In the RC console orchestration tree, right-click the target network pool, and select [Create Resource] from the popup menu.

The [Create a network resource] dialog is displayed.

2. Enter the items necessary for network resources.

Point

When using VMware vDS, in port group creation for distributed virtual switches, set the same VLAN ID used for the port group to the network resource.

For details on network resource creation, refer to "[5.3.4 Network Resources](#)".

3. Create an L-Server template

a. Export an L-Server template

For details, refer to "[5.4.1 Exporting a Template](#)".

b. Edit an L-Server template

For details, refer to "[5.4.2 Editing a Template](#)".

c. Importing an L-Server template

For details, refer to "[5.4.3 Importing a Template](#)".

Automatic Network Configuration

If the NIC and network resources are connected when an L-Server is created, the following settings matching the network resource definition will be registered automatically for the VM host that the L-Server will operate on.

- LAN switch blade (when using blade servers)

A tagged VLAN is configured on the internal ports.

- Virtual switches, port groups

If the required network resources do not exist, they are automatically created. A redundant NIC configuration will be configured.

If it already exists, the virtual switch and port group are used.

- VM guests

VM guests are connected to port groups.

If an image is specified, the IP address is automatically configured.

In environments using the clustering function of VM management software, in order to enable the migration of VM guests and operation using the HA function, settings for LAN switch blades, virtual switches, and port groups are performed automatically for all VM hosts comprising the cluster.

The RC Console can be used for VLAN configuration of LAN switch blade external ports. Right-click the LAN switch in the server resource tree, and select [Modify]-[Network Settings] from the popup menu.

For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

Manually perform virtual switch and port group settings using VMware functions.



Note

- After creating an L-Server, if VM hosts are added to the cluster afterwards, Resource Orchestrator network settings are not performed automatically.
Perform the same settings as the existing VM hosts in the cluster configuration for the LAN switch blades and virtual switches of the additional VM hosts.
- For the gateway address, set the IP address of the existing node.

Configuration Patterns of VM Hosts which Support Automation of Network Configuration

Configuration patterns of VM hosts which support automation of network configuration are as follow:

Each configuration pattern indicates the combination of hardware and the number of LAN switch blades mounted in it. In this combination, the table below provides information on which physical network adapter is used for creation of virtual switches and port groups depending on the external connection port settings for the network resources.

Table G.1 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
A	- Server blades - PRIMERGY BX920 S1	2	Select one from each of LAN switch blade 1 and 2	- For PG-SW111 or PG-SW112	Mount LAN switch blades on the following connection blade slots. - When mounting 2 LAN switch blades CB1(*1), CB2(*1) - When mounting 4 LAN switch blades CB1(*1), CB2(*1), CB3, CB4
B	- PRIMERGY BX920 S2 - PRIMERGY BX922 S2 - LAN switch blades - PG-SW109	2	Do not specify external connection ports (Internal network)	- Use 3 and 4 that are connected to LAN switch blade 1 and 2 for teaming (Enable 3 to perform redundancy) - For PG-SW109 or PG-SW201	

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
				Use 1 and 2 that are connected to LAN switch blade 1 and 2 for teaming (*2)	
C		4	Select one from each of LAN switch blade 1 and 2	- For PG-SW111 or PG-SW112	
D	- PG-SW111 - PG-SW112 - PG-SW201	4	Do not specify external connection ports (Internal network)	Use 3 and 4 that are connected to LAN switch blade 1 and 2 for teaming (Enable 3 to perform redundancy) - For PG-SW109 or PG-SW201 Use 1 and 2 that are connected to LAN switch blade 1 and 2 for teaming (Enable 1 to perform redundancy)	
E		4	Select one from each of LAN switch blade 3 and 4	Use 5 and 6 that are connected to LAN switch blade 3 and 4 for teaming (Enable 5 to perform redundancy)	
F		2	Select one from each of LAN switch blade 1 and 2	Use 1 and 2 that are connected to LAN switch blade 1 and 2 for teaming (*2)	
G	- Server blades - PRIMERGY BX924 S2	2	Do not specify external connection ports (Internal network)		Mount LAN switch blades on the following connection blade slots.
H	- LAN switch blades - PG-SW109	4	Select one from each of LAN switch blade 1 and 2	Use 1 and 2 that are connected to LAN switch blade 1 and 2 for teaming (Enable 1 to perform redundancy)	- When mounting 2 LAN switch blades CB1, CB2
I	- PG-SW111 - PG-SW112	4	Do not specify external connection ports (Internal network)		- When mounting 4 LAN switch blades CB1, CB2, CB3, CB4
J	- PG-SW201	4	Select one from each of LAN switch blade 3 and 4	Use 3 and 4 that are connected to LAN switch blade 3 and 4 for teaming (Enable 3 to perform redundancy)	
K	- Server blades - PRIMERGY BX960 S1	2	Select one from each of LAN switch blade 1 and 2	Use 11 and 12 that are connected to LAN switch blade 1 and 2 for teaming (Enable 11 to perform redundancy)	Mount LAN switch blades on the following connection blade slots.
L	- LAN switch blades - PG-SW109	2	Do not specify external connection ports (Internal network)		- When mounting 2 LAN switch blades CB1, CB2

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
M	<ul style="list-style-type: none"> - PG-SW111 - PG-SW112 - PG-SW201 	4	Select one from each of LAN switch blade 1 and 2	Use 11 and 12 that are connected to LAN switch blade 1 and 2 for teaming (Enable 11 to perform redundancy)	<ul style="list-style-type: none"> - When mounting 4 LAN switch blades CB1, CB2, CB3 (*3), CB4 (*3)
N		4	Do not specify external connection ports (Internal network)		
O		4	Select one from each of LAN switch blade 3 and 4	Use 3 and 4 that are connected to LAN switch blade 3 and 4 for teaming (Enable 3 to perform redundancy)	

*1: When installing a PG-SW109 on CB1 or CB2, set the transmission speed at the down link port of PG-SW109 to 1 Gbps. For details on how to configure the settings, refer to the corresponding hardware manual.

*2: The admin LAN and public LAN share the same physical network adapter. Use 1 and 2 for teaming on the admin LAN.

*3: Only configurations where LAN expansion cards are mounted in expansion slot 1 are supported.

Table G.2 VM Host Configuration Pattern (For PRIMERGY BX400 S1 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
P	<ul style="list-style-type: none"> - Server blades - PRIMERGY BX920 S2 - PRIMERGY BX922 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201 	2	Select one from each of LAN switch blade 1 and 2	<ul style="list-style-type: none"> - For PG-SW111 or PG-SW112 Use 3 and 7 that are connected to LAN switch blade 1 and 2 for teaming (Enable 3 to perform redundancy) - For PG-SW109 or PG-SW201 Use 2 and 6 that are connected to LAN switch blade 1 and 2 for teaming (Enable 2 to perform redundancy) 	Mount LAN switch blades on the following connection blade slots. CB1(*1,*2), CB2(*1,*2)
Q		2	Do not specify external connection ports (Internal network)		
R	<ul style="list-style-type: none"> - Server blades - PRIMERGY BX924 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201 	2	Select one from each of LAN switch blade 1 and 2	Use 2 and 4 that are connected to LAN switch blade 1 and 2 for teaming (Enable 2 to perform redundancy)	Mount LAN switch blades on the following connection blade slots. CB1(*1), CB2(*1)
S		2	Do not specify external connection ports (Internal network)		

*1: The same LAN switch blade model should be mounted in CB1 and CB2.

*2: When installing a PG-SW109 on CB1 or CB2, set the transmission speed at the down link port of PG-SW109 to 1 Gbps. For details on how to configure the settings, refer to the corresponding hardware manual.

Table G.3 VM Host Configuration Pattern (For PRIMERGY BX600 S3 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
T	<ul style="list-style-type: none"> - PRIMERGY BX600 series servers - LAN switch blades - PG-SW104 - PG-SW107 	2	Select one from each of LAN switch blade 1 and 2	Use 3 and 4 that are connected to LAN switch blade 1 and 2 for teaming (Enable 3 to perform redundancy)	<ul style="list-style-type: none"> - Mount LAN switch blades on the following network blade slots. - When mounting 2 LAN switch blades NET1(*1), NET2(*1) - When mounting 4 LAN switch blades NET1(*1), NET2(*1), NET3(*2), NET4(*2)
U		2	Do not specify external connection ports (Internal network)		
V		4	Select one from each of LAN switch blade 1 and 2	Use 3 and 4 that are connected to LAN switch blade 1 and 2 for teaming (Enable 3 to perform redundancy)	
W		4	Do not specify external connection ports (Internal network)		
X		4	Select one from each of LAN switch blade 3 and 4	Use 7 and 8 that are connected to LAN switch blade 3 and 4 for teaming (Enable 7 to perform redundancy)	

*1: Mount PG-SW107.

*2: Mount PG-SW104.

The numbers of physical network adapters given above can be checked on the details window of the LAN switch blade.

When the LAN switch blade is in IBP mode, specify virtual switches and port groups as in the case when external connection ports have not been specified (internal network).

When a virtual switch for use on the public LAN has been created in advance, or settings have been performed manually, it is necessary that the number of the physical network adapter the virtual switch is connected to matches the number in the details given above.

In rack mount server environments, only the function for connecting NICs of VM guests is provided for the port groups of virtual switches created in advance. Manually perform virtual switch and port group settings in advance.

When manually configuring a port group, for the name of port groups using the same VLAN ID, it is necessary to use a common name on all VM hosts. When using server virtualization software other than VMware with the same manager, set a different port group name from the one used for the virtual switch, virtual network, and virtual bridge on the other server virtualization software.

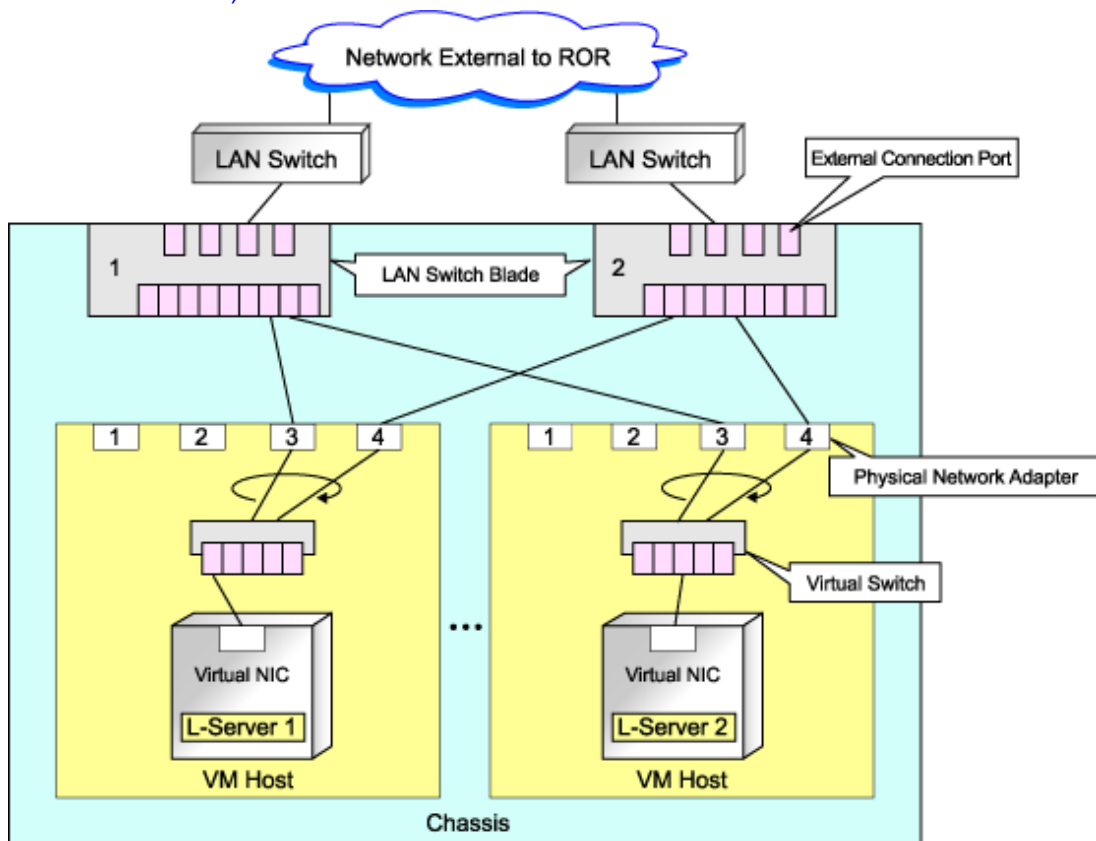
For blade servers, refer to "[Manual Network Configuration](#)".

 Note

In the configuration pattern V or X for the PRIMERGY BX600 series, Fibre Channel switch blades cannot be connected.

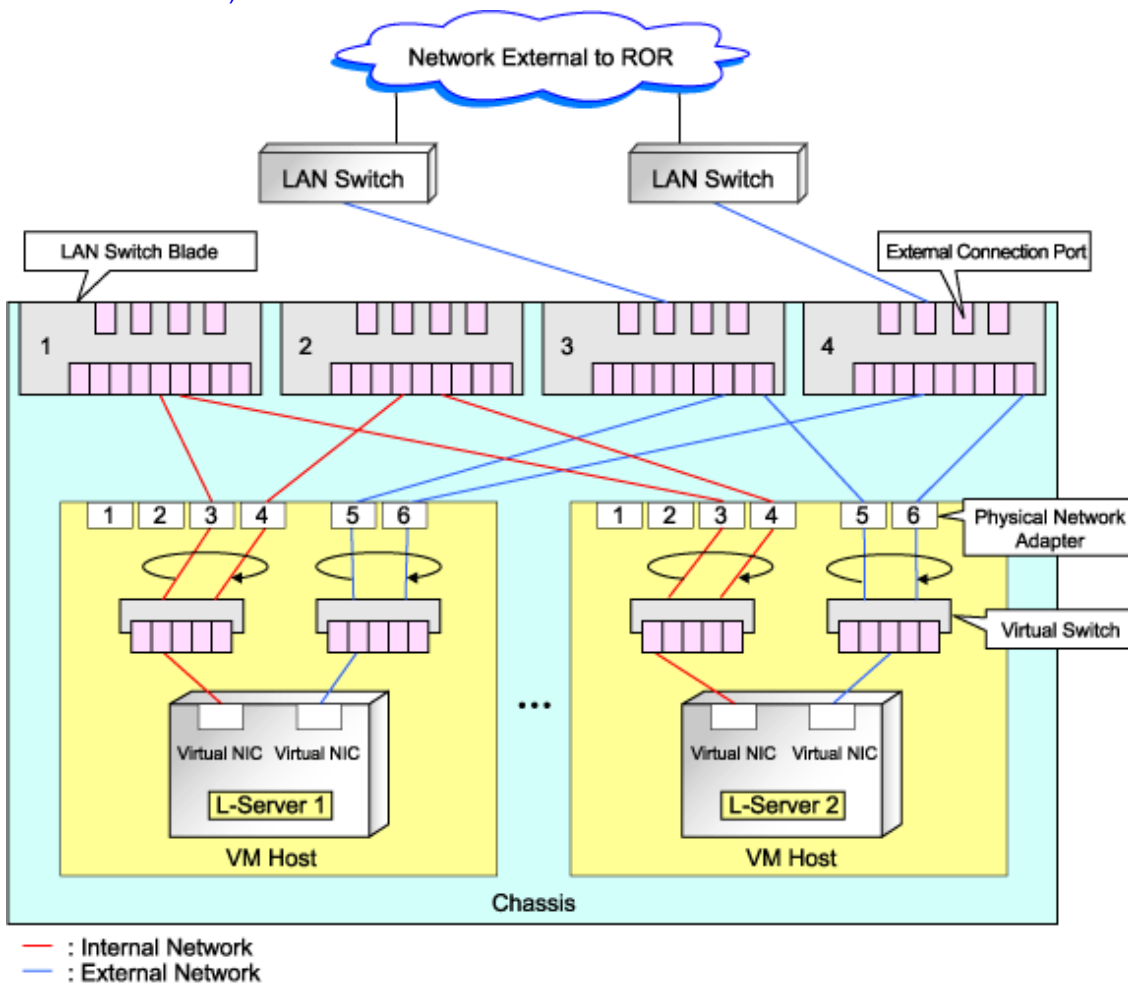
An example configuration of the pattern "A" in "[Table G.1 VM Host Configuration Pattern \(For PRIMERGY BX900 S1 Chassis\)](#)" is given below.

Figure G.5 Configuration Example Pattern A of "Table G.1 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)"



An example configuration of the pattern "E" in "Table G.1 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)" is given below.

Figure G.6 Configuration Example Pattern E of "Table B.1 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)"



Manual Network Configuration

When using a physical network adapter number that differs from configuration patterns of VM hosts which support automation of network configuration, configure the network using the following procedure:

1. Manually create a virtual switch connected to a physical NIC.
For details on how to create virtual switches, refer to the VMware manual.
2. On the virtual switch created in 1., manually create a port group for which a VLAN ID has been set.
For details on how to create port groups, refer to the VMware manual.

When manually configuring a port group, for the name of port groups using the same VLAN ID, it is necessary to use a common name on all VM hosts. When using server virtualization software other than VMware with the same manager, set a different port group name from the one used for the virtual switch, virtual network, and virtual bridge on the other server virtualization software.

3. For the LAN switch blade connected to the physical NICs, configure a VLAN which includes a downlink port.
Right-click the LAN switch in the server resource tree, and select [Modify]-[Network Settings] from the popup menu.
For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".
4. Create the XML file that defines network resources.
Define the VLAN ID specified at 2 and 3 in the XML file.
In this case, specify auto="false" in the Network tag.

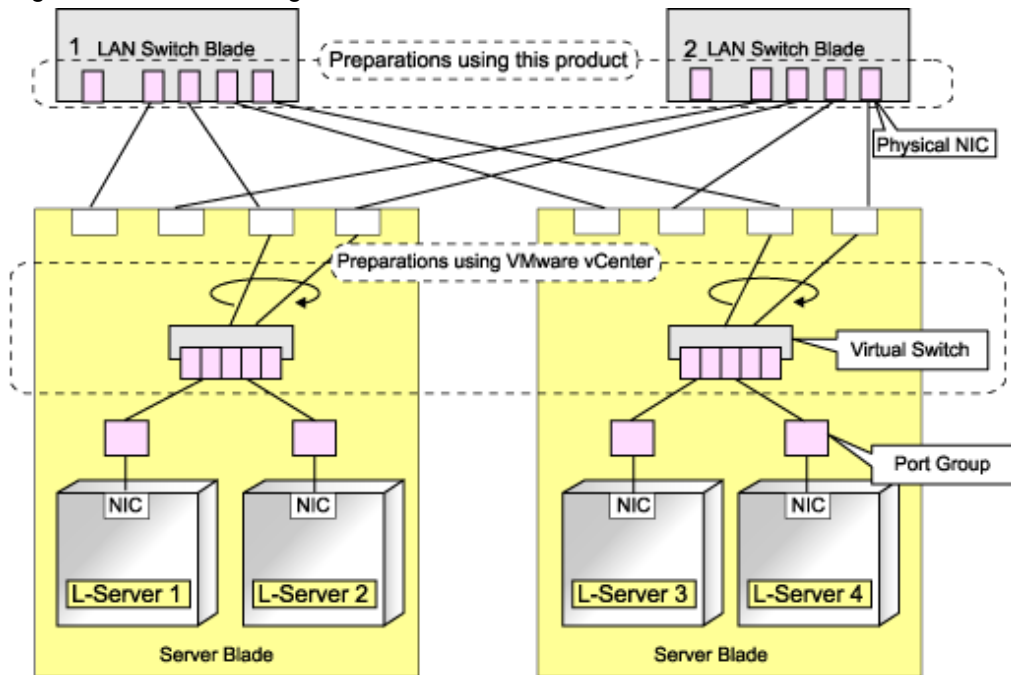
For details on the Network tag and creation of XML files that define network resources, refer to "2.4 Network Resources" of the "ServerView Resource Orchestrator Reference Guide".

5. To create the network resource, execute the `rcxadm network create` command specifying the XML file created in 4.

The network resources are created.

For details on the `rcxadm network` command, refer to "1.3.5 rcxadm network" in the "ServerView Resource Orchestrator Reference Guide".

Figure G.7 Network Diagram



G.1.5 Creating an L-Server

Use the following procedure to create L-Servers:

1. Creating an L-Server using an L-Server template
 - a. When there are no cloning images, or when not using already registered cloning images
 1. Create an L-Server, referring to "6.1 Creation Using an L-Server Template". In this case, select "None" for images.
 2. Install an OS, referring to "Manual OS Installation".
 3. When collecting cloning images after creating an L-Server, the cloning images are stored in the image pool. Collect cloning images, referring to "Collecting Cloning Images".
 - b. When using an existing cloning image

Create an L-Server, referring to "6.1 Creation Using an L-Server Template". In this case, specify the cloning image that you want to use as an image.
2. Create an L-Server specifying individual specifications

Refer to "Appendix D L-Server Parameter Details".

For details on the [OS] tab settings, refer to "G.1.6 [OS] Tab Configuration".

Manual OS Installation

To manually install an operating system, use the following procedure.

1. Stop an L-Server.

If an L-Server is operating, stop it.

For details, refer to "[6.2.2 Stopping an L-Server](#)".

2. Connect a console to the L-Server.

Connect a console to the L-Server. For details on console connections, refer to "[Console](#)" in "6.4 Using the L-Server Console".

3. Connect DVD drives.

Perform connection of DVD drives from the console window.

4. Install an OS manually on the L-Server.

Start an L-Server, and manually install an OS on the L-Server.

When installing an OS manually, refer to "Guest Operating System Installation Guide".

Refer to the relevant version of document, referring to the following URL:

Guest Operating System Installation Guide

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

Configuration After OS Installation

Install VMware Tools after installing an OS.

Use the following procedure to install VMware Tools.

1. Right-click the target L-Server in the orchestration tree, and select [Install VM Tool] from the popup menu.
2. In the displayed confirmation dialog, click <OK>.

The ISO images are connected to the L-Server for VM guest.

For details on VMware Tools, refer to the information on VMware Tools in "vSphere Basic System Administration" of VMware.

Refer to the relevant version of document, referring to the following URL:

vSphere Basic System Administration

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)



Note

When a connection with the ISO image of VMware Tools has already been established, subsequent operations for the connection will be completed normally. In some cases, a task error may be output on VMware vCenter Server. This error is output by ignoring the message already received from VMware vCenter Server which informs the connection has already been established, and does not affect the system operations.

Collecting Cloning Images

This section explains how to collect cloning images.

Use the following method to collect cloning images:

After installing an OS, stop the target L-Server.

Right-click the target L-Server in the orchestration tree, select [Cloning]-[Collect] from the popup menu, and click <OK>.

A given cloning image (identified by its name attribute) can be managed by image version.

If a cloning image is created using VM management software, it can be used as is.

Point

When "Select Automatically" is specified in the [Collect a Cloning Image] dialog, it is assumed that the virtual storage resource containing the L-Server for collecting cloning images has been specified.

When performing cloning of a Windows OS on an L-Server, the Microsoft Sysprep tool is necessary.

The necessary files vary depending on the CPU architecture (x86, x64) of the target system, and the OS version. When using Windows Server 2008, the modules are already configured in the OS so there is no need to obtain new modules.

For details on obtaining tool and its installation, refer to the information regarding the Microsoft Sysprep tool in the "vSphere Basic System Administration" documentation and the following VMware web site.

Refer to the relevant version of document, referring to the following URL:

vSphere Basic System Administration

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

VMware web site

URL:
http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1005593 (As of July 2011)

Note

- If an L-Server is created with a specified Windows image, when deploying the image use Sysprep, provided by Microsoft, to re-configure the properties unique to the server. By executing Sysprep, the user information and OS setting information are reset. For details on Sysprep, refer to the information provided by Microsoft.
- If stopping or restarting of the manager is performed during execution of Sysprep, the operation being executed will be performed after the manager is started.
Until the process being executed is completed, do not operate the target resource.
- When using MAK license authentication for activation of Windows Server 2008 image OS, Sysprep can be executed a maximum of three times. Since Sysprep is executed when creating L-Server with images specified or when collecting cloning images, collection of cloning images and creation of L-Servers with images specified cannot be performed more than four times. Therefore, it is recommended not to collect cloning images from L-Servers which have had cloning images deployed, but to collect them from a dedicated master server. When customization of a guest OS is performed using the template function in VMware or when the template is created using SCVMM, Sysprep is executed and the number is included in the count.
- If an L-Server is created with a Windows image specified, use Sysprep to set the server specific information again, when starting for the first time after creating the L-Server. After startup and resetting the server specific information, it is recommended that you log off once, otherwise when the L-Server console is opened from the server virtualization software management window you will be logged on with Administrator status.
- Note the following points when collecting cloning images from an L-Server that was created using a cloning image.
 - As L-Servers which has not been used even once after creation do not have server specific information set, creation of L-Servers using cloning images collected from an L-Server may fail. When collecting cloning images, set the server specific information on L-Server, after starting the target L-Server.

G.1.6 [OS] Tab Configuration

Enter the parameters to set for the OS when creating the L-Server. This setting is valid only if an image is specified in the [General] tab.

The setting process is performed the first time the L-Server is started. If an image name is not specified, it is not necessary to enter all these items.

Table G.4 List of Settings

Item	Windows		Linux		Description
	Necessity of entry	Values when omitted	Necessity of entry	Values when omitted	
Host name/ Computer name	Optional	<i>L-Server Name</i>	Optional	<i>L-Server Name</i>	Enter the host name or computer name. For Windows, enter a string of between 1 and 15 alphanumeric characters or hyphens ("-"). For Linux, enter between 1 and 63 alphanumeric characters or hyphens ("-"). In either case, the first character must be an alphanumeric character. The string cannot be composed solely of numbers. If underscores ("_") or periods (".") are used in an L-Server name, they will be replaced with hyphens ("-"), because these characters cannot be used for host names or computer names. If the basic information is not specified, the L-Server name is converted and set as indicated above.
Domain name	Optional	WORKGROUP (*1)	Optional	localdomain (*1)	For Windows, enter the workgroup name. Settings for participation in a domain cannot be made. For Linux, enter the domain name. Enter between 1 and 255 alphanumeric characters, hyphens ("-"), or periods (".").
DNS search path	No	-	Yes	-	Enter a list of domain names to use for DNS searching, using between 1 and 32,767 characters. You can specify the same characters as the domain name. To specify multiple domain names, use a space as the separator character.
Full name	Optional	WORKNAME (*1)	No	-	Enter the Windows full name using between 1 and 50 characters. By default, the value defined in the OS property definition file is entered.
Organization name	Optional	WORKORGANIZATION (*1)	No	-	Enter the organization name displayed in the Windows system properties using between 1 and 50 characters.
Product key	Optional	If omitted, the following will happen when the OS is operated: (*1)	No	-	Enter a product key.

Item	Windows		Linux		Description
	Necessity of entry	Values when omitted	Necessity of entry	Values when omitted	
		<ul style="list-style-type: none"> - For Windows Server 2003, the product key entry screen is displayed the first time the server is started. - For Windows Server 2008, the product key is unregistered. 			
License mode	Optional	Server unit (*1)	No	-	Specify "Seat Unit" (number of connected clients) or "Server Unit" (number of servers used at the same time).
Maximum number of connections	Optional	5 (*1)	No	-	Specify this when "Server Unit" is set (number of servers used at the same time: server). Specify a number between 5 and 9,999.
Administrator password	Optional	- (*1)	No	-	Configure the same password as that specified for the local administrator account during L-Server creation. Enter the password using between 1 and 128 alphanumeric characters or symbols. (*2)
Hardware clock configuration	No	-	Optional	Local	Specify either "UTC" or "Local (LOCAL)".
Time zone	Optional	<i>The same time zone as the OS of the manager</i>	Optional	<i>The same time zone as the OS of the manager</i>	Specify the time zone of the OS.

Yes: Entry is required

Optional: Entry can be omitted

No: Entry is not required

*1: When the OS property definition file is specified, its values are configured.

*2: When a different password from the password of the local administrator account of the images specified during L-Server creation is specified, enter the values according to VM management software specifications.

For details on administrator password settings, refer to the section of customization for virtual machines of the "vSphere Basic System Administration".

vSphere Basic System Administration

URL: http://www.vmware.com/support/pubs/vs_pubs.html (As of July 2011)

Information

OS Property Definition File

By setting the default values in an OS property definition file in advance, the default values of the information on the [OS] tab, etc. are generated when creating an L-Server. Use the UTF-8 character code for OS property definition files.

Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvnr/customize_data

Definition File Name

The definition file name can be used by dividing into definitions that are available for each user group and definitions that are common to the system. If the key of the definition file common to the system is the same as a definition file for a user group, priority is given to the values indicated in the definition file for the user group.

- For User Groups

os_setting_user_group_name.rcxprop

- Common to System

os_setting.rcxprop

Definition File Format

In the definition file, an item to define is entered on each line. Each line is entered in the following format.

Key = Value

Definition File Items

Specify the following items in a definition file.

Table G.5 List of Items

Item	Key	Value	Remarks
Domain name	workgroup_name	(*1)	For Windows
	domain_name	(*1)	For Linux
DNS search path	dns_search_path	(*1)	-
Full name	full_name	(*1)	-
Organization name	org_name	(*1)	-
Product key	product_key	(*1)	-
License mode	license_mode	Specify "seat" (number of connected clients) or "server" (per server: number of servers used at the same time).	-
Maximum number of connections	license_users	(*1)	-
Administrator password	admin_password	(*1)	-
Hardware clock configuration	hwclock	Specify either "UTC" or "LOCAL".	-
DNS server (for Windows)	nic N _dns_address n	Specify the IP address using numeric values (between 0 and 255) and periods.	For N , specify the NIC number. For n , specify primary ("1") or secondary ("2").

Item	Key	Value	Remarks
DNS server (for Linux)	dns_addressX	Specify the IP address using numeric values (between 0 and 255) and periods.	For X, specify primary ("1"), secondary ("2"), or tertiary ("3").

*1: For more information on this value, refer to "[Table G.4 List of Settings](#)".

Example Definition File

An example definition file is indicated below.

```
# Windows
workgroup_name = WORKGROUP
full_name = WORKNAME
org_name = WORKORGANIZATION
product_key = AAAA-BBBB-CCCC-DDDD
license_mode = server
license_users = 5
admin_password = xxxxxxxx
nic1_dns_address1 = 192.168.0.60
nic1_dns_address2 = 192.168.0.61
nic2_dns_address1 =
nic2_dns_address2 =

# Linux
domain_name = localdomain
dns_search_path = test.domain.com
hwclock = LOCAL
dns_address1 = 192.168.0.60
dns_address2 = 192.168.0.61
dns_address3 =
```

G.1.7 Advisory Notes for VMware Usage

This section explains advisory notes for VMware.

Values for CPU Share and Memory Share

If CPU share and memory share for a virtual L-Server have been set to a value of 1,000,000 or greater using the RC console, when the VM guest is edited from vSphereClient, these values may be forcibly replaced with 1,000,000.

When setting a value greater than 1,000,000, modify the configuration from the RC console again.

Operating Systems for Which Parameters can be set and the Prerequisites for Performing the Settings

Depending on the server virtualization software used, some restrictions may apply to the operating systems that parameters can be set for and the prerequisites for performing the settings.

For details, refer to the server virtualization software manual.

Information

Snapshot

The snapshot function provided by server virtualization software records the disk from the last update. Consequently, when a disk failure occurs, the snapshot function becomes unavailable at the same time.

Snapshot can be used as a corrective measure for problems such as the following:

Example

- For recovery when a problems occurs with the applied patch
- For recovery when a problem occurs when changing operating system parameters

VMware Storage VMotion

The following are advisory notes for when using VMware Storage VMotion.

- When disk resources are moved to a newly created datastore which has not yet been detected by Resource Orchestrator, the information of moved disk resources is reflected as follows:
 1. The newly created datastore is detected as a virtual storage resource during regular update.
 2. After being detected as virtual storage resources, the information of moved disk resources is reflected on Resource Orchestrator.
- When using VMware vSphere Client, after completing moving of disk resources, the newest datastore status may not be reflected. When performing update of the data store, the newest status is displayed.

VMware FT

When an L-Server is linked with a virtual machine on which VMware FT has been configured, the secondary VM host information can be viewed using the following method:

- Select the target L-Server on the orchestration tree.

In the "Server recovery" on the [Resource Details] tab, VMware FT (*Secondary_VM_host_name*) is displayed.

Example

VMware FT(host2)

When migration to the secondary VM host occurs, the secondary VM host information will be updated by periodic update.

G.1.8 Overcommit

This chapter explains the VMware overcommit function for L-Servers.

Overcommit

The VMware overcommit function for the CPU and memory is available on Resource Orchestrator.

The VMware overcommit function for the CPU and memory virtually allows a guest OS to use more resources than that of the actual CPU and memory of a server.

Resource Orchestrator provides the following functions to utilize the VMware overcommit function for the CPU and memory when creating L-Servers.

- Creating an L-Server with the overcommit function for the CPU and memory
 - CPU performance
The maximum number of CPU resources to be allocated to a virtual machine (Limitation)
 - CPU reservation performance
The minimum number of CPU resources to be reserved for a virtual machine (Reservation)

- CPU shares
The relative proportion for allocation of CPU resources when there are competing virtual machines (Share)
- Memory Size
 - Memory limit
The maximum amount of memory resources to be allocated to a virtual machine (Limitation)
 - Memory Size
The maximum amount of memory resources to be allocated to a virtual machine by the VM host (Memory Size)

For the virtual L-Server created using Resource Orchestrator, the same value is set for both Memory Reserved and memory size.
- Memory reservation capacity
The minimum amount of memory resources to be reserved for a virtual machine (Reservation)
- Memory Shares
The relative proportion for allocation of memory resources when there are competing virtual machines (Share)
- Setting an overcommit attribute for a resource pool
Overcommit attributes can be set for resource pools. An L-Server with overcommit attributes can be created using overcommit attributes settings or a resource pool.
- Calculation of available space on VM pools, which uses values set for CPU reservation performance and memory reservation capacity
- Max. number of possible L-Servers
The following functions are provided:
 - For a VM pool with overcommit attributes, add a function to calculate the free CPU capacity and free memory capacity based on CPU reservation values and memory reservation capacity of an L-Server created beforehand.
 - For free CPU capacity and free memory capacity of a VM pool with overcommit attributes, add a function to convert to the number of L-Servers based on the CPU reservation values and memory reservation capacity specified in the L-Server template.

For details on L-Servers, refer to "[1.2.2 Logical Server \(L-Server\)](#)", "[1.2.3 Creating an L-Server](#)", or "[Chapter 6 L-Servers](#)".

For details on resource pools, refer to "[1.2.1 Resource Pool](#)" or "[Appendix A Resource Pools](#)".

For details on the available capacity view or the L-Server conversion view, refer to "[A.4 Viewing a Resource Pool](#)".

Prerequisites

Admin Server

When using the function for coordination with Resource Orchestrator, VMware, or the overcommit function for the CPU and memory, the only supported admin server OS is Windows.

Installation Procedure

This section describes the procedure for installing the overcommit function.

1. Creating a VM pool for overcommit

Create a VM pool for overcommit. For details on how to create VM pools, refer to "[Appendix A Resource Pools](#)".



Note

For the VM pool for overcommit, register VMware VM hosts only. If a non-VMware VM host has been registered, move that VM host to another VM pool.

The following operations cannot be performed on non-VMware VM hosts registered in the VM pool for overcommit.

- Creating an L-Server

- Linking L-Servers with configured physical servers

2. Creating an overcommit configuration file for a VM pool

For the VM pool created in 1., specify a reservation value or a maximum value after calculating the available space for the VM pool used for overcommit settings or performing overcommit.

Create an overcommit configuration file.

Storage Location of the Overcommit Configuration File

[Windows]
Installation_folder\Manager\etc\customize_data

Name of the Overcommit Configuration File

pool.rcxprop

Format of the Overcommit Configuration File

```
over_commit=pool1,pool2,...  
over_commit_calculate_by_reserve_value=true|false
```

over_commit

Multiple VM pool names can be specified. When specifying multiple resource pools, separate them using commas (",").

If the VM pool is arranged in a hierarchy, specify the name using an absolute path.

For a VM pool directly under the orchestration tree, specify only its name.

Example

```
over_commit=VMPool,/folder1/VMPool
```

Point

When creating L-Servers that use overcommit and L-Servers that do not, both a VM pool that uses overcommit and a VM pool that does not must be created.

over_commit_calculate_by_reserve_value

Specify the calculation method for available space for a VM pool used for overcommit.

"true" or "false" can be specified.

When using a reservation value, specify "true". When using a maximum value, specify "false".

"false" is specified in the following cases:

- When over_commit_calculate_by_reserve_value specification is omitted
- When an invalid value is specified

Example

```
over_commit_calculate_by_reserve_value=true
```

3. Exporting an L-Server template

Export an L-Server template. For details on how to export L-Server templates, refer to "[5.4.1 Exporting a Template](#)".

4. Edit an L-Server template

Configure the overcommit settings for an L-Server template.

For details on how to edit the XML definition for an L-Server template, follow the instructions in "[1.2.4 L-Server Template](#)".

Information

If a template is imported without editing the L-Server template name, the content of the existing L-Server template is overwritten. If an L-Server template is imported after the name is edited from when it was exported, the L-Server template is added.

5. Importing an L-Server template

Import an L-Server template.

For details on how to import L-Server templates, refer to "[5.4.3 Importing a Template](#)".

6. Create an L-Server

Create an L-Server using the L-Server template created in 4.

For details, refer to "[6.1 Creation Using an L-Server Template](#)".

When not using an L-Server template, create an L-Server using a command. Edit the L-Server XML referring to "[Chapter 6 L-Servers](#)", and then execute the `rcxadm lserver create` command.

For details, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

7. Confirming the overcommit function settings for an L-Server

To confirm overcommit settings configured for an L-Server, execute the `rcxadm lserver show` command.

Confirm that the command output result includes the line starting with `OverCommit`.

For details on the `rcxadm lserver` command, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

Note

When starting of an L-Server fails, retrieval procedures vary depending on the L-Server settings. Perform the following procedures:

- When "Boot Location" of the L-Server is set to "Relocate at startup"

Start the L-Server again. When there is a VM host with an available resource, the L-Server will start on that VM host after several attempts at startup.

- When "Boot Location" of the L-Server is set to "Fixed"

As no VM host is automatically selected, start the L-Server after changing its boot location, or moving or stopping other L-Servers on the same VM host.

For details on how to change or move the boot location, refer to "[D.2.2 When "VM" is Selected for \[Server type\]](#)" or "[6.8 Moving an L-Server Between Servers \(Migration\)](#)" respectively.

Changing L-Server specifications

This section explains how to modify L-Server specifications.

To change L-Server specifications, execute the `rcxadm lserver modify` command.

For details, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

 Note

Changing of L-Server specifications will fail if the resources (the number of CPUs, CPU frequency, and memory capacity) of a physical server where a VM host operates are less than the CPU reservation performance and memory reservation capacity.

G.2 Hyper-V

This section explains how to configure Hyper-V as server virtualization software.

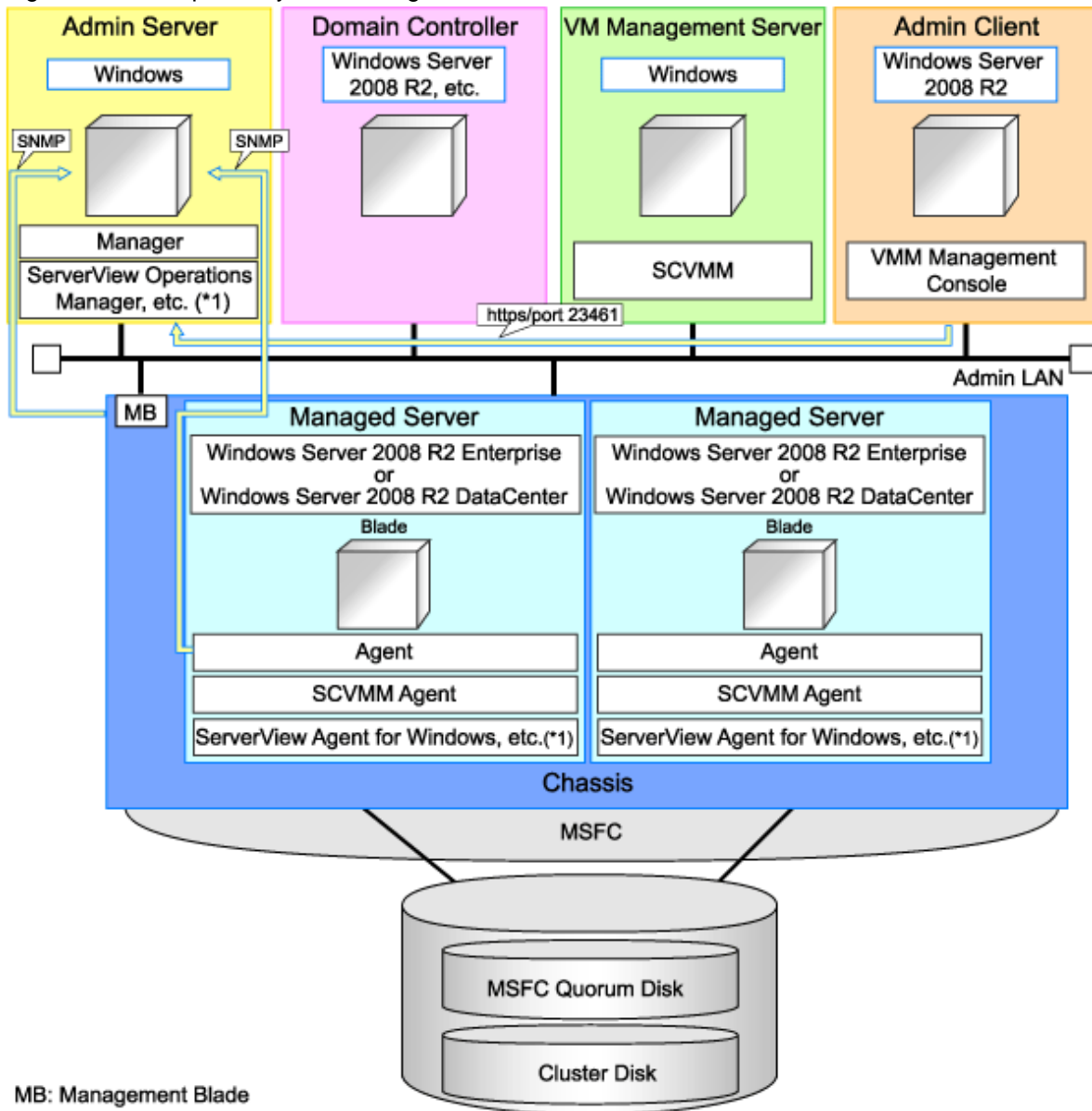
G.2.1 System Configuration

This explains how to configure Hyper-V for use as server virtualization software.

Example of System Configuration

This section explains how to configure Hyper-V as managed server.

Figure G.8 Example of System Configuration



*1: For details on required software, refer to "[1.3.2.2 Required Software](#)".

Note

- For a configuration example for rack mount servers, delete the chassis and management blades from the diagram above.
- For the manager, agents, SCVMM, SCVMM agents, and Windows guest OS's, apply the latest updated program using Microsoft Update. Necessary for installing the latest integrated services provided by each OS on VM guests.

SCVMM (System Center Virtual Machine Manager 2008 R2)

Necessary for management of VM hosts and VM guests.

Can be placed on the same admin server as the manager or on another server.

Can be placed on the same server as the domain controller or on another server.

SCVMM must be in the domain of the domain controller in this configuration.

Domain Controller

Can be placed on the same admin server as the manager or on another server.

Can be placed on the same server as SCVMM or on another server.

Managed Server

Create a cluster using MSFC.

Managed servers must be in the domain of the domain controller in this configuration.

Admin Client

Must be in the same domain as SCVMM and the VM host. The Microsoft(R) System Center Virtual Machine Manager 2008 R2 VMM management console must be installed.

Advisory Notes for System Configuration

- SCVMM and the VM host must be in the same domain.
- The VM host must be connected to the Resource Orchestrator admin LAN.
- For the Resource Orchestrator manager, it is recommended that the configuration enables access to SCVMM through the Resource Orchestrator admin LAN.
- When opening the SCVMM management window from an RC console executed on a Resource Orchestrator admin client, the admin client must be in the same domain as SCVMM, and logged in to the domain account.
- When connecting with the L-Server console from the RC console executed on the admin client of Resource Orchestrator, the admin client must be in the same domain as SCVMM.

Simplifying Network Settings

Network settings can be easily configured by Resource Orchestrator when creating L-Servers.

Depending on the conditions, such as hardware (blade servers or rack mount servers) used and whether or not network redundancy is performed for L-Servers, the setting ranges of networks differ.

For details, refer to "[1.2.6 Simplifying Network Settings](#)".

Network Configuration Example

An example network configuration using Hyper-V is given below:

Figure G.9 Configuration when Performing Network Redundancy for L-Servers on Blade Servers (Using Intel PROSet or PRIMECLUSTER GLS)

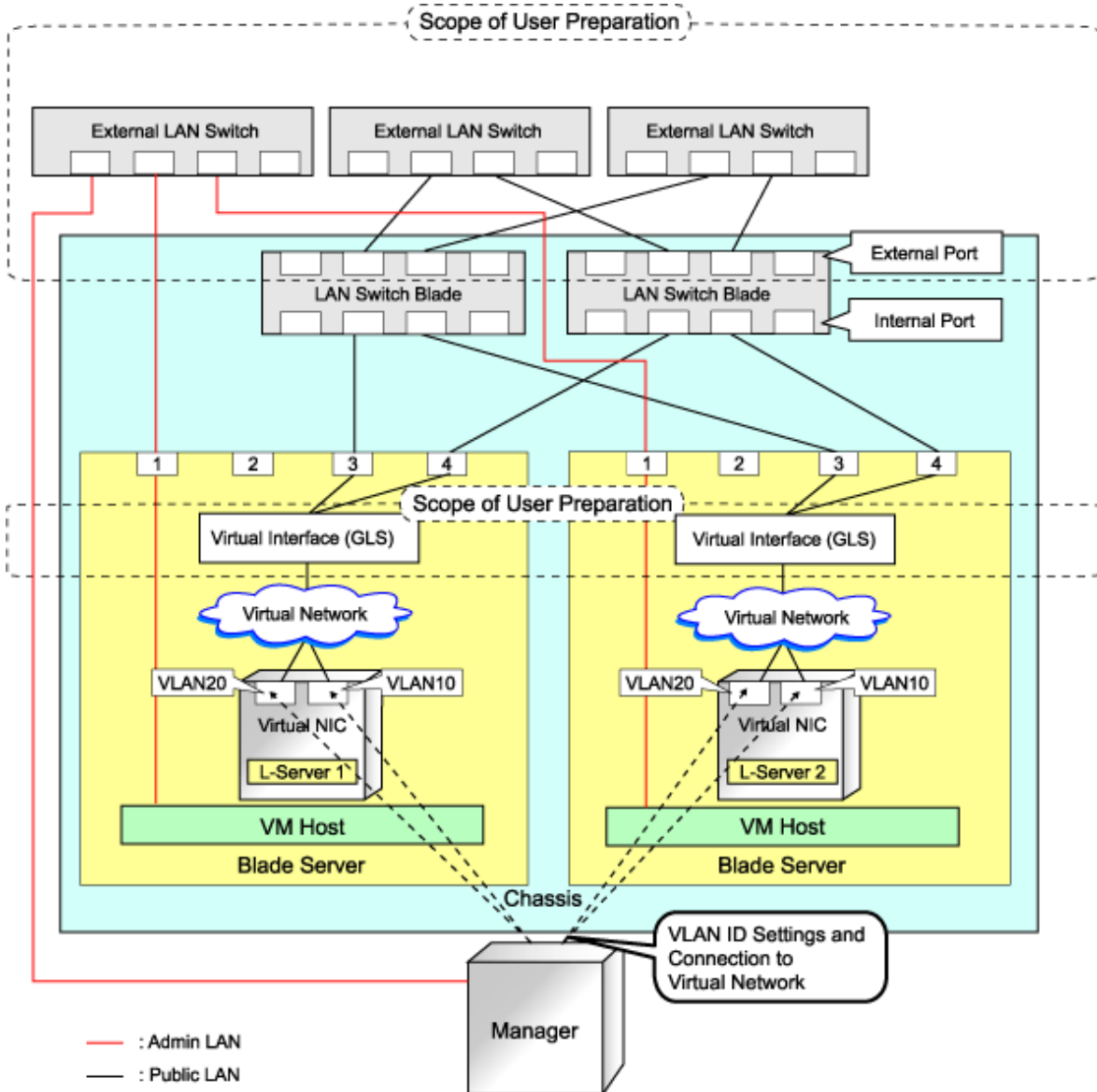
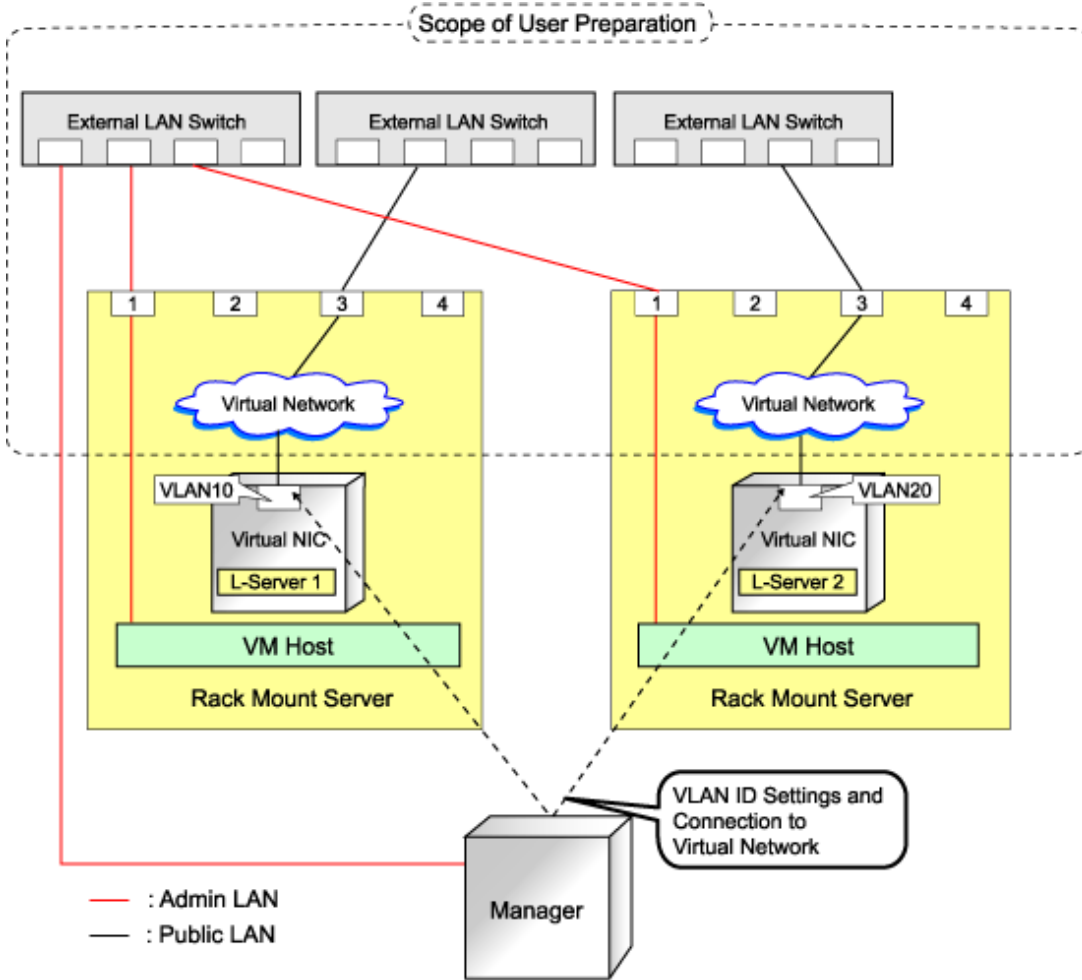


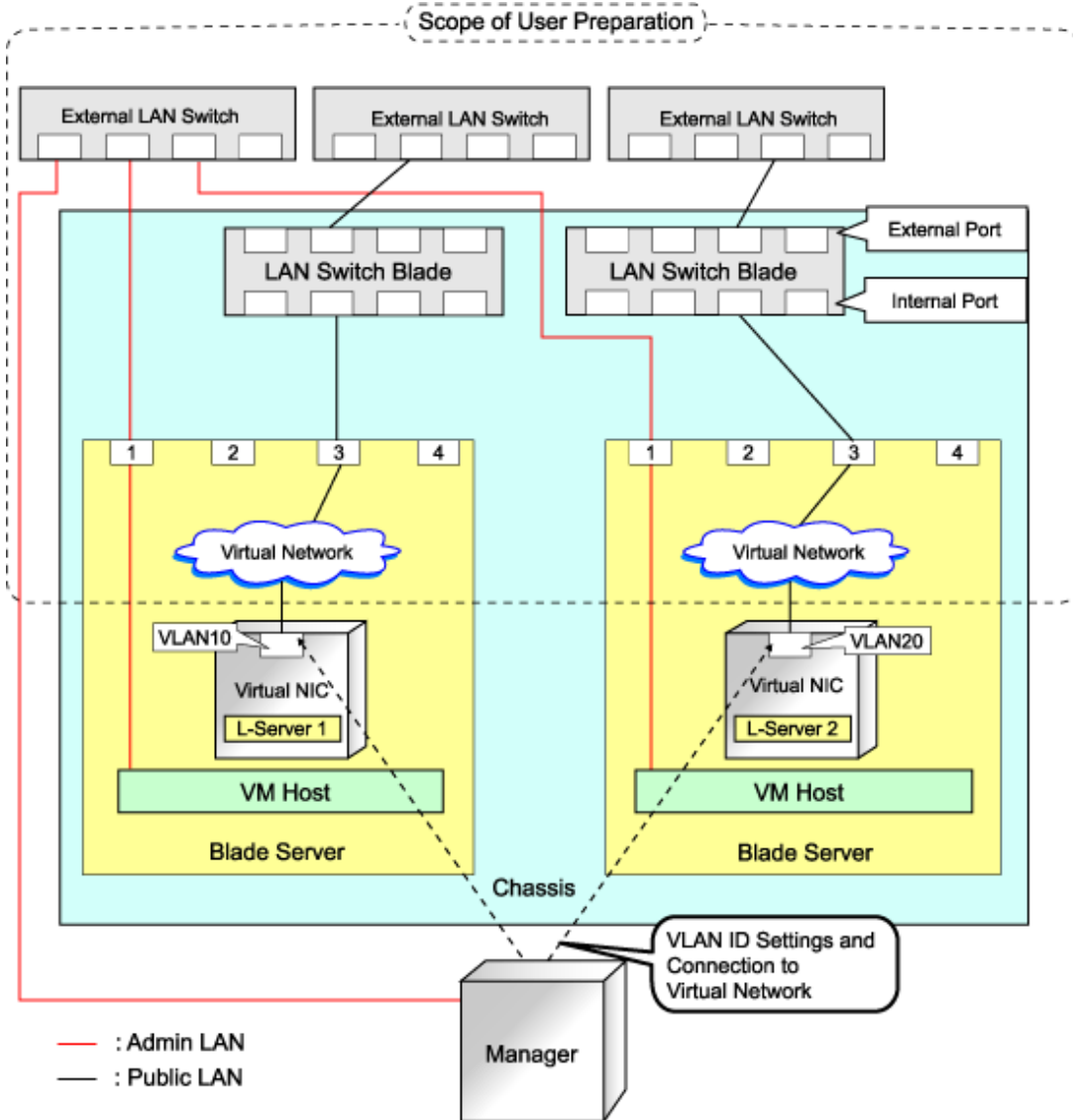
Figure G.10 Network Configurations of L-Servers for Rack Mount Servers



Note

- For environments using servers other than blade servers or environments where network redundancy is not performed for L-Servers, it is necessary to configure the external connections of the network manually.
For details, refer to "[Manual Network Configuration](#)" in "G.2.4 Setup".
- For Resource Orchestrator, only configure the LAN switch blades when using switch mode.

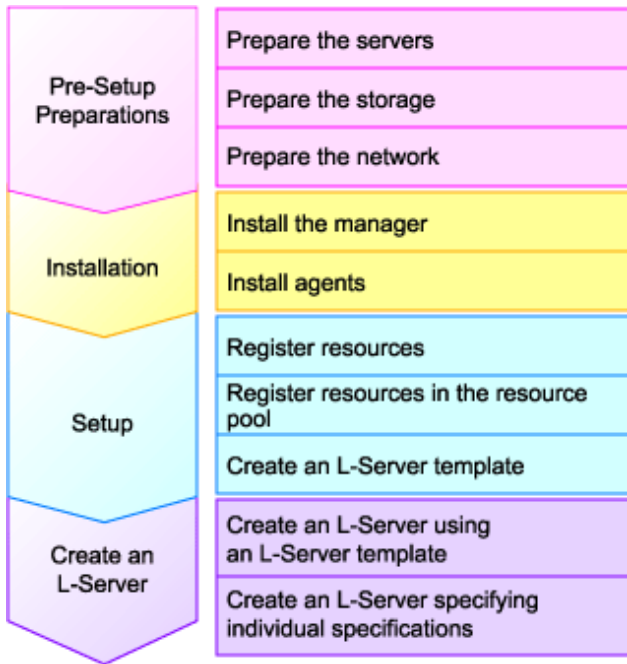
Figure G.11 Configuration when not Performing Network Redundancy for L-Servers with Blade Servers



L-Server Creation Procedure

The procedure for creating L-Servers is shown below.

Figure G.12 Resource Orchestrator Setup Procedure



For details on how to prepare to setup Resource Orchestrator, refer to "[G.2.2 Pre-setup Preparations](#)".

For details on how to install Resource Orchestrator, refer to "[G.2.3 Installation](#)".

For details on how to set up Resource Orchestrator, refer to "[G.2.4 Setup](#)".

For details on how to create an L-Server, refer to "[G.2.5 Creating an L-Server](#)".

G.2.2 Pre-setup Preparations

Pre-setup preparations are necessary when using a Hyper-V environment to create and manage an L-Server of Resource Orchestrator.

For details on pre-setup preparations for Hyper-V environment, refer to the Hyper-V manual.

Pre-setup Preparations (Servers)

In addition to the operations in "[3.1 Preparations for Server Environments](#)", confirm the following:

- When using I/O virtualization, that VIOM has been configured
- MSFC has been added to VM hosts
- A cluster disk has been configured as a shared cluster volume

All created L-Servers are located on a cluster as high availability VMs.

Pre-setup Preparations (Storage)

Confirm the following:

- A SAN volume has been configured as a cluster disk
- Zoning and affinity have been set
- The configuration enables use of SAN environments on VM hosts

Pre-setup Preparations (Network)

In addition to the operations in "[3.3 Preparations for Network Environments](#)", confirm the following:

- The configuration for the admin LAN and public LAN has been designed
- The network environment for the admin LAN is configured
- The virtual switch to connect to the admin LAN has been designed and configured
- When performing network redundancy for L-Servers, using Intel PROSet or PRIMECLUSTER GLS with blade servers
 - The external LAN switch to connect to the LAN switch blade has been designed and configured
 - The LAN switch blade has been designed
- When not performing network redundancy for L-Servers with blade servers
 - The external LAN switch to connect to the LAN switch blade has been designed and configured
 - The LAN switch blade has been designed and configured
- When using servers other than blade servers
 - The external LAN switch to connect to servers other than blade servers has been designed and configured

When using IBP

When using virtual L-Servers, connect the IBP uplink sets used for the public LAN and admin LAN to the VM host regardless of VIOM, after creating each IBP uplink set.

It is not necessary to use the same name for the uplink set and the name of the network resource.

Pre-setup Preparations in Hyper-V Environments

Use the following procedure for pre-setup preparations for Hyper-V environments: For details, refer to the MSFC help.

1. Installation of an operating system and configuration of a domain controller on the domain controller server.
2. Storage environment preparation
 - Creation of the volume (LUN) for allocation to the MSFC of the managed server (quorum disk and cluster disk)
3. Configuration of managed servers
 - a. BIOS Configuration (Hardware Virtualization and Data Execution Prevention (DEP))
 - b. Install an OS
 - When installing an OS on a physical server, refer to the server virtualization software manual.
 - When installing a VM host in an L-Server, refer to "[Appendix K Installation of VM Hosts on Physical L-Servers](#)".
 - c. Join a domain
 - d. Add SNMP services
 - e. Configure SNMP services and SNMP traps
 - f. Add Hyper-V roles
 - g. Add a failover cluster function
4. Cluster configuration of managed servers (MSFC)
 - a. Create an access point for cluster management on the admin LAN side.
 - b. In a quorum configuration, select "Node and Disk Majority", and specify a quorum disk.
 - c. Enable the shared volume of the cluster.

d. Add a cluster disk to a shared cluster volume.

5. Configuration after creating clusters for managed servers

a. Enable remote WMI settings.

1. Open "Computer Management" from "Administrative Tools" from the "Control Panel" of Windows on a VM host.

The [Computer Management] window is displayed.

Right-click [Services and Applications]-[WMI Control] from the [Computer Management] window, and select [Properties].

The [WMI Control Properties] window is displayed.

2. Select the [Security] tab from the [WMI Control Properties] window, and click <Security> after selecting [Root]-[virtualization].

The [Security for ROOT\virtualization] window is displayed.

3. Select the login user for the VM host from the [Security for ROOT\virtualization] window, check "Allow" from "Remote Enable", and click <OK>.

The remote WMI settings are enabled.

b. Configure the Windows firewall to enable remote WMI management.

1. On VM host, execute "Gpedit.msc".

The [Local Group Policy Editor] window is displayed.

2. Select the following folders from the [Local Group Policy Editor] window.

[Computer Configuration]-[Management Templates]-[Network]-[Network Connections]-[Windows Firewall]

3. Double-click [Domain Profile] when joining a domain, and [Standard Profile] for others.

The [Domain Profile] window or the [Standard Profile] window is displayed.

4. Right-click [Windows Firewall: Allow remote administration exception properties] on the displayed window, and select [Properties].

The [Windows Firewall: Allow remote administration exception properties] window is displayed.

5. Select "Enabled", and click <OK>.

c. Configure DCOM.

1. On the VM host, execute "Dcomcnfg.exe" specifying the file name.

The [Component Services] window is displayed.

2. Right-click [Component Services]-[Computers]-[My Computer] from the [Component Services] window, and select [Properties].

The [My Computer Properties] window is displayed.

3. Select the [COM Security] tab from the [My Computer Properties] window.

4. Click <Edit Limits> from "Launch and Activation Permissions".

The [Launch and Activation Permission] window is displayed.

5. Select the login user for VM host under "Group or user names" from the [Launch and Activation Permission] window, then check the "Allow" checkbox for "Remote Launch" and "Remote Activation" and click <OK>.

6. Click <Edit Limits> under "Access Permissions".

The [Access Permission] window is displayed.

7. Select "ANONYMOUS LOGON" under "Group or user names" from the [Access Permission] window, and check the "Allow" checkbox for "Remote Access" and then click <OK>.

6. Configuration and installation of SCVMM

Use the following procedure to install and configure SCVMM:

- a. Install an OS
- b. Join a domain
- c. Register a VM host

Register by the cluster. An SCVMM agent is automatically installed on newly registered VM hosts.

- d. Configure Windows remote management environment

Configure remote administration on VM management software registered with Resource Orchestrator.

1. Log in to the server which on VM management software operates on using administrative privileges.
2. Execute the following command from the command prompt.

```
>winrm quickconfig <RETURN>
```

3. Enter "y", when requested.

- e. SCVMM Server MaxShellPerUser Settings

7. Configure the Resource Orchestrator admin server

Configure remote management authentication settings on the machine the Resource Orchestrator admin server will be set up.

- a. Log in to the admin server using administrative privileges.
- b. Execute the following command from the command prompt.

```
>winrm set winrm/config/client @{TrustedHosts=" VM_management_software_IP_address"} <RETURN>
```

8. For the server on which the manager will be installed, managed VM hosts, SCVMM and SCVMM agents, apply the latest updates using Microsoft Update.

SCVMM Server MaxShellPerUser Settings

Resource Orchestrator controls SCVMM using PowerShell Web Services for Management (hereinafter WS-Management).

With standard Windows settings, the maximum number of processes which can start shell operations per user (MaxShellsPerUser) is set to five. For Resource Orchestrator, it is necessary to change settings to enable a maximum of six sessions.

Since WS-Management is used for Windows administrator tools as well as Resource Orchestrator, set a number six or larger than MaxShellsPerUser, giving consideration to operating needs.

Change the MaxShellsPerUser settings using the following procedure:

1. Execute Windows PowerShell as an administrator.
2. Change the current directory using the Set-Location commandlet.

```
PS> Set-Location -Path WSMAN:\localhost\Shell <RETURN>
```

3. Check the current MaxShellsPerUser configuration information using the Get-ChildItem commandlet.

The content displayed in MaxShellsPerUser is the current setting.

```
PS WSMAN:\localhost\Shell> Get-ChildItem <RETURN>
```



```
PS WSMAN:\localhost\Shell> Get-ChildItem
WSManConfig: Microsoft.WSMan.Management\WSMan::localhost\Shell

Name                           Value                           Type
----                           -
AllowRemoteShellAccess         true                             System.String
IdleTimeout                     180000                          System.String
MaxConcurrentUsers              5                                System.String
MaxShellRunTime                 2147483647                       System.String
MaxProcessesPerShell           15                               System.String
MaxMemoryPerShellMB            150                              System.String
MaxShellsPerUser                5                                System.String
```

4. Configure MaxShellsPerUser using the Set-Item commandlet.

Example

When setting MaxShellsPerUser 10

```
PS WSMAN:\localhost\Shell> Set-Item .\MaxShellsPerUser 10 <RETURN>
```

G.2.3 Installation

Installing the Manager

Install the Resource Orchestrator manager. For details on manager installation, refer to "[4.1 Installing the Manager](#)".

When using Hyper-V on managed servers, the only supported OS of the admin server is Windows.

When Windows PowerShell 2.0 or later has not been installed on the admin server, install it.

Install agents

Install Resource Orchestrator agents on managed servers. For details on agent installation, refer to "[4.2.1 Installation \[Windows/Hyper-V\]](#)".

G.2.4 Setup

The setup procedure when using Hyper-V as server virtualization software is as follows:

1. Register resources
 - a. Register VM management software

When registering VM management software, VMFS datastores which are created in advance during pre-setup preparations, are automatically registered in Resource Orchestrator as virtual storage resources.

For details on how to register VM management software, refer to "6.1.5 Registering VM Management Software" in the "ServerView Resource Coordinator VE Setup Guide".
 - b. Register managed servers
 1. Register chassis

Refer to "6.1.2 Registering Chassis" in the "ServerView Resource Coordinator VE Setup Guide".
 2. Register managed servers (within chassis)

For details, refer to "6.1.3 Registering Managed Servers" in the "ServerView Resource Coordinator VE Setup Guide".

3. Register LAN switch blades

For details, refer to "6.1.4.1 Registering LAN Switch Blades" in the "ServerView Resource Coordinator VE Setup Guide".

c. Preparations for networks (for manual network configuration)

Preparation is necessary in the following cases:

Refer to "[Preparations for Connections with Virtual Networks Created in Advance](#)".

- When not performing network redundancy for L-Servers with blade servers
- When using servers other than blade servers

d. Network resources

To register a network resource, specify a network pool when creating the network resource.

By creating network resources in advance, if the NIC and network resources are connected when an L-Server is created, the following settings matching the network resource definition will be registered automatically.

For details on automatic configuration of network resources, refer to "[Automatic Network Configuration](#)".

2. Register resources in resource pools

a. Register VM host resources

1. In the RC console orchestration tree, right-click the target VM pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the VM host to register and click <OK>.

b. Register virtual storage resources

1. In the RC console orchestration tree, right-click the target storage pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the virtual storage resource to register and click <OK>.

c. Register network resources

If the NIC and network resources are connected when an L-Server is created, a VLAN ID is automatically configured for the NIC of the VM guest, and connected to the virtual network. For details, refer to "[Automatic Network Configuration](#)".

1. In the RC console orchestration tree, right-click the target network pool, and select [Create Resource] from the popup menu.

The [Create a network resource] dialog is displayed.

2. Enter the items necessary for network resources. For details, refer to "[5.3.4 Network Resources](#)".

3. Create an L-Server template

a. Export an L-Server template

For details, refer to "[5.4.1 Exporting a Template](#)".

b. Edit an L-Server template

For details, refer to "[5.4.2 Editing a Template](#)".

c. Importing an L-Server template

For details, refer to "[5.4.3 Importing a Template](#)".

Automatic Network Configuration

Network settings on Hyper-V differ depending on hardware (blade servers and rack mount servers) and whether or not to perform network redundancy for L-Servers.

- Automatic network configuration for blade servers
Refer to "[Automatic Network Configuration for Blade Servers](#)".
- When not performing network redundancy for L-Servers with blade servers
Refer to "[Manual Network Configuration](#)".
- Network configuration for servers other than blade servers
Refer to "[Manual Network Configuration](#)".

Automatic Network Configuration for Blade Servers

If the NIC and network resources are connected when an L-Server is created, the following settings will be registered automatically for the VM host that the L-Server will operate on.

- LAN switch blades
A tagged VLAN is configured on the internal ports.
- Virtual network
Created automatically, when there is no network on the public LAN.
When a network already exists, the existing virtual network can be used.
- VM guest
Configure a VLAN on the virtual NIC of the VM guest, and connect with the virtual network.
If an image is specified, the IP address is automatically configured. For details on how to configure IP addresses automatically, refer to "Network (NIC)" of "[D.1 \[General\] Tab](#)".

In environments using the clustering function of VM management software, in order to enable the migration of VM guests and operation using the HA function, settings for LAN switch blades and virtual switches are performed automatically for all VM hosts comprising the cluster.

The RC Console can be used for VLAN configuration of LAN switch blade external ports. Right-click the LAN switch in the server resource tree, and select [Modify]-[Network Settings] from the popup menu.

For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

Manually perform virtual network settings using SCVMM functions.



Note

After creating an L-Server, if VM hosts are added to the cluster afterwards, Resource Orchestrator network settings are not performed automatically.

Perform the same settings as the existing VM hosts in the cluster configuration for the LAN switch blades and virtual networks of the additional VM hosts.

Virtual Network Definition Files for Blade Servers

- When automatically configuring networks for blade servers, it is not necessary to create virtual network definition files.
- When a virtual network definition file exists and a virtual network with a VLAN ID is not defined, the virtual network is automatically configured.

- When a virtual network with a VLAN ID is defined using the virtual network definition file, it is necessary to manually configure the virtual network for the VLAN ID in advance. In this case, it will be the same automatic network configuration as for rack mount servers.

For details, refer to "[Manual Network Configuration](#)".

Configuration Patterns of VM Hosts which Support Automation of Network Configuration

Configuration patterns of VM hosts which support automation of network configuration are as follow:

Each configuration pattern indicates the combination of hardware and the number of LAN switch blades mounted in it. In this combination, the table below provides information on which physical network adapter is used for creation of virtual networks depending on the external connection port settings for the network resources.

Table G.6 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
A	<ul style="list-style-type: none"> - Server blades - PRIMERGY BX920 S1 - PRIMERGY BX920 S2 - PRIMERGY BX922 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201 	2	Select one from each of LAN switch blade 1 and 2	<ul style="list-style-type: none"> - For PG-SW111 or PG-SW112 Use the virtual interface (Intel PROSet or GLS) created beforehand on 3 and 4 that are connected to LAN switch blade 1 and 2	Mount LAN switch blades on the following connection blade slots. <ul style="list-style-type: none"> - When mounting 2 LAN switch blades CB1(*1), CB2(*1) - When mounting 4 LAN switch blades CB1(*1), CB2(*1), CB3, CB4
B		2	Do not specify external connection ports (Internal network)	<ul style="list-style-type: none"> - For PG-SW109 or PG-SW201 Use the virtual interface (Intel PROSet or GLS) created beforehand on 1 and 2 that are connected to LAN switch blade 1 and 2 (*2)	
C		4	Select one from each of LAN switch blade 1 and 2	<ul style="list-style-type: none"> - For PG-SW111 or PG-SW112 Use the virtual interface (Intel PROSet or GLS) created beforehand on 3 and 4 that are connected to LAN switch blade 1 and 2	
D		4	Do not specify external connection ports (Internal network)	<ul style="list-style-type: none"> - For PG-SW109 or PG-SW201 Use the virtual interface (Intel PROSet or GLS) created beforehand on 1 and 2 that are	

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
				connected to LAN switch blade 1 and 2	
E		4	Select one from each of LAN switch blade 3 and 4	Use the virtual interface (Intel PROSet or GLS) created beforehand on 5 and 6 that are connected to LAN switch blade 3 and 4	
F	- Server blades - PRIMERGY BX924 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201	2	Select one from each of LAN switch blade 1 and 2	Use the virtual interface (Intel PROSet or GLS) created beforehand on 1 and 2 that are connected to LAN switch blade 1 and 2 (*2)	Mount LAN switch blades on the following connection blade slots. - When mounting 2 LAN switch blades CB1, CB2 - When mounting 4 LAN switch blades CB1, CB2, CB3, CB4
G		2	Do not specify external connection ports (Internal network)		
H		4	Select one from each of LAN switch blade 1 and 2	Use the virtual interface (Intel PROSet or GLS) created beforehand on 1 and 2 that are connected to LAN switch blade 1 and 2	
I		4	Do not specify external connection ports (Internal network)		
J		4	Select one from each of LAN switch blade 3 and 4	Use the virtual interface (Intel PROSet or GLS) created beforehand on 3 and 4 that are connected to LAN switch blade 3 and 4	
K	- Server blades - PRIMERGY BX960 S1 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201	2	Select one from each of LAN switch blade 1 and 2	Use the virtual interface (Intel PROSet or GLS) created beforehand on 11 and 12 that are connected to LAN switch blade 1 and 2	Mount LAN switch blades on the following connection blade slots. - When mounting 2 LAN switch blades CB1, CB2 - When mounting 4 LAN switch blades CB1, CB2, CB3 (*3), CB4 (*3)
L		2	Do not specify external connection ports (Internal network)		
M		4	Select one from each of LAN switch blade 1 and 2	Use the virtual interface (Intel PROSet or GLS) created beforehand on 11 and 12 that are connected to LAN switch blade 1 and 2	
N		4	Do not specify external connection ports (Internal network)		
O		4	Select one from each of LAN switch blade 3 and 4	Use the virtual interface (Intel PROSet or GLS) created beforehand on 3 and 4 that are connected to LAN switch blade 3 and 4	

*1: When installing a PG-SW109 on CB1 or CB2, set the transmission speed at the down link port of PG-SW109 to 1 Gbps. For details on how to configure the settings, refer to the corresponding hardware manual.

*2: The admin LAN and public LAN share the same physical network adapter. For the admin LAN, also create a virtual interface (Intel PROSet or GLS) on 1 and 2.

*3: Only configurations where LAN expansion cards are mounted in expansion slot 1 are supported.

Table G.7 VM Host Configuration Pattern (For PRIMERGY BX400 S1 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
P		2	Select one from each of LAN switch blade 1 and 2	- For PG-SW111 or PG-SW112	Mount LAN switch blades on the following connection blade slots. CB1(*1,*2), CB2(*1,*2)
Q	- Server blades - PRIMERGY BX920 S2 - PRIMERGY BX922 S2 - LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201	2	Do not specify external connection ports (Internal network)	Use the virtual interface (Intel PROSet or GLS) created beforehand on 3 and 7 that are connected to LAN switch blade 1 and 2 - For PG-SW109 or PG-SW201 Use the virtual interface (Intel PROSet or GLS) created beforehand on 2 and 6 that are connected to LAN switch blade 1 and 2	
R	- Server blades - PRIMERGY BX924 S2	2	Select one from each of LAN switch blade 1 and 2		Mount LAN switch blades on the following connection blade slots. CB1(*1), CB2(*1)
S	- LAN switch blades - PG-SW109 - PG-SW111 - PG-SW112 - PG-SW201	2	Do not specify external connection ports (Internal network)	Use the virtual interface (Intel PROSet or GLS) created beforehand on 2 and 4 that are connected to LAN switch blade 1 and 2	

*1: The same LAN switch blade model should be mounted in CB1 and CB2.

*2: When installing a PG-SW109 on CB1 or CB2, set the transmission speed at the down link port of PG-SW109 to 1 Gbps. For details on how to configure the settings, refer to the corresponding hardware manual.

Table G.8 VM Host Configuration Pattern (For PRIMERGY BX600 S3 Chassis)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
T	- PRIMERGY BX600 series servers	2	Select one from each of LAN switch blade 1 and 2	Use the virtual interface (Intel PROSet or GLS) created beforehand on 3 and 4 that are connected to LAN switch blade 1 and 2	Mount LAN switch blades on the following network blade slots. - When mounting 2 LAN switch blades NET1(*1), NET2(*1)
U	- LAN switch blades - PG-SW104	2	Do not specify external connection ports (Internal network)		
V	- PG-SW107	4	Select one from each of LAN switch blade 1 and 2	Use the virtual interface (Intel PROSet or GLS) created beforehand on 3	- When mounting 4 LAN switch blades NET1(*1), NET2(*1), NET3(*2), NET4(*2)

	Hardware	Number of LAN Switch Blades	Specification of Network Resource External Connection Ports	Physical Network Adapter Number	Remarks
W		4	Do not specify external connection ports (Internal network)	and 4 that are connected to LAN switch blade 1 and 2	
X		4	Select one from each of LAN switch blade 3 and 4	Use the virtual interface (Intel PROSet or GLS) created beforehand on 7 and 8 that are connected to LAN switch blade 3 and 4	

*1: Mount PG-SW107.

*2: Mount PG-SW104.

The numbers of physical network adapters given above can be checked on the details window of the LAN switch blade.

The server MAC address (IP address) information can be confirmed in the hardware maintenance section of the server blade details window.

Configure the Intel PROSet or GLS settings on the server in advance, using the MAC address information.

When the LAN switch blade is in IBP mode, create a virtual network on the redundant virtual interface (Intel PROSet or GLS) of the physical network adapters as in the case when external connection ports have not been specified (internal network).

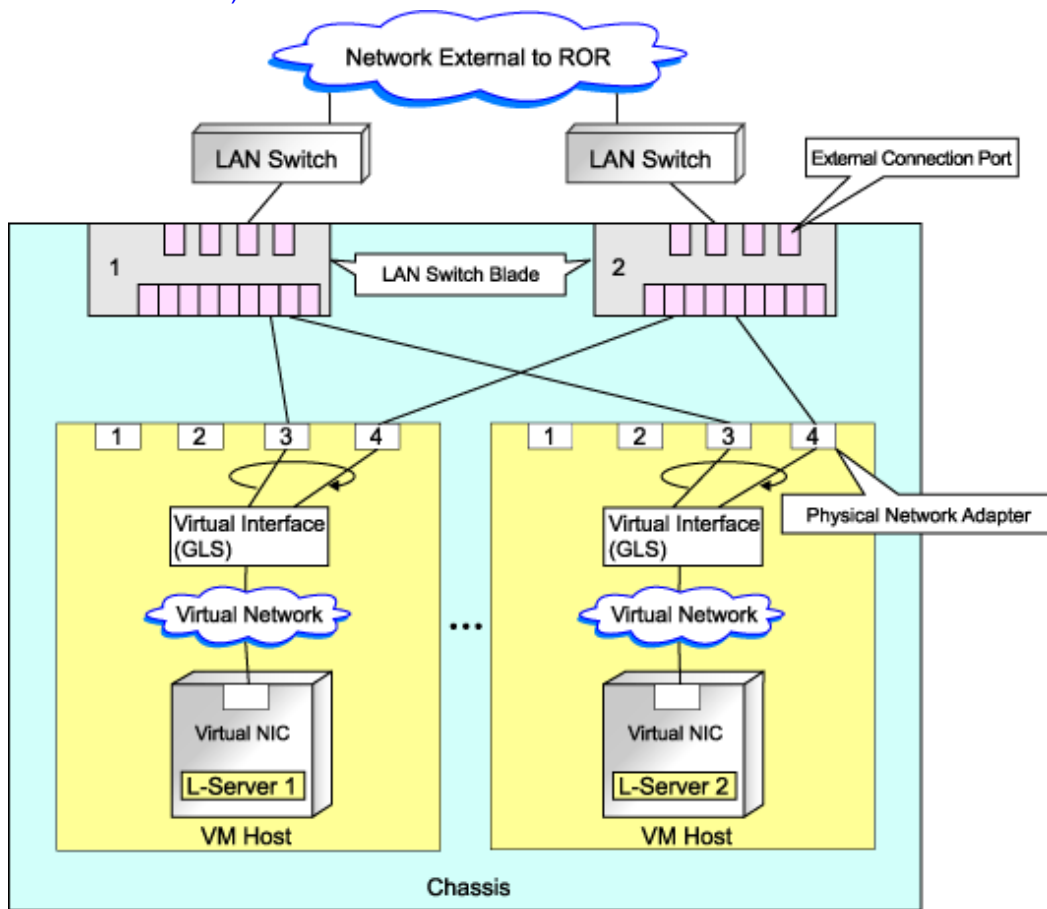
When a virtual network for use on the public LAN has been created in advance, or settings have been performed manually, it is necessary to specify the redundant virtual interface (Intel PROSet or GLS), which is one of A, C, F, H, K, M, P, R, or T on the VM host configuration patterns of the physical network adapter.

Note

- In the configuration pattern V or X for the PRIMERGY BX600 series, Fibre Channel switch blades cannot be connected.
- If there are VM hosts that meet the following conditions, automation of network configuration is not supported in the chassis.
 - Network resources with external connection ports specified are used.
 - There is a virtual network that uses a NIC in a VM host configuration pattern that differs from the ones supporting automation of network configuration.
- If there are VM hosts that meet the following conditions, automation of network configuration is not supported.
 - Network resources with no external connection port specified are used.
 - There is a virtual network that uses a NIC in a VM host configuration pattern that differs from the ones supporting automation of network configuration.

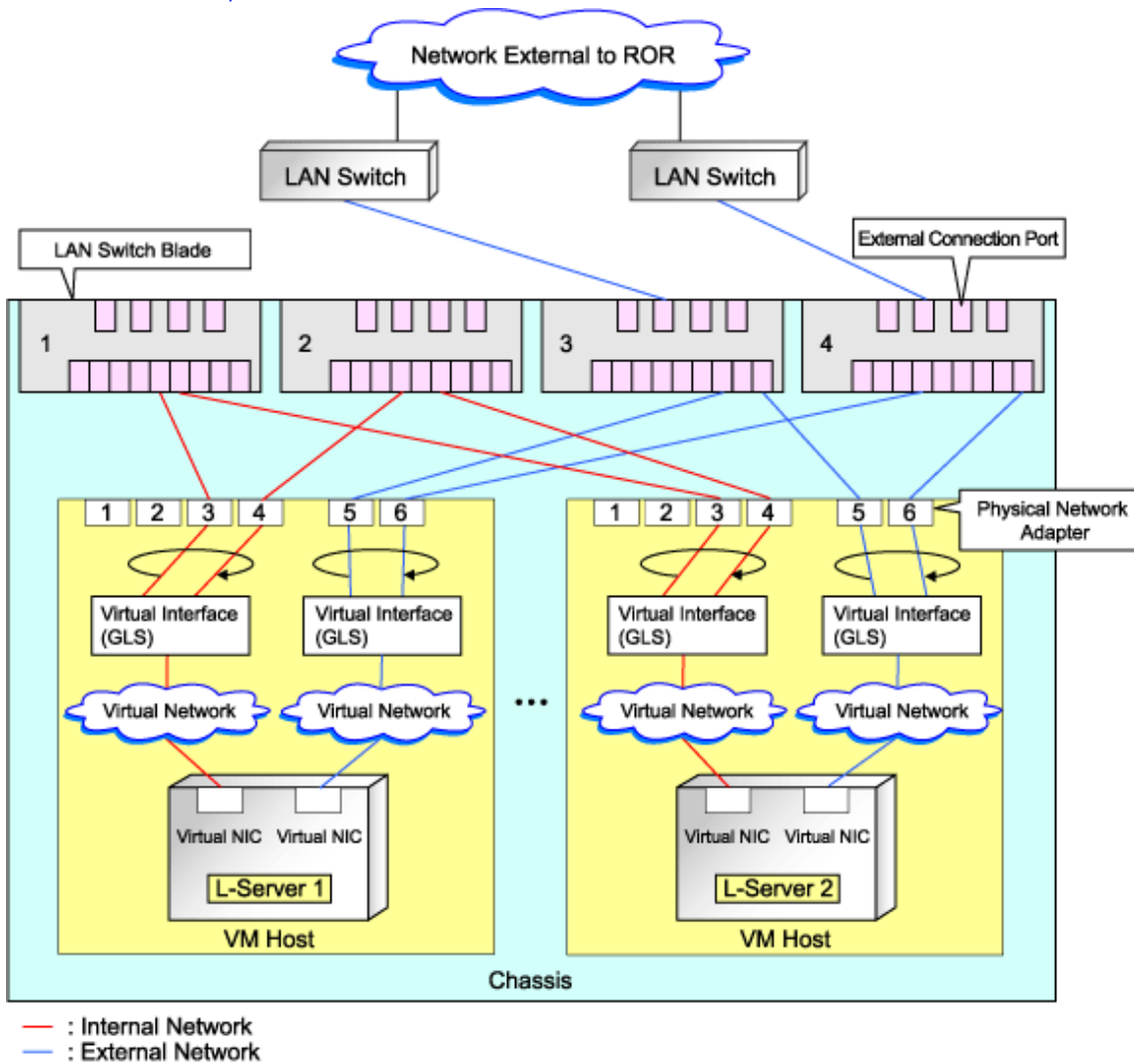
An example configuration of the pattern "A" in "Table G.1 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)" is given below.

Figure G.13 Configuration Example Pattern A of "Table G.1 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)"



An example configuration of the pattern "E" in "Table G.6 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)" is given below.

Figure G.14 Configuration Example Pattern E of "Table G.1 VM Host Configuration Pattern (For PRIMERGY BX900 S1 Chassis)"



Manual Network Configuration

In the following cases, configure the network manually.

- When using a physical network adapter number that differs from configuration patterns of VM hosts which support automation of network configuration

Refer to "Configuring Network Resources when Using a Physical Network Adapter Number that Differs from Configuration Patterns of VM Hosts which Support Automation of Network Configuration" in "G.1.4 Setup".

- When not performing network redundancy for L-Servers with blade servers

Refer to "Connections with Virtual Networks Created in Advance".

- For environments using servers other than blade servers

Refer to "Connections with Virtual Networks Created in Advance".

When a virtual network has already been manually configured and server virtualization software other than Hyper-V is being used with the same manager, set a different name from the one used by the virtual switch, virtual network, and virtual bridge on the other virtualization software.

Configuring Network Resources when Using a Physical Network Adapter Number that Differs from Configuration Patterns of VM Hosts which Support Automation of Network Configuration

When using a physical network adapter number which is different from the one used in the configuration patterns mentioned above, create networks using the following procedure.

1. Create a virtual network with the same name (including upper and lower case characters) for all VM hosts comprising the cluster.

This enables migration of VM guests between VM hosts.

For details, refer to the procedure for addition or modification of virtual networks on hosts in the SCVMM help.

2. Configure LAN switches to enable communication using the tagged VLAN between virtual networks using the same name.

Right-click the LAN switch in the server resource tree, and select [Modify]-[Network Settings] from the popup menu.

For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

3. Supported virtual networks and VLAN IDs are defined in the following definition file:

Installation_folder\Manager\etc\customize_data\vnetwork_hyperv.rcxprop

For details on definition file format, refer to "[File Format for Virtual Network Definitions](#)".

4. Create the XML file that defines network resources.

Define the VLAN ID specified at 2 and 3 in the XML file.

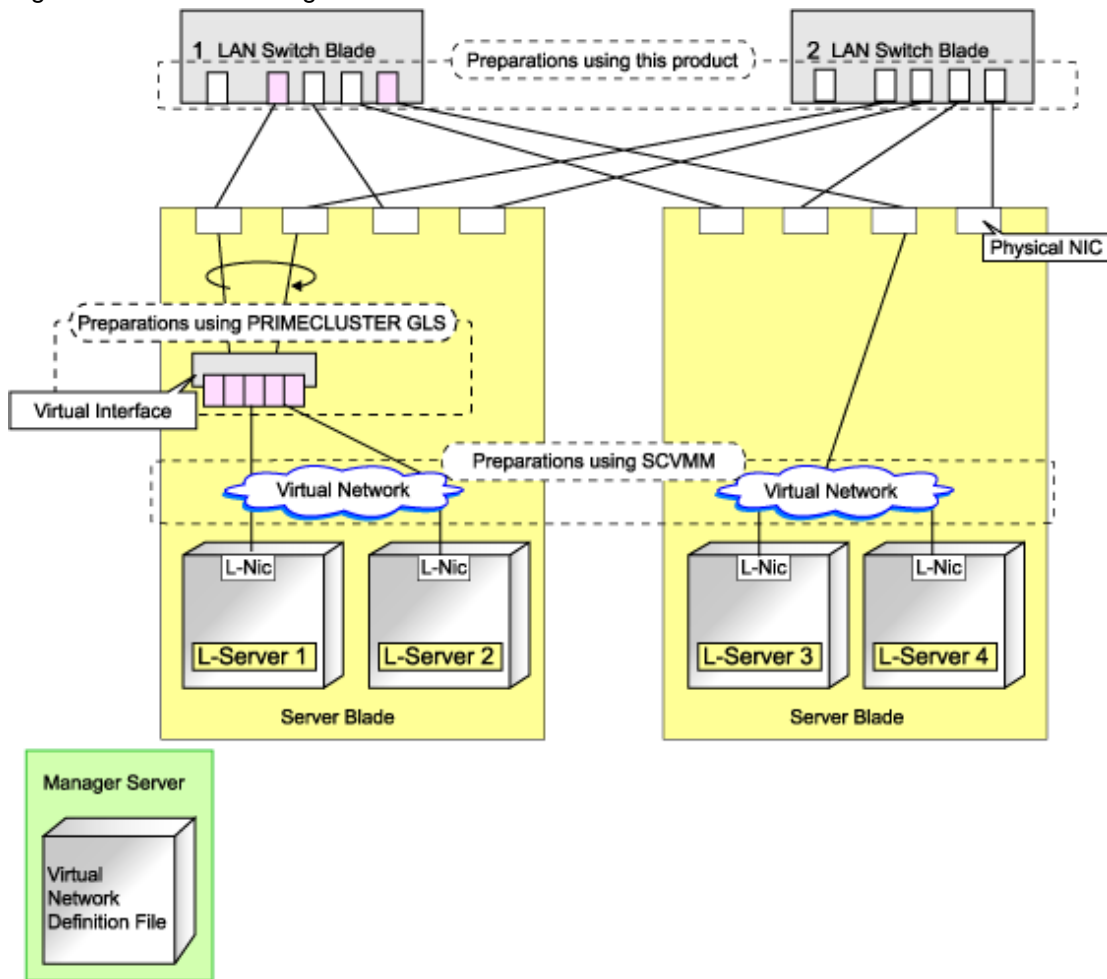
In this case, specify auto="false" in the Network tag.

For details on the Network tag and creation of XML files that define network resources, refer to "2.4 Network Resources" of the "ServerView Resource Orchestrator Reference Guide".

- To create the network resource, execute the `rcxadm network create` command specifying the XML file created in 4.

For details on the `rcxadm network` command, refer to "1.3.5 rcxadm network" in the "ServerView Resource Orchestrator Reference Guide".

Figure G.15 Network Diagram



Connections with Virtual Networks Created in Advance

When not performing network redundancy for L-Servers with blade servers, and in environments where blade servers are not used, only the function for configuring IP addresses and VLAN IDs on VM guest NICs and connecting NICs of VM guests is provided for virtual networks created in advance. Manually perform virtual network settings in advance.

Additionally, the following settings must be performed in advance.

Preparations for Connections with Virtual Networks Created in Advance

1. Create a virtual network

Create a virtual network with the same name (including upper and lower case characters) for all VM hosts comprising the cluster. This enables migration of VM guests between VM hosts.

For details, refer to the procedure for addition or modification of virtual networks on hosts in the SCVMM help.

2. Configure the virtual network communication

Configure LAN switches to enable communication using the tagged VLAN between virtual networks using the same name.

Right-click the LAN switch in the server resource tree, and select [Modify]-[Network Settings] from the popup menu.

For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

3. Define the supported virtual network and VLAN ID

Supported virtual networks and VLAN IDs are defined in the following definition file of Resource Orchestrator:

Installation_folder\Manager\etc\customize_data\vnetwork_hyperv.rcxprop

For details on definition file format, refer to "File Format for Virtual Network Definitions".

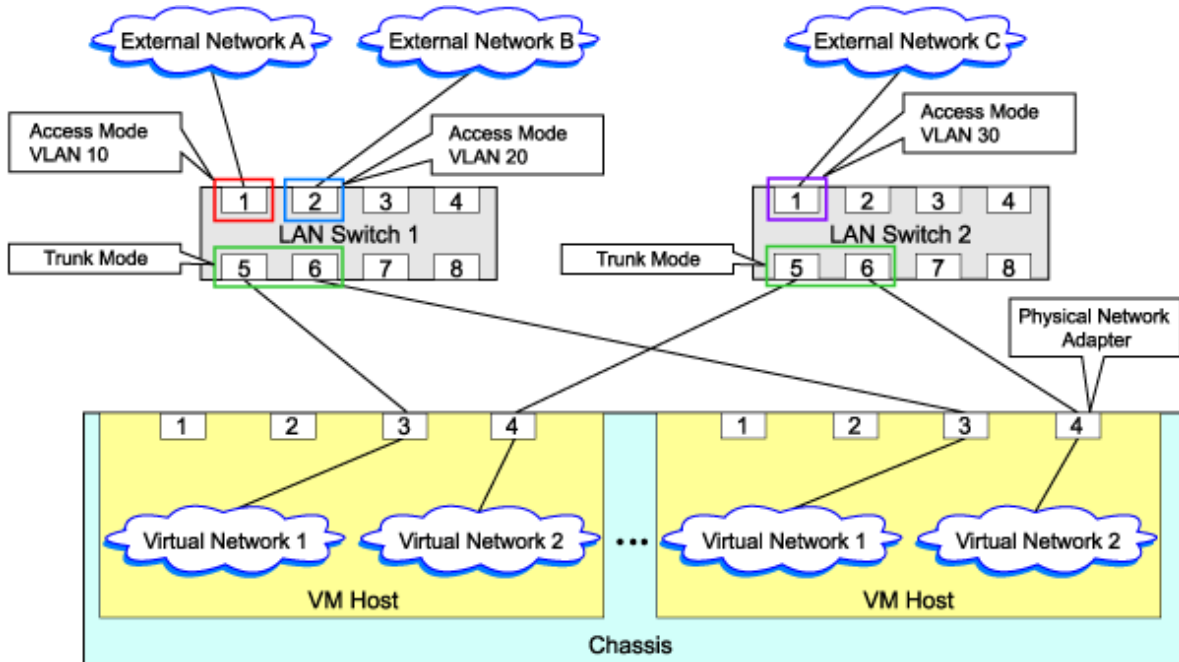
Virtual NIC Automatic Configuration for VM guests

Configure a VLAN on the virtual NIC of the VM guest, and connect with the virtual network.

If an image is specified, the IP address is automatically configured. For details on how to configure IP addresses automatically, refer to "Network (NIC)" of "D.1 [General] Tab".

For rack mount servers, an example of virtual NIC configuration and connection with virtual networks using network resources is given below:

Figure G.16 Virtual NIC configuration and virtual network connection using network resources for rack mount servers



File Format for Virtual Network Definitions

Describe the virtual network definition file in one line as below:

```
"Virtual Network Name"= VLAN ID[, VLAN ID...]
```

For the *VLAN ID*, a value from 1 to 4094 can be specified. When specifying a sequence of numbers, use a hyphen ("-") such as in "1-4094".

 **Example**

```
"Network A"=10
"Network B"=21,22,23
"Network C"=100-200,300-400,500
```

Spaces before and after equal signs ("=") and commas (",") are ignored.

Describe the virtual network correctly, as the entry is case sensitive.
Save files using the UTF-8 character code.

When there are multiple lines with the same virtual network name, all specified lines are valid.

When the same VLAN ID is included in a line with a different virtual network name, the first occurrence in the file is valid and the lines after it are ignored.



Example

"Network D"=11

"Network D"=12 (*1)

"Network E"=11,15 (*2)

*1: Same as when "Network D"=11,12.

*2: 11 is ignored.

An error occurs during L-Server creation if the definition of the VLAN ID of the network resource connected to the NIC cannot be found.

G.2.5 Creating an L-Server

Use the following procedure to create L-Servers:

- Creating an L-Server using an L-Server template
 - When there are no cloning images, or when not using cloning images which have been already registered
 1. Create an L-Server, referring to "[6.1 Creation Using an L-Server Template](#)". In this case, select "None" for images.
In this case, the created L-Server may not be displayed in the orchestration tree. In this case, refer to "Note- When the created L-Server is not displayed in the orchestration tree".
For details on the created VM guests or cloning images, refer to "Information- Information created during L-Server creation".
 2. Install an OS, referring to "[Manual OS Installation](#)".
 3. When collecting cloning images after creating an L-Server, the cloning images are stored in the image pool. Collect cloning images, referring to "[Collecting Cloning Images](#)".
 - When using an existing cloning image
Create an L-Server, referring to "[6.1 Creation Using an L-Server Template](#)". In this case, specify the cloning image that you want to use as an image.
- Create an L-Server specifying individual specifications
Refer to "[Appendix D L-Server Parameter Details](#)".
For details on the [OS] tab settings, refer to "[G.2.6 \[OS\] Tab Configuration](#)".



Note

When the created L-Server is not displayed in the orchestration tree

When using the following SCVMM functions for the VM of the created L-Server, after this, the L-Server will not be recognized or displayed in the orchestration tree, and operation of the L-Server becomes unavailable.

- Saving in the library, deploying from the library
- New Template
- Transfer the template to a cluster node that is not managed by Resource Orchestrator

When "copying" is performed, the copied VM is not recognized as an L-Server.

Information created during L-Server creation

- VM guests created as L-Servers have the following configuration:

Disk and DVD

First Disk (System Volume)

Connected to the primary channel (0) of IDE device

Second or Later Disk

Connected to a SCSI adapter as data disk (*1)

DVD Drive

Connected to the secondary channel (0) of IDE device

*1: Cannot be used on guest OS's without the integrated service. Only boot disks connected to the IDE adapter can be used.

Virtual Network Adapter

When a guest OS that Hyper-V supports is specified, a converged network adapter will be used. When a different OS has been selected, an emulated network adapter will be added.

For details on the guest OS's supported by Hyper-V, refer to the following Microsoft web site.

Microsoft web site

URL: <http://www.microsoft.com/windowsserver2008/en/us/hyperv-supported-guest-os.aspx> (As of July 2011)

CPU Type

"1.00GHz Pentium III Xeon" (the SCVMM default value) is specified.

The CPU type is used for internal operations of SCVMM, and it does not indicate the CPU performance.

It is also different from the information displayed for the computer information of the guest OS.

- For cloning images, only system volumes are collected and deployed.

When registering a template created using SCVMM in the image pool of Resource Orchestrator, use a template created from a VM guest which has the system volume (a disk connected to primary channel (0) of the IDE device).

In other configurations, deploying using Resource Orchestrator will create VM guests without system volumes.

Manual OS Installation

Manually install an OS, after configuring the DVD connection settings from the SCVMM management window.

To use a guest OS supported by Microsoft on Hyper-V, it is necessary to install a virtual guest service on the guest OS.

For details on virtual guest service installation, refer to the Help of SCVMM.

Collecting Cloning Images

Use the following procedure to collect cloning images:

After installing an OS, stop the target L-Server.

Right-click the target L-Server in the orchestration tree, select [Cloning]-[Collect] from the popup menu, and click <OK>.

A given cloning image (identified by its name attribute) can be managed by image version.

If a cloning image is created using VM management software, it can be used as is.

Note

- If an L-Server is created with a specified Windows image, when deploying the image use Sysprep, provided by Microsoft, to re-configure the properties unique to the server. By executing Sysprep, the user information and OS setting information are reset. For details on Sysprep, refer to the information provided by Microsoft.
- If stopping or restarting of the manager is performed during execution of Sysprep, the operation being executed will be performed after the manager is started.
Until the process being executed is completed, do not operate the target resource.
- When using MAK license authentication for activation of Windows Server 2008 image OS, Sysprep can be executed a maximum of three times. Since Sysprep is executed when creating L-Server with images specified or when collecting cloning images, collection of cloning images and creation of L-Servers with images specified cannot be performed more than four times. Therefore, it is recommended not to collect cloning images from L-Servers which have had cloning images deployed, but to collect them from a dedicated master server. The number is also included in the count when Sysprep is performed when a template is created using SCVMM.
- Creation of L-Servers by specifying cloning images on which Windows 2000 Server and Windows 2000 Advanced Server are installed is not supported.

Point

Images are stored in the SCVMM library.

Specify a library which has sufficient available disk space to store the collected images.

When "Automatic selection" is specified in the [Collect a Cloning Image] dialog, selection is made from libraries registered with SCVMM, but collection of images may fail as the available disk space of libraries is not managed by SCVMM.

Resource Orchestrator uses SCVMM templates for collection of images.

When collecting images from L-Servers, a template is created using a name with the version number added to the image name. When retrieving the template created by the user as an image, the template is treated as an image.

In order to collect images of L-Servers, a work area equal to the size of the disk (the system volume, all data disks, snapshot, and configuration definition file) of the target of L-Server creation is necessary. This work area is released, when collection of images is complete.

When collecting images, data disks other than the system volume are deleted.

In Resource Orchestrator, the virtual hard disk of the primary channel (0) of the IDE device is managed as the system volume.

DVD drives other than the secondary channel (0) of the IDE device are deleted. A DVD drive is added to the secondary IDE channel (0) even if there is no DVD drive in the image. If DVD drives other than this drive exist, they are deleted.

Collection of images cannot be collected, when there are snapshots. Collect images after deleting snapshots. When creating checkpoints from the SCVMM management console or creating snapshots from Hyper-V manager, collection of images will fail.

When retrieving SCVMM templates created by users using SCVMM, manage them as follows:

- The template name is the image name.
- The virtual hard disk of the primary channel (0) of the IDE device is managed as a system volume.
- When creating an L-Server from an image retrieved from a template with data disks other than the system volume, the data disks other than the system volume are deleted.
- When creating an L-Server from an image with no system volume, an L-Server with no system volume will be created.
- On L-Servers created by retrieving an image from a template where DVD drives are connected to somewhere other than the secondary IDE channel (0), these DVD drives will be deleted.

- When L-Servers are created from an image retrieved from a template not connected to a DVD drive, the DVD drive will be added to the secondary IDE channel (0).

Access Control Configuration File of Image Storage Location

By specifying unavailable library shared path names in the access control configuration file of the image storage destination in advance, cloning image storage destinations can be controlled based on user groups.

Storage Location of the Configuration File

[Windows]
Installation_folder\Manager\etc\customize_data

Configuration File Name

The configuration files can be divided into definitions that are available for each user group and definitions that are common to the system. When there are both types of files, the limitations of both are valid.

- For User Groups
library_share_user_group_name_deny.conf
- Common to System
library_share_deny.conf

Configuration File Format

In the configuration file, library shared path names are entered on each line.

Library_shared_path_name



Example

An example configuration file is indicated below:

```
\\rcxvmm1.rcxvmmshv.local\MSSCVMMLibrary
\\rcxvmm2.rcxvmmshv.local\lib
```

Deleting cloning images

Use the following procedure to delete cloning images:

1. Select the target image pool on the orchestration tree.
The [Resource List] tab is displayed.
2. Right-click the cloning image to be deleted, and select [Delete] from the popup menu.
Click <OK>.
3. The cloning image is deleted.

When SCVMM template creation requirements are not met, or configuration changes are performed outside Resource Orchestrator, collection of images may fail.

When deleting cloning images, the corresponding templates in the SCVMM library are deleted.

When deleting these templates, related files (such as .vhd and .vfd) will remain in the SCVMM library as only template definition files are deleted.

When these related files are unnecessary, delete them individually from SCVMM.

Information

By creating the following setting file beforehand, when deleting cloning images, the related files that have no dependencies with other templates can be deleted at the same time.

Storage Location of the Configuration File

```
[Windows]
Installation_folder\Manager\etc\vm
```

Configuration File Name

```
delete_image_all_files_scvmm
```

Configuration File Format

It is not necessary to describe content in the configuration file.

As in the case of deletion of related files from the SCVMM management console, only the related files are deleted from the SCVMM library. The folder where the related files are stored will remain.

Creating L-Servers by specifying images, with specific language settings in the [Regional and Language Options]

The procedure for creating an L-Server avoiding the KB978336 problem is as follows:

1. Create the Sysprep answer file referring to the KB978336 information on the Microsoft web site.
2. From the SCVMM management console, create a VM image using VM management software.
For details, refer to the SCVMM help.
3. Register the created template in the image pool of Resource Orchestrator.
For details, refer to "[5.3.6 Virtual Image Resources](#)".
4. From the SCVMM management console, open the properties of the SCVMM template for the image of Resource Orchestrator and set the answer file created in 1.
5. Create the definition file for avoiding the KB978336 problem.

In the following definition file, describe an image pool name to use for storing the image to avoid the KB978336 problem, and the language to be set in the [Regional and Language Options] dialog.

Location of the Definition File

```
[Windows]
Installation_folder\Manager\etc\customize_data\
```

Definition File Name

```
kb978336_scvmm.rcxprop
```

Definition File Format

Describe the definition file in individual lines as below:

```
Image_pool_name=Language_specification_string
```

For the *Language_specification_string*, select and specify a value from "Locale name" on the following web page:

Locale Identifier Constants and Strings

```
http://msdn.microsoft.com/en-US/library/dd373765\(VS.85\).aspx (As of July 2011)
```

To set the Japanese language to avoid the KB978336 problem, specify "ja-JP".

Example

An example of the definition file for creating an L-Server in Japanese, specifying images in the image pools "/test/ImagePool1" and "/test/ImagePool2" is as follows:

```
/test/ImagePool1=ja-JP
/test/ImagePool2=ja-JP
```

Spaces before and after equal signs ("=") are ignored.

Specify the image pool name using the full path.

Alphanumeric characters (upper and lower case), underscores ("_"), slashes ("/"), and hyphens ("-") can be used.

Save files using the UTF-8 character code.

When there are multiple lines with the same image pool name, the specification in the last line is valid.

The *Language_specification_string* specified in the definition file is also applied to the following settings in the answer file:

- InputLocale
- SystemLocale
- UILanguage

For these settings, it is not possible to specify different languages individually.

6. Create an L-Server.

Create an L-Server referring to "6.1 Creation Using an L-Server Template" or "Appendix D L-Server Parameter Details".

In this case, specify the image registered in 3. for the cloning image to use as the image.

Note

When creating the following L-Servers, perform 1.-4.

- An L-Server with no NICs
- An L-Server to which an IP address has been allocated using DHCP

G.2.6 [OS] Tab Configuration

Enter the parameters to set for the OS when creating the L-Server. This setting is valid only if an image is specified in the [General] tab.

The setting process is performed the first time the L-Server is started. If an image name is not specified, it is not necessary to enter all these items.

Table G.9 List of Settings

Item	Windows		Description
	Necessity of entry	Values when omitted	
Host name/ Computer name	Optional	<i>L-Server Name</i>	Enter the host name or computer name. Enter a string of between 1 and 15 alphanumeric characters or hyphens ("-"), beginning with an alphanumeric character. The string cannot be composed solely of numbers. If underscores ("_") or periods (".") are used in an L-Server name, they will be replaced with hyphens ("-"), because these characters cannot be used for host names or computer names. If the basic information is not specified, the L-Server name is converted and set as indicated above.

Item	Windows		Description
	Necessity of entry	Values when omitted	
Domain name	Optional	WORKGROUP (*1)	Enter the workgroup name. Settings for participation in a domain cannot be made. Enter between 1 and 255 alphanumeric characters, hyphens ("-"), or periods (".").
DNS search path	No	-	Enter a list of domain names to use for DNS searching, using between 1 and 32,767 characters. You can specify the same characters as the domain name. To specify multiple domain names, use a space as the separator character.
Full name	Optional	WORKNAME (*1)	Enter the Windows full name using between 1 and 50 characters. By default, the value defined in the OS property definition file is entered. When the OS type is Windows Server 2008, Windows Server 2008 R2, Windows 7, or Windows Vista, a full name cannot be set for guest OS's.
Organization name	Optional	WORKORGANIZATION (*1)	Enter the organization name displayed in the Windows system properties using between 1 and 50 characters. When the OS type is Windows Server 2008, Windows Server 2008 R2, Windows 7, or Windows Vista, an organization name cannot be set for guest OS's.
Product key	Yes	- (*1)	Omission not possible. Ensure that you specify a valid product key.
License mode	No	-	Even if the license mode is specified, it is not configured in the guest OS.
Maximum number of connections	No	-	Even if the maximum number of connections is specified, it is not configured in the guest OS.
Administrator password	Optional	- (*1)	Enter the same password as that specified for the local administrator account during L-Server creation. When specifying a new password, the local administrator account will be overwritten. Enter the password using between 1 and 128 alphanumeric characters or symbols.
Hardware clock configuration	No	-	Specify either "UTC" or "Local (LOCAL)".
Time zone	Optional	<i>The same time zone as the OS of the manager</i>	Specify the time zone of the OS.

Yes: Entry is required

Optional: Entry can be omitted

No: Entry is not required

*1: When the OS property definition file is specified, its values are configured.

Information

OS Property Definition File

By setting the default values in an OS property definition file in advance, the default values of the information on the [OS] tab, etc. are generated when creating an L-Server. Use the UTF-8 character code for OS property definition files.

Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]
 /etc/opt/FJSVrcvnr/customize_data

Definition File Name

The definition file name can be used by dividing into definitions that are available for each user group and definitions that are common to the system. If the key of the definition file common to the system is the same as a definition file for a user group, priority is given to the values indicated in the definition file for the user group.

- For User Groups
 os_setting_user_group_name.rcxprop
- Common to System
 os_setting.rcxprop

Definition File Format

In the definition file, an item to define is entered on each line. Each line is entered in the following format.

Key = Value

Definition File Items

Specify the following items in a definition file.

Table G.10 List of Items

Item	Key	Value	Remarks
Domain name	workgroup_name	(*1)	For Windows
	domain_name	(*1)	For Linux
DNS search path	dns_search_path	(*1)	-
Full name	full_name	(*1)	-
Organization name	org_name	(*1)	-
Product key	product_key	(*1)	-
License mode	license_mode	Specify "seat" (number of connected clients) or "server" (per server: number of servers used at the same time).	-
Maximum number of connections	license_users	(*1)	-
Administrator password	admin_password	(*1)	-
Hardware clock configuration	hwclock	Specify either "UTC" or "LOCAL".	-
DNS server (for Windows)	nic N _dns_address n	Specify the IP address using numeric values (between 0 and 255) and periods.	For N , specify the NIC number. For n , specify primary ("1") or secondary ("2").
DNS server (for Linux)	dns_address X	Specify the IP address using numeric values (between 0 and 255) and periods.	For X , specify primary ("1"), secondary ("2"), or tertiary ("3").

*1: For more information on this value, refer to "[Table G.9 List of Settings](#)".

Example Definition File

An example definition file is indicated below.

```
# Windows
workgroup_name = WORKGROUP
full_name = WORKNAME
org_name = WORKORGANIZATION
```

```
product_key = AAAA-BBBB-CCCC-DDDD
license_mode = server
license_users = 5
admin_password = xxxxxxxxx
nic1_dns_address1 = 192.168.0.60
nic1_dns_address2 = 192.168.0.61
nic2_dns_address1 =
nic2_dns_address2 =

# Linux
domain_name = localdomain
dns_search_path = test.domain.com
hwclock = LOCAL
dns_address1 = 192.168.0.60
dns_address2 = 192.168.0.61
dns_address3 =
```

 **Information**

VM Guest Administrator Account Settings Necessary When Creating an L-Server with an Image Specified

When creating an L-Server with an image specified, it is necessary to enter the "administrator password" as a parameter.

The entered "administrator password" is the one set for the Administrator of the built-in administrator account, but on some localized editions of Windows the account name may differ. In addition, when the client OS is Windows 7 or Windows Vista, on standard installations the built-in administrator account is disabled, and the user account created during installation becomes the administrator account.

When an L-Server is created with a cloning image that was collected from a localized edition of Windows or a client OS specified, it is necessary to either configure an Administrator account for the administrator and set a password, or change the name of the administrator account with the "Administrator password" so that it fits the description given in the definition file below.

Note that when using a definition file, it is not possible to define different administrator ID settings for different generations of images.

Location of the Definition File

[Windows]
Installation_folder\Manager\etc\customize_data

Definition File Name

The definition file name can be used by dividing into definitions that are available for each user group and definitions that are common to the system. Search the definition file of each user group, from the start, for the administrator name corresponding to the image. When there is no corresponding definition, search in the system's common definition file.

Modification of the definition file is soon reflected, and it becomes valid for the creation of L-Servers from that point.

- For User Groups
image_admin_hyperv_user_group_name.rcxprop
- Common to System
image_admin_hyperv.rcxprop

Definition File Format

In the definition file, describe the image name and account name for which the administrator password has been configured on a single line.

```
Image name = "Administrator_account_name"
```

The *Administrator_account_name* is displayed enclosed in double quotes (").

Blank spaces and tabs other than those in the *Administrator_account_name* are ignored.

It is possible to use an asterisk ("*") as a wildcard in image names. By specifying an asterisk ("*") it is possible to create substitute strings for strings of indefinite length.

When creating an L-Server from an image, the corresponding image name is searched for from the start of the definition file, and the specified "Administrator password" will be set for the specified administrator account name.

It is necessary to create the definition files using the following line break code and character codes:

- Line break code: CR+LF(0x0d0a)
- Character code: Shift-JIS in Japanese environment, UTF-8 in other environments

Example Definition File

An example definition file is indicated below.

- Image names and administrator account names are set in pairs.

```
FR_WIN2003_001 = "Administrator"
EN_WIN7_001 = "root"
EN_WIN7_002 = "admin"
```

- For image names that start with "FR_WIN", use "Administrator" as the name of the administrator account.

```
FR_WIN* = "Administrator"
```

- Use "Administrator" as the name of the administrator account for all images. When an image name is specified using only a wildcard, the definition after that line will be ignored.

```
* = "Administrator"
```

G.2.7 Advisory Notes for Hyper-V Usage

This section explains advisory notes for Hyper-V usage.

Operating Systems for Which Parameters can be set and the Prerequisites for Performing the Settings

Depending on the server virtualization software used, some restrictions may apply to the operating systems that parameters can be set for and the prerequisites for performing the settings. For details, refer to the server virtualization software manual.

VMware ESX Management

VMware ESX can be managed by SCVMM using VMware vCenter Server. In Resource Orchestrator, VMware ESX cannot be managed through SCVMM. When managing VMware ESX in the above configuration, register VMware vCenter Server in Resource Orchestrator.

Attaching and Detaching Disks

- Data disks are connected to the L-Server as SCSI disks. They cannot be connected as IDE disks.
- When changing the configuration, a maximum of up to four disks can be specified at one time. To perform addition of five or more disks, please perform an additional configuration change.

Snapshot

The Resource Orchestrator snapshot uses the checkpoint function of SCVMM. To collect snapshots, sufficient free space is necessary to create a difference disk on the storage destination of VM guest.

When connecting the VM management software using the path through disk, snapshot creation will fail.

Operation with snapshots collected is not recommended due to the following reasons:

- When snapshots are collected, operation uses disk difference, and performance may deteriorate.
- If a snapshot is created from a VM guest that has been moved between servers (migration), and the snapshot is restored to a different VM host, the status on SCVMM becomes "Stored" and the VM may not be able to be started. In this situation, it is necessary to return the VM guest to the VM host from which the snapshot was collected and then start it.
- For combining of difference disks, it is necessary to delete not only all snapshots collected using Resource Orchestrator, but also all checkpoints created using VM management software. Combining of the disk is automatically performed by SCVMM, but depending on the status of the VM guest the operation may take a long time, because it is only performed while the target VM guest is stopped.

Information

The snapshot function provided by server virtualization software records the disk from the last update. Consequently, when a disk failure occurs, the snapshot function becomes unavailable at the same time.

Snapshot can be used as a corrective measure for problems such as the following:

Example

- For recovery when a problems occurs with the applied patch
- For recovery when a problem occurs when changing operating system parameters

L-Server Parameter Details [General] Tab

When a guest OS that Hyper-V supports is specified for the OS type, a converged network adapter will be added to VM.

When another OS has been selected, an emulated network adapter will be added.

When using a converged network adapter, it is necessary to install a virtual guest service on the guest OS.

For details on virtual guest service installation, refer to the Help of SCVMM.

L-Server Parameter Details [Server] Tab

If an unsupported OS type is specified, there is a chance that installation may fail or the OS of the VM guest may not operate correctly. Additionally, if an incorrect OS type is specified, there is a chance that image collection or L-Server creation for a specified image may fail, and a guest OS may start but hang while awaiting entry. This occurs because Microsoft's Sysprep cannot be processed correctly during personalization processing.

The OS types displayed in the list are the guest OS's which can be specified on the SCVMM management console.

Resource Orchestrator displays all guest OS's in the list in order not to limit user selection, however this does not mean that all guest OS's are supported by SCVMM.

Hyper-V does not support some server type settings such as number of CPUs depending on the OS type. When an incorrect OS type and server type are selected, operation is not guaranteed.

Additionally, even when a service pack is not listed in the OS type list, it may be necessary to install the service pack.

When a guest OS that Hyper-V supports is specified for the OS type, a converged network adapter will be added to VM.

When a different OS has been selected, an emulated network adapter will be added.

Creation of L-Servers by specifying cloning images on which Windows 2000 Server and Windows 2000 Advanced Server are installed is not supported.

For details on the guest OS's supported by SCVMM, refer to the Help of SCVMM.

For details on the guest OS's supported by Hyper-V, refer to the following Microsoft web site.

Microsoft web site

URL: <http://www.microsoft.com/windowsserver2008/en/us/hyperv-supported-guest-os.aspx> (As of July 2011)

L-Server Parameter Details [Disk] Tab

When creating an L-Server or changing the configuration, a maximum of four disks can be specified at one time.

To perform addition of five or more disks, please perform an additional configuration change.

L-Server Parameter Details [Network] Tab

IP addresses can be automatically configured, on the following guest OS's on which the integrated services are installed.

- Microsoft(R) Windows Server(R) 2008 R2
- Microsoft(R) Windows Server(R) 2008
- Microsoft(R) Windows Server(R) 2003 R2
- Microsoft(R) Windows Server(R) 2003
- Microsoft(R) Windows(R) 7
- Microsoft(R) Windows Vista(R)
- Microsoft(R) Windows(R) XP

Overcommit for L-Server

When overcommit has been configured for an L-Server, the following information is displayed.

- CPU Reserved

Reserved for a virtual machine.

The minimum amount of CPU resources to be reserved for a virtual machine.

- CPU Weight

The relative weight.

The weight (priority) of CPU resources on the host to be allocated to a virtual machine

- Startup RAM

The startup RAM.

The minimum amount of memory resources to be allocated when starting a virtual machine (startup memory) (*1)

- Memory Buffer

The memory resources on the host to be allocated to a virtual machine as a buffer (memory buffer) (*1)

- Memory Weight

The weight (priority) of memory resources on the host to be allocated to a virtual machine (*2)

*1: Displayed only when dynamic memory is enabled on the virtual machine.

*2: Displayed only when acceptable values have been configured.

Note that overcommit settings for L-Servers cannot be configured from Resource Orchestrator.

DVD Disk Operations

DVD disk operations cannot be performed for L-Servers. When using a DVD, use VM management software functions.

Automatic Network Configuration with Intel PROSet for Blade Servers

- The VLAN functions of Intel PROSet are not supported by Resource Orchestrator. Do not use the VLAN functions of Intel PROSet.
- User Accounts used when logging in to the SCVMM server must belong to the Administrator's group of each managed server.
- With SCVMM, NIC information of a managed server recognized once is not updated even if the NIC information is changed.

When changing the Intel PROSet settings of a managed server, use the following procedure to make SCVMM re-realize the NIC information:

1. Disable the virtual NIC of Intel PROSet using the Device Manager of the managed server (Hyper-V).
2. In the SCVMM management console of the admin server (SCVMM), right-click the target host, then select "Refresh".
3. Change the settings of Intel PROSet, and enable the virtual NIC using the Device Manager of the managed server (Hyper-V).
4. In the SCVMM management console of the admin server (SCVMM), right-click the target host, then select "Refresh".

If the information recognized by SCVMM is not reflected even after performing the above operations, follow the steps below to release and reconfigure Intel PROSet.

1. Cancel teaming settings for Intel PROSet on the managed server (Hyper-V).
 2. In the SCVMM management console of the admin server (SCVMM), right-click the target host, then select "Refresh".
 3. Reconfigure teaming settings for Intel PROSet on the managed server (Hyper-V).
 4. In the SCVMM management console of the admin server (SCVMM), right-click the target host, then select "Refresh".
- When setting ALB for the teaming mode of Intel PROSet, disable the RLB (Receive Load Balancing) function. This configuration is not supported by Hyper-V.
 - Do not disable NIC devices teamed using Intel PROSet.



Note

.....
If this procedure is not performed correctly, automatic network configuration will fail.
.....

G.3 RHEL5-Xen

This section explains how to configure RHEL5-Xen as server virtualization software.

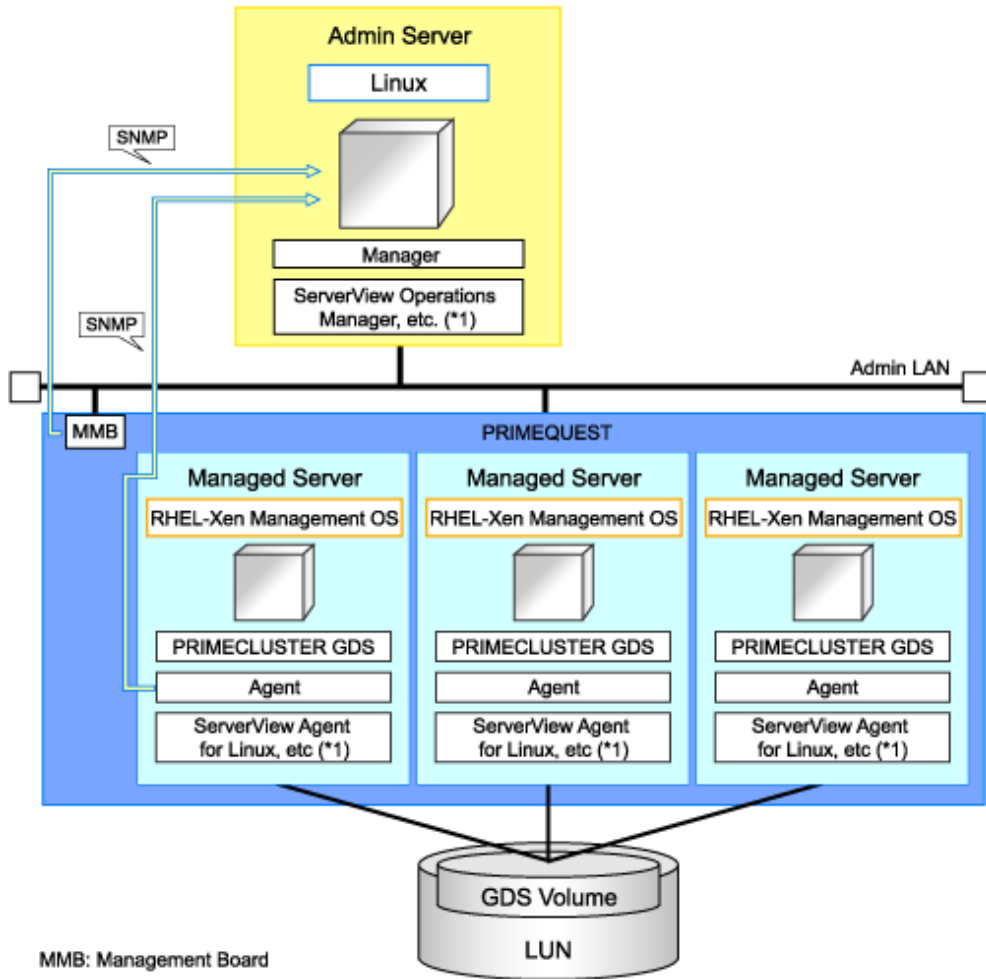
G.3.1 System Configuration

This explains how to configure RHEL5-Xen for use as server virtualization software.

Example of System Configuration

An example system configuration using RHEL5-Xen is given below.

Figure G.17 System Configuration Example Using RHEL5-Xen

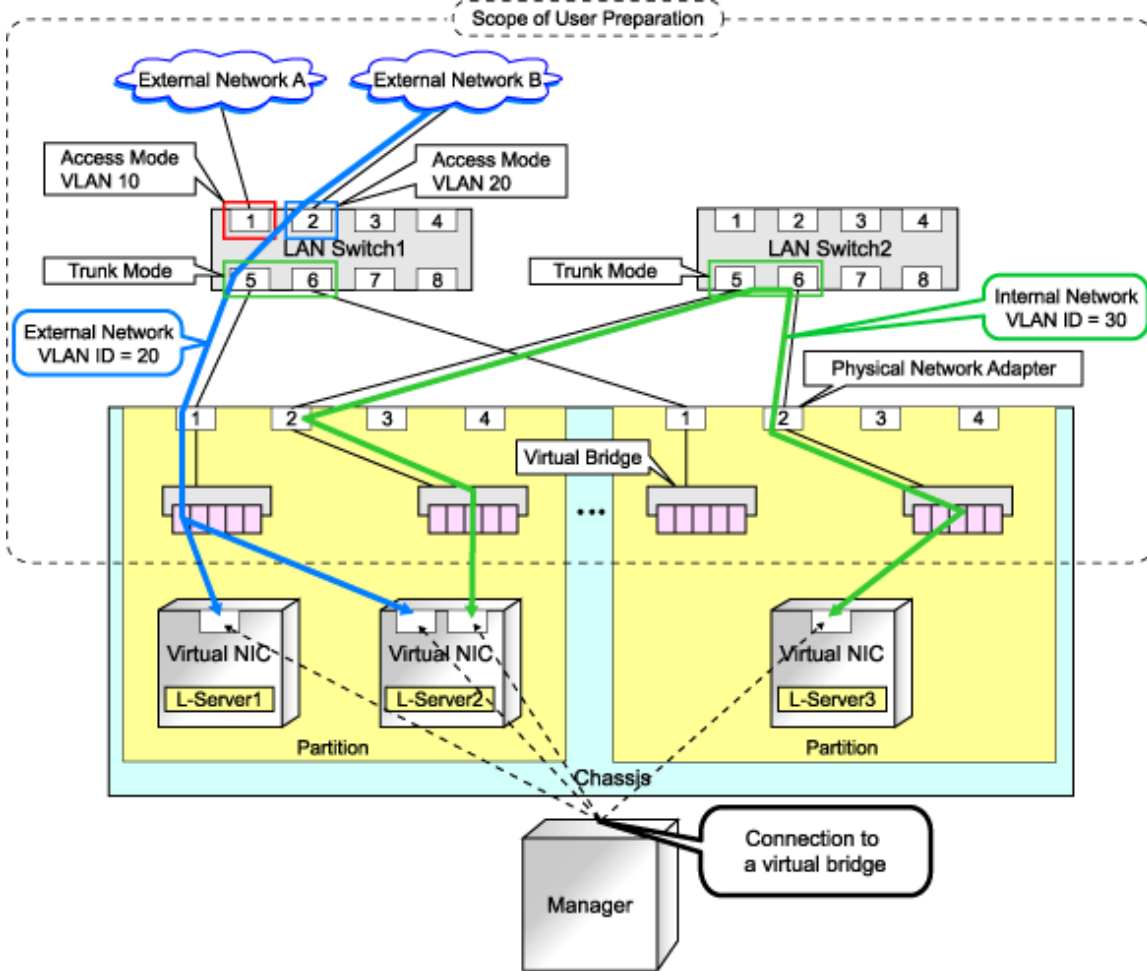


*1: For details on required software, refer to "[1.3.2.2 Required Software](#)".

Network Configuration Example

An example network configuration using RHEL5-Xen is given below:

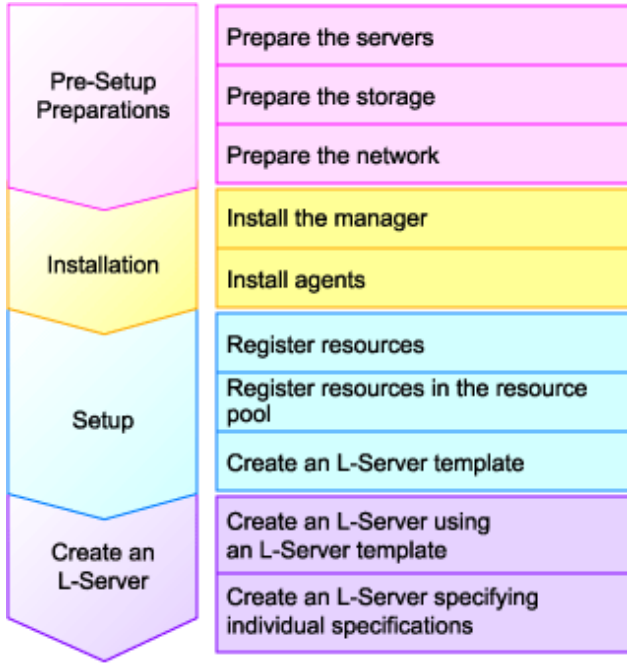
Figure G.18 Virtual Bridge Settings Using Network Resources



L-Server Creation Procedure

The procedure for creating L-Servers is shown below.

Figure G.19 Resource Orchestrator Setup Procedure



For details on how to prepare to setup Resource Orchestrator, refer to "G.3.2 Pre-setup Preparations".

For details on how to install Resource Orchestrator, refer to "G.3.3 Installation".

For details on how to set up Resource Orchestrator, refer to "G.3.4 Setup".

For details on how to create an L-Server, refer to "G.3.5 Creating an L-Server".

G.3.2 Pre-setup Preparations

Pre-setup preparations are required to create and manage RHEL5-Xen virtual machines as L-Servers of Resource Orchestrator.

For details on pre-setup preparations for RHEL5-Xen environment, refer to the RHEL5-Xen manual.

- Red Hat Enterprise Linux 5 Virtualization Guide

URL: http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/5/html/Virtualization/index.html (As of July 2011)

Pre-setup Preparations (Servers)

In addition to the operations in "3.1 Preparations for Server Environments", the following operations are necessary.

- Installation and configuration of the admin OS
Install and configure the admin OS of domain 0.
- Installation and configuration of PRIMECLUSTER GDS on the admin OS
Install and configure PRIMECLUSTER GDS on the admin OS.
For details, refer to the PRIMECLUSTER GDS manual.

Pre-setup Preparations (Storage)

Confirm the following:

- Volumes (LUN) to allocate to the admin OS have been created
The size must be larger than that allocated to the L-Server.

- Zoning and affinity have been set
 - The LUN has already been set as the shared class of PRIMECLUSTER GDS
- Start the name of the shared class and single disk with "rcx".
Do not overlap the class name within the VM hosts registered in Resource Orchestrator.

For details, refer to the ETERNUS and PRIMECLUSTER GDS manuals.

Pre-setup Preparations (Network)

Confirm the following:

- The configuration for the admin LAN and public LAN has been designed
- The network environment for the admin LAN is configured
- The VLAN ID to allocate to the network resource has been configured
- The virtual bridge has been configured beforehand
- The MAC address range for the virtual network interface (VNIF) has been decided

When using IBP

When using virtual L-Servers, connect the IBP uplink sets used for the public LAN and admin LAN to the VM host regardless of VIOM, after creating each IBP uplink set.

It is not necessary to use the same name for the uplink set and the name of the network resource.

Creating a virtual bridge

The virtual bridge is required on the admin OS, in order to connect the L-Server to the network.

For the virtual bridge settings, refer to the manual for RHEL5-Xen.

G.3.3 Installation

Installing the Manager

Install the Resource Orchestrator manager. For details on manager installation, refer to "[4.1 Installing the Manager](#)".

Install agents

Install agents of Resource Orchestrator on managed servers (admin OS).

For details on how to install agents, refer to "[4.2.2 Installation \[Linux/VMware/Xen/Oracle VM\]](#)".

G.3.4 Setup

The setup procedure when using Xen as server virtualization software is as follows:

1. Create storage connection definition files

Give descriptions, separating the admin IP addresses of VM hosts belonging to the scope of PRIMECLUSTER GDS shared classes using commas, and giving the scopes of shared clusters on individual lines.

When changing the shared class configuration, modify the definition files.

Storage Location of the Definition File

[Linux]

/etc/opt/FJSVrcvmr/customize_data

Definition File Name

storage_vmhost.rcxprop

Definition File Format

<i>vmhost_ipaddr,vmhost_ipaddr,...</i>

2. Register resources

a. Register storage management software

Register PRIMECLUSTER GDS on VM hosts as storage management software.

Register 1 of the VM hosts belonging to the scope of PRIMECLUSTER GDS shared classes. It is not necessary to register all VM hosts which belong to the scope.

When registering PRIMECLUSTER GDS as storage management software, single disks which were created in advance during pre-setup preparations, are automatically registered in Resource Orchestrator as virtual storage resources.

Execute the rcxadm storagemgr command to register storage management software.

For details on the rcxadm storagemgr command, refer to "1.7.1 rcxadm storagemgr" in the "ServerView Resource Orchestrator Reference Guide".

b. Register managed servers (domain 0)

1. Register managed servers

For details, refer to "6.1.3 Registering Managed Servers" in the "ServerView Resource Coordinator VE Setup Guide".

2. Registering LAN Switches

For details, refer to "6.1.4.2 Registering LAN Switches (Non-Blade Switches)" in the "ServerView Resource Coordinator VE Setup Guide".

3. Register resources in resource pools

a. Register VM host resources (domain 0)

1. In the RC console orchestration tree, right-click the target VM pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the VM host to register and click <OK>.

b. Register virtual storage resources

1. In the RC console orchestration tree, right-click the target storage pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the virtual storage resource to register and click <OK>.

c. Register network resources

If the NIC and network resources are connected when an L-Server is created, the settings matching the network resource definition will be registered automatically for the VM host that the L-Server will operate on. For details, refer to "[Manual Network Configuration](#)".

1. In the RC console orchestration tree, right-click the target network pool, and select [Create Resource] from the popup menu.

The [Create a network resource] dialog is displayed.

2. Enter the items necessary for network resources. For details, refer to "[5.3.4 Network Resources](#)".

d. Register address set resources (MAC addresses)

Create and register an address set resource (MAC address) in the address pool. For details, refer to "[5.3.5 Address Set Resources](#)".

4. Create an L-Server template

Create a master L-Server using an L-Server template.

The master L-Server is the L-Server to collect cloning images from.

a. Export an L-Server template

For details, refer to "[5.4.1 Exporting a Template](#)".

b. Edit an L-Server template

Edits an L-Server template. For details on the XML definition of L-Server templates, refer to "2.2 L-Server Template" in the "ServerView Resource Orchestrator Reference Guide", and edit the template.

In this case, perform the following configuration:

- Specify RHEL-Xen for the VM type.
- When sharing the disks allocated to the L-Servers with other L-Servers, specify the shared attributes of shared disks, "true".
- Specify None for the redundancy.
- Specify None for the positioning.

c. Importing an L-Server template

For details, refer to "[5.4.3 Importing a Template](#)".

Manual Network Configuration

For the virtual bridge created in advance, only provide the function for connection with the virtual bridge. Manually perform virtual bridge settings in advance.

Use a different VLAN ID for each virtual bridge to connect with the virtual bridge.

Additionally, the following settings must be performed in advance.

1. Creating a virtual bridge

Create a virtual bridge with the same name (including upper and lower case characters) for all VM hosts comprising the cluster. This enables migration of VM guests between VM hosts.

When a virtual bridge has already been manually configured and server virtualization software other than RHEL5-Xen is being used with the same manager, set a different name from the one used by the virtual switch, virtual network, and virtual bridge on the other server virtualization software.

2. Virtual bridge communication settings

Right-click the LAN switch in the server resource tree, and select [Modify]-[Network Settings] from the popup menu.

Configure LAN switches to enable communication using the tagged VLAN between virtual bridges using the same name.

The RC Console can be used for VLAN configuration of LAN switch blade external ports.

For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

3. Define the supported virtual bridge and VLAN ID

Supported virtual bridges and VLAN IDs are defined in the following definition file of Resource Orchestrator:

```
/etc/opt/FJSVrcvmt/customize_data/vnetwork_rhelxen.rcxprop
```

For details on definition file format, refer to "[File Format for Virtual Bridge Definitions](#)".

4. Create the XML file that defines network resources

Define the VLAN ID specified at 2 and 3 in the XML file.

When configuring an external connection port using one of the following configurations, specify auto="true" for the Network tag or omit the element.

- For BX400 Chassis
 - Select one external connection port from each of LAN switch blades 1 and 2.
 - Do not specify external connection ports.
- For BX600 Chassis
 - Select one external connection port from each of LAN switch blades 1 and 2.
 - Select one external connection port from each of LAN switch blade 3 and 4.
 - Do not specify external connection ports.
- For BX900 Chassis
 - Select one external connection port from each of LAN switch blades 1 and 2.
 - Select one external connection port from each of LAN switch blade 3 and 4.
 - Do not specify external connection ports.

When configuring an external connection port using a configuration other than the above, specify auto="false" for the Network tag.

5. Create network resources

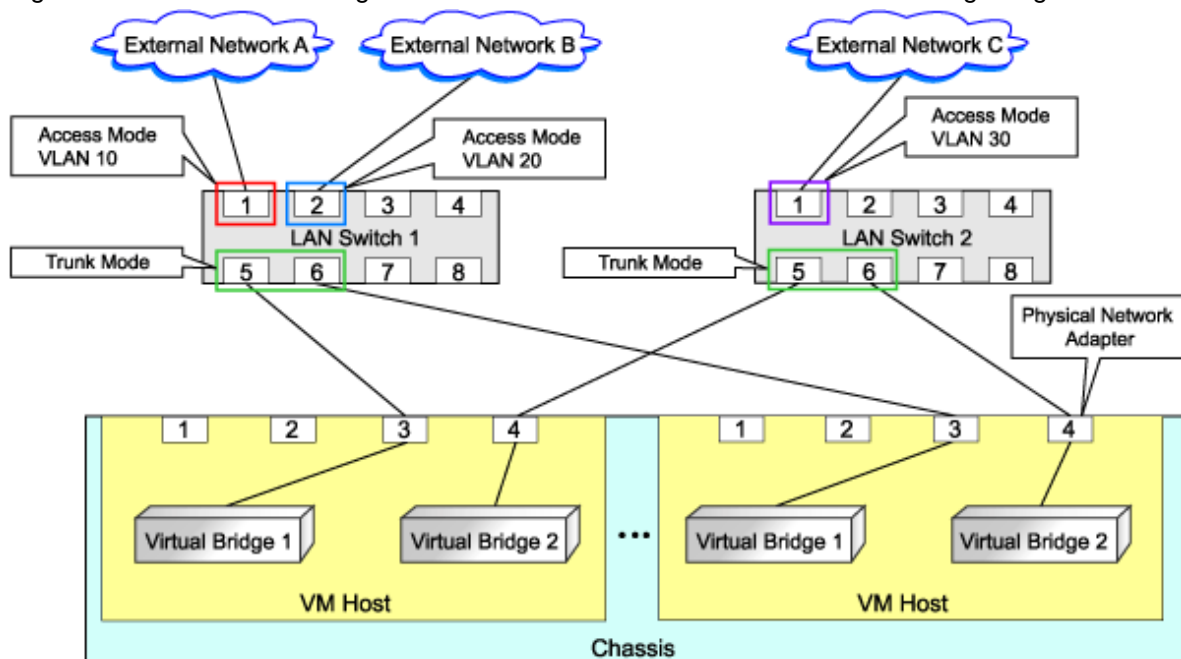
To create the network resource, execute the rxcadm network create command specifying the XML file created in 4.

For details on the rxcadm network command, refer to "1.3.5 rxcadm network" in the "ServerView Resource Orchestrator Reference Guide".

For details on the Network tag, refer to "2.4 Network Resources" in the "ServerView Resource Orchestrator Reference Guide".

An example of virtual NIC configuration and connection with virtual bridge using network resources is given below:

Figure G.20 Virtual NIC Configuration and Connection with Virtual Networks Using Bridge Resources



File Format for Virtual Bridge Definitions

Describe the virtual bridge definition file in one line as below:

```
"Virtual_bridge_name"=VLAN ID[,VLAN ID...]
```

For the *VLAN ID*, a value from 1 to 4094 can be specified. When specifying a sequence of numbers, use a hyphen ("-") such as in "1-4094".



Example

```
"xenbr0"=10
```

```
"xenbr1"=21,22,23
```

```
"xenbr2"=100-200,300-400,500
```

Spaces before and after equal signs ("=") and commas (",") are ignored.

Describe the virtual bridge correctly, as the entry is case sensitive.

Save files using the UTF-8 character code.

When there are multiple lines with the same virtual bridge name, all specified lines are valid.

When the same VLAN ID is included in a line with a different virtual bridge name, the first occurrence in the file is valid and the lines after it are ignored.



Example

```
"xenbr4"=11
```

```
"xenbr4"=12 (*1)
```

```
"xenbr5"=11,15 (*2)
```

*1: Same as when "xenbr4"=11,12.

*2: 11 is ignored.

An error occurs during L-Server creation if the definition of the VLAN ID of the network resource connected to the NIC cannot be found.

G.3.5 Creating an L-Server

Use the following procedure to create L-Servers:

Create a Master L-Server

Creates a master L-Server using an L-Server template. Use the following procedure to create master L-Servers:

1. Create a master L-Server using an L-Server template.

Execute the `rcxadm lserver create` command, and create an L-Server.

For details on the `rcxadm lserver create` command, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

In this case, perform the following configuration:

- For the name of an L-Server template, specify the name of the L-Server template which has been created in advance.
- For VM host, specify the VM host (admin OS) to allocate to the L-Server.

2. Install an OS

For manual OS installation, use the virtual machine manager.

For manual OS installation, refer to the "Red Hat Enterprise Linux 5 Virtualization Guide".

URL: http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/5/html/Virtualization/index.html (As of July 2011)

3. Collecting cloning images

Collect cloning images after creating an L-Server. Execute the `rcxadm image create` to collect cloning images.

When executing `rcxadm image create`, the cloning images are stored in the image pool.

For details on the `rcxadm image create` command, refer to "1.4.1 `rcxadm image`" in the "ServerView Resource Orchestrator Reference Guide".

Point

When the destination folder for image storage is omitted during the cloning image collection, virtual storage in the same storage pool as the virtual storage used by the L-Server that is the target for collecting cloning images is automatically selected.

Create an L-Server

Create an L-Server using Systemwalker Software Configuration Manager.

For details, refer to the "Systemwalker Software Configuration Manager Operation Guide".

In this case, specify the cloning images collected during the master L-Server creation for images.

Note

When sharing disks among L-Servers, create the *M*th L-Server, after completing creation of the *M*th-1 L-Server.

When copying the data during the L-Server creation, perform the operation after powering off the L-Server that is the source of the data to be copied. When creating an L-Server while copying data, do not perform power operations on the source of the data to be copied.

G.3.6 L-Server Operations

When using RHEL5-Xen, L-Server operations cannot be performed using the RC console. Use the `rcxadm lserver` command, for L-Server operations. For details, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

Changing L-Server specifications

To change L-Server specifications, execute `rcxadm lserver modify`.

For details on specifications that can be changed, refer to "2.3.2 For Virtual L-Servers" in the "ServerView Resource Orchestrator Reference Guide".

The value after changing the specifications can be checked in the [Resource List] tab in the orchestration tee.

From the command-line, execute `rcxadm lserver list` and `rcxadm lserver show`.

For details, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

Check the CAP value of a guest domain that is operating, using the `virsh schedinfo` command.

Check the CAP value of a guest domain that has been stopped, using the domain configuration files.

For details, refer to the "Red Hat Enterprise Linux 5 Virtualization Guide".

Red Hat Enterprise Linux 5 Virtualization Guide

URL: http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/5/html/Virtualization/index.html (As of July 2011)

The CAP value is calculated as follows:

$$\text{CAP value} = ((\text{Specified_CPU_clock_speed GHz} * 1000) * \text{CPU_number} * 1000) / \text{physical_CPU_clock_speed MHz}$$

G.3.7 Advisory Notes for RHEL5-Xen Usage

This section explains advisory notes for RHEL5-Xen.

Required Software

When using RHEL5-Xen, Systemwalker Software Configuration Manager is required.

Admin Server

When using RHEL5-Xen as managed servers, the only supported OS of the admin server is Linux.

Managed Server

When using RHEL5-Xen as managed servers, the only server type available for use as managed servers is RHEL5-Xen.

L-Server OS

When using RHEL5-Xen as managed servers, the only supported OS of the admin server is Linux.

Snapshot

When using RHEL5-Xen, snapshots cannot be used.

Collect L-Server snapshots using PRIMECLUSTER GDS.

The part of the virtual storage name before "-" is the PRIMECLUSTER GDS class name, and the part after "-" is the single disk name.

The disk resource name corresponds to the volume name.

For details on snapshots, refer to the PRIMECLUSTER GDS manual.

VM Type View

In the RC console, the VM type of VM host and VM guest for RHEL5-Xen is displayed as "Xen".

Shared Disk View

On the RC console, when multiple L-Servers have shared disk resources, only the information of one L-Server to which the resources are allocated is displayed.

Check the disk shared information, using the rcxadm disk show command.

Max. number of possible L-Servers View

The available space on resources and the space displayed for the number of L-Servers that can be created are calculated as follows:

Available Amount of CPUs and Number of L-Servers that can be Created

$$\text{Total resource space} * 80\% - (\text{Total of resources used for L-Server})$$

Attaching Resources

When attaching VM hosts, virtual storages or networks, perform the same procedure as in "G.3.4 Setup".

Hardware Maintenance

When server failure is detected on Systemwalker Software Configuration Manager, open the RC console, and identify the failed server. For details on server hardware replacement, refer to "Chapter 9 Hardware Maintenance" in the "ServerView Resource Coordinator VE Operation Guide".

G.4 Oracle VM

This section explains how to configure Oracle VM as server virtualization software.

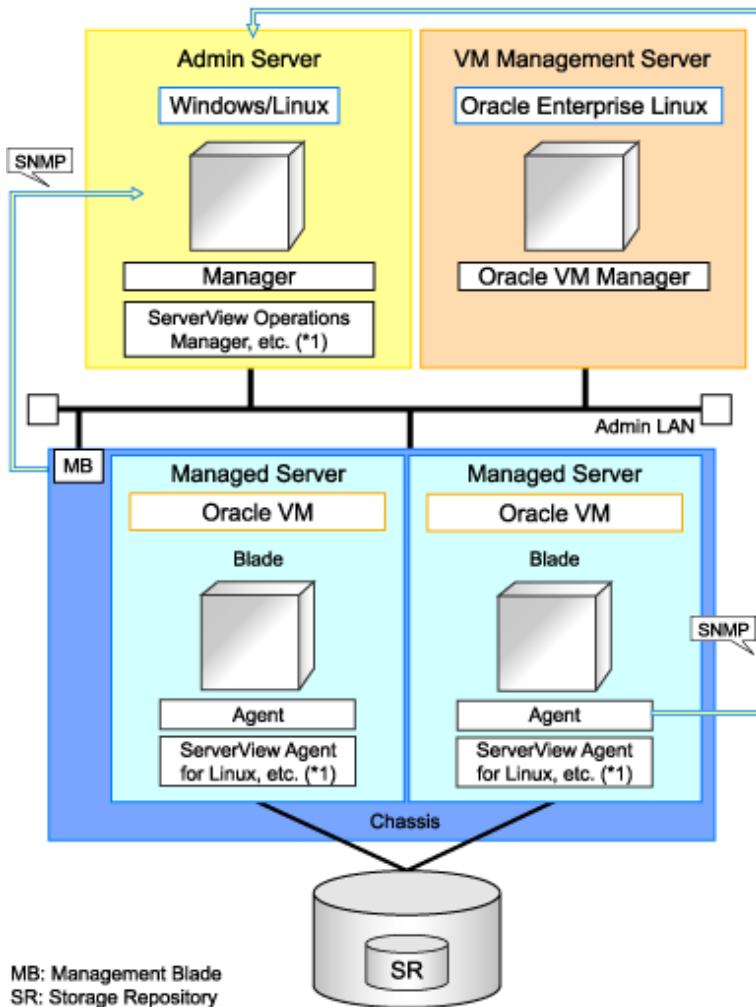
G.4.1 System Configuration

This explains how to configure Oracle VM for use as server virtualization software.

Example of System Configuration

An example system configuration using Oracle VM is given below.

Figure G.21 System Configuration Example Using Oracle VM



*1: For details on required software, refer to "1.3.2.2 Required Software".

Simplifying Network Settings

Network settings can be easily configured by Resource Orchestrator when creating L-Servers.

Depending on the conditions, such as hardware (blade servers or rack mount servers) and the presence or absence of network redundancy for L-Servers, the setting ranges of networks differ.

For details, refer to "[1.2.6 Simplifying Network Settings](#)".

G.4.2 Pre-setup Preparations

Pre-setup preparations are required to create and manage Oracle VM virtual machines as L-Servers of Resource Orchestrator.

For details on preparations for Oracle VM environments, refer to "Oracle VM Manager User's Guide" and "Oracle VM Server User's Guide".

Refer to the relevant version of document, referring to the following URL:

URL: http://www.oracle.com/technetwork/indexes/documentation/index.html (As of July 2011)

Pre-setup Preparations (Servers)

In addition to the operations in "[3.1 Preparations for Server Environments](#)", the following operations are necessary.

- Configure VIOM

When using I/O virtualization, configuration of VIOM is necessary.

- Install and configure Oracle VM Server for x86

When installing an OS on a physical server, refer to the server virtualization software manual.

When installing a VM host on an L-Server, refer to "[Appendix K Installation of VM Hosts on Physical L-Servers](#)".

- Install and configure Oracle VM Manager

Necessary for management of VM hosts and L-Servers.

- Configure server pools

Configure the server pool that contains the VM host used as the L-Server location.

For details on the configurations of server pools, refer to the "Oracle VM Server User's Guide".

- Design and configure high availability

When performing redundancy of L-Servers, enable high availability for the server pool.

- Configure SSH connection

Perform configuration to enable SSH connections from the admin server of Resource Orchestrator to the VM host using the admin LAN.

Pre-setup Preparations (Storage)

Confirm the following:

- Volumes (LUN) to allocate to domain 0 have been already created

The LUN must be larger than the size to allocate to the L-Server.

- Zoning and affinity have been set

Pre-setup Preparations (Network)

Confirm the following:

- The configuration for the admin LAN and public LAN has been designed
- The network environment for the admin LAN is configured
- The VLAN ID to allocate to the network resource has been configured
- The bridge has been configured beforehand

When using IBP

When using virtual L-Servers, connect the IBP uplink sets used for the public LAN and admin LAN to the VM host regardless of VIOM, after creating each IBP uplink set. It is not necessary to use the same name for the uplink set and the name of the network resource.

Creating a Bridge

A bridge is required on domain 0, in order to connect the L-Server to the network.

The bridge is configured by default. When changing the settings, refer to the "Oracle VM Server User's Guide".

G.4.3 Installation

Installing the Manager

Install the Resource Orchestrator manager. For details on manager installation, refer to ["4.1 Installing the Manager"](#).

Install agents

Install Resource Orchestrator agents on managed servers (Oracle VM Server).

For details on how to install agents, refer to ["4.2.2 Installation \[Linux/VMware/Xen/Oracle VM\]"](#).

G.4.4 Setup

The setup procedure when using Oracle VM as server virtualization software is as follows:

1. Register resources
 - a. Register VM management software (Oracle VM Manager)

When registering VM management software, the storage repositories which are created in advance during pre-setup preparations, are automatically registered in Resource Orchestrator as virtual storage resources.

Use the following procedure to register VM management software:

1. In the RC console, select [Settings]-[Register]-[Management Software (OVM Manager)].
The [Management Software (OVM Manager)] dialog is displayed.
2. In the [Management Software (OVM Manager)] dialog, set the following items.

Management software name

Enter the name of the target VM management software.

Enter a character string beginning with an alphabetical character and containing up to 15 alphanumeric characters and hyphens ("-").

Location

Select the location where the VM management software to register is operating.

- For Resource Orchestrator admin servers

Specify "Admin Server".

- For servers other than Resource Orchestrator admin servers

Specify "Other Server".

In the IP address entry field, enter the IP address of the server on which VM management software is operating.

"Admin Server" is selected by default.

IP address

Enter the IP address of VM management software. When specifying "Admin Server" for the location, entry is not possible, as the IP address of admin server remains displayed.

Enter the IP address using periods ".".

User name

Enter the user name to use to control VM management software.

The string must be composed of alphanumeric characters and symbols (ASCII characters 0x20 to 0x7e), and can be up to 128 characters long.

Specify a user name with administrative privileges.

Password

Enter the password for VM management software.

The string must be composed of alphanumeric characters and symbols (ASCII characters 0x20 to 0x7e), and can be up to 128 characters long.

3. Click <OK>.

VM management software is registered.

b. Register managed servers (domain 0)

1. Register chassis (for blade servers)

Refer to "6.1.2 Registering Chassis" in the "ServerView Resource Coordinator VE Setup Guide".

2. Register managed servers

For details, refer to "6.1.3 Registering Managed Servers" in the "ServerView Resource Coordinator VE Setup Guide".

3. Register LAN switch blades (for blade servers) or LAN switches (for rack mount servers)

For details, refer to "6.1.4.1 Registering LAN Switch Blades" or "6.1.4.2 Registering LAN Switches (Non-Blade Switches)" in the "ServerView Resource Coordinator VE Setup Guide".

c. Network resources

To register a network resource, specify a network pool when creating the network resource.

By creating network resources in advance, if the NIC and network resources are connected when an L-Server is created, the following settings matching the network resource definition will be registered automatically.

For details on manual configuration of network resources, refer to "[Manual Network Configuration](#)".

2. Register resources in resource pools

a. Register VM host resources (domain 0)

1. In the RC console orchestration tree, right-click the target VM pool, and select [Register Resources] from the popup menu.

The [Register Resources] dialog is displayed.

2. Select the VM host to register and click <OK>.

b. Register virtual storage resources

1. In the RC console orchestration tree, right-click the target storage pool, and select [Register Resources] from the popup menu.
The [Register Resources] dialog is displayed.
2. Select the virtual storage resource to register and click <OK>.

c. Register network resources

If the NIC and network resources are connected when an L-Server is created, the settings matching the network resource definition will be registered automatically for the VM host that the L-Server will operate on. For details, refer to "[Manual Network Configuration](#)".

1. In the RC console orchestration tree, right-click the target network pool, and select [Create Resource] from the popup menu.
The [Create a network resource] dialog is displayed.
2. Enter the items necessary for network resources. For details, refer to "[5.2.5 Network Resources](#)".

3. Create an L-Server template

a. Export an L-Server template

For details, refer to "[5.4.1 Exporting a Template](#)".

b. Edit an L-Server template

For details, refer to "[5.4.2 Editing a Template](#)".

c. Importing an L-Server template

For details, refer to "[5.4.3 Importing a Template](#)".

Manual Network Configuration

For the virtual bridge created in advance, only provide the function for connection with the virtual bridge. Manually perform virtual bridge settings in advance.

Use a different VLAN ID for each virtual bridge to connect with the virtual bridge.

Additionally, the following settings must be performed in advance.

1. Creating a virtual bridge

A virtual bridge is created.

When configuring a cluster, create a virtual bridge with the same name (including upper and lower case characters) for all VM hosts comprising the cluster. This enables migration of VM guests between VM hosts.

When a virtual bridge has already been manually configured and server virtualization software other than Oracle VM is being used with the same manager, set a different name from the one used by the virtual switch, virtual network, and virtual bridge on the other server virtualization software.

2. Virtual bridge communication settings

Right-click the LAN switch in the server resource tree, and select [Modify]-[Network Settings] from the popup menu.

Configure LAN switches to enable communication using the tagged VLAN between virtual bridges using the same name.

The RC Console can be used for VLAN configuration of LAN switch blade external ports.

For details, refer to "6.2.1 Configuring VLANs on LAN Switches" in the "ServerView Resource Coordinator VE Setup Guide".

3. Define the supported virtual bridge and VLAN ID

Supported virtual bridges and VLAN IDs are defined in the following definition file of Resource Orchestrator:

[Windows]

Installation_folder\Manager\etc\customize_data\vnetwork_oraclevm.rcxprop

[Linux]

/etc/opt/FJSVrcvmm/customize_data/vnetwork_oraclevm.rcxprop

For details on definition file format, refer to "[File Format for Virtual Bridge Definitions](#)".

4. Create the XML file that defines network resources

Define the VLAN ID specified at 2 and 3 in the XML file.

When configuring an external connection port using one of the following configurations, specify auto="true" for the Network tag or omit the element.

- For BX400 Chassis
 - Select one external connection port from each of LAN switch blades 1 and 2.
 - Do not specify external connection ports.
- For BX600 Chassis
 - Select one external connection port from each of LAN switch blades 1 and 2.
 - Select one external connection port from each of LAN switch blade 3 and 4.
 - Do not specify external connection ports.
- For BX900 Chassis
 - Select one external connection port from each of LAN switch blades 1 and 2.
 - Select one external connection port from each of LAN switch blade 3 and 4.
 - Do not specify external connection ports.

When configuring an external connection port using a configuration other than the above, specify auto="false" for the Network tag.

5. Create network resources

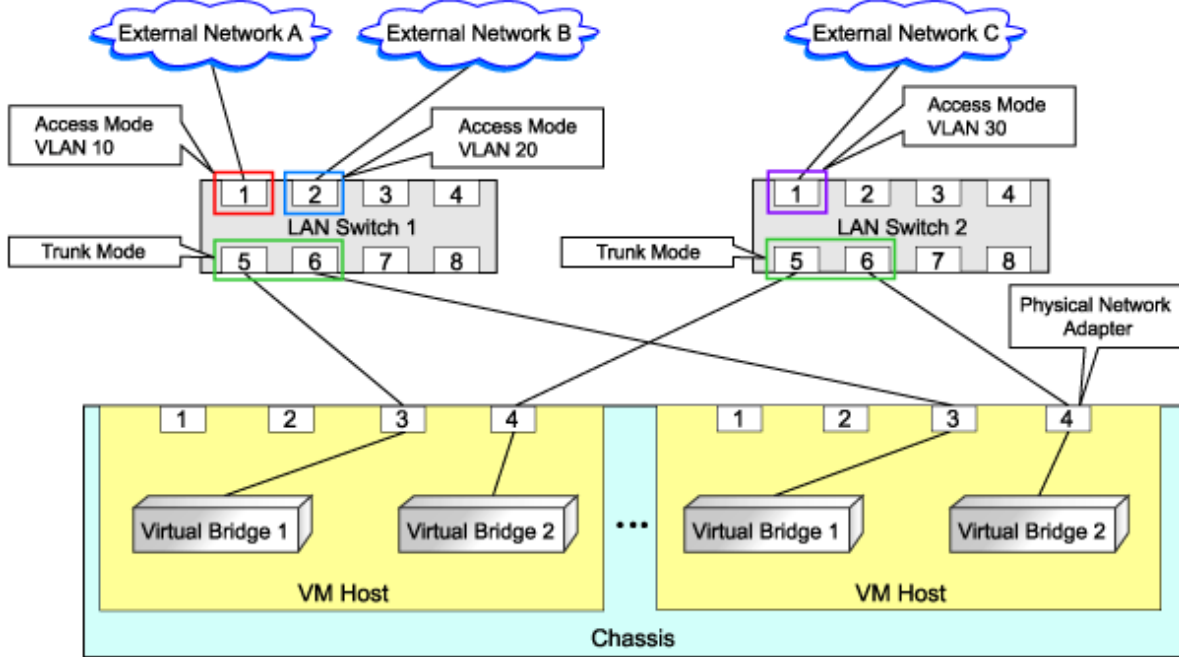
To create the network resource, execute the rcxadm network create command specifying the XML file created in 4.

For details on the rcxadm network command, refer to "1.3.5 rcxadm network" in the "ServerView Resource Orchestrator Reference Guide".

For details on the Network tag, refer to "2.4 Network Resources" in the "ServerView Resource Orchestrator Reference Guide".

An example of virtual NIC configuration and connection with virtual bridge using network resources is given below:

Figure G.22 Virtual NIC Configuration and Connection with Virtual Networks Using Bridge Resources



File Format for Virtual Bridge Definitions

Describe the virtual bridge definition file in one line as below:

```
"Virtual_bridge_name"=VLAN ID
```

For the *VLAN ID*, a value from 1 to 4094 can be specified.

Example

```
"xenbr0"=10
```

Spaces before and after equal signs ("=") and commas (",") are ignored.

Describe the virtual bridge correctly, as the entry is case sensitive.

Save files using the UTF-8 character code.

When the same VLAN ID is included in a line with a different virtual bridge name, the first occurrence in the file is valid and the lines after it are ignored.

Example

```
"xenbr4"=11
```

```
"xenbr5"=11 (*1)
```

*1: This line is ignored.

An error occurs during L-Server creation if the definition of the VLAN ID of the network resource connected to the NIC cannot be found.

G.4.5 Creating an L-Server

Use the following procedure to create L-Servers:

1. Creating an L-Server using an L-Server template

Create an L-Server, referring to "[6.1 Creation Using an L-Server Template](#)".

In this case, specify the cloning image that you want to use as an image.

2. Create an L-Server specifying individual specifications

Refer to "[Appendix D L-Server Parameter Details](#)".

For details on the [OS] tab settings, refer to "[G.1.6 \[OS\] Tab Configuration](#)".

Manual OS Installation

To manually install an operating system, use VM management software.

When installing an OS manually, refer to the virtual machine creation section of the "Oracle VM Server User's Guide".

Refer to the relevant version of document, referring to the following URL:

URL: http://www.oracle.com/technetwork/indexes/documentation/index.html (As of July 2011)

Collect Cloning Images

This section explains how to collect cloning images.

Use the following method to collect cloning images:

After installing an OS, stop the target L-Server.

Right-click the target L-Server in the orchestration tree, select [Cloning]-[Collect] from the popup menu, and click <OK>.

A given cloning image (identified by its name attribute) can be managed by image version.

If a cloning image is created using VM management software, it can be used as is.

DVD Drive Configuration

The same DVD drive as the one in the image to be deployed is configured for the L-Server to be created. If there is no DVD drive in the image, no DVD drive will be created on the L-Server.

G.4.6 [OS] Tab Configuration

For Oracle VM, the values specified in the [OS] tab are not set.

Instead, it is necessary to specify a console password in the OS property definition file.

OS Property Definition File

When creating a VM guest using Oracle VM Manager, specify a console password for connection from Oracle VM Manager to VM guest console. The console password should be specified in the OS definition file in advance. Use the UTF-8 character code for OS property definition files.

Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvmr/customize_data

Definition File Name

The definition file name can be used by dividing into definitions that are available for each user group and definitions that are common to the system. If the key of the definition file common to the system is the same as a definition file for a user group, priority is given to the values indicated in the definition file for the user group.

- For User Groups
os_setting_user_group_name.rcxprop
- Common to System
os_setting.rcxprop

Definition File Format

In the definition file, an item to define is entered on each line. Each line is entered in the following format.

```
Key = Value
```

Definition File Items

Specify the following items in a definition file. Other key specifications will be ignored.

Table G.11 List of Items

Item	Key	Value	Remarks
Console password	console_password	The string must be composed of alphanumeric characters and underscores("_"), and can be up to 24 characters long.	Specify the password required to open the console.

Example Definition File

An example definition file is indicated below.

```
# group A
console_password = xxxxxxxx
```

G.4.7 Advisory Notes for Oracle VM Usage

This section explains advisory notes for when using Oracle VM.

Operating Systems for Which Parameters can be set and the Prerequisites for Performing the Settings

Depending on the server virtualization software used, some restrictions may apply to the operating systems that parameters can be set for and the prerequisites for performing the settings.

For details, refer to the manual of server virtualization software.

VM Host Functions

VM Hosts that have no ability to provide virtual machine and virtual server functions cannot be registered in VM pools.

If those VM Hosts were registered, when a VM host specification used to create L-Servers is omitted, one of the VM host may be selected as the operational VM host.

In this case, even if the VM host is registered in the VM pool, when it is selected to create an L-Server, creation will fail.

Snapshot

When using Oracle VM, snapshots cannot be used.

L-Server creation

When creating L-Servers, set the destination VM host to the Preferred Server of a created VM guest.

L-Server Disk

Disks cannot be detached while they are powered ON.

L-Server Network (NIC)

One or more networks must be specified.

L-Server CPU Performance

For L-Server CPU performance, do not specify a value of less than 1GHz.

Moving an L-Server between servers (migration)

When performing migration with an L-Server powered on, after powering it off, the L-Server may be moved back to the previous server.

In this case, power off the L-Server before migration, and power it on again after moving it.

When the L-Server is an HVM (Hardware Virtualized Machine)

Installation of paravirtual drivers is required to connect data disks as SCSI disks.

If paravirtual drivers are not installed, the OS may fail to recognize the data disks.

SSL Access Method for VM Management Software

When starting VM management software from the management console, SSL-enabled URL or SSL-disabled URL can be specified as the destination. In Oracle VM Manager configurations, if SSL is enabled for access to Oracle VM Manager, the following definition file is required: Use the UTF-8 character code for definition files.

Location of the Definition File

[Windows]

Installation_folder\Manager\etc\customize_data

[Linux]

/etc/opt/FJSVrcvmr/customize_data

Definition File Name

ovmm.rcxprop

Definition File Format

The definition file is entered in the following format.

<i>Key = Value</i>

Definition File Items

Specify the following items in a definition file. Other key specifications will be ignored.

Table G.12 List of Items

Item	Key	Value	Remarks
Enable/Disable SSL	SSL	"vmm_ip[:port][,vmm_ip[:port]...]" vmm_ip: IP address of SSL-enabled VM management software port: Port number of SSL-enabled VM management software	If the port number is omitted, the default port number (4443) is set.

Example Definition File

An example definition file is indicated below.

```
# Oracle VM Manager
ssl = 192.168.2.2:4443,192.168.2.3:4443
```

Name and number of detected virtual storage resources

Even if multiple storage repositories are connected to a VM host, only a single virtual storage resource is detected for each VM host.

The displayed name of virtual storage resources is the string of the VM host root repository, excluding the path name (/var/ovs/mount).



Example

```
D1567B83A58D41FEB28FB8897801C7ED
```

Virtual storage resource free space

When multiple storage repositories have been connected to the VM host, a storage repository that has the largest available space is displayed as the available space of the virtual storage resource.

Therefore, the space may not decrease in proportion to the virtual disk space created during L-Server creation.

Total virtual storage resource size

Not displayed.

Virtual storage resource used space

Not displayed.

Cloning Images Collected from L-Servers

Cloning images are stored in Oracle VM Manager, using the following template name:

```
"cloning_image_name[_index]@version_number"
```

However, in the template editor window of Oracle VM Manager, "@" cannot be included in the template name. When using Oracle VM Manager to edit the template information collected using Resource Orchestrator, modify the template name so that it does not contain "@".

VM Host Status

Even when a VM host is running and the xend demon is not running, "normal" is displayed as the status of the VM host. If L-Server operation fails when the VM host status is "normal", execute the following command from the VM host to check the status of the xend demon. If the xend demon is not running, start it.

- Status check for the xend demon

```
>service xend status <RETURN>
```

- Starting the xend demon

```
>service xend start <RETURN>
```

When Managing Multiple Server Pools Using Oracle VM Manager

When creating an L-Server or attaching a disk, specify an image, VM host, or virtual storage that satisfies the following conditions:

- Belongs to the same server pool as the image and VM host.
- The disk created is a virtual storage recognized by the VM host.

Check the server pool to which the image and the VM host belong using Oracle VM Manager.

- Image
"Server Pool Name" in the "Virtual Machine Templates" list
- VM host
"Server Pool Name" in the "Servers" list

The name of a virtual storage recognized by the VM host is the string of the root storage repository, excluding the path name (/var/ovs/mount). To check the root storage repository, log in to the VM host, then execute the following command:

```
# ls -l /OVS
```

Example

```
lrwxrwxrwx 1 root root 47 Apr 11 23:15 /OVS -> /var/ovs/mount/D1567B83A58D41FEB28FB8897801C7ED
```

Appendix H Dashboard Coordination

This appendix explains dashboard coordination.

H.1 Overview

Dashboard coordination is the function for acquiring the status of resource usage of Resource Orchestrator, and displaying it using the dashboard, by coordinating with the dashboard of Systemwalker Service Catalog Manager.

H.2 Configuration of Dashboard Coordination

This section explains configuration of dashboard coordination.

H.2.1 Setting Up Dashboard Coordination Scripts

Use the following procedure for setup, when using dashboard coordination.

1. Install the Resource Orchestrator manager

When installing a Resource Orchestrator manager, the four files for dashboard coordination are installed in the following folders:

Storage Location

[Windows]

Installation_folder\manager\dashboard\bin

[Linux]

/opt/FJSVrcvnr/dashboard/bin

Stored Files

[Windows]

- README.txt

Instructions for the setup procedure of the dashboard coordination script (rcxadm2csv).

- setupRcxadm2csv.bat

Installation script for dashboard coordination.

- setupCmd2csv.bat

A script invoked from the installation script for dashboard coordination that performs installation operations.

- rcxadm2csv.rb

Execution module for dashboard coordination (rcxadm2csv).

[Linux]

- README.txt

Instructions for the setup procedure of the dashboard coordination script (rcxadm2csv).

- setupRcxadm2csv.sh

Installation script for dashboard coordination.

- setupCmd2csv.sh

A script invoked from the installation script for dashboard coordination that performs installation operations.

- rcxadm2csv.rb

Execution module for dashboard coordination (rcxadm2csv).

2. Execution of installation script for dashboard coordination

When the installation script for dashboard coordination is executed, dashboard coordination is installed.

After installing dashboard coordination, coordination is executed at 5-minute intervals.

[Windows]

```
> setupRcxadm2csv.bat <RETURN>
```

[Linux]

```
#sh setupRcxadm2csv.sh <RETURN>
```

3. Confirmation of dashboard coordination execution

When dashboard coordination is performed, CSV files for the dashboard and log files are stored in the following folders.

Storage Location

- CSV files for dashboard

[Windows]

Installation_folder\manager\dashboard\csv

[Linux]

/var/opt/FJSVrcvmr/dashboard/csv

- Log files

[Windows]

Installation_folder\dashboard\rcxadm2csv.log

[Linux]

/var/opt/FJSVrcvmr/dashboard/rcxadm2csv.log

H.2.2 Stopping, Restarting, and Uninstalling Dashboard Coordination

Stopping Dashboard Coordination

To stop dashboard coordination, execute the following stop script for dashboard coordination.

[Windows]

Installation_folder\manager\dashboard\schtasks_unregister.bat

```
> schtasks_unregister.bat <RETURN>
```

[Linux]

/var/opt/FJSVrcvmr/dashboard/cron_unregister.sh

```
#sh cron_unregister.sh <RETURN>
```

Restarting Dashboard Coordination

To restart dashboard coordination, execute dashboard execution scripts for dashboard coordination.

When executing dashboard execution scripts for dashboard coordination, dashboard coordination will be executed again.

[Windows]

Installation_folder\manager\dashboard\schtasks_register.bat

```
> schtasks_unregister.bat <RETURN>
```

[Linux]

/var/opt/FJSVrcvmr/dashboard/cron_register.sh

```
#sh cron_register.sh <RETURN>
```

Uninstalling Dashboard Coordination

Use the following procedure to uninstall dashboard coordination:

1. Stop dashboard coordination

Stop dashboard coordination. For details, refer to "[Stopping Dashboard Coordination](#)".

2. Delete dashboard coordination files

Delete folders and files in the following folders.

[Windows]

Folders and files other than bin under *Installation_folder*\manager\dashboard

[Linux]

/var/opt/FJSVrcvnr/dashboard/

H.2.3 Messages

This section explains the messages output using log files, when using dashboard coordination.

The storage location of log files is as described below.

Storage Location

[Windows]

Installation_folder\dashboard\rcxadm2csv.log

[Linux]

/var/opt/FJSVrcvnr/dashboard/rcxadm2csv.log

The following messages will be output in the log files:

cannot get pool list, maybe ServerView Resource Orchestrator is down

[Description]

After executing the rcxadm pool list command, if acquisition of the resource pool list fails, the message will be output.

Services of Resource Orchestrator may not have been started.

[Corrective Action]

Check if services of Resource Orchestrator have been started, and start them if they have been stopped.



Note

Regularly check the size of the log files. When their size increases, delete them.

Appendix I Realization of High Availability

This section explains how to realize high availability.

I.1 High Availability of Managed Resources

This section explains how to realize high availability of managed resources.

The methods of environment creation and operation for enabling higher availability of managed resources vary depending on resources involved.

- Servers

["I.1.1 L-Server High Availability"](#)

- Blade chassis

["I.1.2 Blade Chassis High Availability"](#)

- Storage chassis

["I.1.3 Storage Chassis High Availability"](#)

I.1.1 L-Server High Availability

This section explains high availability for L-Servers.

Regardless of the server type, select the "HA" checkbox on the "Server" tab to perform redundancy settings when creating an L-Server.

- For physical L-Servers

Select the "HA" checkbox to enable the selection of the pool of a spare server.

The server pool of the spare server that the physical server will use for automatic switchover is registered in can be specified.

For details on the [Server] tab, refer to ["D.2.1 When "Physical" is Selected for \[Server type\]"](#).

For the details on conditions for switchover to spare servers, refer to "9.3 Server Switchover Conditions" in the "ServerView Resource Coordinator VE Setup Guide".

- For virtual L-Servers

The settings depend on the server virtualization software used.

For details, refer to ["D.2.2 When "VM" is Selected for \[Server type\]"](#).

Checks of Spare Server Models and Configurations

The L-Server definition and spare server configuration are checked when configuring server redundancy during creation or modification of a physical L-Server.

The check is performed on the following items of an L-Server definition and spare server configuration:

- Server Model

Checks that there is a server compatible with the L-Server definition in the specified server pool.

The compatibility of server models is evaluated by the definition file for checks on spare server models and configurations.

The definition file is created when installing managers.

When installing a new compatible server model, update the definition file by adding the server model.

If the definition file does not exist or contains incorrect information, a server model with a matching L-Server definition and physical server model is selected.

- Number of NICs

Checks the number of NICs mounted on a compatible server and an L-Server.

If the number of NICs on the compatible server is equal to or larger than that defined on the L-Server, the compatible server is evaluated as a qualified server.

Selection of Suitable Spare Servers

When the "Use a low spec server" checkbox is not selected, a spare server is automatically set.

Based on the following conditions, an L-Server definition is compared to physical L-Servers existing in the specified resource pool as a spare server:

- Number of CPUs
- CPU Clock Speed
- Memory Size
- Number of NICs

A server that satisfies or exceeds all conditions and has the nearest specifications to the L-Server definition is selected.

When the "Use a low spec server" checkbox is selected, physical servers with models matching that in the L-Server definition are selected as spare servers.

Modification of Checks on Spare Server Models and Configurations

The switchover policy, and the definition of server model compatibility can be modified.

Although the definition file is deployed when installing managers, if the definition file is not found, or contains incorrect information, a server model with a matching L-Server definition and physical server model is selected as a spare server.

When the "Use a low spec server" checkbox is selected, physical servers with models matching that in the L-Server definition are selected as spare servers.

The definition file for checks on spare server models and configurations is stored in the following location.

Location of the Definition File

[Windows]
Installation_folder\Manager\etc\customize_data

[Linux]
 /etc/opt/FJSVrcvmr/customize_data

Definition File Name

spare_server_config.rcxprop

Definition File Format

Describe the definition file in individual lines as below:

<i>Key = Value</i>

When adding comments, start with a number sign ("#").

Definition File Items

Specify the following items in a definition file.

Table I.1 List of Items Specified in Definition Files for Checking Spare Server Models and Configurations

Item	Key	Value	Remarks
Policy of Switchover	OVERALL_POLICY	skip	Configure the check policy of the L-Server definition for the whole system and the spare server configuration. - skip
		warning	
		error	

Item	Key	Value	Remarks
			<p>Omits the check of whether or not there is a server that satisfies the spare server conditions.</p> <p>Even if a server pool that does not satisfy the conditions is selected, creation and modification of an L-Server are performed without checking.</p> <ul style="list-style-type: none"> - warning <p>Server pools without servers that satisfy the spare server conditions are also displayed.</p> <p>When a server pool that does not satisfy the conditions is selected, a warning message is displayed during creation and modification of an L-Server, checking whether or not to continue the operation.</p> <ul style="list-style-type: none"> - error <p>Server pools without servers that satisfy the spare server conditions are not displayed.</p> <p>Therefore, a server pool that does not satisfy the spare server conditions cannot be selected.</p> <p>Server switchover is impossible when the destination cannot be found while performing the switchover, even if the check has been made in advance.</p>
Compatibility of Server Model (*1)	SPARE_SVR_COMPATX (X is a number from 0 - 255)	["modelA", "modelB"]	<p>Define compatible server models as a group.</p> <p>When checking the L-Server definition and the spare server configuration, the server models in the same group are the target of switchover.</p> <p>Examples of server models are as below.</p> <ul style="list-style-type: none"> - BX920 S1 - BX920 S2

*1: The value of SPARE_SVR_COMPAT is changeable. Server switchover may fail depending on the combination of changed values, such as when a server with no compatibility is set as a spare server.

Example Definition File

```
# Spare server check configuration

# Spare server check logic's policy: skip | warning | error
OVERALL_POLICY=skip

# Server model compatibility list
SPARE_SVR_COMPAT0=["BX920 S1", "BX920 S2"]
```

I.1.2 Blade Chassis High Availability

This section explains high availability for when operating L-Servers on blade servers.

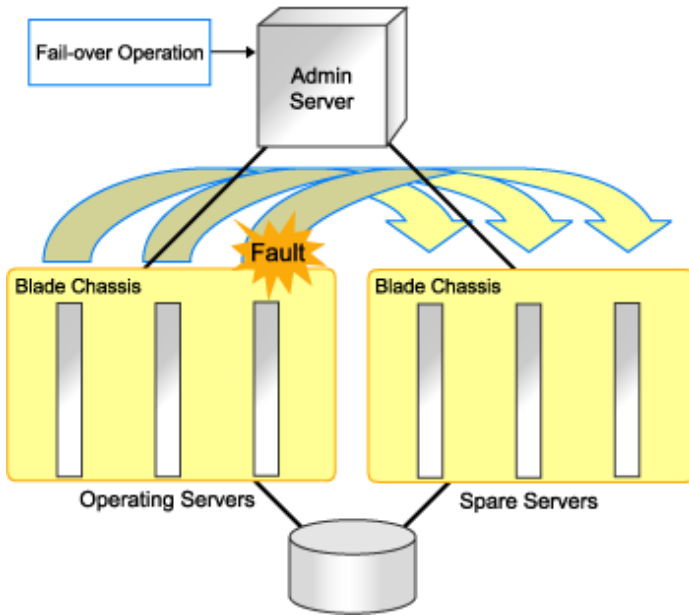
When the server is a physical L-Server for a blade server, this function which enables restarting of L-Servers, by manually switching over servers to spare servers when there are blade servers are specified as spare servers on other chassis.

To perform server switchover for chassis failures, it is necessary to configure the server switchover settings in advance.

If VM hosts were registered as physical L-Servers, virtual L-Servers can also be restarted by switching over the VM hosts to spare servers.

For details, refer to "[Appendix K Installation of VM Hosts on Physical L-Servers](#)".

Figure I.1 Server Switchover When a Chassis Fails



Installation

This section explains the preparations for configuration of server switchover.

Use the following procedure for configuration:

1. Register a server in a spare blade chassis in the server pool.

Perform one of the following steps:

- Register a server in a spare blade chassis in the server pool.
- Register a server in a spare chassis in the server pool for a spare server.

2. Create an L-Server.

For details, refer to "[6.1 Creation Using an L-Server Template](#)" or "[Appendix D L-Server Parameter Details](#)".

In this case, perform redundancy for the L-Server.

On the [Server] tab of the [Create an L-Server] dialog, set the following items.

- Check the "HA" checkbox.
- When the server in the chassis was registered in the spare server pool in step 1., specify the spare server pool.

Operations

This section explains how to perform switchover of L-Servers.

Use the following procedure to perform switchover of L-Servers:

1. A chassis error is detected.

If the following events occur, determine whether or not to perform chassis switchover regarding the event as the chassis failure.

- Both management blades cannot be accessed because of a management blade failure
- Communicate with the admin LAN is not possible
- Communication is not possible because there is trouble with the LAN switches that connect with the admin LAN

2. Check the chassis on which the L-Server for which an error was detected.

Execute the `rcxadm chassis show` command to check if the L-Server that was being operated on the chassis that has trouble.

For details on the `rcxadm chassis show` command, refer to "1.3.9 `rcxadm chassis`" in the "ServerView Resource Orchestrator Reference Guide".

3. Check if the status of the L-Server that is the source for switchover is stop.

If the status of the L-Server is not stop, stop the L-Server.

The L-Server cannot be stopped, as the management blade cannot be accessed. Stop the L-Server on the managed server, using the console of managed server.

Note

If switchover is performed while an L-Server in a chassis that has trouble is still operating, there is a possibility that another instance of the L-Server will be started and its disks damaged. Ensure the L-Server is stopped.

4. Place the server into maintenance mode.

For details on how to place servers into maintenance mode, refer to "Appendix F Maintenance Mode" of the "ServerView Resource Coordinator VE Setup Guide".

Execute the `rcxadm server` command from the command line. For details on the `rcxadm server` command, refer to "1.3.10 `rcxadm server`" in the "ServerView Resource Orchestrator Reference Guide".

5. Start the L-Server.

Start the L-Server on the switchover destination server.

For details on how to start an L-Server, refer to "6.2.1 Starting an L-Server".

6. Release the server that has been switched to from maintenance mode.

For details on how to release servers from maintenance mode, refer to "Appendix F Maintenance Mode" in the "ServerView Resource Coordinator VE Setup Guide".

Execute the `rcxadm server` command from the command line. For details on the `rcxadm server` command, refer to "1.3.10 `rcxadm server`" in the "ServerView Resource Orchestrator Reference Guide".

Restoration

This section explains restoration.

Use the following procedure for restoration:

1. If a management blade has failed, replace it with new one. If an admin LAN or switches fail, replace them. After that, initialize the management blade. To initialize the management blade, select "controlled by VIOM" in the management window of the management blade. After performing the configuration to forcibly reset the local VIOM settings on the displayed screen, restart the management board. In either case, if any concerns arise, contact Fujitsu technical staff.
2. Mount a blade on the chassis.
3. After unregistering the restored chassis using the RC console, register the chassis again.
4. After powering on the server in the restored chassis from the server resource tree, forcibly power off the server.

After restoring the blade chassis, use the following procedure to relocate the L-Server.

1. Stop an L-Server.

For details on how to stop an L-Server, refer to "6.2.2 Stopping an L-Server".

2. Perform modification of the physical server to use.

In the "Modify an L-Server" dialog, specify the restored server for "Physical server".

For details on modification of physical servers, refer to "6.3.1 Modifying Specifications".

3. Start the L-Server.

For details on how to start an L-Server, refer to "[6.2.1 Starting an L-Server](#)".

I.1.3 Storage Chassis High Availability

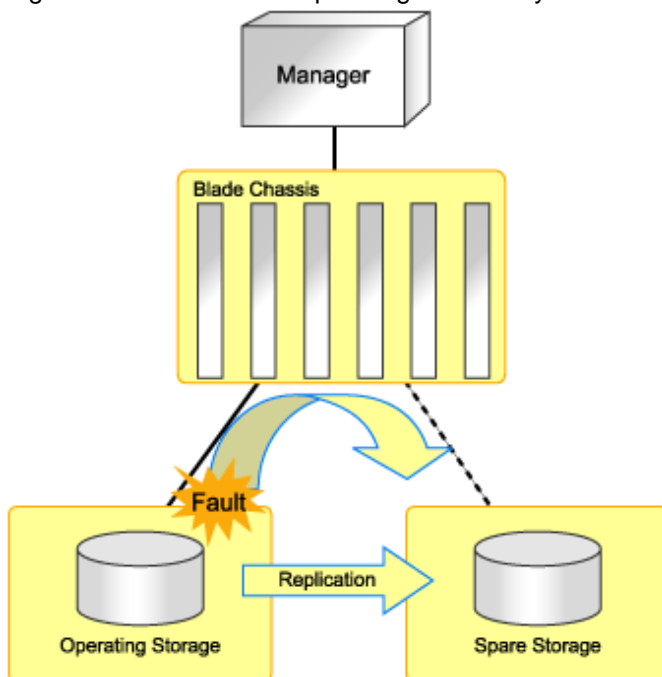
This section explains high availability of storage chassis connected to physical L-Servers.

If performing replication between two storage units of LUNs used by a physical L-Server, quick restoration of physical L-Servers is possible, even when storage units have failed.

This section explains the switchover of disks used by physical L-Servers, between two storage units on which replication of LUNs is managed by a single manager.

When performing switchover of physical L-Servers and disks used by physical L-Servers in a Disaster Recovery environment, refer to "[Appendix J Disaster Recovery](#)".

Figure I.2 Switchover of Operating or Standby Status of Storage



Prerequisites

- The target disk resources of switchover point to the LUNs which were created in advance for the storage unit, and replication must be set between the operating storage and the standby storage in advance.

In this case, the disk resource automatically created by Resource Orchestrator will be the target of switchover.

- The relationship of the replication for LUNs must be 1 to 1 between the operating storage and the standby storage.
- It is necessary for an operating disk resource to be connected to a physical L-Server.

The disk resources that are not registered in storage pools or not connected to L-Servers are not the targets of operations.

- The switchover of disk resources is performed based on the relationship of the replication described in the replication definition file created in advance. Disk resources that are not described in the replication definition file are not the target of the process.

When modifying storage configurations, such as addition of LUNs, the replication definition file must be updated.

- It is necessary that a standby disk resource has been detected by Resource Orchestrator. When the LUN for the standby disk resource can be accessed from a server, the disk resource is not detected by Resource Orchestrator. Do not register detected disk resources in a storage pool.

- The identifiers of storage units (ETERNUS, NetApp, or IP address for EMC CLARiiON, SymmID for EMC Symmetrix DMX) described in the replication definition file must be in a configuration which does not overlap.

In this case, a storage unit which has the same IP address or SymmID as that of the storage unit existing in an operating unit cannot be used as the standby storage unit.

- When a configuration uses NetApp storage units, and the MetroCluster function for storage replication, the switchover process using this function is unavailable.

Physical L-Server operations can be restored by performing switchover on the operating storage and standby storage using the MetroCluster function.

- It is necessary to configure the Fibre Channel switch in advance in order to access operating and standby storage units from the server on which a physical L-Server is operating.

When the storage unit is ETERNUS, configuration in advanced is not necessary.

- The time taken to perform switchover is proportional to the number of disk resources used for L-Servers, and the number of L-Servers that use the operating storage units.

Users are recommended to perform a test in advance to check the time required for restoration of a storage unit after a failure.

Replication of Storage Unit LUNs

- For ETERNUS

Define the LUN replication using ETERNUS SF AdvancedCopy Manager.

- For EMC CLARiiON

Define the LUN replication using the MirrorView function.

- For EMC Symmetrix DMX

Define the device replication using the SRDF function.

Replication Definition Files

The replication definition file must be created in advance. In the replication definition file, describe the relationship between the operating storage and the standby storage for replication.

The format of the replication definition file is as follows:

IP_address_of_operating_storage_unit,Operating_volume_identifier,IP_address_of_standby_storage_unit,Standby_volume_identifier

Configure the definition file using a unique combination of an IP address for an operating or standby storage unit, and an identifier for an operating or standby volume. When the information overlaps in the replication definition file, an error will occur when creating a failover or a failback script.

- For ETERNUS

The relationship for replication can be checked using ETERNUS SF AdvancedCopy Manager. For example, when performing replication using the Copy Control Module of ETERNUS SF AdvancedCopy Manager, use the acec query command.

Specify the IP address of a storage for the storage identifier. Check the IP address of a storage using the rcxadm storage list command.

For details on volume identifiers, check them from ETERNUS SF AdvancedCopy Manager. Volume identifiers are written in hexadecimal format without zero suppression.



Example

```
192.168.1.24,0x0001,192.168.2.25,0x0005
192.168.1.24,0x0002,192.168.2.25,0x0006
192.168.3.25,0x0001,192.168.4.26,0x0005
```

- For EMC CLARiiON

The relationship for replication can be checked using the MirrorView function.

Specify an IP address for the storage identifier. Check the IP address, using the rcxadm storage list command.

For details on volume identifiers, check them using the MirrorView function. Volume identifiers are written in hexadecimal format without zero suppression.



Example

```
192.168.1.24,0x0001,192.168.2.25,0x0005
192.168.1.24,0x0002,192.168.2.25,0x0006
192.168.3.25,0x0001,192.168.4.26,0x0005
```

- For EMC Symmetrix DMX

The relationship for replication can be checked using the SRDF function.

Specify SymmID for the storage identifier. Check SymmID, using the rcxadm storage list command.

Specify a device for the volume identifier. Check the device, using the SRDF function. Volume identifiers are written in hexadecimal format without zero suppression.



Example

```
000192601264,0001, 000192601265,0005
000192601264,0002, 000192601265,0006
000192601274,0001, 000192601275,0005
```

When performing switchover from operating to standby (failover)

This section explains the procedure to perform switchover from operating storage units to standby storage units.

1. Create the replication definition file.

For details on replication definition files, refer to "[Replication Definition Files](#)".

2. Create the following scripts by executing the rcxstorage -failover command.

- failover script
- Physical L-Server stopping script
- Physical L-Server startup script

For details on the rcxstorage command, refer to "1.7.13 rcxstorage" in the "ServerView Resource Orchestrator Reference Guide".

- Create these scripts in units of operating storage.
- These scripts are created based on the configuration information at the time which the command is executed. When changing configurations, create these scripts again.
- Execute the rcxstorage command with the -failover option, when an operating and a standby storage unit are displayed in the storage tree. The script can be created as long as the operating storage unit is displayed in the storage tree, even if it has failed.

Note

These scripts cannot be created when the operation target storage unit is not displayed in the storage tree.

3. Execute the physical L-Server stopping script on the server where the manager is being operated. This operation stops the physical L-Server targeted by the failover script. To forcibly stop the server without shutting down the operating system running on the L-Server, specify the `-force` option when executing the physical L-Server stopping script.

If an error occurs during execution of the script, contact Fujitsu technical staff.

Note

Physical L-Servers are stopped in the order of the entries in the physical L-Server stopping script. When specification of the order of stopping physical L-Servers is necessary, edit the physical L-Server stopping script.

4. Delete the zoning combining the WWPN of the HBA of the physical L-Server and the WWPN of the port of the operating storage from the Fibre Channel switch. For ETERNUS storage, this step is not necessary as the zoning for Fibre Channel switch will be deleted by Resource Orchestrator when the failover script is executed.
5. If the replication function for storage is in operation, stop it.
6. Execute the failover script on the server where the manager is being operated.
7. To access the standby storage, add the zoning combining the WWPN of the HBA of the physical L-Server and the WWPN of the port of the standby storage to the Fibre Channel switch. For ETERNUS storage, this step is not necessary as the zoning for Fibre Channel switch will be added by Resource Orchestrator when the failover script is executed.

8. When perform reading or writing for the LUN of the standby storage, modify the settings of replication if necessary.

9. Execute the physical L-Server startup script on the server where the manager is being operated. This operation starts the physical L-Server.

If an error occurs during execution of the script, contact Fujitsu technical staff.

Note

Physical L-Servers are started in the order of the entries in the physical L-Server startup script. When the specification of the order of starting physical L-Servers is necessary, edit the physical L-Server startup script.

When performing switchover from standby to operating (failback)

This section explains the procedure for performing switchover from standby storage units to operating storage units.

1. Request repair of the operating storage units.
2. Using storage management software, restore the logical configuration (RAID, LUN) of an operating storage unit.
3. Using storage management software, check the LUN masking definition and LUN mapping definition of the operating storage unit. If the definitions relating to the WWPN of the HBA of the physical L-Server remain, delete them.
4. By modifying the settings of the replication function, perform replication of the storage unit from the operating to the standby, then wait until the status of the LUNs of the operating and standby storage become equivalent.
5. Prepare the replication definition file.

Use the same replication definition file as that for failover. When changing the configuration after executing the failover script, correct the replication definition file.

6. Create the following scripts by executing the rcxstorage -failback command.
 - failback script
 - Physical L-Server stopping script
 - Physical L-Server startup script

For details on the rcxstorage command, refer to "1.7.13 rcxstorage" in the "ServerView Resource Orchestrator Reference Guide".

- Create these scripts in units of operating storage.
 - These scripts can be created after executing the failover script and performing switchover to the standby storage unit.
 - These scripts are created based on the configuration information at the time which the command is executed. When changing configurations, create these scripts again.
 - Execute the rcxstorage command with the -failback option, when an operating and a standby storage unit are displayed in the storage tree. These scripts cannot be created when the operation target storage unit is not displayed in the storage tree.
7. Execute the physical L-Server stopping script on the server where the manager is being operated. This operation stops the physical L-Server targeted by the failback script. To forcibly stop the server without shutting down the operating system running on the L-Server, specify the -force option when executing the physical L-Server stopping script.

If an error occurs during execution of the script, contact Fujitsu technical staff.

Note

Physical L-Servers are stopped in the order of the entries in the physical L-Server stopping script. When specification of the order of stopping physical L-Servers is necessary, edit the physical L-Server stopping script.

8. Delete the zoning combining the WWPN of the HBA of the physical L-Server and the WWPN of the port of the standby storage from the Fibre Channel switch. For ETERNUS storage, this step is not necessary as the zoning for Fibre Channel switch will be deleted by Resource Orchestrator when the failback script is executed.
9. Stop the storage replication function.
10. Execute the failback script on the server where the manager is being operated.

If an error occurs during execution of the script, contact Fujitsu technical staff.
11. To access the operating storage, add the zoning combining the WWPN of the HBA of the physical L-Server and the WWPN of the port of the operating storage to the Fibre Channel switch. For ETERNUS storage, this step is not necessary as the zoning for Fibre Channel switch will be added by Resource Orchestrator when the failback script is executed.
12. By modifying the settings of the replication function, perform replication of the storage unit from the standby to the operating, then wait until the status of the LUNs of the standby and operating storage become equivalent.
13. Execute the physical L-Server startup script on the server where the manager is being operated. This operation starts the physical L-Server.

If an error occurs during execution of the script, contact Fujitsu technical staff.

Note

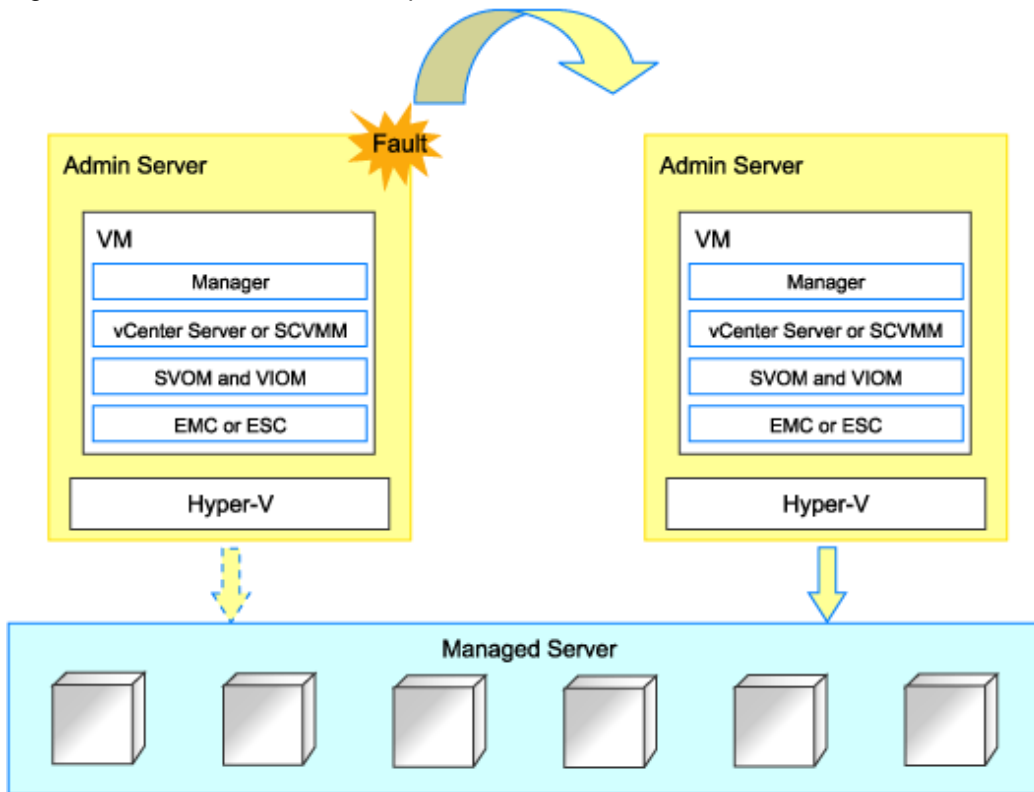
Physical L-Servers are started in the order of the entries in the physical L-Server startup script. When the specification of the order of starting physical L-Servers is necessary, edit the physical L-Server startup script.

I.2 Admin Server High Availability

This section explains high availability of managers.

Managers can be operated in cluster systems with Resource Orchestrator. When operating a blade server as the managed server using SVOM/VIOM, install the manager on the Windows guest OS environment of the Hyper-V environment.

Figure I.3 Admin Server Cluster Operation



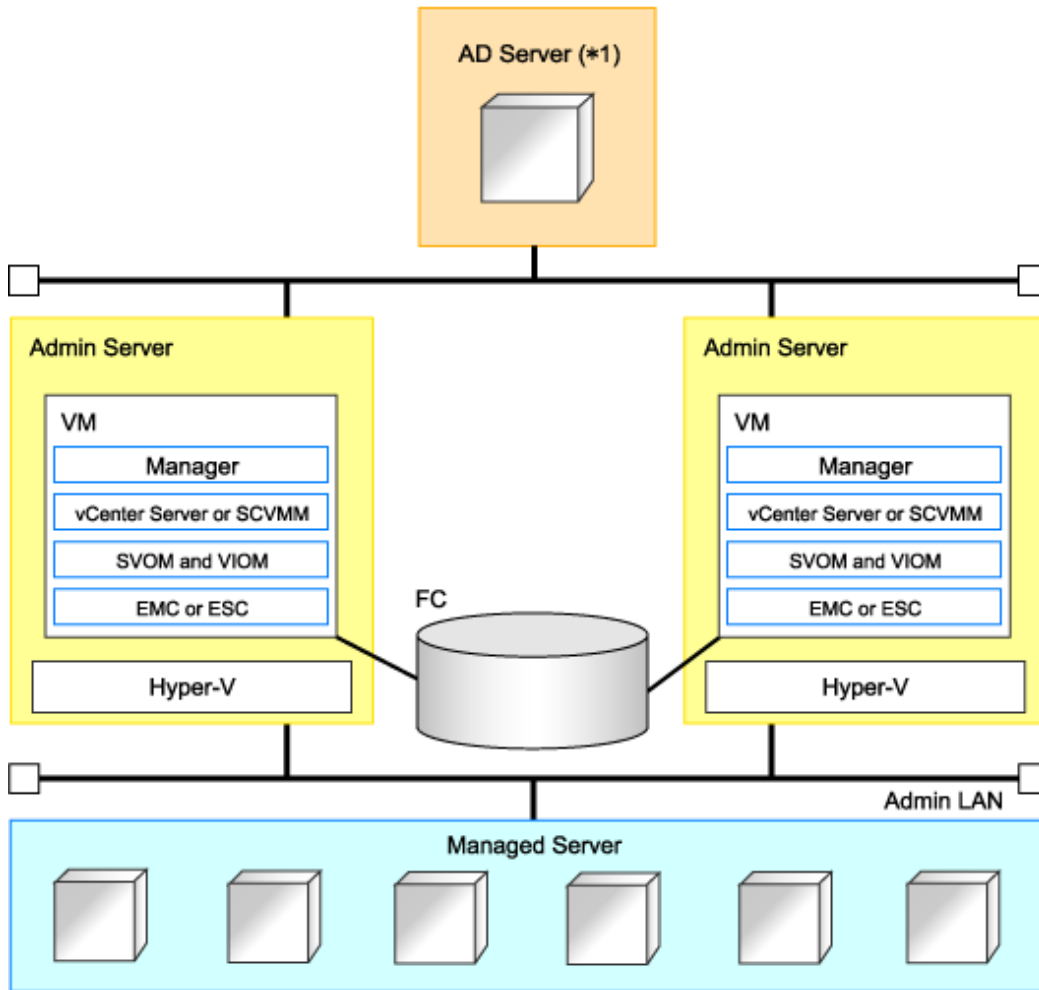
Prerequisites for Manager Cluster Operation

The prerequisites for operating managers in cluster environment are as below.

- Managers can be operated in Windows guest OS environments in Windows, Linux, or Hyper-V environments.
- When using I/O virtualization by VIOM, create managers in Windows guest OS environments of Hyper-V environments.
- When operating managers in cluster systems using Windows guest OS environments of Hyper-V environments, use the configuration indicated below.
 - Place a manager on the same VM guest that ServerView Operations Manager and ServerView Virtual-IO Manager are on.
 - Place a manager and VM management software on the same VM guest.
 - Place a manager and storage management software other than Solutions Enabler on the same VM guest.
 - Solutions Enabler must be placed on VM hosts because Solutions Enabler needs a Fibre Channel connection.

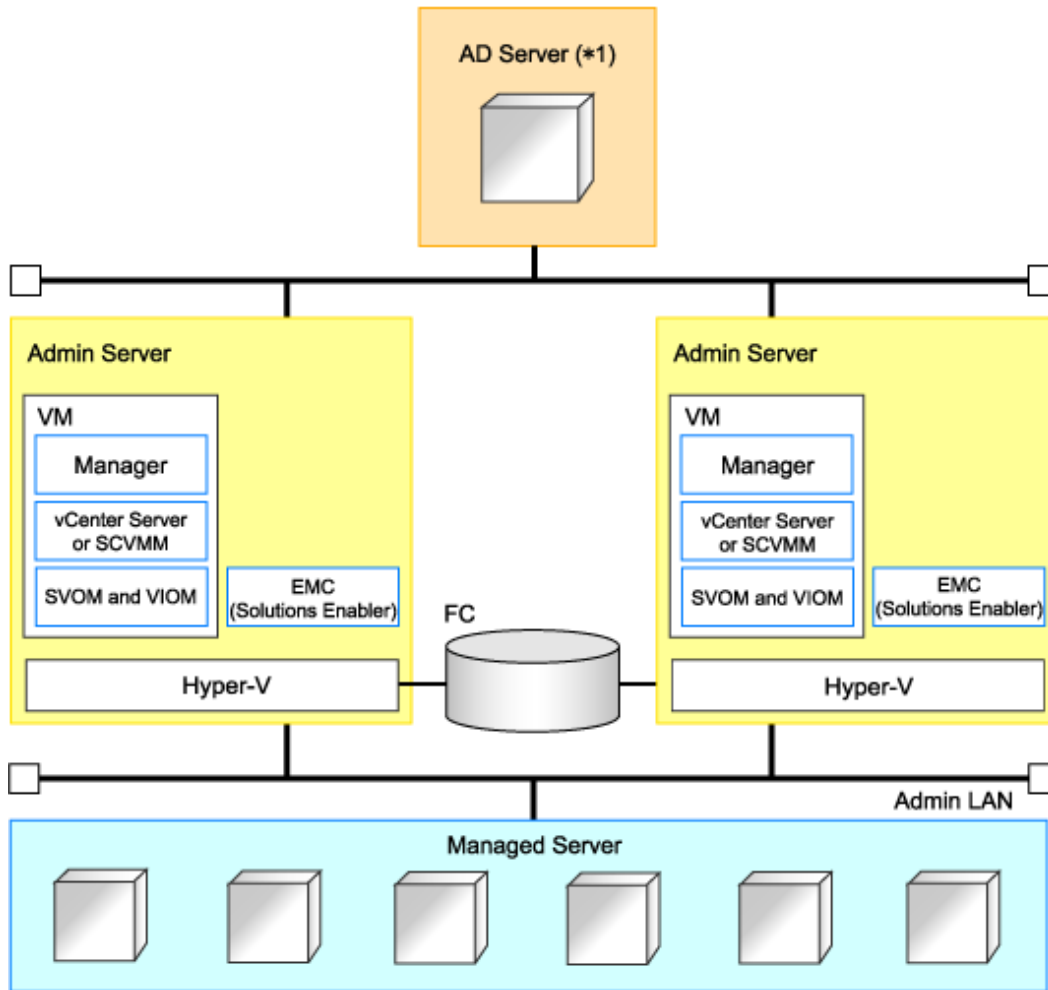
Configurations are as follow:

Figure I.4 When the Storage is Something Other Than EMC (Symmetrix)



*1: AD Server can be deployed on each admin server.

Figure I.5 When the Storage is EMC (Symmetrix)



*1: AD Server can be deployed on each admin server.

Manager Cluster Operation in Windows Guest Environments in Hyper-V environments

- Install an operating system and configure a domain controller on the domain controller server.
- Perform installation and configuration of the admin server.

The following operations are necessary:

- Primary node
 - Connection with shared storage
 - Configure BIOS
 - Install Hyper-V roles
 - Install and configure EMC Solutions Enabler (when used)
 - Add a failover clustering function
 - Create a Hyper-V virtual network
 - Create clusters
 - Prepare virtual machines
 - Register virtual machines in clusters
 - Install and configure storage management software

- Install and configure VM management software
- Install and configure ServerView Operations Manager and ServerView Virtual-IO Manager
- Install the Resource Orchestrator manager
- Setup Resource Orchestrator
- Secondary node
 - Connection with shared storage
 - Configure BIOS
 - Install Hyper-V roles
 - Install and configure EMC Solutions Enabler (when used)
 - Add a failover clustering function
 - Create a Hyper-V virtual network

For details on the following items, refer to the Hyper-V manual.

- Install Hyper-V roles
- Add a failover clustering function
- Create a Hyper-V virtual network
- Create clusters
- Prepare virtual machines
- Register virtual machines in clusters
- Operation

When an error occurs on a VM guest, the operation will continue if the VM guest is switched over.

Note

- When performing configuration, modification, or deletion of managed server environments, such as L-Server creation, if an error occurs on VM guest, the operation may fail.
 In this case, part of the environment of the managed server may be created. Perform the operation again after deleting created environments.
- When performing L-Server creation or ETERNUS configuration information modification using ETERNUS, if an error occurs on a VM guest, ETERNUS may not be able to return from the status of processing to normal status. In this case, to restore, forcibly log on from ETERNUSmgr, then log off. In the case of ETERNUS DX60/DX80/DX90, contact Fujitsu technical staff. For details on how to restore ETERNUS, refer to the ETERNUS manual.

Manager Cluster Operation in Windows and Linux Environments

The settings and deletion operations described below are required for cluster operation.

For details on the settings for cluster operation and the procedure for deletion, refer to "Appendix B Manager Cluster Operation Settings and Deletion" of the "ServerView Resource Coordinator VE Installation Guide".

- Settings
 - Primary node
 - Create cluster resources
 - Copy dynamic disk files

- Perform link settings for folders on the shared disk
- Set folder and file access rights
- Set access rights for the Resource Orchestrator database
- Change the IP address set for the manager's admin LAN
- Register service resources
- Start the cluster service
- Secondary node
 - Perform link settings for folders on the shared disk
 - Set access rights for the Resource Orchestrator database
 - Change the IP address set for the manager's admin LAN
 - Start the cluster service
- Deletion
 - Primary node
 - Stop the cluster service
 - Delete service resources
 - Uninstall the manager
 - Secondary node
 - Uninstall the manager
 - Delete shared disk files
 - Delete cluster resources

Note

- If switchover of an admin server occurs while L-Servers are operating, the operation being performed may fail.
If you were creating or registering resources, delete unnecessary resources and then perform the operation again.
- When performing L-Server creation or ETERNUS configuration information modification using ETERNUS, if an error occurs on an admin server, ETERNUS may not be able to return from the status of processing to normal status. In this case, to restore, forcibly log on from ETERNUSmgr, then log off. In the case of ETERNUS DX60/DX80/DX90, contact Fujitsu technical staff. For details on how to restore ETERNUS, refer to the ETERNUS manual.

Appendix J Disaster Recovery

This section explains the Disaster Recovery of L-Servers.

Resource Orchestrator provides simple and highly reliable Disaster Recovery, through exporting and importing of the Resource Configuration Information and User Definition Information (XML files).

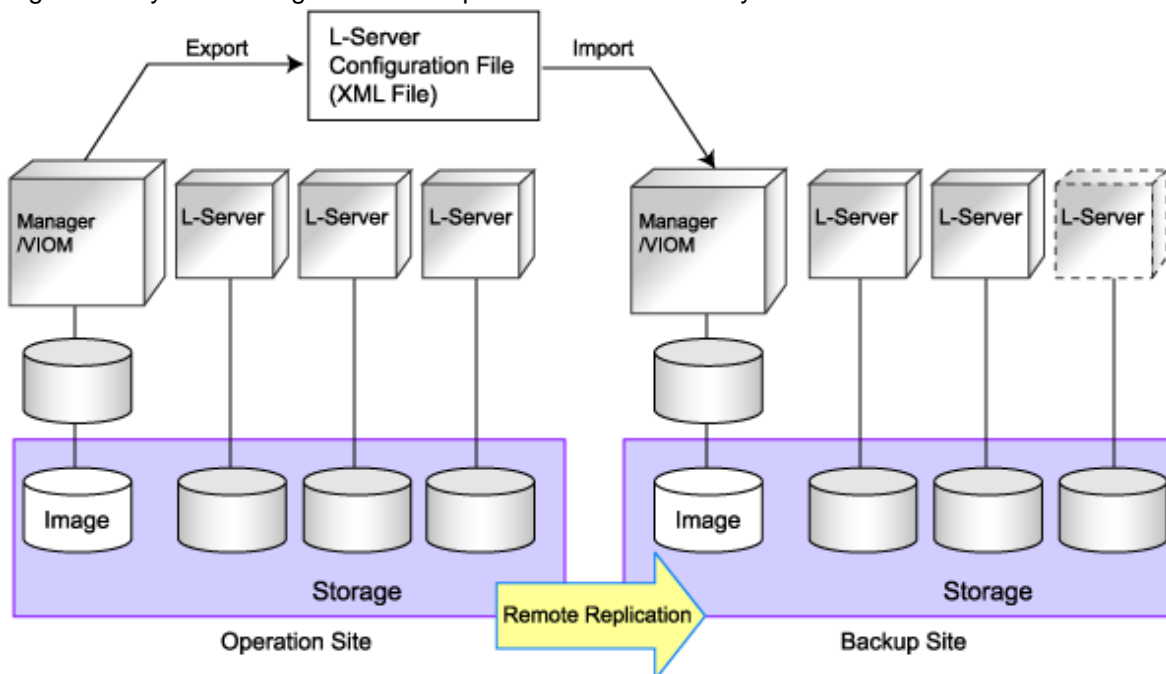
Prerequisites for Configuring Disaster Recovery Environments

The prerequisites for configuring Disaster Recovery environments are as below.

- It is only supported when the manager is Windows.
- Primary site and backup site are only supported for ServerView Resource Orchestrator V2.3.0 or later. Users are recommended to use the same version for the primary site and the backup site.
- Multiple primary sites can be configured for one backup site, but takeover cannot be performed for multiple primary sites at the same time, when taking over from a primary site to a backup site.
- It is necessary to manually perform configuration (zoning, VLAN settings, and CB uplink port settings) for external networks and SAN switches in advance. It is necessary to perform the same settings for the primary site and the backup site.
- Users are recommended to configure the same server settings for the primary site and the backup site. When the number of servers for backup site is decreased, continued operation of all tasks operating on primary site is not possible.
- Switch mode can be used for CB (Connection Blade). IBP mode cannot be used.
- For systems using virtual L-Servers, it is necessary to configure VM hosts and VM management software on the physical L-Server.
- Configure different host names for the primary server and for the backup site.

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

Figure J.1 System Configuration Example of Disaster Recovery Environment



J.1 Installation

This section explains the installation of a Disaster Recovery environment.

Install a Disaster Recovery environment.

1. Pre-setup Preparations

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

For details, refer to "[Chapter 3 Pre-setup Preparations](#)".

When creating a physical L-Server, refer to "[Appendix F Configuration when Creating a Physical L-Server](#)".

When creating an L-Server using server virtualization software, refer to "[Appendix G Configuration of Server Virtualization Software](#)". Installation of VM management software on the backup site is not necessary because it is installed on physical L-Servers on the primary site.

When using a VMware virtual L-Server, enter the following commands for the VM host and disable detection of the copied LUNs.

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

When installing a Disaster Recovery environment, copy the primary site information to the backup site using the storage unit replication function.

For storage replication, use the functions of "[I.1.3 Storage Chassis High Availability](#)". For details on prerequisites for storage replication, refer to "[Prerequisites](#)" in "[I.1.3 Storage Chassis High Availability](#)".

For primary sites, it is not necessary for the disk resources for 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 specified during installation of Resource Orchestrator on the storage of the replication target, and copy the image files from the image file storage folder.

Note

When an error occurs in the middle of transmission of online data using the replication functions of storage units, the system may not recover correctly depending on the status of data.

Also perform backup of the primary site regularly.

When installing the directory service, configure the same settings for the primary site and the backup site.

2. Installation

Install Resource Orchestrator on the primary site and the backup site.

For details, refer to "[Chapter 4 Installation and Uninstallation](#)".

3. Setup

Set up Resource Orchestrator on the primary site and the backup site.

For details, refer to "[Chapter 5 Setup](#)".

For Disaster Recovery environments, configure as follows.

- Configure the same values for the following tuning parameters of the primary site and the backup site:

Installation_folder\Manager\rails\config\rcx\vm_guest_params.rb

For details on settings of tuning parameters, refer to "When a Virtual L-Server is Stopped, "Message number 69122" is Displayed, and Stopping of the L-Server Fails." of "4.4 General Operations for L-Servers" in the "ServerView Resource Orchestrator Reference Guide".

- It is necessary register the same resource name in the server tree for the primary site and the backup site.
- It is necessary to set the same IP address for the IP address of the admin LAN used by the admin server on the primary site and the backup site.
- Regarding the following configurations, use the information satisfying the necessities of both the primary site and the backup site.

Under *Installation_folder*\Manager\etc\storage\emc

Installation_folder\Manager\etc\customize_data\storage_portset.rcxprop

- When using a virtual L-Server, it is necessary to operate both the server and the VM host for operation of VM management software on a physical L-Server.
- It is recommended to use simple names for resources to manage in order to understand the relation of resource names of the primary site and the backup site easily.
- Certificates installed on both the primary site and the backup site must be the same. When installing a manager on the backup site, copy the following 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\Manager\etc\opt\FJSVssmgr\current\certificate

Installation_folder\Manager\etc\opt\FJSVrcxdm\certificate

Installation_folder\Manager\sys\apache\conf\ssl.crt

Installation_folder\Manager\sys\apache\conf\ssl.key

4. Creation of an L-Server

Create an L-Server on the primary site.

For details, refer to "[6.1 Creation Using an L-Server Template](#)" or "[Appendix D L-Server Parameter Details](#)".

5. Export of Resource Configuration Information and User Definition Information (XML files) for the Primary Site

If there is trouble on the primary site and the system environment to be restored for the backup site has been configured, export the Resource Configuration Information and User Definition Information (XML files).

The following operations are recommended.

- When changing the managed server configuration, export the information first, and maintain the latest system information
- Export regularly, and update the data

Execute the rcxadm config export command to export Resource Configuration Information and User Definition Information (XML files).

For details on the rcxadm config export command, refer to "1.7.11 rcxadm config" in the "ServerView Resource Orchestrator Reference Guide".

Note

Do not export the Resource Configuration Information and User Definition Information (XML files) at the same time as operations that modify the Resource Configuration Information and User Definition Information (XML files), such as L-Server creation.

6. Acquisition of the storage replication information

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

Create a replication definition file which describes LUN relations, specify that file and create the file to perform mapping of LUNs in the resources from the relation lists during import.

To create this file, execute the rcxstorage command with the -recovery and -mode options. Specify "prepare" for the -mode option.

For details on replication definition files, refer to "[Replication Definition Files](#)" in "I.1.3 Storage Chassis High Availability".

For details on the rcxstorage command, refer to "1.7.13 rcxstorage" in the "ServerView Resource Orchestrator Reference Guide".

J.2 Operation

This section explains the operation of Disaster Recovery environments.

Use the following procedure to operate the Disaster Recovery environment:

1. Edit Resource Configuration Information and User Definition Information (XML Files)

Commands must be used to edit the Resource Configuration Information and User Definition Information (XML files), such as dividing into units for import or changing resource information to match the backup site environment.

Use the following procedure to edit the configuration information.

a. Separating an L-Server linked with a configured physical server

L-Servers linked to configured physical servers cannot be restored using Disaster Recovery.

After performing the following operations, execute the command to create a link with an L-Server. Once the restoration is complete, create a link with the L-Server again.

```
>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
```

b. Mapping of storage

Create files to perform mapping of the storage information of the backup site from the storage replication information created in step 6. of "[J.1 Installation](#)". For mapping file creation, execute the `rcxstorage` command with the `-recovery` and `-mode` options. Specify "mapping" for the `-mode` option.

For details on the `rcxstorage` command, refer to "1.7.13 `rcxstorage`" in the "ServerView Resource Orchestrator Reference Guide".

Change the storage information of the Resource Configuration Information and User Definition Information (XML files) of Resource Orchestrator imported using the created mapping files. Use the `rcxadm config map` command to change the storage information.

For details on the `rcxadm config map` command, refer to "1.7.11 `rcxadm config`" in the "ServerView Resource Orchestrator Reference Guide".

c. Division of Tenant Units

When operating after creating tenants, it is necessary to divide the Resource Configuration Information and User Definition Information (XML files) to import for Resource Orchestrator into information common among tenants and information unique to each tenant. Use the `rcxadm config filter` command to divide Resource Configuration Information and User Definition Information (XML files) relating to tenants for Resource Orchestrator.

For details on the `rcxadm config filter` command, refer to "1.7.11 `rcxadm config`" in the "ServerView Resource Orchestrator Reference Guide".

- When using tenants

- Resources common among tenants: Execute the command with the `-global` option specified.

- Resources of individual tenants: Execute the command repeatedly for the total number of tenants, with the `-tenant` option specified. Resource Configuration Information will be divided for each tenant.

- When not using tenants

Execution of the rcxadm config filter command is unnecessary because dividing is unnecessary.

d. Division of virtual L-Servers and physical L-Servers

When operating using a virtual L-Server, it is necessary to divide the virtual L-Server related resources and other resources, since the virtual L-Server must be restored after restoring the physical L-Server the VM management software is mounted on. When performing division of virtual L-Server resources, it is necessary to do so in an environment where tenants are not used, in the common environment among tenants divided in step b., and in each individual tenant's environment. Use the rcxadm config filter command for this operation.

For details on the rcxadm config filter command, refer to "1.7.11 rcxadm config" in the "ServerView Resource Orchestrator Reference Guide".

2. Stop operation of the backup site

When operating other operations on the backup site, stop the L-Server operations and delete the L-Server information and resources used by each L-Server.

Note

It is not possible to delete all resource pools for backup sites. Ensure that at least one resource remains in the resource pool specifically for the backup site, and ensure that its name does not overlapping with the names of the primary site and other resource pools.

Ensure there is a least one user remaining, such as an administrative user, to perform import operations. When using the same user name as a remaining user on the primary site, settings for the backup site are valid even after import. For instance, the password will not change to the password used in the primary site. The password originally used in the backup site can be used.

3. Disconnect the storage

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

4. Start L-Servers and import the Resource Configuration Information and User Definition Information (XML files) for the backup site

Import the Resource Configuration Information and User Definition Information (XML files) for the backup site. Manually start the created L-Server using the import operation, as it has been stopped.

Execute the rcxadm config import command to import Resource Configuration Information and User Definition Information (XML files).

For details on the rcxadm config import command, refer to "1.7.11 rcxadm config" in the "ServerView Resource Orchestrator Reference Guide".

When import is executed, a test of whether importing for the Resource Configuration Information and User Definition Information (XML files) is available or not is performed. If available, an L-Server is created, then the resources allocated, and the L-Server is ready for use.

Note

As not all resources are registered after testing, only some resources may be registered.

In this case, import again after dealing with the cause of failures.

When executing import, the following are automatically performed.

- Resource folder creation (tenant folders)
- Resource pool creation
- Registration of resources in resource pools
- L-Server template creation
- System image information creation

- Snapshot information creation
- L-Server creation
- User group creation
- User creation

The import procedure differs depending on whether or not tenants and virtual L-Servers will be used. Depending on the case, perform the following procedure:

- When using tenants
 - a. Depending on whether or not virtual L-Servers will be used, perform the procedure explained in "When using virtual L-Servers" or "When not using virtual L-Servers".
At this time, use resources common among tenants.
 - b. After completing step a., perform the procedure explained in "When using virtual L-Servers" or "When not using virtual L-Servers" for each tenant, depending on whether or not virtual L-Servers are being used.
At this time, use the resources of each tenant.

- When not using tenants
Depending on whether or not virtual L-Servers will be used, perform the procedure explained in "When using virtual L-Servers" or "When not using virtual L-Servers".

- When using virtual L-Servers
 - a. Execute import of resources other than virtual L-Servers.
The imported L-Server is in the status where it has only been defined.
 - b. Start the imported L-Server.
It is necessary to start a physical L-Server with VM management software mounted and a physical L-Server with a VM host mounted. There are no problems starting other L-Servers after performing step e.
 - c. Register VM management software in the resource tree if necessary.
It is not necessary to registration again, when registration has already been performed on another tenant, sharing VM management software with other tenants.
 - d. Update VM management software information, and reflect the information.
Execute the `rcxadm vmmgr` command to update the VM management software information.
For details on the `rcxadm vmmgr` command, refer to "1.7.3 rcxadm vmmgr" in the "ServerView Resource Orchestrator Reference Guide".
 - e. Import resources related to virtual L-Servers.
The imported L-Server is in the status where it has only been defined.
 - f. Start the L-Server imported in step e.

 **Note**

Do not import the Resource Configuration Information and User Definition Information (XML files) at the same time as operations that modify the Resource Configuration Information and User Definition Information (XML files), such as L-Server creation.

- When not using virtual L-Servers
 - a. Execute import of resources.
The imported L-Server is in the status where it has only been defined.

b. Start the imported L-Server.

The L-Server is started.

Appendix K Installation of VM Hosts on Physical L-Servers

This appendix explains how to install a VM host on a physical L-Server.

Installation of VM Hosts on physical L-Servers offers the following benefits:

- Simplified configuration of servers, storage, and networks

When installing a physical L-Server on a VM host, the following configurations can be simplified further than when installing a VM host on a physical server.

- Server configuration such as I/O virtualization
 - Storage configuration such as LUN masking
 - Network configuration such as LAN switch blades
- DR

In order to be able to perform DR of virtual L-Servers, it is necessary to install a VM host on a physical L-Server.

K.1 Installation

This section explains how to install a VM host on a physical L-Server.

1. Preparations for physical L-Server creation

For physical L-Server creation, configure the necessary settings.

For details, refer to the following:

- ["F.2 Pre-setup Preparations \(Servers\)"](#)
- ["F.3 Pre-setup Preparations \(Storage\)"](#)
- ["F.4 Pre-setup Preparations \(Network\)"](#)
- ["F.6 Setup"](#)

2. Create resource folders

Create a resource folder to locate physical servers to install VM hosts on.

For details on how to create a resource folder, refer to ["B.2.1 Creating a Resource Folder"](#).



To prevent accidental deletion, create a resource folder for the physical L-Server on which the VM host will be installed, and configure it so that service administrators cannot access it.

For details, refer to ["C.1 Roles"](#).

3. Create physical L-Servers

Create a physical L-Server to install a VM host in the created resource folder.

For details on how to create a physical L-Server, refer to ["F.7 Creating an L-Server"](#).



Cloning images cannot be collected or deployed.

4. Install a VM host

Install a VM host on the created physical L-Server.

For details on how to install a VM host, refer to the relevant server virtualization software manual.

5. Install agents

Install Resource Orchestrator agents and ServerView Agents on a VM host.

For details on how to install agents, refer to "[4.2 Installing the Agent](#)".

Point

When using VMware ESX, install Resource Orchestrator agents and ServerView for VMware agents.

When using VMware ESXi, install ServerView ESXi CIM Provider agents.

6. Register a VM host

Registers a VM host with VM management software.

For details, refer to the individual manuals of server virtualization software.

7. Register VM management software

Register VM management software in Resource Orchestrator.

For details, refer to "[5.2.2 VM Management Software](#)".

8. Register agents

Register an agent on the physical L-Servers the VM host will be installed on. Execute the following procedure to register agents.

- a. Right-click the target L-Server in the orchestration tree, and select [Register]-[Agent] from the popup menu.
- b. In the displayed "Register Agent" dialog, click <OK>.

9. Register VM pools

Register a VM host in a VM pool.

For details, refer to "[5.3.1 VM Host Resources](#)".

K.2 Changing Configuration

Configuration of VM hosts can be changed the same way as physical L-Servers.

For details, refer to "[6.3 Modifying an L-Server](#)".

K.3 Deleting a VM Host

Execute the following procedure to delete a VM host.

1. Unregister the VM host

Unregister the VM host from VM pools.

For details, refer to "[Unregistration](#)" of "A.3 Resource Operations".

2. Stop the VM host

Stop the VM host.

For details, refer to "[6.2.2 Stopping an L-Server](#)".

3. Deletion of physical L-Servers

Delete the physical L-Server used for installation of the VM host.

For details, refer to "[6.5 Deleting an L-Server](#)".

K.4 Advisory Notes for Installation of VM Hosts on Physical L-Servers

Collecting and Deploying Cloning Images

Cloning images cannot be collected or deployed.

When a VM host is VMware vSphere(TM) 4 or later

When installing a VMware vSphere(TM) 4 or later VM host, take note of the following points:

- Backup and restore functions cannot be used.
- When using L-Server redundancy, it is not possible to specify the same pool as that of a spare server between L-Servers on which Windows is operating.
- When performing physical server usage change, the same physical servers cannot be switched over between L-Servers on which Windows is operating.

Appendix L Linking L-Servers with Configured Physical Servers or Virtual Machines

This appendix explains how to link a configured physical server to a physical L-Server and how to link a configured virtual machine to a virtual L-Server.

L.1 Management Scope

The management scope varies depending on the resources used by the configured physical server or virtual machine.

Depending on which resources can be managed, L-Servers are referred to differently as follows:

- L-Server for server management

Refers to L-Servers that manage only servers.

- For Physical Servers

This applies when using the hardware listed in "[L.3.1 Manageable Hardware](#)".

- For Virtual Machines

This applies when using the hardware listed in "[L.3.1 Manageable Hardware](#)" and the server virtualization software listed in "[L.3.4 When Using Server Virtualization Software](#)".

- L-Server for server/storage management

Refers to L-Servers that manage servers and storage.

This applies when using the hardware listed in "[L.3.1 Manageable Hardware](#)" and "[L.3.3 Manageable Storage](#)".



Note

When linking a configured physical server to a physical L-Server, only "L-Server for server management" is supported. "L-Server for server/storage management" cannot be created.

When disk and NIC information is successfully obtained from the configured physical server or virtual machine, that information is displayed.

When admin server has been configured on a virtual machine, do not link that virtual machine to an L-Server.

L.2 Available Range

The functional range available when a configured physical server or virtual machine is linked to an L-Server is as follows:

Table L.1 Functional Range Available When Using a Configured Physical Server as an L-Server

L-Server Function	Type of L-Server		
	Physical Server Using VIOM	Physical Server Using HBA address rename	Other Physical Servers
Starting	Yes	Yes	Yes
Stopping	Yes	Yes	Yes
Restarting	Yes	Yes	Yes
Modifying specifications	Yes (*1)	Yes (*1)	Yes (*1)
Modifying the basic information	Yes	Yes	Yes
Collecting cloning images	Yes	Yes	Yes
Backup and Restore	Yes	Yes	Yes

L-Server Function	Type of L-Server		
	Physical Server Using VIOM	Physical Server Using HBA address rename	Other Physical Servers
Attaching and detaching disks	No	No	No
Sharing disks among L-Servers	No	No	No
Changing physical server usage	No	No	No
Server redundancy	Yes (*2)	Yes (*2)	Yes (*2)
Spare server configuration checks	Yes	No	No
Deploying the network information	No	No	No
Admin LAN multiple subnet names	No	No	No
Network redundancy, TagVLAN	No	No	No
Modifying network resource settings	No	No	No
Starting the console	Yes	Yes	No
Batch power operations	Yes	Yes	Yes
PXE boot	No	No	No
iSCSI boot	No	No	No
Allocating and releasing resources	No	No	No
Blade chassis high availability	No	No	No
Storage chassis high availability	No	No	No
Disaster Recovery	No	No	No
Deletion	Yes	Yes	Yes
Releasing an L-Server	Yes	Yes	Yes

*1: The following items can be modified.

- Server redundancy, spare server specifications, and spare server pool
- Startup priority

*2: Configured physical servers for which server switchover has been already set cannot be managed. Enable server redundancy by modifying specifications.

Table L.2 Functional Range Available When Using a Configured Virtual Machine as an L-Server

L-Server Function	Type of L-Server	
	L-Server for server management (*1)	L-Server for server/storage management
Starting	Yes	Yes
Stopping	Yes	Yes
Restarting	Yes	Yes
Migration of L-Servers between servers (migration)	Yes (*2)	Yes (*2)
Modifying specifications	Yes (*3)	Yes (*3)
Modifying the basic information	Yes	Yes
Collecting cloning images	Yes (*4)	Yes (*4)
Attaching and detaching disks	No	Yes

L-Server Function	Type of L-Server	
	L-Server for server management (*1)	L-Server for server/storage management
Snapshot collection and restoration	Yes	Yes
Allocating and releasing resources	Yes	Yes
Starting the console	Yes	Yes
Batch power operations	Yes	Yes
Disaster Recovery	Yes	Yes
Deletion	Yes	Yes
Releasing an L-Server	Yes	Yes

*1: If its disk configuration is not supported by L-Servers, it will be "L-Server for server management". When using storage listed in "[L.3.3 Manageable Storage](#)", and device paths for all disks that have been allocated to the virtual machine are found in the following list, it will be "L-Server for server/storage management". Configurations consisting only of Raw Device Mapping (RDM), pass-through disks, or difference disks, and configurations containing device paths not listed here, Raw Device Mapping (RDM), pass-through disks, and difference disks will be "L-Server for server management".

[VMware]

- SCSI:0:1 - SCSI:0:6
- SCSI:0:8 - SCSI:0:14
- SCSI:1:0 - SCSI:1:6
- SCSI:1:8 - SCSI:1:14
- SCSI:2:0 - SCSI:2:6
- SCSI:2:8 - SCSI:2:14
- SCSI:3:0 - SCSI:3:6
- SCSI:3:8 - SCSI:3:14

[Hyper-V]

- SCSI:0:1 - SCSI:0:14
- SCSI:1:0 - SCSI:1:14
- SCSI:2:0 - SCSI:2:14
- SCSI:3:0 - SCSI:3:14

*2: Data store must be installed on a shared disk.

*3: When CPU performance and memory size have been specified, the settings cannot be changed into no limit.

*4: For system disks, use SCSI:0:0 (VMware) or IDE:0:0 (Hyper-V). If SCSI:0:0 (VMware) or IDE:0:0 (Hyper-V) is not used for the system disk, the L-Server creation process that accompanies cloning image deployment may fail. For Hyper-V, datastore must be installed on a shared disk.

L.3 Prerequisites

When linking a configured physical server to a physical L-Server, or when linking a configured virtual machine to a virtual L-Server, the available management scope varies depending on the configured hardware and software environments.

L.3.1 Manageable Hardware

When using the hardware listed in "[Table 1.27 Required Hardware](#)" in "1.4 Hardware Environment", only servers can be managed.

Table L.3 Required Hardware

Software	Hardware	Remarks
Agent	PRIMERGY BX400 S1 PRIMERGY BX620 S6 PRIMERGY BX620 S5 PRIMERGY BX620 S4 PRIMERGY BX920 S2 PRIMERGY BX920 S1 PRIMERGY BX922 S2 PRIMERGY BX924 S2 PRIMERGY BX960 S1 PRIMERGY RX100 S6 PRIMERGY RX100 S5 PRIMERGY RX200 S6 PRIMERGY RX200 S5 PRIMERGY RX200 S4 PRIMERGY RX300 S6 PRIMERGY RX300 S5 PRIMERGY RX300 S4 PRIMERGY RX600 S5 PRIMERGY RX600 S4 PRIMERGY RX900 S1 PRIMERGY TX150 S7 PRIMERGY TX150 S6 PRIMERGY TX200 S6 PRIMERGY TX200 S5 PRIMERGY TX300 S6 PRIMERGY TX300 S5 PRIMERGY TX300 S4 PRIMEQUEST 1000 series servers Other PC servers	<ul style="list-style-type: none"> - In the case of PRIMERGY BX series servers, only configurations where Fibre Channel cards are mounted in expansion slot 2 are supported. - When using servers other than the PRIMERGY BX series, it is necessary to mount an IPMI-compatible (*1) server management unit (*2). - When the server virtualization software is RHEL5-Xen, only PRIMEQUEST 1000 series are supported as managed servers. - When using iSCSI boot on physical L-Servers, both PRIMERGY BX900 and VIOM are necessary.

*1: Supports IPMI2.0.

*2: This usually indicates a BMC (Baseboard Management Controller).

For PRIMERGY, it is called iRMC (integrated Remote Management Controller).

L.3.2 Manageable Servers

For Physical Servers

- Connected with a SAN.
- Has 2 HBA ports on the server.
- An agent has been registered.



Note

When not using VIOM or HBA address rename, disk information of connected SAN disks is not displayed.

L.3.3 Manageable Storage

Manageable storage differs when using a physical server and when using server virtualization software.

For Physical Servers

Servers and storage can be managed when using the hardware listed in "[Table 1.27 Required Hardware](#)" in "1.4 Hardware Environment" and in the following cases: In other cases, only servers can be managed.

- When using the storage unit(s) listed in "[Table 1.29 Storage Units which can be Connected with L-Servers on Physical Servers](#)" in "1.4 Hardware Environment".
- When using "[Table 1.30 Fibre Channel Switches which can be used when Connecting ETERNUS Storage, NetApp Storage, EMC CLARiiON Storage, and EMC Symmetrix DMX Storage with L-Servers on Physical Servers](#)" in "1.4 Hardware Environment".
- When storage units are managed using the storage management software listed in "[1.3.2.2 Required Software](#)".
- When one AffinityGroup is operated for one physical server.

For Virtual Machines

The settings depend on the server virtualization software used. In the following cases, both servers and storage can be managed.

[VMware]

- Virtual machines are managed using VMware and vCenter Server.
- VMFS is used.
- SAN storage supported by VMware, excluding built-in disks on the server and iSCSI storage, is used.
- SCSI:0:0 is used for the system disk.
- The following device paths are used for data disks.
 - SCSI:0:1 - SCSI:0:6
 - SCSI:0:8-SCSI:0:14
 - SCSI:1:0 - SCSI:1:6
 - SCSI:1:8-SCSI:1:14
 - SCSI:2:0 - SCSI:2:6
 - SCSI:2:8-SCSI:2:14
 - SCSI:3:0 - SCSI:3:6
 - SCSI:3:8-SCSI:3:14

Note

When using non-VMFS pass-through devices or Raw Device Mapping, or when using a device path other than those listed above, only servers can be managed.

For disks using any other device path, assign 56 or higher as the disk number.

When collecting a cloning image for deploying an L-Server, use SCSI:0:0 for the system disk.

[Hyper-V]

- Virtual machines are managed using SCVMM.
- MSFC has been added to VM hosts.
- A cluster disk has been configured as a shared cluster volume.
- A SAN volume has been configured as a cluster disk.
- SAN storage supported by Hyper-V, excluding built-in disks on the server and iSCSI storage, is used.
- IDE:0:0 is used for the system disk.

- The following device paths are used for data disks.
 - SCSI:0:1-SCSI:0:14
 - SCSI:1:0-SCSI:1:14
 - SCSI:2:0-SCSI:2:14
 - SCSI:3:0-SCSI:3:14

Note

When using pass-through devices or difference disks, or when using a device path other than those listed above, only servers can be managed.

For disks using any other device path, assign 60 or higher as the disk number.

When collecting a cloning image for deploying an L-Server, use IDE:0:0 for the system disk.

L.3.4 When Using Server Virtualization Software

Virtual machines of server virtualization software supported by Resource Orchestrator that are managed by VM management software can be managed as virtual L-Servers.

For the server virtualization software supported by Resource Orchestrator, refer to "[1.3.2.1 Basic Software](#)" and "[1.3.2.2 Required Software](#)".

This function supports VMware and Hyper-V.

Note

If "[1.3.2.2 Required Software](#)" is not installed, a new L-Server cannot be deployed on that VM host.

L.4 Installation

This section explains the installation method to link a configured physical server to a physical L-Server, and the installation method to link a configured virtual machine to a virtual L-Server.

L.4.1 Preparations

Preparations

For details, refer to the procedure in "[F.2 Pre-setup Preparations \(Servers\)](#)".

Installing the Manager

Install the Resource Orchestrator manager. Refer to "[4.1 Installing the Manager](#)".

Setup

Register the resources of configured physical servers and VM hosts to Resource Orchestrator. Perform the following procedures referring to "[Chapter 5 Setup](#)" and "[F.6 Setup](#)".

1. Register resources
2. Register resources in resource pools

Register resources in a resource pool.

When linking a configured physical server to an L-Server, perform the following procedure:

- Register physical server resources in a server pool. In the [Register Resources] dialog for the server pool, check the "Display servers with OS installed" checkbox and specify a physical server with an OS installed.
- Register the disks that are connected to the physical server to be linked with the L-Server in a storage pool.
- Register address set resources. Specify the scope including MAC/WWN addresses being used by the configured physical server.
- Register network resources. Specify the addresses excluding IP addresses being used by the configured physical server or the virtual machine.

Confirmation

L-Servers linked to configured physical servers or virtual machines can be confirmed using the following methods:

- Confirmation from the GUI

Select the L-Server in the orchestration tree, display the [Resource Details] tab, and check the information is displayed in "Controlled resources" on the "Status" table.

In "Controlled resources", the following text strings are displayed.

When "Server" is displayed, the managed virtual L-Server is a physical L-Server or a server.

When "Server,Storage" is displayed, the managed virtual L-Server is a server or a storage unit.

- Confirmation from the command line

Execute the `rcxadm lserver show` command and check that the scope of the controlled resources (ControlledResources) is displayed.

For details, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".

For the scope of controlled resources, the following text strings are displayed.

When "Server" is displayed, the managed virtual L-Server is a physical L-Server or a server.

When "Server,Storage" is displayed, the managed virtual L-Server is a server or a storage unit.

L.4.2 For Physical Servers

To use a physical machine as a physical L-Server, perform the following operations.

1. In the RC console orchestration tree, right-click a physical server in the registered server pool, and select [Convert to L-Server] from the popup menu.

The [Convert to L-Server] dialog is displayed.

Enter the following items:

L-Server Name

Enter a name for the L-Server.

When the physical server name starts with an alphanumeric character (upper or lower case) and consists of 64 or less characters, including alphanumeric characters (upper or lower case), underscores ("_"), or hyphens ("-"), the physical server name is displayed as the default L-Server name.

Enter up to 64 characters beginning with an alphanumeric character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), or hyphens ("-").

Destination folder

Select a resource folder or a tenant folder to store L-Servers.

If omitted, the L-Server is stored in the root folder of the user that executed the virtual L-Server.

Label (Optional)

Enter a label for the L-Server.

Enter up to 32 alphanumeric characters or symbols.

Comment (Optional)

Enter any comments for the L-Server.

Enter up to 256 alphanumeric characters or symbols.

2. Click <OK>. The physical server becomes manageable as a physical L-Server.

From the command-line, execute the `rcxadm lserver convert` command.

For details, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".

L.4.3 For Virtual Machines

To use a virtual machine as a virtual L-Server, perform the following operations.

1. In the RC console orchestration tree, right-click a VM host in the registered VM pool, and select [Convert to L-Server] from the popup menu.

The [Convert to L-Server] dialog is displayed.

Enter the following items:

Batch Folder Settings (optional)

Select a resource folder or a tenant folder to store L-Servers.

If omitted, the L-Server is stored in the root folder of the user that executed the virtual L-Server.

VM guests

Displays virtual machines that were created on the specified VM host, that have not been linked to L-Servers. In addition to the virtual machine name, the OS type, L-Server name, and the destination folder are displayed.

When the virtual machine name starts with an alphanumeric character (upper or lower case) and consists of 64 or less characters, including alphanumeric characters (upper or lower case), underscores ("_"), hyphens ("-"), or periods("."), the virtual machine name is displayed as the default L-Server name.

Select a virtual machine to use as a virtual L-Server.

To use all virtual machines registered on the specified VM host, click <Select all>.

Details (optional)

Set the L-Server name, label, comment, and destination folder.

Clicking <Details> displays the [VM Guest Setting] dialog.

For the information that can be specified for each item, refer to "L.4.2 For Physical Servers".

For the L-Server name, enter up to 64 characters beginning with an alphabetical character (upper or lower case), and including alphanumeric characters (upper or lower case), underscores ("_"), periods("."), and hyphens ("-").

Enter the desired items and click <OK> to reflect the settings on the items displayed in the VM guest list.

2. Click <OK>. The virtual machine becomes manageable as a virtual L-Server.

From the command-line, execute the `rcxadm lserver convert` command.

For details, refer to "1.3.1 rcxadm lserver" in the "ServerView Resource Orchestrator Reference Guide".



When operating an admin server on a virtual machine on VMware or Hyper-V environment, do not link that virtual machine to an L-Server.

VMware FT secondary virtual machines cannot be linked with L-Servers.

[VMware]

When the limit values of CPU/memory of a virtual machine linked with an L-Server have been set to "Unlimited", different methods are used for calculating the number of possible L-Servers and modifying L-Server specifications.

For details on the calculation method, refer to "[Max. number of possible L-Servers View](#)" in "A.4 Viewing a Resource Pool".
For details on modifying specifications, refer to "[L.5 Changing Configuration](#)".

[Hyper-V]

When a virtual machine with a network adapter that has never been started before is linked with a L-Server, the MAC address the L-Server uses on the network might be set to "00:00:00:00:00:00". In that case, cancel the link between the virtual machine and L-Server and assign a static MAC address to that virtual machine using VM management software, or start the virtual machine, wait for 3 minutes, and then create the link with the L-Server.

Virtual machines on the Hyper-V VM host registered in the resource pool for overcommit cannot be linked with L-Servers.

For a virtual L-Server linked with a configured virtual machine, a hyphen ("-") is displayed for "Usage" in the "Disk Information" displayed on the [Resource Details] tab on the RC console.

L.5 Changing Configuration

This section explains how to change configurations of L-Servers linked to configured physical servers or virtual machines.

For details on configuration changes, refer to "[6.3 Modifying an L-Server](#)".

From the command-line, execute the `rcxadm lserver modify` command.

For details, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".



Disks cannot be attached or detached to and from L-Servers which do not manage storage.

L.6 Reverting L-Servers

This section explains how to revert the link between an L-Server and a configured physical server or virtual machine.

Right-click the target L-Server in the orchestration tree, and select [Revert] from the popup menu.

In the displayed confirmation dialog, click <OK>.

The link between the L-Server and the configured physical server or virtual machine can be reverted.

From the command-line, execute the `rcxadm lserver revert` command.

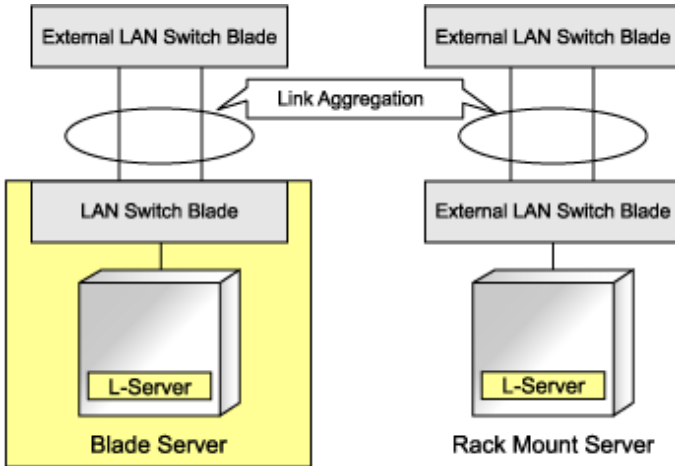
For details, refer to "1.3.1 `rcxadm lserver`" in the "ServerView Resource Orchestrator Reference Guide".

However, for L-Servers created using Resource Orchestrator, the link between the L-Server and a physical server or virtual machine cannot be reverted.

Appendix M Using Link Aggregation

This appendix explains the procedure to use Resource Orchestrator and link aggregation at the same time. By using link aggregation between switches, it is possible to increase the bandwidth and reliability of the network used by L-Servers.

Figure M.1 Connection Image Using Link Aggregation



M.1 Configuration of Link Aggregation and a Server

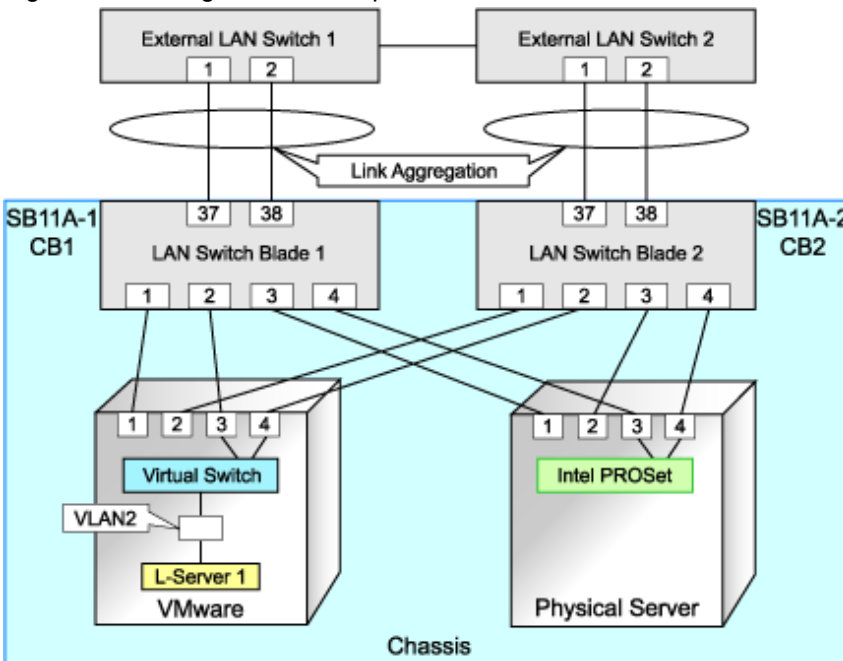
This section explains about link aggregation configuration.

M.1.1 Configuration For Blade Servers

Connect an external port of a LAN switch blade and an external port using link aggregation. Usually, link aggregation is not used for connecting an internal port of a LAN switch blade and a blade server. They are connected by configuring a redundant NIC on the server.

In "Figure M.2 Configuration Example For Blade Servers", Intel PROSet is used for configuring a redundant NIC on a physical L-Server. This configuration can be applied for Hyper-V as well as for VMware.

Figure M.2 Configuration Example For Blade Servers



M.1.2 Configuration For Rack Mount Servers

Usually, link aggregation is not used between rack mount servers and switches that are directly connected to rack mount servers. Link aggregation can be used between switches.

M.2 Configuration Procedure

This section explains the procedure for configuring link aggregation.

M.2.1 Preparations

This should be performed by infrastructure administrators.

Decide the Network Resource VLAN ID

Decide the VLAN ID to be used by Resource Orchestrator. In "Figure M.2 Configuration Example For Blade Servers", decide the VLAN ID to use for port 37 and port 38.

Configure Link Aggregation to LAN Switch Blades

Create a link aggregation (port channel) group, and add an uplink port of the LAN switch blade used for link aggregation to the port channel. Next, create a port VLAN on the switch, and incorporate the port channel into that port LAN. The port channel can be incorporated by logging in to the two LAN switch blades and executing the command.

The following shows the example of setting "static" link aggregation for one LAN switch blade. For details, refer to the manual of the LAN switch blade.

- Create a port channel and add external ports

```
#port-channel pc-1 <RETURN>          Create a port channel
Interface BX900-CB1/1/1 created for port-channel pc-1
#interface BX900-CB1/1/1 <RETURN>    Set the port channel
#no staticcapability <RETURN>       Configure static link aggregation

#exit <RETURN>
#interface range 0/37 - 0/38 <RETURN> Add uplink ports
#channel-group BX900-CB1/1/1 <RETURN>

#exit <RETURN>
#exit <RETURN>
#show port-channel all <RETURN>      Check the configuration results
Port- Link
Log. Channel Adm. Trap STP Mbr Port Port
Intf          Name  Link  Mode  Mode  Mode  Type  LB   Ports          Speed  Active
-----
BX900-CB1/1/1 pc-1  Down  En.   En.   En.   St.   SDM  BX900-CB1/0/37 Auto   False
BX900-CB1/0/38
```

Make sure that a port channel has been created, and specified ports have been added to the channel.

- Create a VLAN

```
#configure <RETURN>
#vlan database <RETURN>
#vlan 2 <RETURN>          Create VLAN ID2
#exit <RETURN>
#exit <RETURN>
#show vlan <RETURN>
VLAN ID  VLAN Name  VLAN Type  Interface(s)
```

```
-----  
2          VLAN0002      Static
```

Make sure that VLAN ID2 has been created.

- Incorporate the port channel into the VLAN

```
#configure <RETURN>  
#interface BX900-CB1/1/1 <RETURN>  
#switchport allowed vlan add 2 tagging <RETURN>  
#exit <RETURN>  
#exit <RETURN>  
#show vlan id 2 <RETURN>  
  
VLAN ID: 2  
VLAN Name: VLAN0002  
VLAN Type: Static  
Interface          Current  Configured  Tagging  
-----  
BX900-CB1/1/1     Include  Autodetect  Tagged
```

M.2.2 Operating Resource Orchestrator

Creating Network Resources

Creation of network resources should be performed by infrastructure administrators.

For details on the parameters to configure, refer to "[5.3.4 Network Resources](#)".

Create an L-Server

Creation of L-Servers should be performed by either infrastructure administrators or service administrators.

Specify the created network resources, and then create an L-Server.

Communication Checks between L-Servers and External Devices

Check the communication between the L-Server and devices outside the chassis. Use TCP/IP for the communication protocol. This allows you to check whether the L-Server can be operated in a configuration using link aggregation.

Glossary

aggregate

A unit for managing storage created through the aggregation of a RAID group. Aggregates can contain multiple FlexVols.

backup site

An environment prepared in a different location, which is used for data recovery.

data center

A facility that manages client resources (servers, storage, networks, etc.), and provides internet connections and maintenance/operational services.

directory service

A service for updating and viewing the names (and associated attributes) of physical/logical resource names scattered across networks, based on organizational structures and geographical groups using a systematic (tree-shaped structure) management methodology.

disk resource

The unit for resources to connect to an L-Server. An example being a virtual disk provided by LUN or VM management software.

DN (Distinguished Name)

A name defined as a line of an RDN, which contains an entry representing its corresponding object and higher entry.

Fibre Channel

A method for connecting computers and peripheral devices and transferring data. Generally used with servers requiring high-availability, to connect computers and storage systems.

Fibre Channel port

The connector for Fibre Channel interfaces.
When using ETERNUS storage, referred to as an FC-CA port, when using NetApp storage, referred to as an FC port, when using EMC CLARiiON, referred to as an SP port, when using EMC Symmetrix DMX, referred to as a DIRECTOR port.

FlexVol

A function that uses aggregates to provide virtual volumes. Volumes can be created in an instant.

global pool

A resource pool that contains resources that can be used by multiple tenants. It is located in a different location from the tenant folder. By configuring a global pool with the attributes of a tenant folder, it becomes possible for tenant admins to use the pool.

IBP (Intelligent Blade Panel)

One of the operation modes for PRIMERGY LAN switch blades. Can be used in coordination with ServerView Virtual-IO Manager (VIOM), and enables simple yet safe configuration of relationships of server blades and LAN switch blades.

ICT governance

A collection of principles and practices that encourage desirable behavior in the use of ICT (Information and Communication Technology) based on an evaluation of the impacts and risks posed in the adoption and application of ICT within an organization or community.

iSCSI boot

A configuration function that enables the starting and operation of servers via a network.
The OS and applications used to operate servers are stored on iSCSI storage, not the internal disks of servers.

iSCSI storage

Storage that uses an iSCSI connection.

LDAP (Lightweight Directory Access Protocol)

A protocol used for accessing Internet standard directories operated using TCP/IP.
LDAP provides functions such as direct searching and viewing of directory services using a web browser.

link aggregation

Function used to multiplex multiple ports and use them as a single virtual port.
By using this function, it becomes possible to use a band equal to the total of the bands of all the ports.
Also, if one of the multiplexed ports fails its load can be divided among the other ports, and the overall redundancy of ports improved.

local pool

A resource pool that contains resources that can only be used by a specific tenant.
It is located in a tenant folder.

L-Server

A logical platform composed of resource pools containing physical and virtual resources.

L-Server template

A template that defines the number of CPUs, memory capacity, disk capacity, and other specifications for resources to deploy to an L-Server.

LUN (Logical Unit Number)

A logical unit defined in the channel adapter of a storage unit.

MAC address (Media Access Control address)

A unique identifier that is assigned to Ethernet cards (hardware).
Also referred to as a physical address.
Transmission of data is performed based on this identifier. Described using a combination of the unique identifying numbers managed by/assigned to each maker by the IEEE, and the numbers that each maker assigns to their hardware.

member server

A collective term that refers to a server in a Windows network domain that is not a domain controller.

migration

The migration of a VM guest to a different VM host. The following two types of migration are available:

- Cold migration
Migration of an inactive (powered-off) VM guest.
- Live migration
Migration of an active (powered-on) VM guest.

overcommit

A function to virtually allocate more resources than the actual amount of resources (CPUs and memory) of a server.

physical network adapter

An adapter, such as a LAN, to connect physical servers or VM hosts to a network.

primary site

The environment that is usually used by Resource Orchestrator.

private cloud

A private form of cloud computing that provides ICT services exclusively within a corporation or organization.

RAID (Redundant Arrays of Inexpensive Disks)

Technology that realizes high-speed and highly-reliable storage systems using multiple hard disks.

RCVE (ServerView Resource Coordinator VE)

Automation/visualization software that enables simple server life cycle management by reducing setup, operational and maintenance efforts.

RDN (Relative Distinguished Name)

A name used to identify the lower entities of a higher entry.
Each RDN must be unique within the same entry.

resource

Collective term or concept that refers to the ICT resources (servers, storage, and networks), both physical (hardware) and logical (software), from which a system is composed.

resource folder

An arbitrary group of resources.

resource pool

A collection of servers, storage, networks, and other resources.

role

A collection of operations that can be performed.

SAN boot

A configuration function that enables the starting and operation of servers via a SAN.
The OS and applications used to operate servers are stored on SAN storage, not the internal disks of servers.

SAN storage

Storage that uses a Fibre Channel connection.

storage management software

Software for managing storage units.

storage resource

Collective term that refers to virtual storage resources and disk resources.

tenant

A unit for the division and segregation of management and operation of resources based on organizations or operations.
Resource Orchestrator enables operation of tenants through division of resources on a resource folder level (tenant folders), as well by user groups, and combinations of scopes configured to divide resources.

tenant admin

A user who manages the resources allocated to a tenant folder.

Has a scope corresponding to a tenant folder. The user who has the role of either administrator or service_admin is called a tenant admin.

tenant folder

A folder that is created for each tenant, and is used to manage the resources allocated to a tenant.

L-Servers and local groups are located in tenant folders. Also, it is possible to configure a global pool that tenant admins can use.

virtual storage resource

This refers to a resource that can dynamically create a disk resource.

An example being a file system for creating RAID groups or VM (VMFS of VMware, etc.).

In Resource Orchestrator, disk resources can be dynamically created from ETERNUS RAID groups, NetApp aggregates, and file systems for creating VM.

virtual switch

A function provided by server virtualization software in order to manage L-Server (VM) networks as virtual LAN switches.

Management of relationships between virtual L-Server NICs, and physical server NICs operating on VM hosts, can be performed using an operation similar to the connection of a normal LAN switch.

VMware Teaming

A function of VMware. By using VMware Teaming it is possible to perform redundancy by connecting a single virtual switch to multiple physical network adapters.

WWNN (World Wide Node Name)

A name that is set as a common value for the Fibre Channel ports of a node. However, the definitions of nodes vary between manufacturers, and may also indicate devices or adapters. Also referred to as a node WWN.

WWPN (World Wide Port Name)

A name that is a unique value and is set for each Fibre Channel port (HBA, CA, fibre channel switch ports, etc.), and is the IEEE global MAC address.

As the Fibre Channel ports of the same WWPN are unique, they are used as identifiers during Fibre Channel port login. Also referred to as a port WWN.