

FUJITSU Software

ServerView Resource Orchestrator V3.4.0

Overview

Windows/Linux

J2X1-7770-05ENZ0(03)
October 2020

Preface

Purpose of This Document

This manual provides an overview of FUJITSU Software ServerView Resource Orchestrator (hereinafter Resource Orchestrator).

Intended Readers

This manual is for people who want an overview of Resource Orchestrator.

Structure of This Document

This manual is composed as follows:

[Chapter 1 Overview](#)

Provides an overview of Resource Orchestrator.

[Chapter 2 System Configuration](#)

Explains system configurations of Resource Orchestrator.

[Chapter 3 Image of Operation](#)

Explains the image of operation of environments using ServerView Resource Orchestrator.

[Chapter 4 User Roles in Resource Orchestrator \[Cloud Edition\]](#)

Explains user roles in Resource Orchestrator.

[Chapter 5 Functions](#)

Provides an overview of the functions available in Resource Orchestrator.

[Chapter 6 System Requirements](#)

Explains the operational environment of Resource Orchestrator.

Web Site URLs

URLs provided as reference sources within the main text are correct as of October 2020.

Document Conventions

The notation in this manual conforms to the following conventions.

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

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

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

[Windows Manager]

Sections related to Windows manager

[Linux Manager]

Sections related to Linux manager

[Windows]

Sections related to Windows

[Linux]

Sections related to Linux

[Red Hat Enterprise Linux]

Sections related to Red Hat Enterprise Linux

[Solaris]

Sections related to Solaris

[VMware]

Sections related to VMware

[Horizon View]

Sections related to VMware Horizon View

[Hyper-V]

Sections related to Hyper-V

[Xen]

Sections related to RHEL5-Xen

[KVM]

Sections related to RHEL-KVM

[Solaris Zones]

Sections related to Solaris Zones (Solaris 10) and Solaris Zones (Solaris 11)

[Solaris Zones (Solaris 10)]

Sections related to Solaris Zones with Solaris 10 VM hosts

[Solaris Zones (Solaris 11)]

Sections related to Solaris Zones with Solaris 11 VM hosts

[OVM for x86]

Sections related to Oracle VM Server for x86 2.2 and Oracle VM Server for x86 3.x

[OVM for x86 2.2]

Sections related to Oracle VM Server for x86 2.2

[OVM for x86 3.x]

Sections related to Oracle VM Server for x86 3.2 and Oracle VM Server for x86 3.3

[OVM for SPARC]

Sections related to Oracle VM Server for SPARC

[Citrix Xen]

Sections related to Citrix XenServer

[Physical Servers]

Sections related to physical servers

[Trend Micro OfficeScan]

Sections related to Trend Micro OfficeScan

[Symantec]

Sections related to Symantec Endpoint Protection

[McAfee]

Sections related to McAfee ePolicy Orchestrator

- Unless specified otherwise, the blade servers mentioned in this manual refer to PRIMERGY BX servers.
- Oracle Solaris may also be indicated as Solaris, Solaris Operating System, or Solaris OS.

- Oracle Solaris Zones may also be indicated as Solaris Containers or Solaris Container.
- Oracle VM Server for x86 may also be indicated as Oracle VM.
- In Resource Orchestrator, the following servers are referred to as SPARC Enterprise.
 - SPARC Enterprise M3000/M4000/M5000/M8000/M9000
 - SPARC Enterprise T5120/T5140/T5220/T5240/T5440
- In Resource Orchestrator, the following servers are referred to as SPARC M12.
 - SPARC M12-1/M12-2/M12-2S
- In Resource Orchestrator, the following servers are referred to as SPARC M10.
 - SPARC M10-1/M10-4/M10-4S
- Fujitsu SPARC M12 is the product name used for SPARC M12 when they are sold outside Japan.
- Fujitsu M10 is the product name used for SPARC M10 when they are sold outside Japan.
- In this manual, Fujitsu SPARC M12 is referred to as SPARC M12.
- In this manual, Fujitsu M10 is referred to as SPARC M10.
- In this manual, Fujitsu SPARC M12 and Fujitsu M10 are collectively referred to as SPARC M10/M12.
- In Resource Orchestrator, the following software is referred to as GLS.
 - PRIMECLUSTER GLS 4.4 or earlier
- In Resource Orchestrator, the following software is referred to as GDS.
 - PRIMECLUSTER GDS 4.4 or earlier
- References and character strings or values requiring emphasis are indicated using double quotes (").
- GUI items are shown enclosed by 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 "#".
- When using Resource Orchestrator on Windows 8 and Windows Server 2012, please note the following. When OS operations are explained in this manual, the examples assume OSs up to Windows 7 and Windows Server 2008. When using Resource Orchestrator on Windows 8 or Windows Server 2012, take explanations regarding the [Start] menu as indicating the [Apps] screen. The [Apps] screen can be displayed by right-clicking on the [Start] screen and then right-clicking [All apps].
- When using Resource Orchestrator on Windows 8.1 and Windows Server 2012 R2, please note the following. When OS operations are explained in this manual, the examples assume OSs up to Windows 7 and Windows Server 2008. When using Resource Orchestrator on Windows 8.1 or Windows Server 2012 R2, take explanations regarding the [Start] menu as indicating the [Apps] screen. The [Apps] screen can be displayed by swiping the [Start] screen from bottom to top, or clicking the downward facing arrow on the lower-left of the [Start] screen.

Menus in the ROR console

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

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

Regarding Installation Folder Paths

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

Replace it as shown below.

[Virtual Edition]

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

[Cloud Edition]

C:\Program Files (x86)\Resource Orchestrator

Command Examples

The paths used in command examples may be abbreviated. When using commands, execute them using the paths in the "Name" column in the "Reference Guide (Command) VE" and the "Reference Guide (Command/XML) CE".

Abbreviations

The following abbreviations are use in this manual.

Category

Abbreviation

- Products

Windows

Windows

- Microsoft(R) Windows Server(R) 2012 Standard
- Microsoft(R) Windows Server(R) 2012 Datacenter
- Microsoft(R) Windows Server(R) 2012 R2 Essentials
- Microsoft(R) Windows Server(R) 2012 R2 Standard
- Microsoft(R) Windows Server(R) 2012 R2 Datacenter
- Microsoft(R) Windows Server(R) 2016 Standard
- Microsoft(R) Windows Server(R) 2016 Datacenter
- Microsoft(R) Windows Server(R) 2019 Standard
- Microsoft(R) Windows Server(R) 2019 Datacenter
- Windows(R) 7 Professional
- Windows(R) 7 Ultimate
- Windows(R) 8.1 Pro
- Windows(R) 8.1 Enterprise
- Windows(R) 10 Pro
- Windows(R) 10 Enterprise

Windows Server 2012

- Microsoft(R) Windows Server(R) 2012 Standard
- Microsoft(R) Windows Server(R) 2012 Datacenter
- Microsoft(R) Windows Server(R) 2012 R2 Essentials
- Microsoft(R) Windows Server(R) 2012 R2 Standard
- Microsoft(R) Windows Server(R) 2012 R2 Datacenter

Windows Server 2016

- Microsoft(R) Windows Server(R) 2016 Standard

- Microsoft(R) Windows Server(R) 2016 Datacenter

Windows Server 2019

- Microsoft(R) Windows Server(R) 2019 Standard
- Microsoft(R) Windows Server(R) 2019 Datacenter

Windows PE

- Microsoft(R) Windows(R) Preinstallation Environment

Windows 7

- Windows(R) 7 Professional
- Windows(R) 7 Ultimate

Windows 8.1

- Windows(R) 8.1 Pro
- Windows(R) 8.1 Enterprise

Windows 10

- Windows(R) 10 Pro
- Windows(R) 10 Enterprise

DOS

- Microsoft(R) MS-DOS(R) operating system, DR DOS(R)

MSFC

- Microsoft(R) Windows Server(R) 2012 Standard Failover Cluster
- Microsoft(R) Windows Server(R) 2012 Datacenter Failover Cluster

SCVMM

- Microsoft(R) System Center 2012 Virtual Machine Manager
- Microsoft(R) System Center 2012 R2 Virtual Machine Manager
- Microsoft(R) System Center 2016 Virtual Machine Manager

Linux

Linux

- Red Hat(R) Enterprise Linux(R) 6.0 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.0 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.1 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.1 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.2 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.3 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.4 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.5 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.6 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)

- Red Hat(R) Enterprise Linux(R) 6.7 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.8 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.9 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.10 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.0 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.1 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.2 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.4 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.5 (for Intel64)
- SUSE(R) Linux Enterprise Server 10 Service Pack 2 for x86
- SUSE(R) Linux Enterprise Server 10 Service Pack 2 for AMD64 & Intel64
- SUSE(R) Linux Enterprise Server 10 Service Pack 3 for x86
- SUSE(R) Linux Enterprise Server 10 Service Pack 3 for AMD64 & Intel64
- SUSE(R) Linux Enterprise Server 11 for x86
- SUSE(R) Linux Enterprise Server 11 for AMD64 & Intel64
- SUSE(R) Linux Enterprise Server 11 Service Pack 1 for x86
- SUSE(R) Linux Enterprise Server 11 Service Pack 1 for AMD64 & Intel64
- Oracle Enterprise Linux Release 6.7 for x86 (32-bit)
- Oracle Enterprise Linux Release 6.7 for x86_64 (64-bit)
- Oracle Enterprise Linux Release 7.2 for x86 (32-bit)
- Oracle Enterprise Linux Release 7.2 for x86_64 (64-bit)

Red Hat Enterprise Linux

- Red Hat(R) Enterprise Linux(R) 6.0 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.0 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.1 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.1 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.2 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.3 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.4 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.5 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.6 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)

- Red Hat(R) Enterprise Linux(R) 6.7 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.8 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.9 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.10 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.0 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.1 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.2 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.4 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.5 (for Intel64)

Red Hat Enterprise Linux 6

- Red Hat(R) Enterprise Linux(R) 6.0 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.0 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.1 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.1 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.2 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.3 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.4 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.5 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.6 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.7 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.8 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.9 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 6.10 (for x86)
- Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)

Red Hat Enterprise Linux 7

- Red Hat(R) Enterprise Linux(R) 7.0 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.1 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.2 (for Intel64)

- Red Hat(R) Enterprise Linux(R) 7.4 (for Intel64)
- Red Hat(R) Enterprise Linux(R) 7.5 (for Intel64)

SUSE Linux Enterprise Server

- SUSE(R) Linux Enterprise Server 10 Service Pack 2 for x86
- SUSE(R) Linux Enterprise Server 10 Service Pack 2 for AMD64 & Intel64
- SUSE(R) Linux Enterprise Server 10 Service Pack 3 for x86
- SUSE(R) Linux Enterprise Server 10 Service Pack 3 for AMD64 & Intel64
- SUSE(R) Linux Enterprise Server 11 for x86
- SUSE(R) Linux Enterprise Server 11 for AMD64 & Intel64
- SUSE(R) Linux Enterprise Server 11 Service Pack 1 for x86
- SUSE(R) Linux Enterprise Server 11 Service Pack 1 for AMD64 & Intel64

Oracle Enterprise Linux

- Oracle Enterprise Linux Release 6.7 for x86 (32-bit)
- Oracle Enterprise Linux Release 6.7 for x86_64 (64-bit)
- Oracle Enterprise Linux Release 7.2 for x86 (32-bit)
- Oracle Enterprise Linux Release 7.2 for x86_64 (64-bit)

KVM

RHEL-KVM

- Red Hat(R) Enterprise Linux(R) 6.1 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.1 (for Intel64) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.2 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.3 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.4 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.5 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.6 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.7 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.8 (for x86) Virtual Machine Function
- Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64) Virtual Machine Function

Xen

Xen

- Citrix XenServer(R) 5.5
- Citrix Essentials(TM) for XenServer 5.5, Enterprise Edition
- Citrix XenServer(R) 6.0
- Citrix Essentials(TM) for XenServer 6.0, Enterprise Edition

Citrix

Citrix XenServer

- Citrix XenServer(R) 6.0
- Citrix XenServer(R) 6.0.2
- Citrix XenServer(R) 6.1.0
- Citrix XenServer(R) 6.2.0
- Citrix XenServer(R) 7.1 LTSR
- Citrix XenServer(R) 7.2
- Citrix Hypervisor(R)

XenServer 6

- Citrix XenServer(R) 6.0
- Citrix Essentials(TM) for XenServer 6.0, Enterprise Edition

Citrix XenApp

- Citrix XenApp(R)
- Citrix Virtual Apps(R)

Citrix XenDesktop

- Citrix XenDesktop(R)
- Citrix Virtual Apps and Desktops(R)

Oracle Solaris

Solaris

- Oracle Solaris 10 05/09 (Update7)
- Oracle Solaris 11 11/11
- Oracle Solaris 11.1
- Oracle Solaris 11.2
- Oracle Solaris 11.3

Oracle VM

OVM for x86 2.2

- Oracle(R) VM Server for x86 2.2

OVM for x86 3.x

OVM for x86 3.2

- Oracle VM Server for x86 v3.2.x

OVM for x86 3.3

- Oracle VM Server for x86 v3.3.x

OVM for SPARC

- Oracle(R) VM Server for SPARC

Oracle VM Manager

- Oracle(R) VM Manager

EMC

Navisphere

- EMC Navisphere Manager

Solutions Enabler

- EMC Solutions Enabler

VMware

VMware vSphere or vSphere

- VMware vSphere(R) 4
- VMware vSphere(R) 4.1
- VMware vSphere(R) 5
- VMware vSphere(R) 5.1
- VMware vSphere(R) 5.5
- VMware vSphere(R) 6
- VMware vSphere(R) 6.5
- VMware vSphere(R) 6.7

VMware ESX

- VMware(R) ESX(R)

VMware ESX 4

- VMware(R) ESX(R) 4

VMware ESXi

- VMware(R) ESXi(TM)

VMware ESXi 5.0

- VMware(R) ESXi(TM) 5.0

VMware ESXi 5.1

- VMware(R) ESXi(TM) 5.1

VMware ESXi 5.5

- VMware(R) ESXi(TM) 5.5

VMware ESXi 6.0

- VMware(R) ESXi(TM) 6.0

VMware ESXi 6.5

- VMware(R) ESXi(TM) 6.5

VMware ESXi 6.7

- VMware(R) ESXi(TM) 6.7

VMware Infrastructure Client

- VMware(R) Infrastructure Client

VMware Tools

- VMware(R) Tools

VMware vSphere 4.0 or vSphere 4.0

- VMware vSphere(R) 4.0

VMware vSphere 4.1 or vSphere 4.1

- VMware vSphere(R) 4.1

VMware vSphere 5 or vSphere 5

- VMware vSphere(R) 5

VMware vSphere 5.1 or vSphere 5.1

- VMware vSphere(R) 5.1

VMware vSphere 5.5 or vSphere 5.5

- VMware vSphere(R) 5.5

VMware vSphere 6.0 or vSphere 6.0

- VMware vSphere(R) 6.0

VMware vSphere 6.5 or vSphere 6.5

- VMware vSphere(R) 6.5

VMware vSphere 6.7 or vSphere 6.7

- VMware vSphere(R) 6.7

VMware vSphere Client or vSphere Client

- VMware vSphere(R) Client

VMware vCenter Server or vCenter Server

- VMware(R) vCenter(TM) Server

VMware vCenter Server Appliance or vCenter Server Appliance

- VMware(R) vCenter(TM) Server Appliance(TM)

VMware vClient

- VMware(R) vClient(TM)

VMware FT

- VMware(R) Fault Tolerance

VMware DRS

- VMware(R) Distributed Resource Scheduler

VMware DPM

- VMware(R) Distributed Power Management

VMware Storage VMotion

- VMware(R) Storage VMotion

VMware vDS

- VMware(R) vNetwork Distributed Switch

VMware Horizon View

- VMware Horizon View 5.2.x
- VMware Horizon View 5.3.x
- VMware Horizon 6.0 (with View)

VMware VSAN or VSAN

- VMware(R) Virtual SAN(TM)

VMware vSphere Web Client or vSphere Web Client

- VMware vSphere(R) Web Client

VMware NSX

- VMware NSX(R)
- VMware NSX(R) for vSphere(R)
- VMware NSX(R) for vSphere(R) 6.3

VMware NSX Controller or NSX Controller

- VMware NSX(R) Controller(TM)

VMware NSX Edge or NSX Edge

- VMware NSX(R) Edge(TM)

VMware NSX Manager or NSX Manager

- VMware NSX(R) Manager(TM)

Excel**Excel**

- Microsoft(R) Office Excel(R) 2007
- Microsoft(R) Office Excel(R) 2010
- Microsoft(R) Office Excel(R) 2013

Excel 2007

- Microsoft(R) Office Excel(R) 2007

Excel 2010

- Microsoft(R) Office Excel(R) 2010

Excel 2013

- Microsoft(R) Office Excel(R) 2013

Browsers**Internet Explorer**

- Windows(R) Internet Explorer(R) 9
- Internet Explorer(R) 10
- Internet Explorer(R) 11

Firefox

- Firefox(R)

Antivirus Software**OfficeScan**

- Trend Micro OfficeScan

McAfee ePolicy Orchestrator

- McAfee(R) ePolicy Orchestrator(R)

McAfee ePO

- McAfee(R) ePolicy Orchestrator(R)

McAfee Agent

- McAfee(R) Agent

McAfee Endpoint Security

- McAfee(R) Endpoint Security

Symantec Endpoint Protection

- Symantec(TM) Endpoint Protection

Symantec Endpoint Protection Manager

- Symantec(TM) Endpoint Protection Manager

BMC**BladeLogic**

- BMC BladeLogic Server Automation

ETERNUS**ESC**

- ETERNUS SF Storage Cruiser

ServerView**ServerView Agent**

- ServerView SNMP Agents for MS Windows (32-bit and 64-bit)
- ServerView Agents Linux
- ServerView Agents VMware for VMware ESX Server

VIOM

- ServerView Virtual-IO Manager

ISM

- ServerView Infrastructure Manager
- Infrastructure Manager

SVOM

- ServerView Operations Manager

SVFAB

- ServerView Fabric Manager

RCVE

- ServerView Resource Coordinator VE

ROR

- FUJITSU Software ServerView Resource Orchestrator

ROR VE

- FUJITSU Software ServerView Resource Orchestrator Virtual Edition

ROR CE

- FUJITSU Software ServerView Resource Orchestrator Cloud Edition

Resource Coordinator

- Systemwalker Resource Coordinator
- Systemwalker Resource Coordinator Virtual server Edition

Resource Coordinator VE

- ServerView Resource Coordinator VE
- Systemwalker Resource Coordinator Virtual server Edition

Resource Orchestrator

- FUJITSU Software ServerView Resource Orchestrator

Export Administration Regulation Declaration

Exportation/release of this document may require necessary procedures in accordance with the regulations of your resident country and/or US export control laws.

Trademark Information

- BMC, BMC Software, and the BMC Software logo are the exclusive properties of BMC Software, Inc., are registered with the U.S. Patent and Trademark Office, and may be registered or pending registration in other countries.
- Citrix, Citrix Virtual Apps and Desktops, Citrix Virtual Apps, Citrix Hypervisor, XenApp, XenDesktop, XenServer, Citrix Essentials are trademarks of Citrix Systems, Inc. and/or one of its subsidiaries, and may be registered in the United States Patent and Trademark Office and in other countries.
- Dell is a registered trademark of Dell Computer Corp.
- EMC, EMC2, CLARiiON, VNX, Symmetrix, and Navisphere are trademarks or registered trademarks of EMC Corporation.
- HP is a registered trademark of Hewlett-Packard Company.
- IBM is a registered trademark or trademark of International Business Machines Corporation in the U.S.
- Linux(R) is a trademark or registered trademark of Linus Torvalds in the United States and other countries.
- McAfee and the McAfee logo, ePolicy Orchestrator, and McAfee ePO are trademarks or registered trademarks of McAfee, LLC or its subsidiaries in the United States and other countries.
- Microsoft, Windows, MS-DOS, Windows Server, Windows Vista, Excel, Active Directory, and Internet Explorer are either registered trademarks or trademarks of Microsoft Corporation in the United States and other countries.
- Firefox is a trademark or registered trademark of the Mozilla Foundation in the United States and other countries.
- NetApp is a registered trademark of Network Appliance, Inc. in the US and other countries. Data ONTAP, Network Appliance, and Snapshot are trademarks of Network Appliance, Inc. in the US and other countries.
- Oracle and Java are registered trademarks of Oracle and/or its affiliates.
- Red Hat, RPM and all Red Hat-based trademarks and logos are trademarks or registered trademarks of Red Hat, Inc. in the United States and other countries.
- Spectrum is a trademark or registered trademark of Computer Associates International, Inc. and/or its subsidiaries.
- "SUSE" and the SUSE logo are trademarks of SUSE LLC or its subsidiaries or affiliates.
- Symantec and the Symantec logo are trademarks or registered trademarks of the Symantec Corporation or its subsidiaries in the United States and other countries.
- TREND MICRO and OfficeScan are registered trademarks of Trend Micro, Inc.
- VMware, the VMware "boxes" logo and design, Virtual SMP, and VMotion are registered trademarks or trademarks of VMware, Inc. in the United States and/or other jurisdictions.
- ServerView and Systemwalker are registered trademarks of FUJITSU LIMITED.
- All other brand and product names are trademarks or registered trademarks of their respective owners.

Notices

- The contents of this manual shall not be reproduced without express written permission from FUJITSU LIMITED.
- The contents of this manual are subject to change without notice.

Revision History

Month/Year Issued, Edition	Manual Code
June 2013, Edition 1.0	J2X1-7770-01ENZ0(00)
August 2013, Edition 1.1	J2X1-7770-01ENZ0(01)
December 2013, Edition 2.0	J2X1-7770-02ENZ0(00)
April 2014, Edition 2.1	J2X1-7770-02ENZ0(01)
June 2014, Edition 2.2	J2X1-7770-02ENZ0(02)
April 2015, Edition 3.0	J2X1-7770-03ENZ0(00)
May 2015, Edition 3.1	J2X1-7770-03ENZ0(01)

Month/Year Issued, Edition	Manual Code
July 2015, Edition 3.2	J2X1-7770-03ENZ0(02)
August 2015, Edition 3.3	J2X1-7770-03ENZ0(03)
September 2015, Edition 3.4	J2X1-7770-03ENZ0(04)
December 2015, Edition 3.5	J2X1-7770-03ENZ0(05)
January 2016, Edition 3.6	J2X1-7770-03ENZ0(06)
June 2016, Edition 3.7	J2X1-7770-03ENZ0(07)
September 2016, Edition 3.8	J2X1-7770-03ENZ0(08)
October 2016, Edition 3.9	J2X1-7770-03ENZ0(09)
November 2016, Edition 3.10	J2X1-7770-03ENZ0(10)
December 2016, Edition 3.11	J2X1-7770-03ENZ0(11)
February 2017, Edition 3.12	J2X1-7770-03ENZ0(12)
April 2017, Edition 4.0	J2X1-7770-04ENZ0(00)
May 2017, Edition 4.1	J2X1-7770-04ENZ0(01)
August 2017, Edition 4.2	J2X1-7770-04ENZ0(02)
September 2017, Edition 4.3	J2X1-7770-04ENZ0(03)
December 2017, Edition 4.4	J2X1-7770-04ENZ0(04)
February 2018, Edition 4.5	J2X1-7770-04ENZ0(05)
March 2018, Edition 4.6	J2X1-7770-04ENZ0(06)
October 2018, Edition 5.0	J2X1-7770-05ENZ0(00)
December 2018, Edition 5.1	J2X1-7770-05ENZ0(01)
December 2018, Edition 5.2	J2X1-7770-05ENZ0(02)
October 2020, Edition 5.3	J2X1-7770-05ENZ0(03)

Copyright Notice

Copyright 2013-2020 FUJITSU LIMITED

Contents

Chapter 1 Overview.....	1
1.1 What is FUJITSU Software ServerView Resource Orchestrator.....	1
1.2 Product Line-up.....	2
1.3 Functional Differences Depending on Product.....	3
Chapter 2 System Configuration.....	4
2.1 Basic System Configuration Example Using Virtual Edition.....	5
2.2 Basic System Configuration Example Using Cloud Edition.....	5
Chapter 3 Image of Operation.....	6
3.1 Virtual Edition.....	6
3.2 Cloud Edition.....	7
Chapter 4 User Roles in Resource Orchestrator [Cloud Edition].....	12
Chapter 5 Functions.....	14
5.1 Available Functions.....	14
5.2 Centralized Management of Virtual and Physical Servers.....	15
5.2.1 Visualization of Blade Server Status (BladeViewer).....	15
5.2.2 Visualization of Networks (NetworkViewer).....	16
5.2.2.1 NetworkViewer (Virtual Edition).....	16
5.2.2.2 NetworkViewer (Cloud Edition).....	17
5.2.2.3 Visualization and Forecasting of Influence Scope (Virtual Edition/Cloud Edition).....	18
5.2.3 Visualization of Power Consumption.....	21
5.2.4 Recovery of Migrated VM Guest Locations (VM Home Position).....	21
5.2.5 Centralized Management of System Images.....	22
5.2.6 Cloning Physical Servers and Automating Configuration.....	23
5.3 Improvement of Server Availability.....	23
5.3.1 I/O Virtualization.....	23
5.3.2 Monitoring of Hang-up and Recovery.....	23
5.3.3 Automatic Recovery of Failed Servers.....	24
5.4 Realization of a Platform Provision Service.....	25
5.4.1 Logical Platforms (L-Platforms) and Logical Servers (L-Servers).....	25
5.4.2 Resource Pool Management.....	26
5.4.3 Resource Management in Multi-tenant Environments.....	27
5.4.4 Standardization of Logical Platforms (L-Platform).....	28
5.4.5 L-Platform Template Creation and Publication.....	28
5.4.6 Subscription.....	29
5.4.7 Approval and Assessment.....	29
5.4.8 Virtualizing Networks.....	30
5.4.8.1 Automatic VLAN Network Configuration when Connecting with Virtual Servers.....	30
5.4.8.2 Auto-configuration of Network Devices.....	31
5.4.8.3 Auto-configuration when Migrating Servers.....	31
5.4.8.4 Auto-configuration of Virtual Fabrics.....	32
5.4.9 Reconfiguration.....	32
5.4.10 Power Operations and Snapshot.....	33
5.4.11 Monitoring the Operation Status of Resources.....	35
5.4.12 Monitoring Resource Pool Use Rate.....	35
5.4.13 Network Device Monitoring and Operation.....	36
5.4.14 Accounting.....	37
5.4.15 Disaster Recovery of Systems.....	38
5.5 Automatic Quarantining to the Quarantine Network.....	38
Chapter 6 System Requirements.....	40
6.1 Software Environment.....	40
6.1.1 Software Requirements (Virtual Edition).....	40

6.1.1.1 Required Basic Software.....	40
6.1.1.2 Required Patches.....	46
6.1.1.3 Required Packages.....	48
6.1.1.4 Required Software.....	52
6.1.1.5 Exclusive Software.....	60
6.1.1.6 Static Disk Space.....	61
6.1.1.7 Dynamic Disk Space.....	62
6.1.1.8 Memory Size.....	66
6.1.2 Software Requirements (Cloud Edition).....	66
6.1.2.1 Required Basic Software.....	66
6.1.2.2 Required Patches.....	74
6.1.2.3 Required Packages.....	75
6.1.2.4 Required Software.....	81
6.1.2.5 Exclusive Software.....	95
6.1.2.6 Static Disk Space.....	104
6.1.2.7 Dynamic Disk Space.....	105
6.1.2.8 Memory Size.....	112
6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016.....	112
6.1.3.1 ServerView Virtual-IO Manager.....	113
6.1.3.2 BladeLogic.....	113
6.2 Hardware Environment.....	113
6.2.1 All Editions.....	113
6.2.2 Virtual Edition.....	126
6.2.3 Cloud Edition.....	128

Chapter 1 Overview

This chapter provides an overview of Resource Orchestrator.

1.1 What is FUJITSU Software ServerView Resource Orchestrator

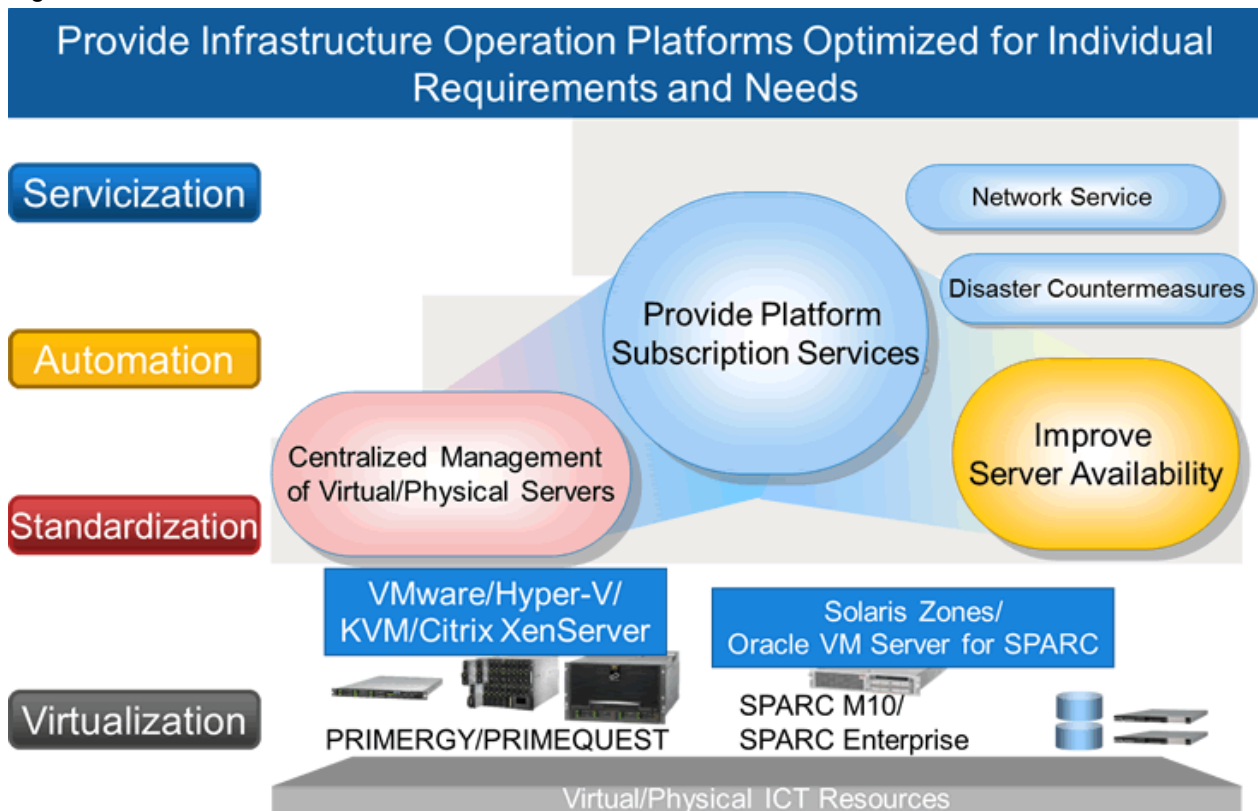
ICT has become one of the significant management resources for business enterprises, and stable ICT system operations are essential 24 hours a day, 365 days a year.

On the other hand, manual management operations are likely to reach their limit soon, since technologies including networks are constantly evolving, and systems have become more so complicated and massive that the workload of administrator operations is increasing and requires in-depth technical knowledge.

FUJITSU Software ServerView Resource Orchestrator is platform software for private clouds, for enabling effective use of ICT resources and streamlining of operation and management.

It provides the optimal private cloud platform based on the configuration requirements for private clouds configured by customers. ICT costs can be optimized through effective use of ICT resources such as servers, storage, and networks, and streamlining of operation and management.

Figure 1.1 Features of ServerView FUJITSU Software Resource Orchestrator



Centralized Management of Virtual and Physical Servers

Integrated operation is possible using a single console, even if a combination of virtual environments and physical environments is used. This realizes server virtualization and operation integration, and reduces the overall management workload.

Improvement of Server Availability

When a server fails, it can be switched over to a spare server automatically, and the risk of operation stopping can be reduced. Also, improvement of server availability can be realized by specifying a managed server as the spare server in advance.

Realization of a Platform Provision Service

Speedy Support for Evolving Businesses

Resource Orchestrator promptly provides servers (with storage and networks) according to the user's specific needs by managing resources, such as servers, storage, networks, and images (*), as resource pools. By simplifying the launch, expansion, and changes of business operations, this software provides quick support for evolving businesses.

* Note: A copy of the contents of a disk (including the operating system) collected from a server, which can be deployed to other servers.

Reduction of Infrastructure Investment Costs

Resource Orchestrator provides complete visualization of servers, storage resources, and network resources, making the state of each of these resources visible to users. This allows for the effective use of unused resources and planning for the installation of required resources.

Moreover, infrastructure investment costs are reduced by managing resources as resource pools, as resources that could not otherwise be diverted to other uses can be used effectively.

Reduction of Infrastructure Operating Costs

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

- Simplified configuration of systems.
- Reduced risk of mistakes through use of predefined values for parameter settings when installing an OS or setting up storage and networks.

1.2 Product Line-up

This section explains the product line-up of FUJITSU Software ServerView Resource Orchestrator.

In Resource Orchestrator, the edition can be upgraded in steps.

For details on available functions for each edition, refer to "[5.1 Available Functions](#)".

Product Line-up

FUJITSU Software ServerView Resource Orchestrator Virtual Edition

FUJITSU Software ServerView Resource Orchestrator Virtual Edition (hereinafter Virtual Edition), realizes server virtualization and operation integration in virtual and physical environments. Failed servers can be automatically recovered. By introducing server automation and visualization, the workload of installation, operation, and maintenance can be reduced.

FUJITSU Software ServerView Resource Orchestrator Cloud Edition

In FUJITSU Software ServerView Resource Orchestrator Cloud Edition (hereinafter Cloud Edition), in addition to the functions of Virtual Edition, centralized management of resources in resource pools and automatic deployment of platforms according to user requirements is possible.

Reduction of the time taken to configure systems and increased efficiency of operations are also possible using the automatic deployment of platforms.

List of Optional Software

FUJITSU Software ServerView Resource Orchestrator DR Option

Provides the functions to promptly recover and restore (from operating to standby) the systems damaged by natural disasters, on a chassis level. It is easy to configure the backed-up system by copying the management information of the primary site to the backup site.

FUJITSU Software ServerView Resource Orchestrator DR option (hereinafter DR option) can be used for Cloud Edition.

FUJITSU Software ServerView Resource Orchestrator I/O Virtualization Option (FJ-WWN16)

Provides virtual WWNs that can be used on managed servers.

The virtual WWNs can be used for SAN environments in which I/O virtualization using HBA address rename, VIOM, or ISM is used. As many virtual WWNs as the number of managed servers (excluding spare servers) for which virtualization of WWNs is to be performed are necessary. (*) Resource Orchestrator provides 16 virtual WWNs, so purchase as many as are necessary for the servers in your environment if you require more.

* Note: Even if multiple ports (HBA ports) are mounted on a single managed server, one virtual WWN is required per server.

FUJITSU Software ServerView Resource Orchestrator I/O Virtualization Option (FJ-MAC16)

This product is an option of FUJITSU Software ServerView Resource Orchestrator, and provides virtual MAC addresses that can be used on managed servers.

The virtual MAC addresses can be used for LAN environments in which I/O virtualization using VIOM or ISM is used.

As many virtual MAC addresses as the number of NICs on the managed servers (excluding spare servers) for which virtualization of MAC addresses is to be performed are necessary. Resource Orchestrator provides 16 virtual MAC addresses, so please purchase as many as are necessary for the NICs in your environment if you require more.

1.3 Functional Differences Depending on Product

The functions available for Resource Orchestrator differ depending on the Resource Orchestrator product purchased.

For details on the differences of functions available for FUJITSU Software ServerView Resource Orchestrator Virtual Edition (hereafter, ROR VE) and FUJITSU Software ServerView Resource Orchestrator Cloud Edition (hereafter, ROR CE), refer to "[Chapter 5 Functions](#)".

The support provided for managed server hardware and server virtualization software differs for ROR VE and ROR CE.

Table 1.1 Managed Server Hardware Differences Depending on Product

Software	Hardware	Express	ROR VE (*1)	ROR CE (*1)
Manager	PRIMERGY RX series/BX series/TX series	Yes	Yes	Yes
	PRIMEQUEST	No	Yes	Yes
Agent	PRIMERGY RX series/BX series/TX series	Yes	Yes	Yes
	Other PC servers	No	Yes	Yes
	PRIMEQUEST	No	Yes	Yes
	SPARC Enterprise M series	No	Yes	Yes
	SPARC Enterprise T5120/T5140/T5220/T5240/T5440	No	Yes	Yes (*2)
	SPARC M10/M12	No	Yes	Yes

*1: For details, refer to "[6.2 Hardware Environment](#)".

*2: Supported for ROR VE functions and linking with physical L-Servers. For details, refer to "[6.2 Hardware Environment](#)".

Table 1.2 Server Virtualization Software Differences Depending on Product

Software	Server Virtualization Software	Express	ROR VE (*)	ROR CE (*)
Agent	VMware	Yes	Yes	Yes
	Hyper-V	Yes	Yes	Yes
	RHEL-Xen	Yes	Yes	Yes
	RHEL-KVM	Yes	Yes	Yes
	Citrix XenServer	Yes	Yes	Yes
	OVM for x86 2.2/OVM for x86 3.3	No	No	Yes
	OVM for SPARC	No	Yes	Yes
	Solaris zones	No	Yes	Yes

* Note: For details, refer to "[6.1.1.1 Required Basic Software](#)" or "[6.1.2.1 Required Basic Software](#)".

Chapter 2 System Configuration

This chapter explains system configurations of Resource Orchestrator.

Admin Server

The admin server is a server used to manage managed servers and managed devices.

It is necessary to install the Resource Orchestrator manager on the admin server.

Managed Server

A server performing operations, or a spare server.

Install agents on servers used for operations.

Install agents only on VM hosts in server virtualization software environments.



Note

When using VMware ESXi, it is not necessary to install a Resource Orchestrator agent on a managed server, since VMs and guest OSs are directly managed from the admin server.

Instead, install ServerView ESXi CIM Provider.

Register the target VMware ESXi in ServerView Operations Manager, and perform monitoring using ServerView ESXi CIM Provider.

When using VMware ESXi on another vendor's servers or when not using ServerView ESXi CIM Provider on VMware ESXi on Fujitsu rack mount servers, it is not necessary to install ServerView ESXi CIM Provider.

Admin LAN

A LAN for managing managed servers from an admin server.

Separate from the public LAN used to perform operations with managed servers.

Redundancy of admin LANs or public LANs can be performed using network redundancy software on the server.

Management of managed servers connected to multiple network segments on an admin server is possible.

Web Client

A client used to operate an admin server of Resource Orchestrator. Uses the management console (ROR console) on the Web browser.

Server for the HBA address rename Setup Service

HBA address rename is the I/O virtualization function provided by Resource Orchestrator.

HBA address rename enables addition or maintenance of servers by modifying the configurations of servers, without modifying the configurations of WWNs of storage units.

The server for the HBA address rename setup service is the server used to operate HBA address rename.

When an admin server and a managed server cannot communicate, the WWN settings required when starting managed servers are configured on behalf of the admin server.

When using I/O virtualization using HBA address rename, it is necessary to prepare the server on which the HBA address rename setup service will operate.

Privileged User [Virtual Edition]

A privileged user is a user who can perform all operations using resources.

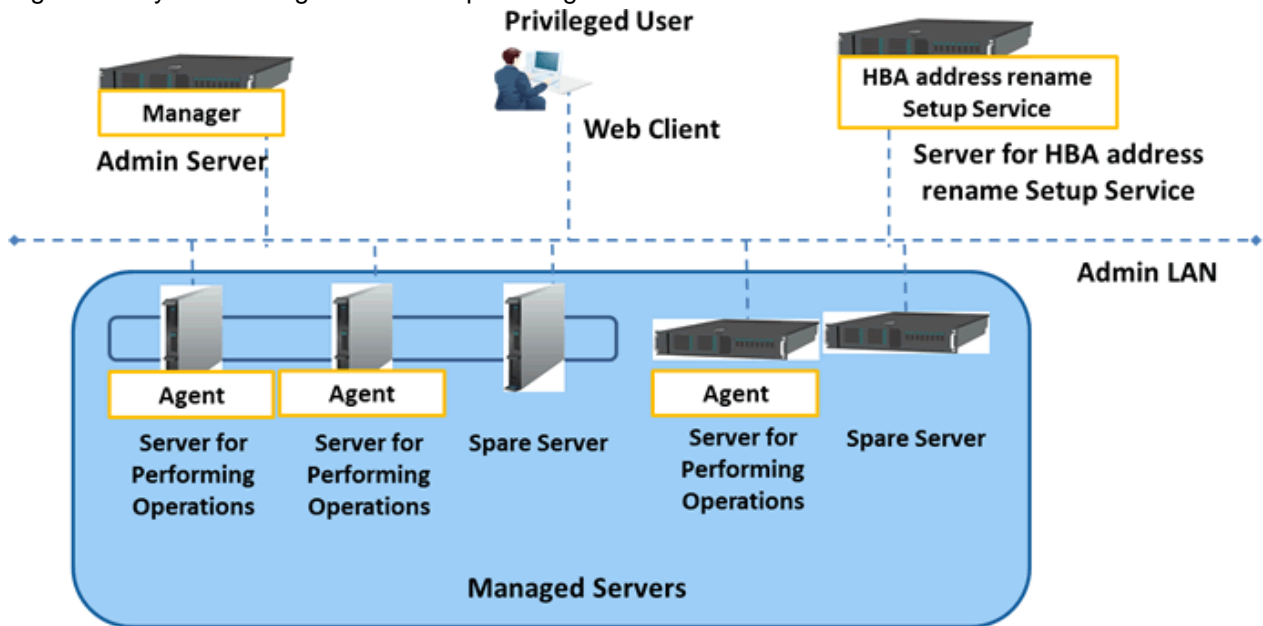
A general user is a user who can only perform reference operations using resources.

Tenant User, Tenant Administrator, Infrastructure Administrator [Cloud Edition]

For details on roles of tenant users, tenant administrators, and infrastructure administrators, refer to "[Chapter 4 User Roles in Resource Orchestrator \[Cloud Edition\]](#)".

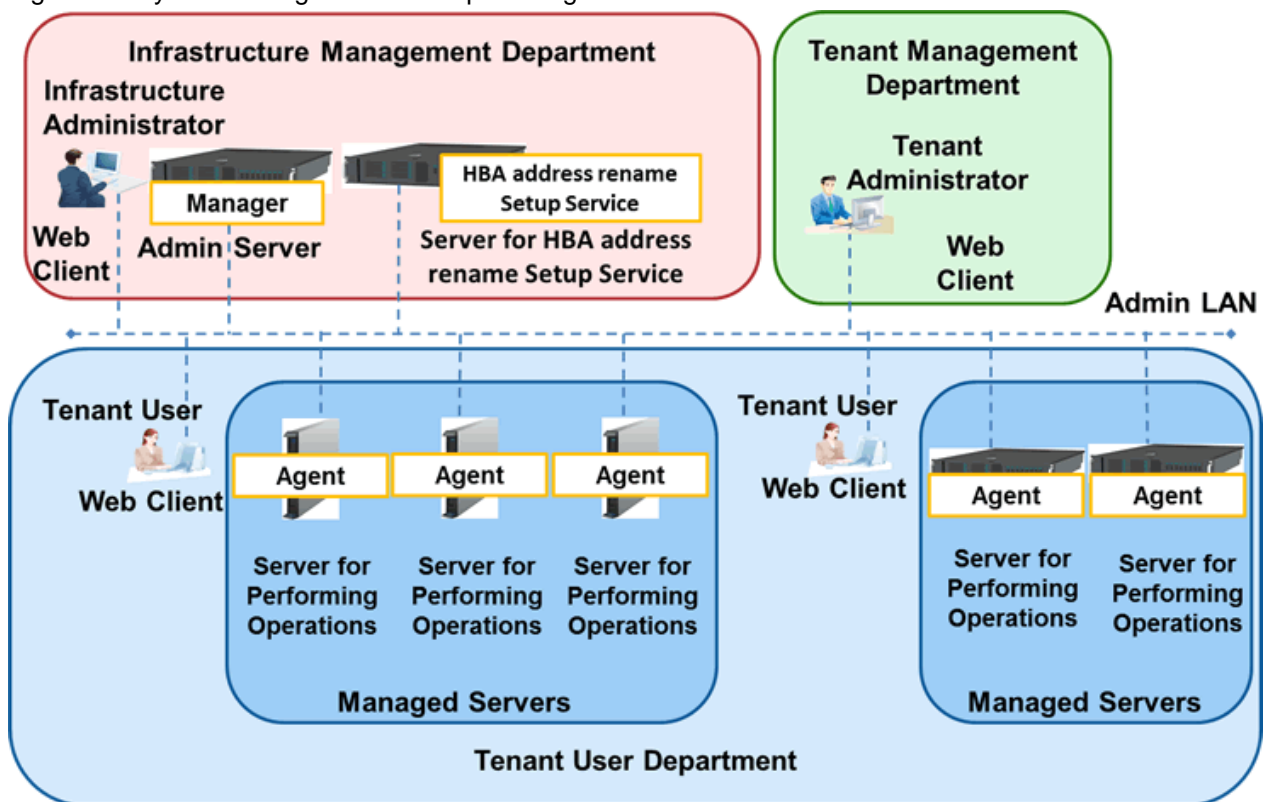
2.1 Basic System Configuration Example Using Virtual Edition

A basic example system configuration using Virtual Edition is given below.
 Figure 2.1 System Configuration Example Using Virtual Edition



2.2 Basic System Configuration Example Using Cloud Edition

A basic example system configuration using Cloud Edition is given below.
 Figure 2.2 System Configuration Example Using Cloud Edition

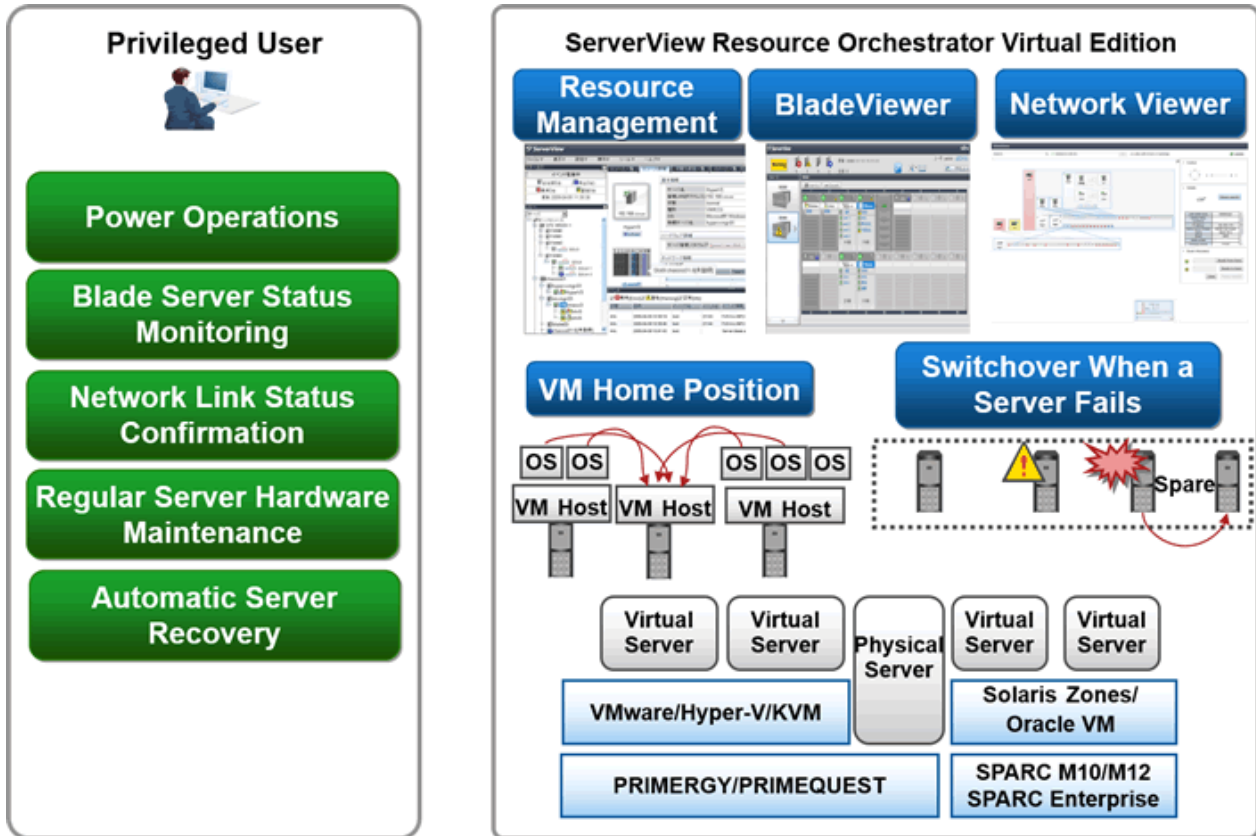


Chapter 3 Image of Operation

This chapter explains the image of operation of environments using FUJITSU Software ServerView Resource Orchestrator.

3.1 Virtual Edition

An image of operation when using Virtual Edition is given below.
Figure 3.1 Image of Operation [Virtual Edition]



Regular Operations

Once resources are registered with Resource Orchestrator, power operations such as startup or stop using a single window are available, with no need to be aware of the differences between the virtual environments, the server hardware models, or the OS types.

Operations When Trouble Occurs

- Check the statuses of blade servers using BladeViewer.
- When a network error has occurred, check NetworkViewer. Check the link statuses of servers and switches, or the switch port statuses, and investigate the effect the network error has on server operations.

Operations for Regular Server Hardware Maintenance

1. Configure the VM Home Position settings.
2. Before maintaining server hardware, back up the guest OS to another VM.
3. Perform maintenance of the server hardware.
4. The guest OS which is backed up on the other VM when switching over servers can easily be returned to its original status before server switchover using VM Home Position.

Operations when Server Hardware Fails

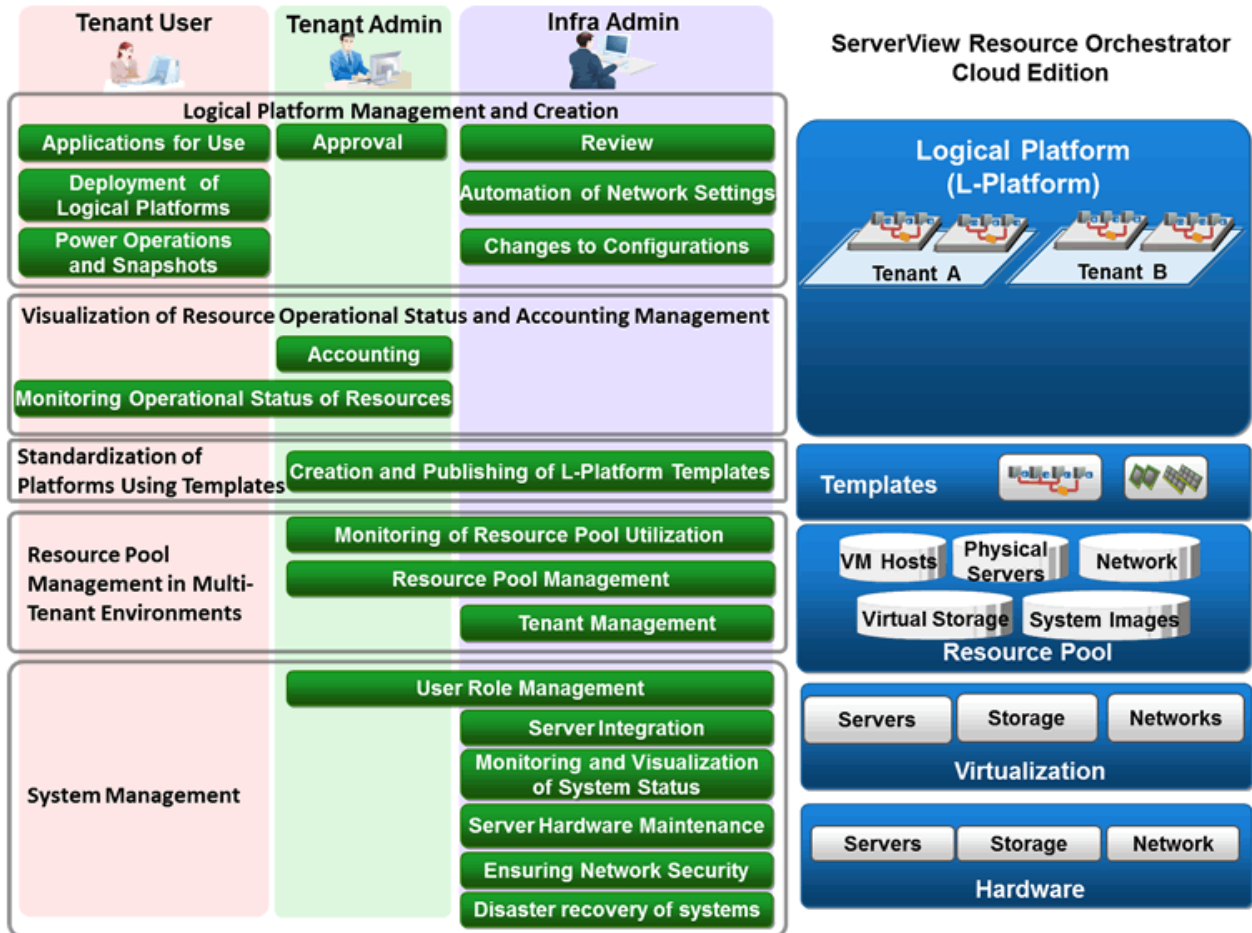
1. Define spare servers in advance.

- When using PRIMERGY servers or SPARC M10/M12 or SPARC Enterprise, recover applications upon hardware failure by automatically switching over primary servers with pre-assigned spare servers.

3.2 Cloud Edition

An image of operation when using Cloud Edition is given below.

Figure 3.2 Image of Operation [Cloud Edition]



Users of Resource Orchestrator

The users who perform configuration and operation of the infrastructure platform for operations using Resource Orchestrator are given below.

For details on the roles of users, refer to "[Chapter 4 User Roles in Resource Orchestrator \[Cloud Edition\]](#)".

Table 3.1 User

Department	User	Overview
Service User Department	Tenant User	A person who performs configuration, operation, or maintenance of business systems. Systems are configured on an allocated logical platform (L-Platform).
	Tenant administrator	The manager of a service user department which performs configuration, operation, and maintenance of a logical platform (L-Platform). In Resource Orchestrator, the unit for division of management and operation of resources based on organizations or operations is called a tenant. They manage tenant users in tenants and logical platforms (L-Platforms).
Service Provision Department	Infrastructure Administrators	A manager of a service provision department which performs configuration, operation, and maintenance of an entire infrastructure.

Department	User	Overview
		Logical platforms (L-Platform) are allocated according to requests from service user departments.
	System administrator	A system administrator who manages the entire system. They install Resource Orchestrator and configure the necessary settings. OS administrator privileges are required for these operations. Usually, the roles of infrastructure administrator and system administrator are performed by the person.

Functions Available to Users of Resource Orchestrator

The functions available to users using the service portal provided by Resource Orchestrator (ROR console) are as shown below.

Table 3.2 Functions Available to Users of Resource Orchestrator

Functions	User	Overview
Logical platform (L-Platform) creation and management	Power operations and snapshots	Tenant User Uses logical platforms (L-Platforms) via remote desktop or by using SSH. Power operations such as starting or stopping of the logical platform (L-Platform) can be performed. Collection and restoration of snapshots of the logical platform (L-Platform) can also be performed.
	Reconfiguration	Infrastructure Administrators Infrastructure administrators can modify the server specifications such as CPUs, memory capacity, and disk capacity defined in the logical platform (L-Platform), when requested by tenant users or tenant administrators. Effective use of resources can be realized, since resources can easily be increased or reduced according to the workload fluctuations of logical platforms (L-Platforms) being used.
	Automation of network settings	Infrastructure Administrators Configures rules and definitions for the network devices automatically, when creating, modifying, and deleting logical platforms (L-Platforms). Automating network settings enables reduction of the operational workload of tenant users.
	Logical platform (L-Platform) creation	Tenant User Deploys logical platforms (L-Platforms) including physical and virtual servers automatically, based on templates. Automated configuration can prevent configuration errors and enable quick provision of logical platforms (L-Platforms).
	Subscription	Tenant User Tenant users can apply to use a logical platform (L-Platform).
	Approval and Assessment	Tenant administrator Infrastructure Administrators Applications for use can be double-checked with approval by the tenant administrator and with review by the infrastructure administrator. This promotes the appropriate use of resources by checking the validity of the application for use.
Visualization of the operational status of resources and accounting management	Accounting	Tenant administrator Displays the usage charges for each tenant or each logical platform (L-Platform), and sends notification by e-mail. Allocates appropriate costs to resources.
	Monitoring the Operation Status of Resources	Tenant User Tenant administrator Tenant users can monitor the operational statuses of allocated logical platforms (L-Platforms). Tenant administrators can monitor all logical platforms (L-Platforms) which belong to the tenants being managed.

Functions		User	Overview
			Infrastructure administrators can check the free space, and monitor the thresholds for all resources managed in resource pools.
Platform standardization using templates	Creating and releasing L-Platform templates	Tenant administrator Infrastructure Administrators	Creates a template called an L-Platform template for the entire infrastructure or for each tenant. This promotes effective operation by determining the user department logical platform (L-Platform) format (standardization) and using it as a template.
Resource Management in Multi-tenant Environments	Monitoring Resource Pool Use Rate	Tenant administrator Infrastructure Administrators	Tenant administrators can check the free space (utilization) of the resource pools which belong to the tenant being managed, and monitor their thresholds. Infrastructure administrators can check the free space (utilization) of the resource pools which can be used by multiple tenants, and monitor their thresholds. The usage status of ICT resources can be easily checked using the dashboard. Displays performance information and configuration information of logical platforms (L-Platforms), can forecast demands of resource pools, and simulate VM guest relocation.
	Resource Pool Management	Infrastructure Administrators	Manages all ICT resources (in a resource pool). Effective use of ICT resources can be realized based on changes in the amount of usage.
	Tenant management	Infrastructure Administrators	Creates, modifies, and deletes tenants to manage divided resources. Enables ICT resources to be shared between multiple departments while ensuring security.
System management	User role management	Tenant administrator Infrastructure Administrators	Tenant administrators can add, modify, and delete tenant users. Infrastructure administrators can limit operations available to each user, and the resources which can be operated.
	Server Integration	Infrastructure Administrators	Operation of physical and virtual servers is possible using a single window, with no need to be aware of the differences of the server hardware models, or the OS types.
	Monitoring and visualization of system status	Infrastructure Administrators	Visualizes the statuses of blade servers, network links, and power consumption, and monitors the system status.
	Server hardware maintenance	Infrastructure Administrators	Creating backups of system disk contents before performing any OS or software installation, configuration changes, deletion or patch application can drastically reduce the time necessary to restore a server to its original state if hardware or software problems occur. When VM guests have been migrated to a different VM host for operation or maintenance of servers, it is possible to restore them to their original VM host using a single operation. When a server fails, the system can be restored by switching over primary servers with pre-assigned spare servers.

Functions		User	Overview
	Ensuring network security	Infrastructure Administrators	Even if there are no dedicated firewall devices, security can be ensured for each tenant, each logical platform (L-Platform), or each segment.
	Disaster Recovery of Systems	Infrastructure Administrators	Quickly recovers logical platforms (L-Platforms), by copying the contents of disks on the primary site to a standby site.

Operation Flow

The operation flow of a logical platform (L-Platform) is shown below.

Figure 3.3 Operation Flow

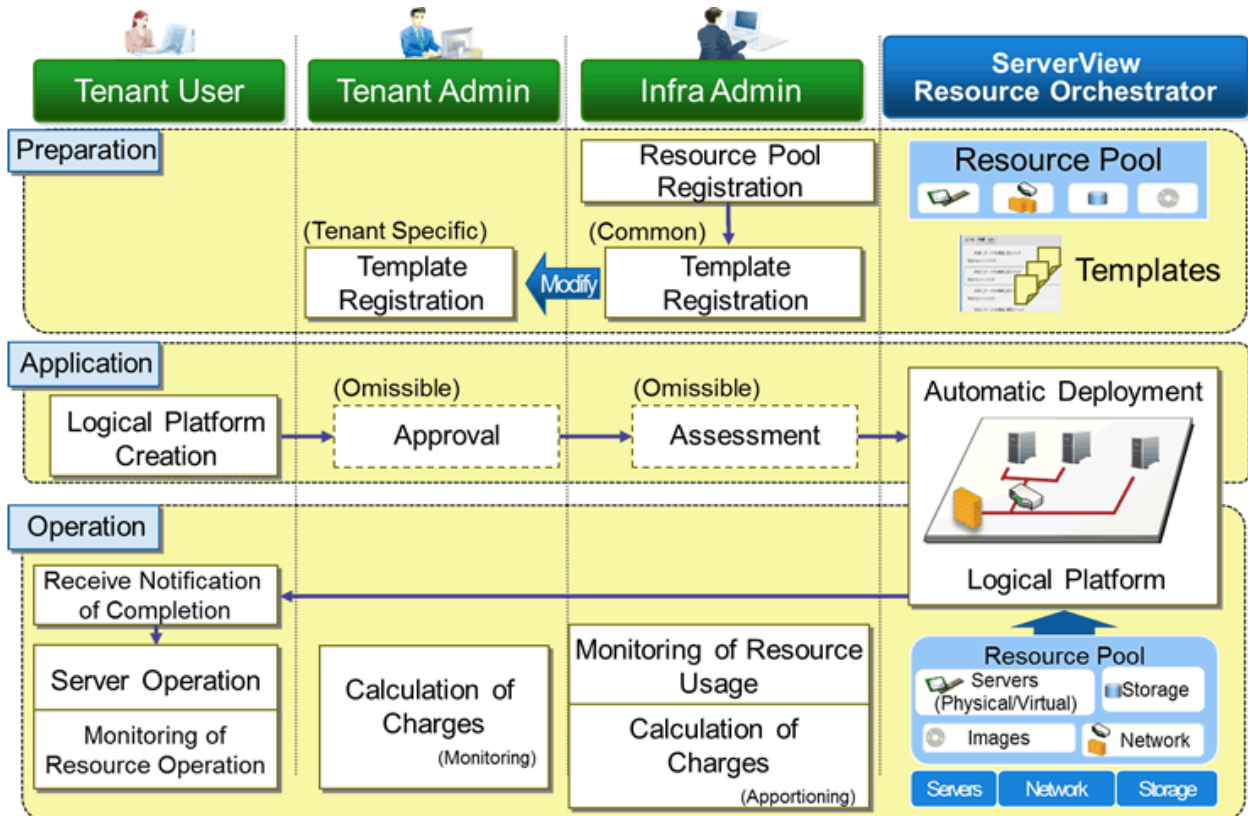


Table 3.3 Operation Flow

Phase	Work	Operator	Overview
Preparation	Resource pool registration	Infrastructure Administrators	Registers managed resources in the resource pool.
	Template registration	Infrastructure Administrators	Registers templates that can be used by all tenants, with Resource Orchestrator.
Tenant administrator		Registers tenant-specific templates after modifying the template common to all tenants.	
Application	Logical platform (L-Platform) creation	Tenant User	Applies for logical platform (L-Platform) creation.
	Approval (Omissible)	Tenant administrator	Approves usage applications from tenant users. This work is optional.
	Review (Omissible)	Infrastructure Administrators	Assesses usage applications from tenant users. This work is optional.
Operation	Receive notification of completion	Tenant User	Once the logical platform (L-Platform) is created, notification of completion is received.

Phase	Work	Operator	Overview
			Upon receipt of the notification of completion, the logical platform (L-Platform) is ready to use.
	Server operation	Tenant User	<p>Uses logical platforms (L-Platforms) via remote desktop or by using SSH.</p> <p>Power operations such as starting or stopping of the logical platform (L-Platform) can be performed.</p> <p>Collection and restoration of snapshots of the logical platform (L-Platform) can also be performed.</p>
	Monitoring of resource operation	Tenant User	Monitors the operational status of the logical platform (L-Platform) that they are using.
	Calculation of charges (Monitoring)	Tenant administrator	Monitors the usage charges for each tenant or each logical platform (L-Platform).
	Monitoring of resource usage	Infrastructure Administrators	Monitors the amount of usage of resources.
	Calculation of charges (Apportioning)	Infrastructure Administrators	<p>Infrastructure administrators can receive usage charge files for each tenant by email.</p> <p>Usage charge files can be used to charge each tenant.</p> <p>If the accounts manager, who is responsible for charging, is not an infrastructure administrator, usage charge files can be sent to the accounts manager.</p>

Chapter 4 User Roles in Resource Orchestrator [Cloud Edition]

This chapter explains user roles in Resource Orchestrator.

User Roles in Resource Orchestrator

System administrator

System administrators manage the entire system. They install Resource Orchestrator and configure the necessary settings.

OS administrator privileges are required for these operations. Usually, the roles of infrastructure administrator and system administrator are performed by the person.

Infrastructure Administrators

Infrastructure administrators manage the ICT resources (servers, storage, networks and system images) in a private cloud.

Using Resource Orchestrator, infrastructure administrators collectively manage ICT resources in resource pools, while monitoring the load and performing addition, replacement, and maintenance of ICT resources when necessary.

Infrastructure administrators prepare L-Platform templates of pre-defined logical platforms (L-Platforms) according to tenant user or tenant administrator needs, and publish them for use by tenant users or tenant administrators.

In accordance with the application process, infrastructure administrators may also receive and review applications from tenant users or tenant administrators.

The main roles and operations of infrastructure administrators are given below.

- Manage (add, switch, and maintain) the ICT resources (servers, storage, networks, and system images) in a private cloud
- Manage shared pools (global pools)
- L-Platform Template Creation and Publication
- Review logical platform (L-Platform) usage applications

Tenant administrator

Tenant administrators prepare an L-Platform template which is specific to the tenant pre-defined by the infrastructure administrator according to tenant user needs, and publish it for tenant users to use.

In accordance with the application process, tenant administrators may also receive and approve applications from tenant users.

Tenant administrators can check the usage status and monitor the operational statuses of tenant users.

The main roles and operations of tenant administrators are given below.

- Manage resource pools (local pools) dedicated to tenants
- Manage L-Platform templates
- Manage accounts of tenant users
- Review and approve logical platform (L-Platform) usage applications

Tenant User

Tenant users can apply to use logical platforms (L-Platforms), and use logical platforms (L-Platforms) configured according to their application.

When the authorization of the tenant administration department manager is required for an application, tenant users must request authorization from the manager in accordance with the application process.

The main roles and operations of tenant users are given below.

- Apply for logical platform (L-Platform) usage
- Check resource usage conditions

Roles and Access Scopes

In Resource Orchestrator, operations or the resources to operate can be limited depending on the user.

Roles

Roles are definitions of users and the various operations that they are able to use, which are based on combinations of resource types and the types of operations using resources.

Access Scopes

The scope of resources available for users in Resource Orchestrator is called an access scope (scope).

Privileges can be limited by configuring the roles and access scopes based on the user.

Chapter 5 Functions

This chapter provides an overview of the functions available in Resource Orchestrator.

5.1 Available Functions

The functions provided by Resource Orchestrator are as shown below:

Table 5.1 Available Functions

Requirement	Function	Express	Virtual Edition	Cloud Edition
Centralized Management of Virtual and Physical Servers	Visualization of Blade Server Status (BladeViewer)	Yes	Yes	Yes
	Visualization of Networks (NetworkViewer)	Yes (*1)	Yes (*1)	Yes
	Visualization of Power Consumption	Yes	Yes	Yes
	Recovery of Migrated VM Guest Locations (VM Home Position)	Yes	Yes	Yes
	Centralized Management of System Images	Yes (*2)	Yes (*2)	Yes (*2)
	Cloning Physical Servers and Automating Configuration	Yes (*2)	Yes (*2)	Yes (*2)
Improvement of Server Availability	I/O Virtualization	-	Yes	Yes
	Monitoring of Hang-up and Recovery	-	Yes	Yes
	Automatic Recovery of Failed Servers	-	Yes (*2)	Yes (*2)
Realization of a Platform Provision Service	Logical Platforms (L-Platforms) and Logical Servers (L-Servers)	-	-	Yes (*2)
	Resource Pool Management	-	-	Yes
	Resource Management in Multi-tenant Environments	-	-	Yes
	Standardization of Logical Platforms (L-Platform)	-	-	Yes
	L-Platform Template Creation and Publication	-	-	Yes
	Subscription	-	-	Yes
	Approval and Assessment	-	-	Yes
	Automating Network Configuration	-	Yes (*3)	Yes
	Reconfiguration	-	-	Yes (*2)
	Power Operations and Snapshot	-	-	Yes
	Monitoring the Operation Status of Resources	-	-	Yes
	Monitoring Resource Pool Use Rate	-	-	Yes
	Network Device Monitoring and Operation	-	-	Yes
	Accounting	-	-	Yes
	Server Load Leveling by Distributing Access to the Servers in an L-Platform	-	-	Yes
Disaster Recovery of Systems	-	-	Yes (*5)	

Requirement	Function	Express	Virtual Edition	Cloud Edition
Security Measures for Virtual Servers and Physical Servers	Automatic Quarantining to the Quarantine Network	-	Yes (*4)	Yes

Yes: Use possible.

-: Use not possible.

*1: Logical view is not supported.

*2: It is necessary to create a Windows PE in advance. For details, refer to the "Windows PE Creation Script Guide".

*3: Only network device monitoring can be used.

*4: Only supported when the Automatic Quarantining Function is enabled.

*5: Available when the DR option is purchased.

5.2 Centralized Management of Virtual and Physical Servers

This section explains centralized management of virtual and physical servers.

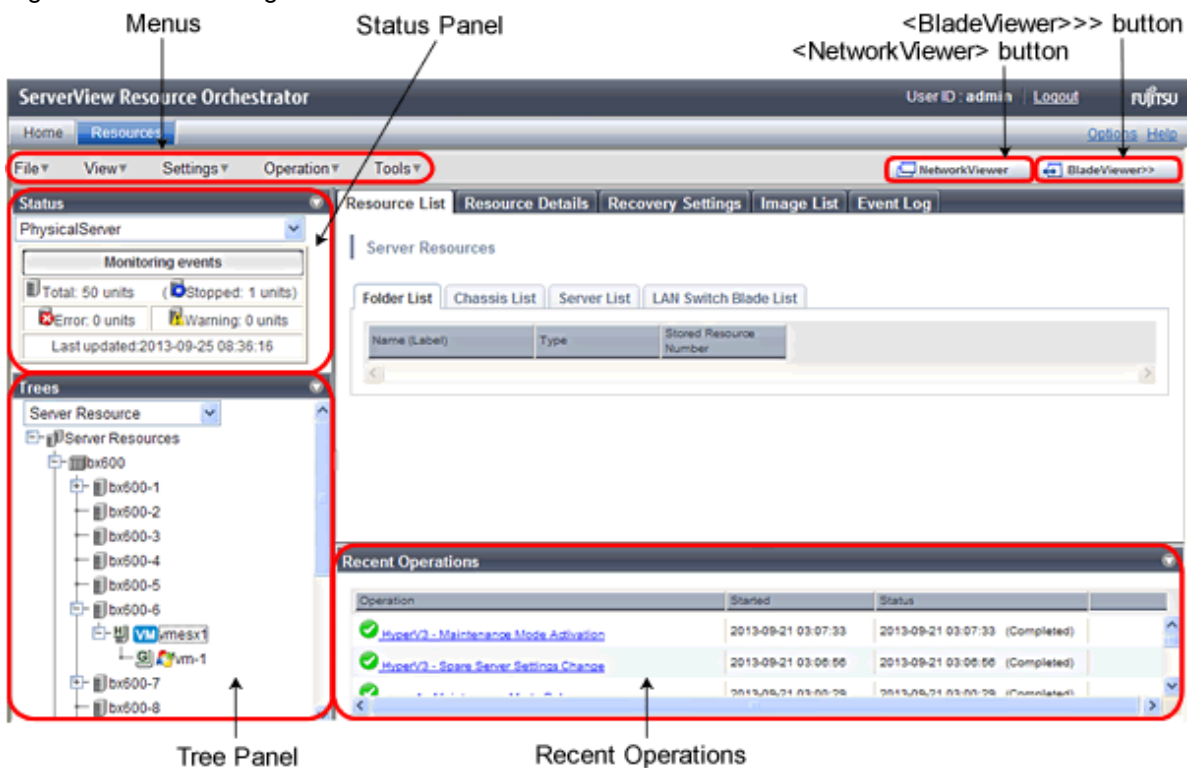
In Resource Orchestrator, operation is possible using a single window, with no need to be aware of the differences of the virtual environments, the server hardware models, or the OS types.

The system monitors chassis, server hardware, OSs (physical OSs, VM (VMware ESX/ESXi, Hyper-V, or Red Hat virtualization functions), VM guests or Solaris Zones) operating on the servers as resources, and displays the statuses such as normal or error.

Resource relations for each partition of PRIMEQUEST series or SPARC M10/M12 or SPARC Enterprise are displayed in the tree.

This helps identify the cause of a failure and determine its impact on servers, thereby streamlining hardware maintenance.

Figure 5.1 Server Integration

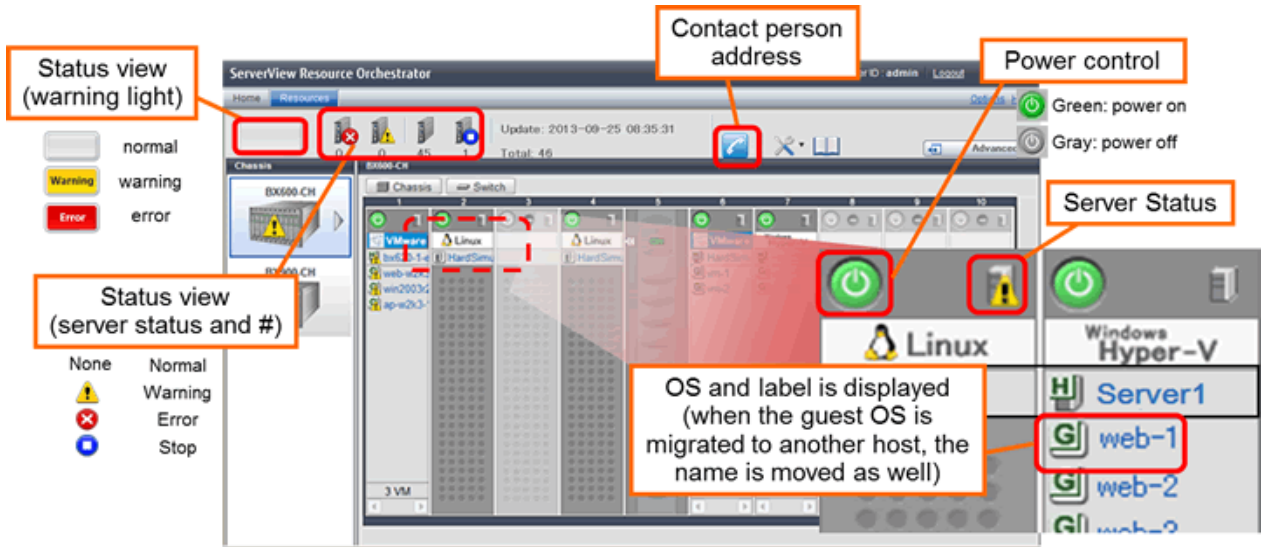


5.2.1 Visualization of Blade Server Status (BladeViewer)

Resource Orchestrator provides BladeViewer, which enables intuitive monitoring of the statuses of blade servers (startup, stop, or error).

In BladeView, blade chassis, server blades, virtual servers, OS and application names are displayed using an image of the blade chassis. In addition, the server statuses such as started, stopped, or error are displayed.

Figure 5.2 BladeViewer



5.2.2 Visualization of Networks (NetworkViewer)

Resource Orchestrator provides NetworkViewer, which visualizes networks.

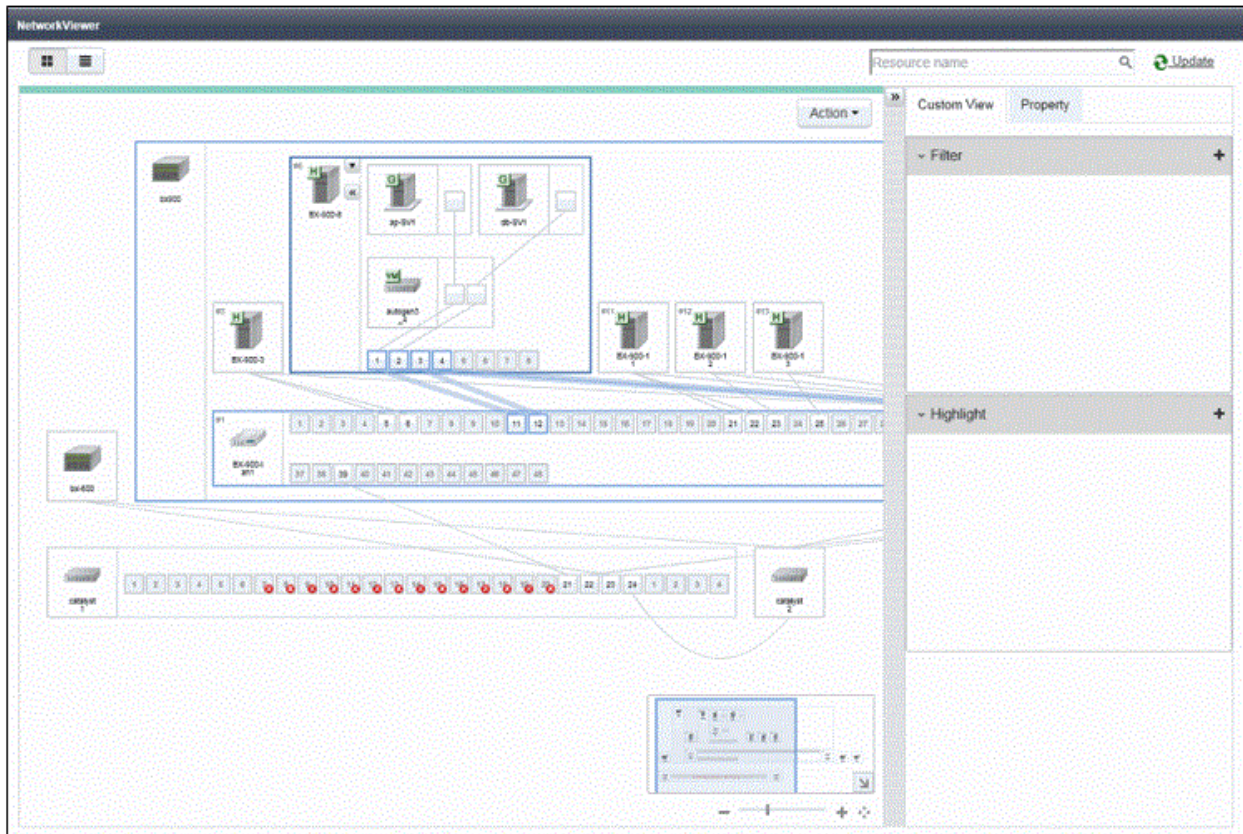
5.2.2.1 NetworkViewer (Virtual Edition)

The network map helps visualize and relate physical networks (between servers and switches) with virtualized networks (from VLANs or virtual switches used in server virtualization software).

Network settings can be easily checked during configuration.

The link statuses of servers and switches, or switch port statuses can be checked, and the effect on server operations caused by network errors can be easily investigated.

Figure 5.3 NetworkViewer (Virtual Edition)



5.2.2.2 NetworkViewer (Cloud Edition)

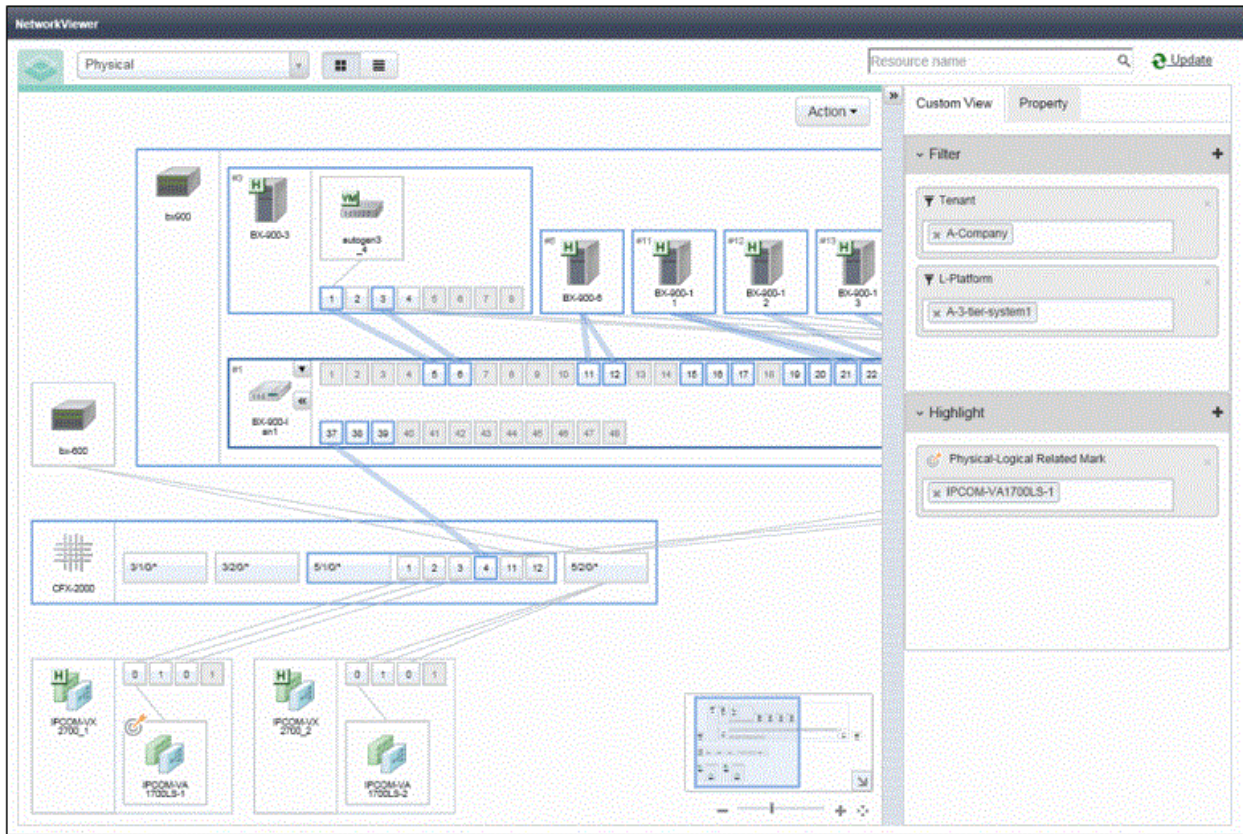
The NetworkViewer displays a visual representation of physical/virtual networks comprised of servers, network devices, VLANs, and virtual switches linked to the logical networks within L-Platforms and L-Servers.

Network settings can easily be checked during configuration and operation.

The link statuses of servers and switches, or switch port statuses can be checked, and the effect on server operations caused by network errors can be easily investigated.

As relationships between L-Platforms, L-Servers, and resources can be checked, the effects of failures of physical/virtual networks on logical networks can be easily investigated.

Figure 5.4 NetworkViewer (Cloud Edition)



5.2.2.3 Visualization and Forecasting of Influence Scope (Virtual Edition/Cloud Edition)

When a network error caused by the failure of a server or a switch occurs, creating influence scope data makes it possible to display the servers and switches affected by the error.

The L-Platforms and users affected by a network error can easily be confirmed.

It is possible to check the scope of the effects of failure of a specific server or switch using influence scope data that has been collected in advance.

This enables you to forecast which L-Platforms and users will be affected when performing maintenance on servers and switches.

Figure 5.5 Analysis Mode - Influence Scope Data

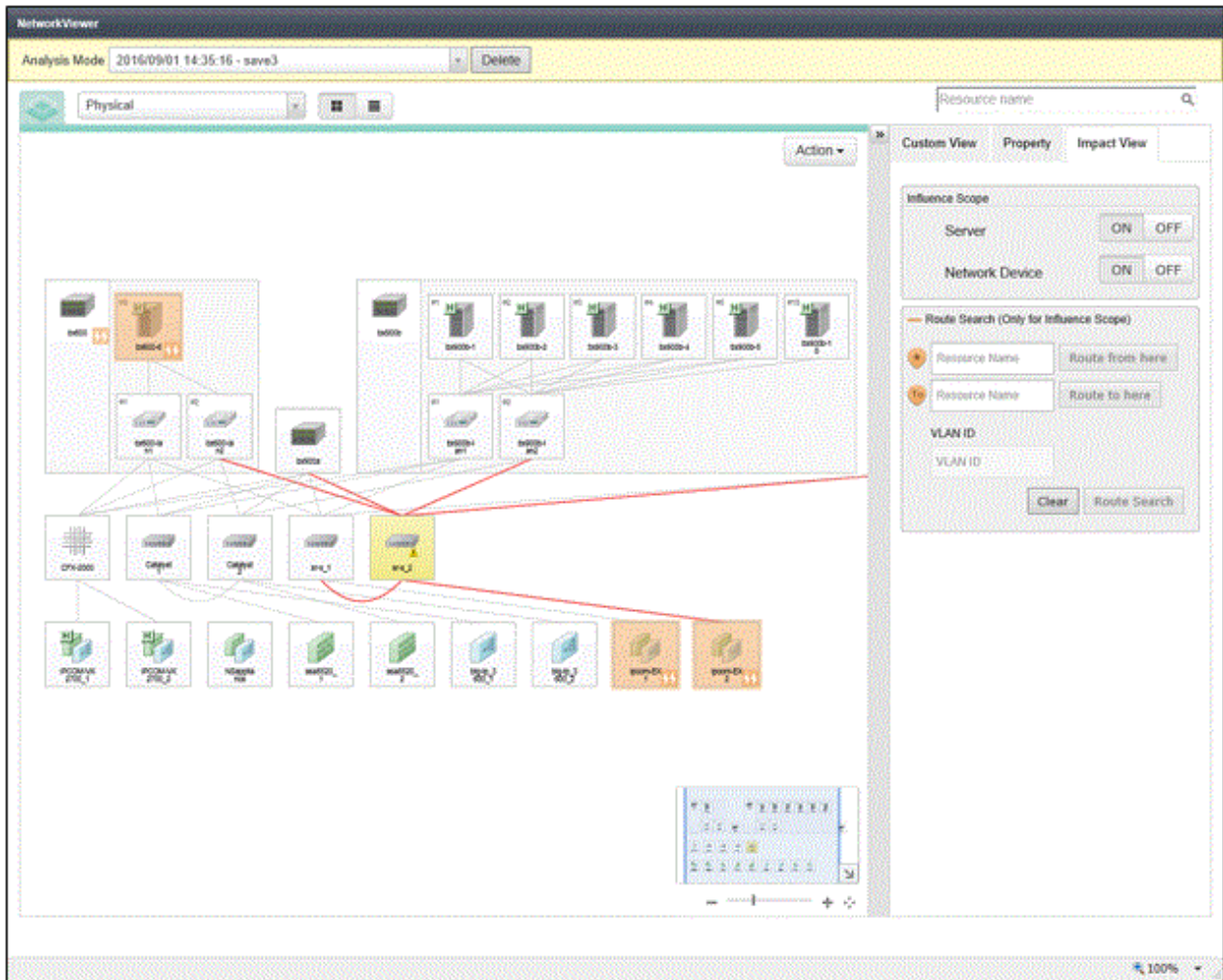


Figure 5.6 Analysis Mode - Change Resource Status

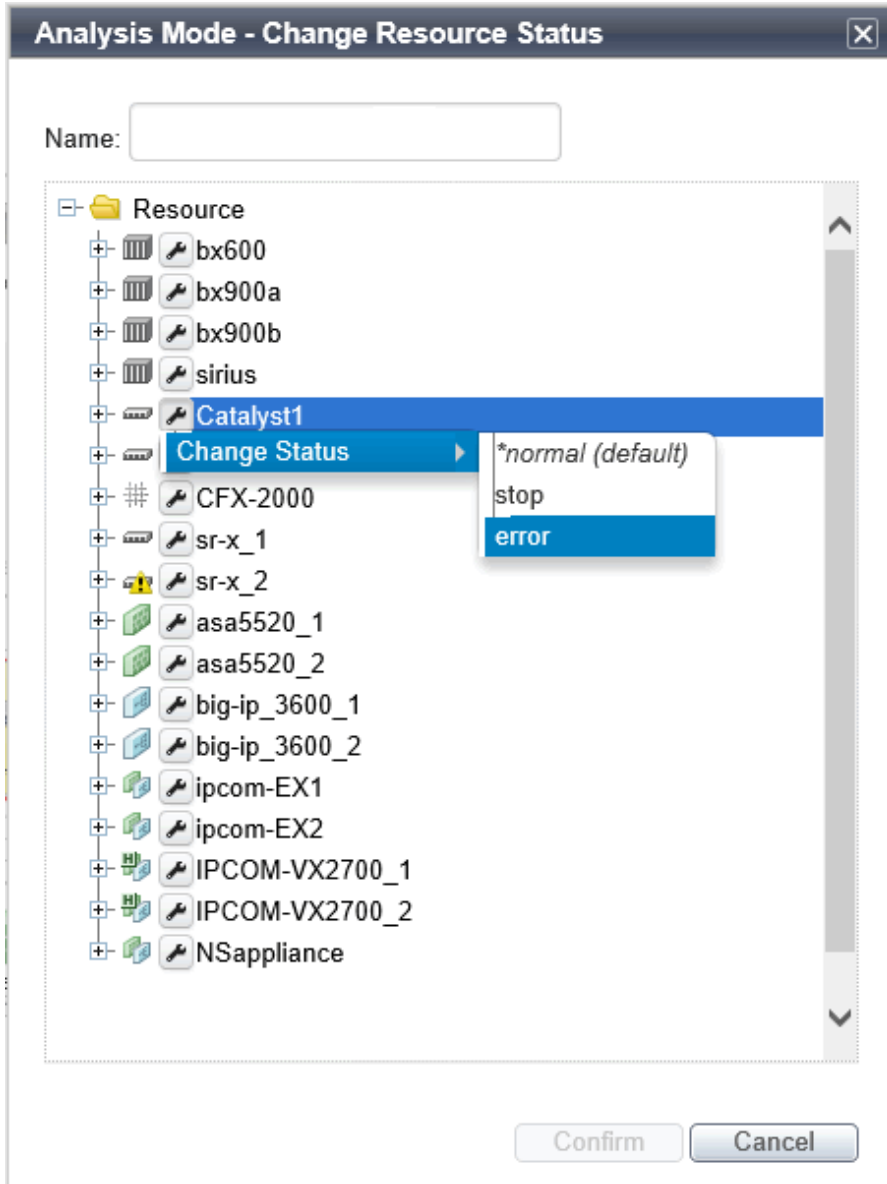
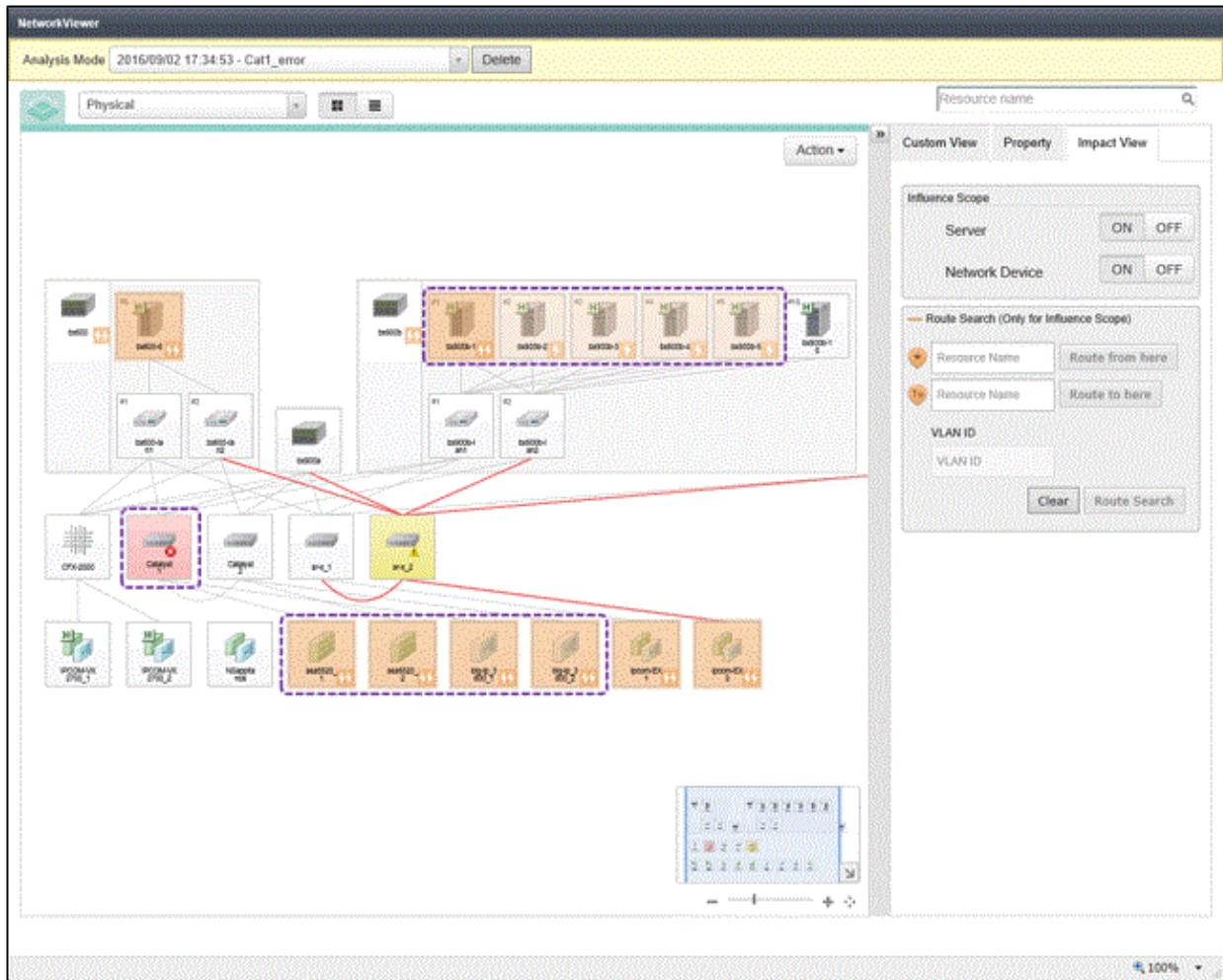


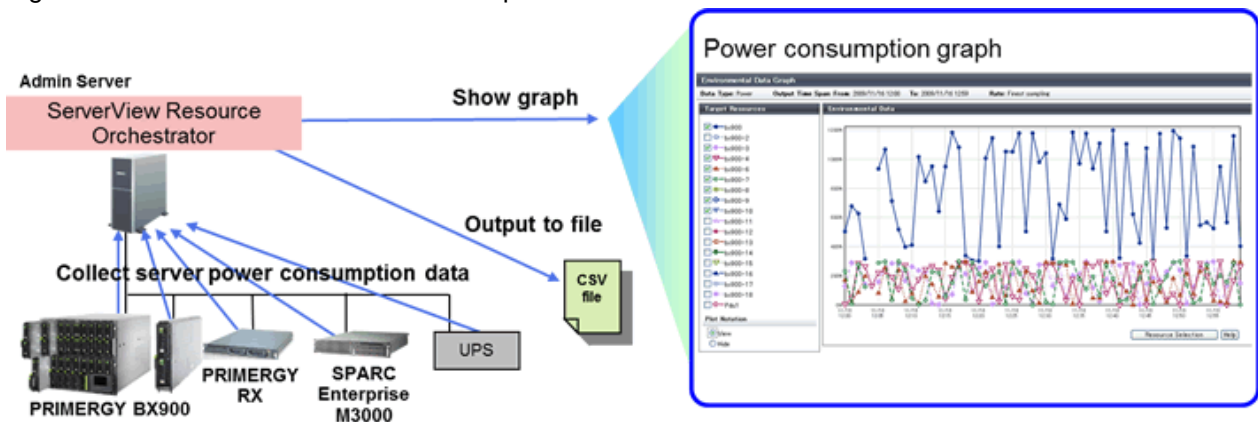
Figure 5.7 Analysis Mode - Influence Scope Data after Changing Resource Status



5.2.3 Visualization of Power Consumption

The fluctuation of power consumption depending on ICT resources such as chassis, servers, or UPSs can be displayed as a graph. The graph can be collected as statistical information. This function enables checking of the power consumption of servers depending on the operations.

Figure 5.8 Visualization of Power Consumption



5.2.4 Recovery of Migrated VM Guest Locations (VM Home Position)

Resource Orchestrator provides the VM Home Position function, which enables the recovery of migrated VM guest locations.

By configuring the VM Home Position in advance, it is possible to restore VM guests to their original VM host using only one operation when they have been migrated to a different VM host for operation or maintenance needs.

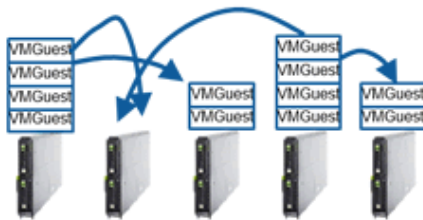
This enables restoration of multiple VM guests to their original locations without the need to record their original locations, and reduces the risk of operational mistakes.

When virtual environments are backed up to a specific server, their status can be easily canceled.

Figure 5.9 VM Home Position

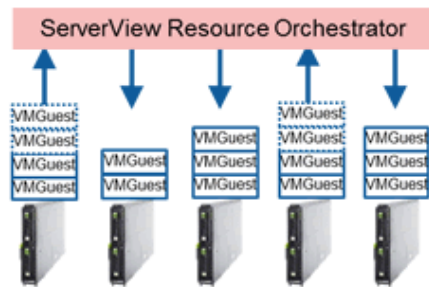
Without ROR

Sometimes administrator need migrate the guest OSES to other hosts temporarily (during maintenance, etc.). But after that, it takes time to migrate those guest OSES back to the original designed position



With ROR

One click to move all the guest OSES to the original designed position



5.2.5 Centralized Management of System Images

System images are collected images that contain the contents of a system disk for system recovery.

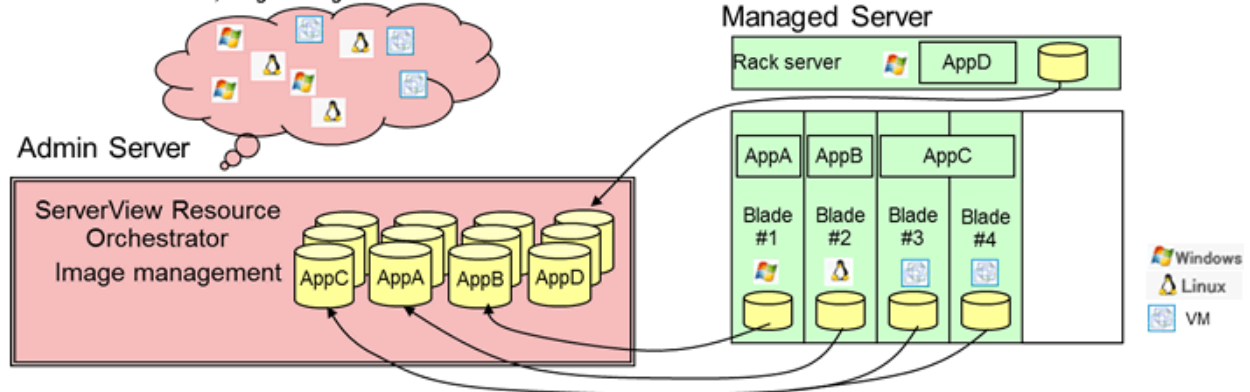
In Resource Orchestrator, system images (only the host OS when using VMs) are backed up and centrally stored on a disk on the admin server.

Multiple versions of system images can be retained.

Creating backups before any OS or software installation, configuration changes, deletion or patch application can drastically reduce the time necessary to restore a server to its original state if hardware or software problems occur.

Figure 5.10 Centralized Management of System Images

Without this function, image management is difficult



Point

- This function is also supported for iSCSI boot and EFI environments.
- Backup and restore of individual physical servers and VM hosts can be performed.

- VM hosts of VMware vSphere 4 or later are not the targets of backup and restore.

5.2.6 Cloning Physical Servers and Automating Configuration

In Resource Orchestrator, cloning images can be created on the admin server, and deployed to multiple servers.

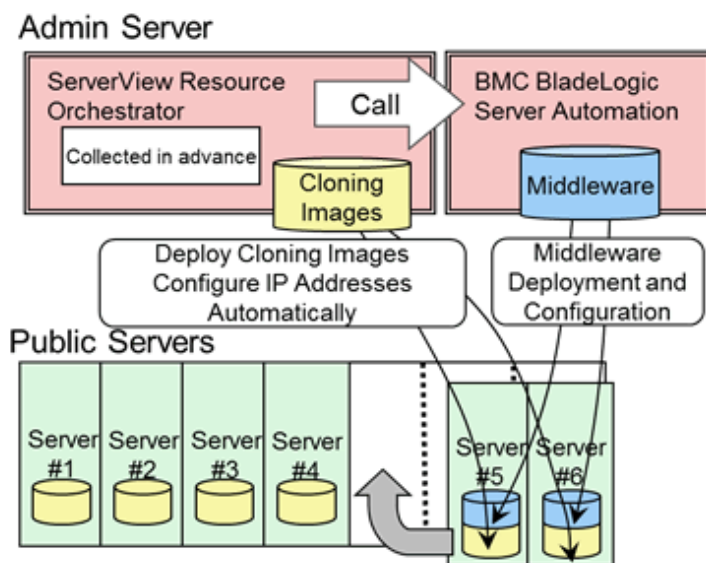
A cloning image is a backup of a system disk, which does not contain server-specific information (system node name, IP address, etc.).

When deploying a cloning image to the system disk of another server, Resource Orchestrator automatically changes server-specific information to that of the target server.

Using this function simplifies the installation procedure, as the work involved in the installation of OSs, drivers and patches, and the addition of servers can be reduced.

Software installation and configuration can be automated, as combination with BMC BladeLogic Server Automation enables continuous deployment and configuration of middleware.

Figure 5.11 Cloning Physical Servers



5.3 Improvement of Server Availability

This section explains the improvement of server availability.

5.3.1 I/O Virtualization

Resource Orchestrator provides an I/O virtualization function (HBA address rename) to realize I/O control in a server, using virtual address WWNs (World Wide Names) according to the server operations.

If defining volumes using the virtual address WWNs in the storage (SAN boot or SAN shared storage), it is possible to add or maintain (replace) servers dynamically just by changing the settings of the server, without any effect on complicated storage settings such as configuration modification of physical address WWNs.

In addition, Resource Orchestrator I/O virtualization functionality using VIOM or ISM enables simplified system operation.

5.3.2 Monitoring of Hang-up and Recovery

By regularly executing the ping command, it is possible to restart a physical server or a VM host which is not responding. (*1)

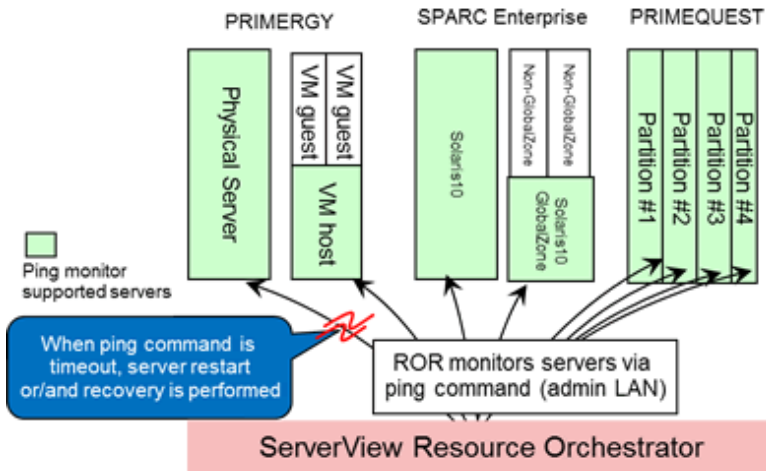
If there is still no response, recovery operations such as server switchover (*2) are performed when the OS hangs.

This improves the continuity of operations for dealing with OS level failures, not hardware failures.

*1: VMware ESXi is not supported.

*2: When using PRIMEQUEST, SPARC Enterprise partition models with divided areas, and SPARC M10/M12 in Building Block configurations, recovery processes including server switchover cannot be performed.

Figure 5.12 Realization of Recovery when the OS Hangs during ping Monitoring



5.3.3 Automatic Recovery of Failed Servers

Recover applications after hardware failure by switching over primary servers with pre-assigned spare servers.

This shortens and simplifies the recovery procedure.

Server switchover can be realized using one of the following methods.

- Backup and restore method

Restore the system image that was backed up in the spare server beforehand and start it in the local boot environment.

- HBA address rename method

In a SAN boot environment, using "I/O virtualization" enables the spare server to connect to and boot from the boot disk.

- Profile switchover method

In a SAN boot or an iSCSI boot environment, using "I/O virtualization" in combination with ServerView Virtual-IO Manager enables the spare server to connect to and boot from the boot disk. When I/O virtualization is used in combination with ISM (ServerView Infrastructure Manager and Infrastructure Manager), only SAN boot is supported.

- Storage affinity switchover method

This is the method used when the server is a SPARC M10/M12 or a SPARC Enterprise. Server switchover can be realized by coordinating with ETERNUS SF Storage Cruiser storage management functions, and automatically modifying configurations in SAN environments.

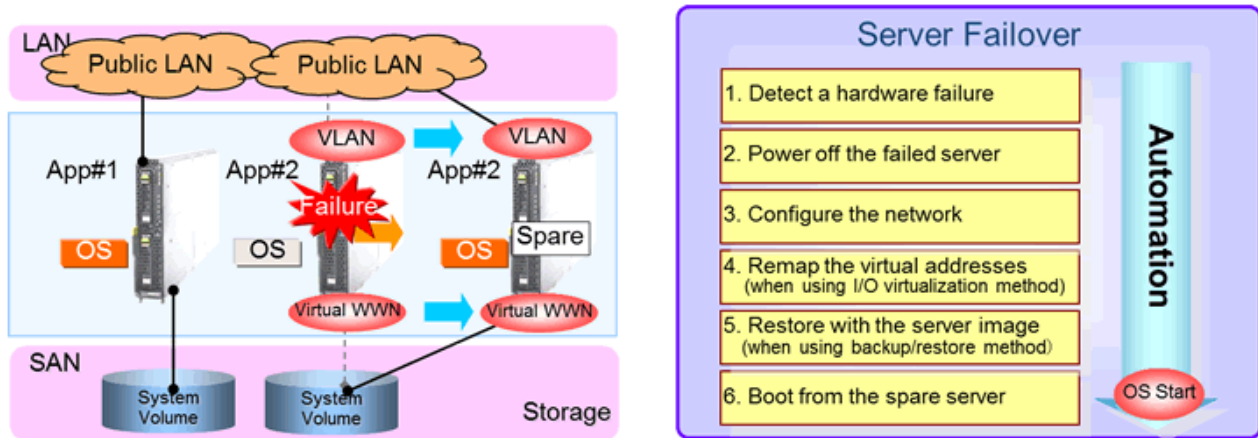
Automatic Recovery of Failed Servers (PRIMERGY)

For PRIMERGY, N+1 cold standby which shares spare servers is provided.

The failed server environments are inherited, and automatically recovered.

By sharing spare servers, improved availability and reduced costs are both possible.

Figure 5.13 Automatic Recovery of Failed Servers (PRIMERGY)

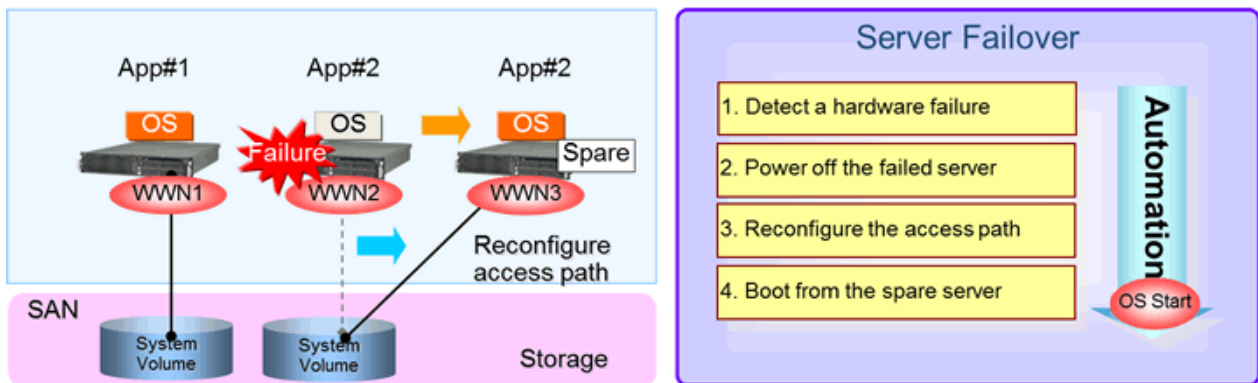


Automatic Recovery of Failed Servers (SPARC M10/M12 and SPARC Enterprise)

This enables recovery of SPARC M10/M12 and SPARC Enterprise.

Through coordination with ETERNUS SF Storage Cruiser, the switch zoning settings configured in the fibre channel switches and the host affinity settings configured in the SAN storage can be switched over automatically.

Figure 5.14 Automatic Recovery of Failed Servers (SPARC M10/M12 and SPARC Enterprise)



5.4 Realization of a Platform Provision Service

This section explains the realization of a platform provision service.

5.4.1 Logical Platforms (L-Platforms) and Logical Servers (L-Servers)

This section explains logical platforms (L-Platforms) and logical servers (L-Servers).

Logical Platforms (L-Platforms)

Logical platforms (L-Platforms) are a logical method for managing an entire system comprised of multiple servers, storage, and networks in Resource Orchestrator.

Multi-tiered (Web/AP/DB) systems including network devices such as firewalls or server load balancers can be managed.

By using a logical platform (L-Platform), configurations including both physical and virtual servers can be managed.

The setting and operation of multiple servers, storage, and networks can be simplified through the use of a logical platform (L-Platform).

Logical Servers (L-Servers)

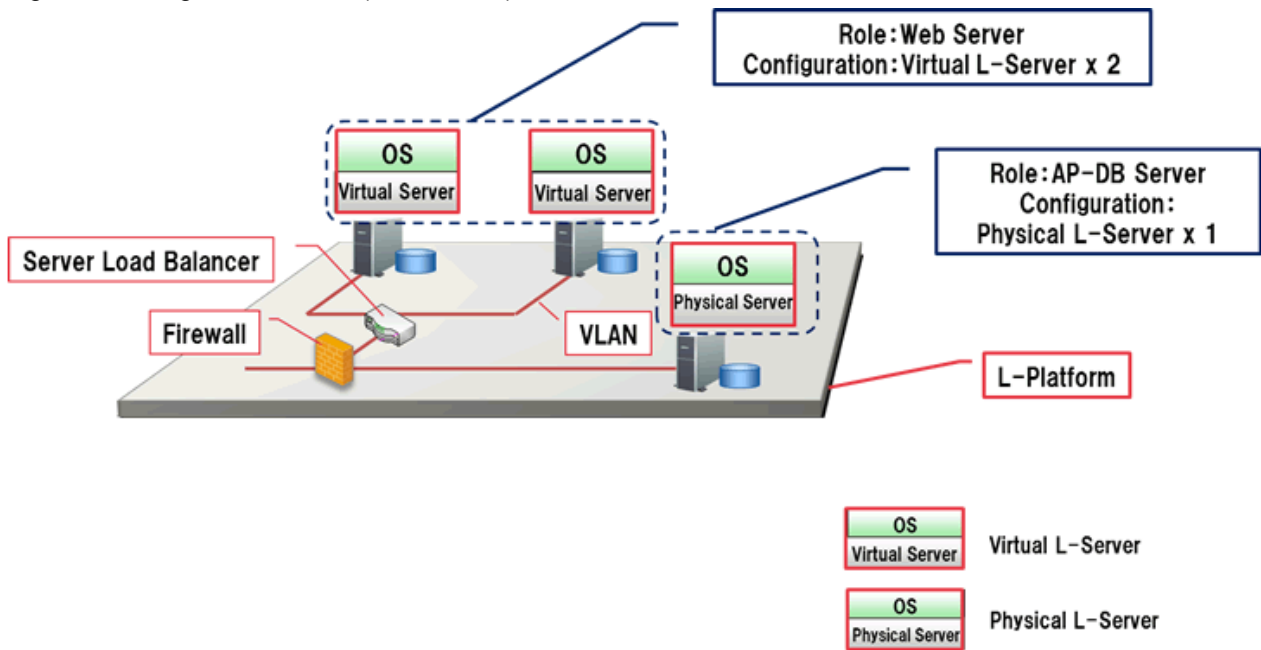
A logical server (L-Server) is a method for logically managing physical and virtual servers in Resource Orchestrator.

Either physical or virtual servers can be used according to the system involved.

An L-Server used for physical servers is called a physical L-Server.

An L-Server used for virtual servers is called a virtual L-Server.

Figure 5.15 Logical Platforms (L-Platforms)



5.4.2 Resource Pool Management

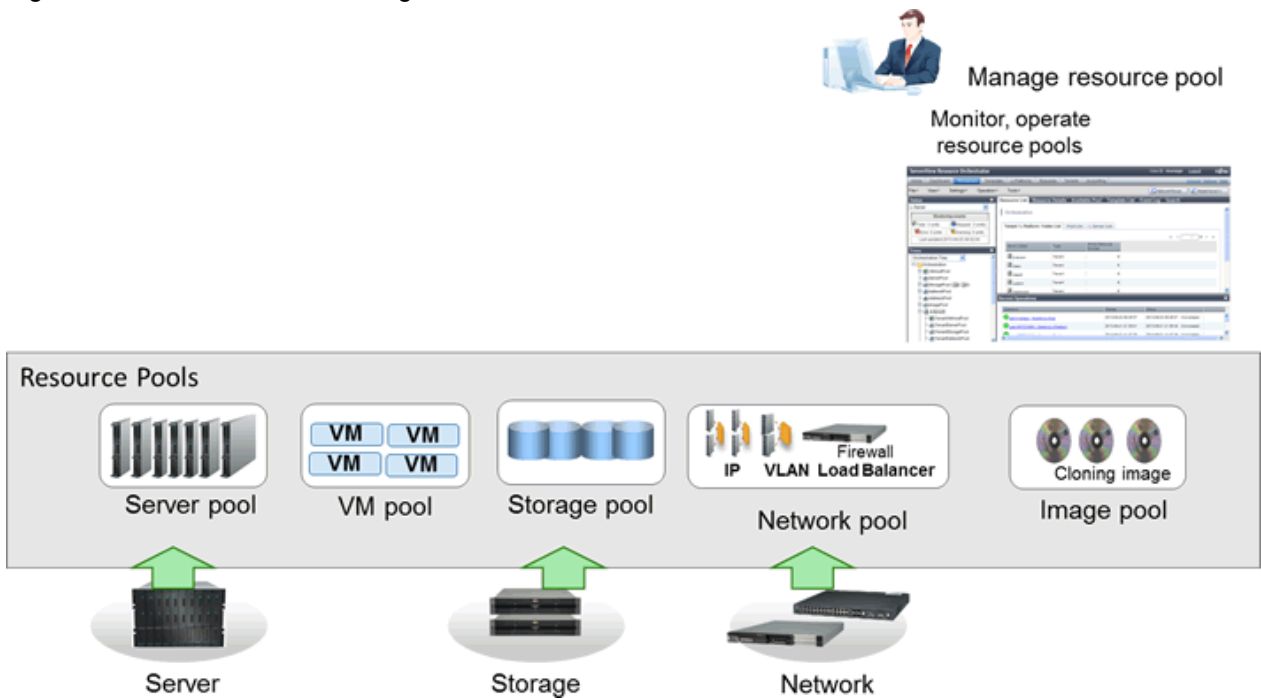
This section explains how to manage resource pools.

A resource is a collective term that refers to the physical resources (hardware) and logical resources (software) from which a system is composed.

For instance, server chassis, VM hosts, storage, network (IP/MAC/WWN) addresses, and cloning images are regarded as resources.

Registering resources in the same resource pool, and allocating them to a logical server (L-Server) when necessary, improves resource utilization.

Figure 5.16 Resource Pool Management



5.4.3 Resource Management in Multi-tenant Environments

This section explains how to manage resources in multi-tenant environments.

Tenants

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

When sharing a system in a group of companies, a company which belongs to one of those companies can be recognized as a tenant, or a user department in the company can be recognized as a tenant.

The workload of resource integration or the provision department can be reduced by dividing and managing tenants by each user department.

Resource Pools Which can be Used in Tenants

The management units of resource pools are the two types given below:

- Global pools

A resource pool storing resources which can be used by multiple tenants.

- Local pools

A resource pool storing resources which can be used only by a specific tenant.

The access scopes of resource pool management units can be changed according to the use of the unit.

Table 5.2 Resource Pool Management Unit

Resource Pool Management Unit	Administrator	User
Global pools	Infrastructure Administrators	All tenant users
Local pools	Tenant administrator	Users within a tenant

Advisory Notes for Tenant Operations

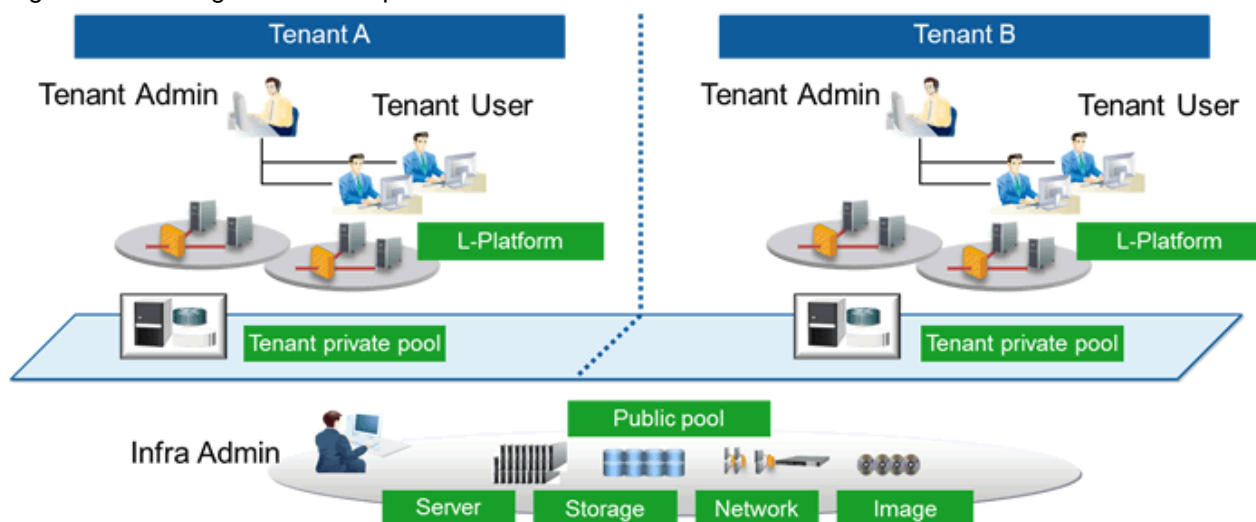
There must be at least one tenant administrator in a tenant, and the tenant administrator manages tenant users.

The resources in other tenants cannot be referred to.

Configuration Example of Multi-tenant Environments

The following figure shows a multi-tenant environment.

Figure 5.17 Configuration Example of Multi-tenant Environments



5.4.4 Standardization of Logical Platforms (L-Platform)

This section explains how to manage resources in multi-tenant environments.

This section explains the standardization of logical platforms (L-Platforms).

Resource Orchestrator provides logical platforms (L-Platforms) for the entire infrastructure or for each tenant.

This realizes effective operation through use of a template (standardization) of the user department work format.

The following types of templates are provided by Resource Orchestrator:

- L-Platform Templates

Templates that contain the specifications for servers, storage, network devices, and images that are configured for a logical platform (L-Platform).

Refer to "[5.4.5 L-Platform Template Creation and Publication](#)".

- L-Server Templates

Templates that define the number of CPUs, memory capacity, disk capacity, and other specifications for resources to deploy to a logical server (L-Server).

- Ruleset Definitions

A collective rule combining script lists for configuring network devices such as firewalls or server load balancers, depending on the type of network device, the aim, and the usage.

5.4.5 L-Platform Template Creation and Publication

L-Platform templates define the specifications for L-Platforms, consisting of: software information (operating system used), image information (configuration of cloning images), segment information (configuration of network resources), and template information (configuration of the L-Platform).

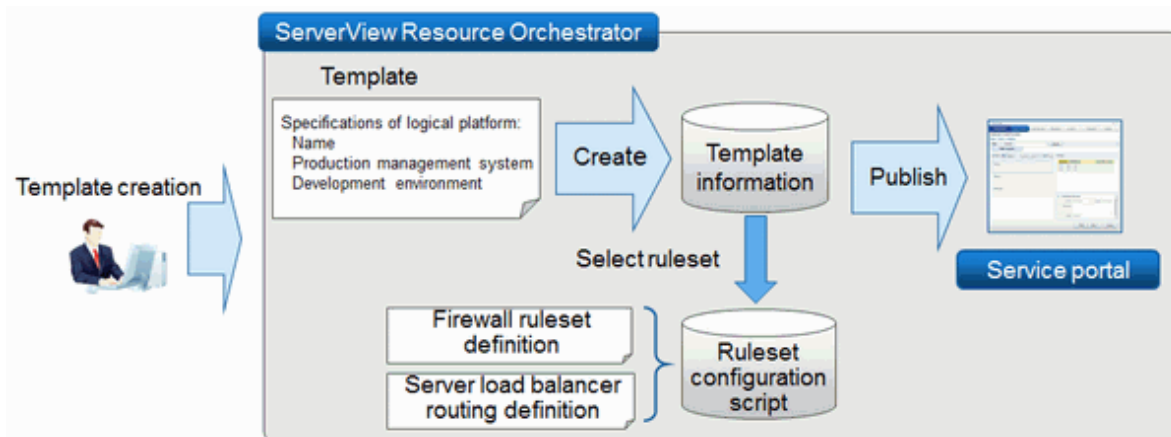
Using L-Platform templates enables the standardization of L-Platform specifications and the easy creation of L-Platforms.

Windows are used to create and publish L-Platform templates. Server make-up and allocated resources (firewalls and server load balancers, for example) are specified in the L-Platform template.

There are two types of L-Platform templates: tenant-specific templates (used by specific tenants), and global templates (shared by all tenants).

When L-Platform templates are published, they can be referenced from the service portal (ROR Console) and used to create L-Platforms.

Figure 5.18 L-Platform Template Creation and Publication

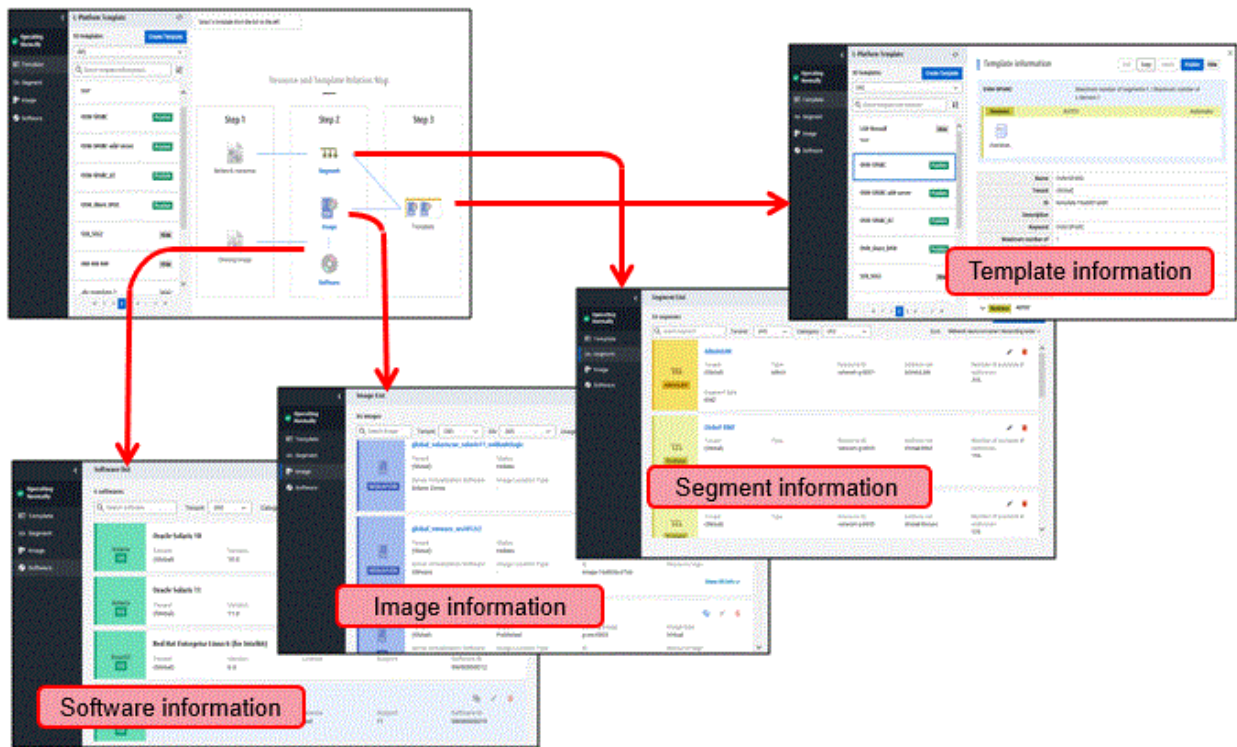


Use the [Templates] tab in the ROR console to create L-Platform templates using the GUI.

Create the information for these in the Startup window of the [Templates] tab.

The following is an example of such a GUI:

Figure 5.19 Example of a GUI for creating an L-Platform template

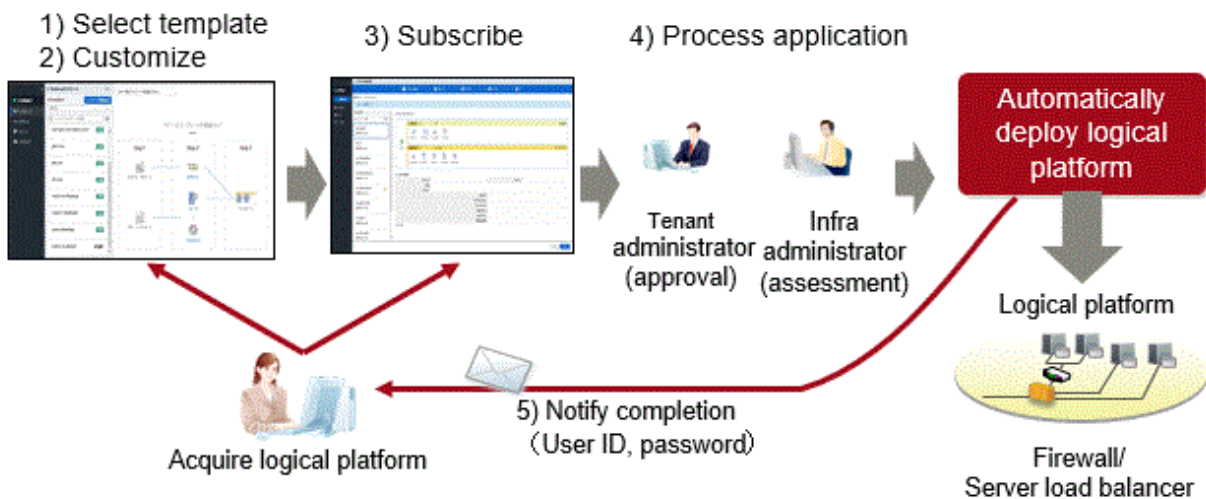


5.4.6 Subscription

It is possible to perform batch deployment of multi-level systems that include firewalls and server load balancers by selecting L-Platform templates.

You can customize resources such as CPU and memory in the L-Platform template for deployment.

Figure 5.20 Subscription

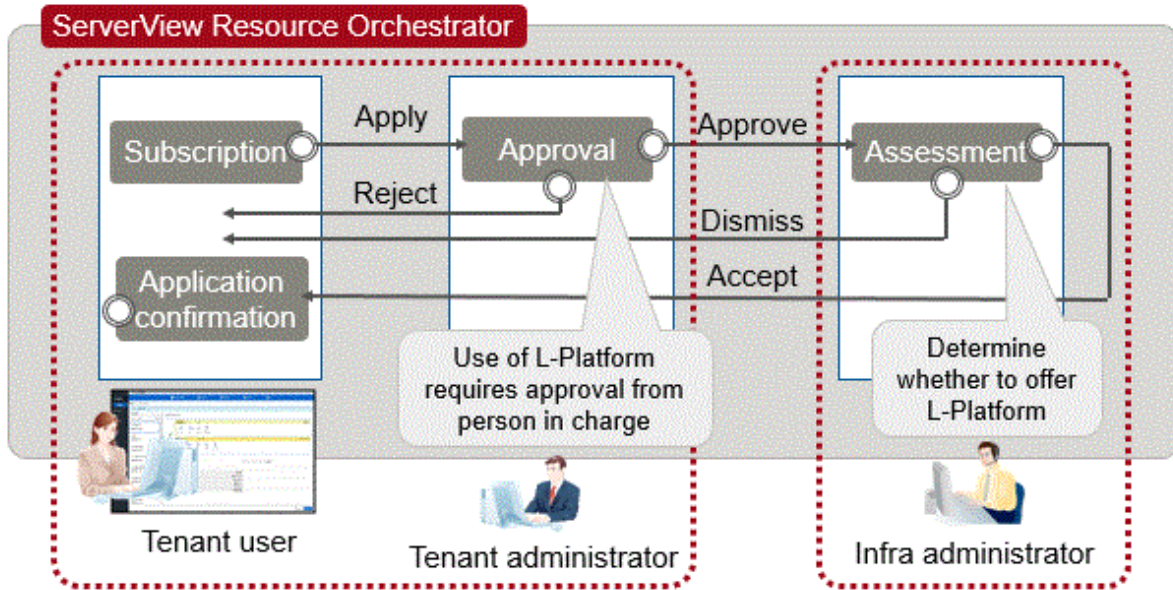


5.4.7 Approval and Assessment

The subscription of logical platforms (L-Platforms), changes to reconfiguration, and cancellations are checked in two stages, by the tenant administrator (approval) and the infrastructure administrator (assessment). At the approval stage the application can be either approved or rejected, and at the assessment stage the application can be either accepted or dismissed.

The following outlines the application process:

Figure 5.21 Approval and Assessment



5.4.8 Virtualizing Networks

In Resource Orchestrator, the settings of network devices to manage can be configured automatically.

In Resource Orchestrator, the settings for the following network devices are configured automatically.

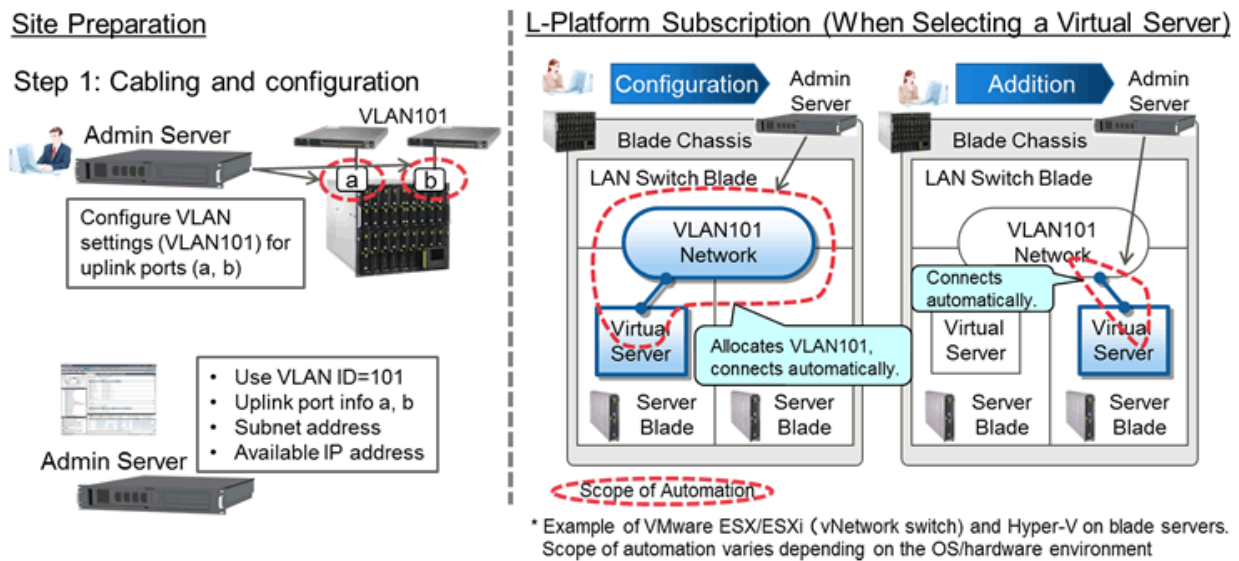
- L2 switches
- Virtual switches
- LAN switch blades
- Firewalls
- Server load balancers
- Ethernet fabric switches (Converged Fabric)

5.4.8.1 Automatic VLAN Network Configuration when Connecting with Virtual Servers

Networks using the VLANs can be created automatically between the network devices and virtual servers deployed on the logical platform (L-Platform).

When creating a virtual server, it can be connected to the VLAN network automatically.

Figure 5.22 Automatic VLAN Network Configuration for Connection with Virtual Servers

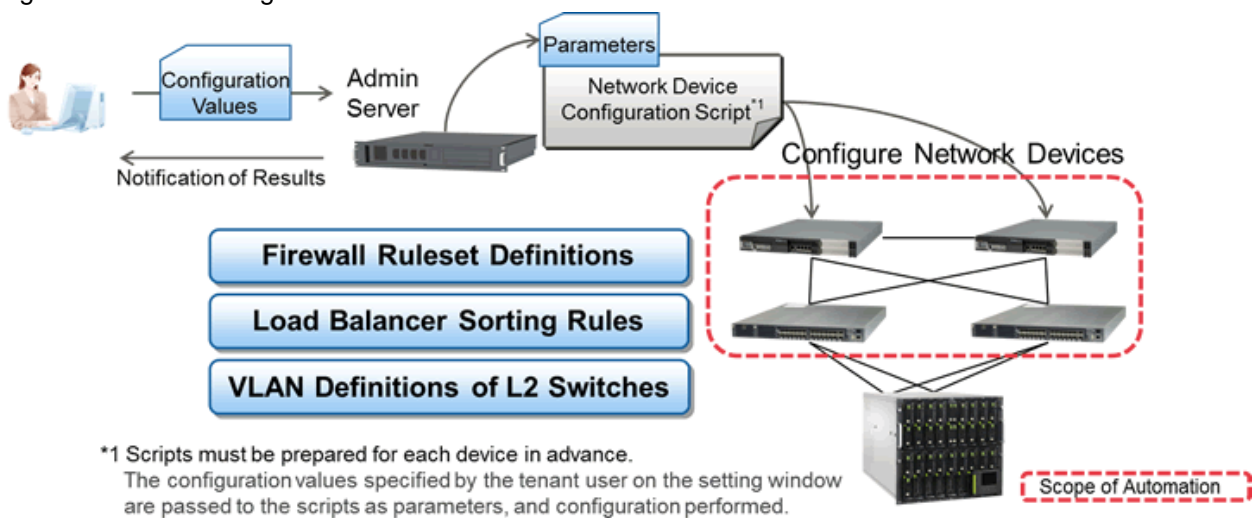


5.4.8.2 Auto-configuration of Network Devices

The definitions for the network devices (firewalls, server load balancers, or L2 switches) deployed on logical platforms (L-Platforms) as resources can be configured automatically using the scripts provided by the infrastructure administrator in advance.

- When creating or deleting network resources
 - Add or delete VLANs of L2 switches.
 - When creating, modifying, or deleting logical platforms (L-Platforms)
 - Add, modify, or delete definitions of deployed firewalls or server load balancers.
- When configuration fails, recovery processes such as deletion of uncompleted settings can be performed, by preparing scripts for recovery.

Figure 5.23 Auto-configuration of Network Devices

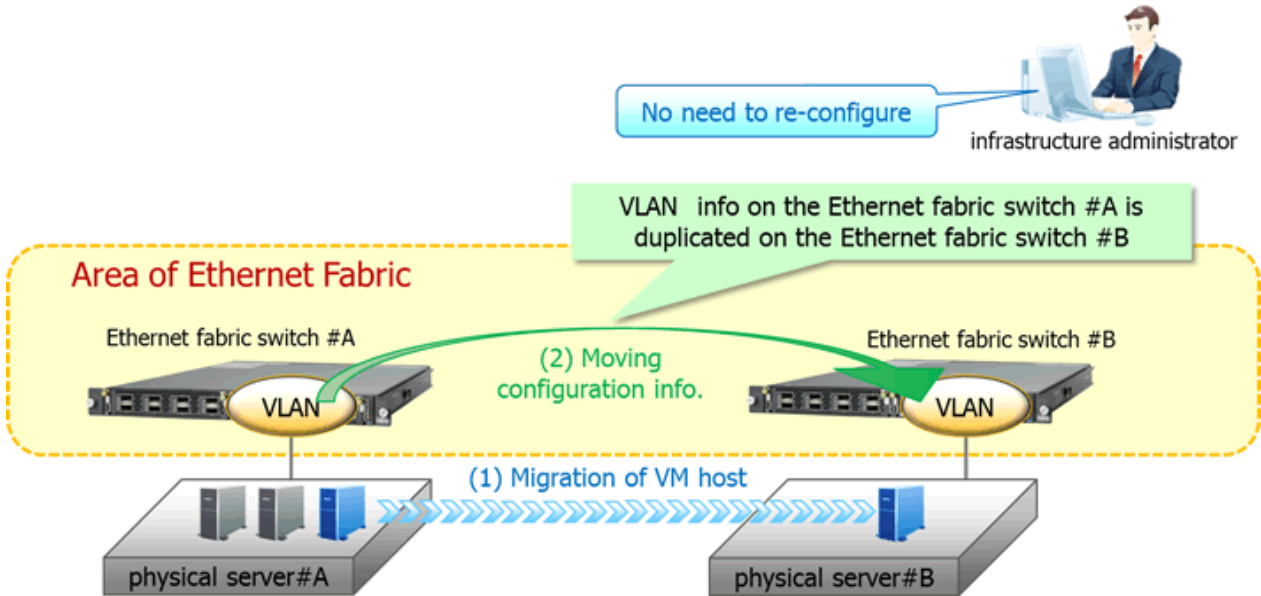


5.4.8.3 Auto-configuration when Migrating Servers

When creating network resources, if using Ethernet Fabric switches (Converged Fabric) as network devices connected to servers, the VLAN port profiles for Ethernet Fabric switches (Converged Fabric) can be created automatically.

By creating the VLAN port profile above, the VLAN settings are automatically migrated to the Ethernet fabric switch (Converged Fabric) connected to the destination server during server migration.

Figure 5.24 Auto-configuration when Migrating Servers



5.4.8.4 Auto-configuration of Virtual Fabrics

When a network device is Converged Fabric, auto-configuration of virtual fabrics can be performed.

This auto-configuration of virtual fabric enables creation of virtual fabrics and modification of virtual fabric settings without stopping operations.

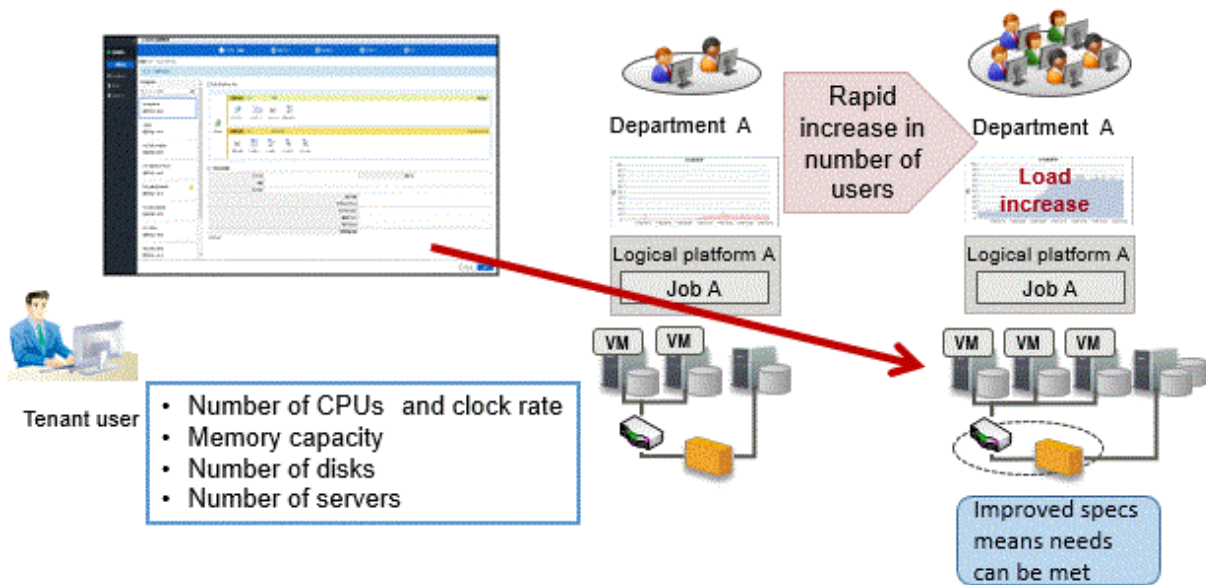
For details on virtual fabrics, refer to "H.1.3 Virtual Fabrics" in the "Design Guide CE".

5.4.9 Reconfiguration

Even after deploying a logical platform (L-Platform), you can change the configuration of the system and the amount of resources (number of CPUs, memory capacity, etc.).

This means that you can deal with an increase in load in a particular department by enhancing the specifications of the system.

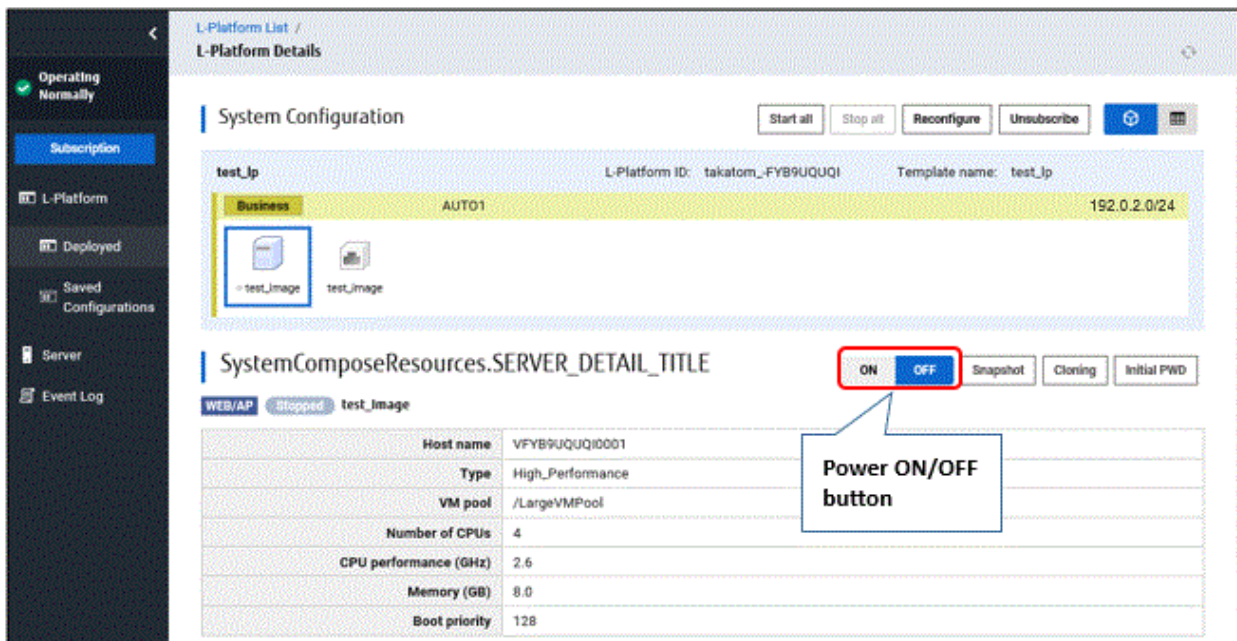
Figure 5.25 Reconfiguring after Operation has Started



5.4.10 Power Operations and Snapshot

You can turn the power of the logical platforms (L-Platforms) and logical servers (L-Servers) on or off.

Figure 5.26 L-Server Power Operations



It is also possible to turn the power of all servers in an L-Platform or tenant on or off all at once.

Figure 5.27 Batch Power Operations Within L-Platforms

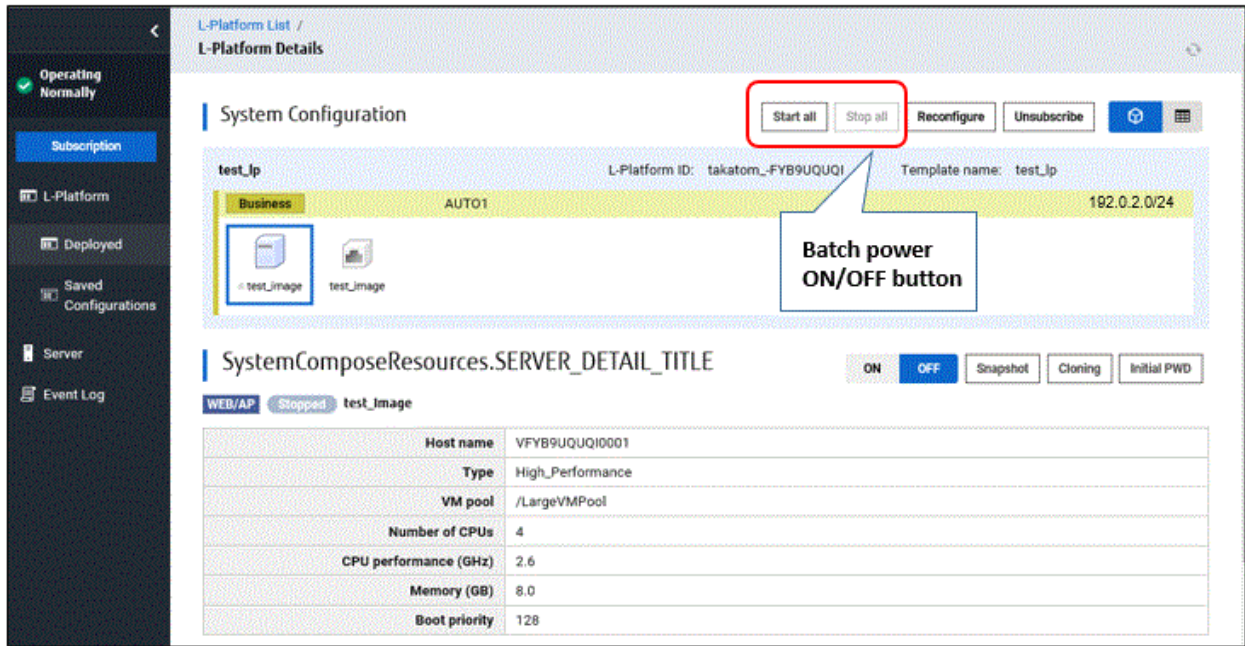
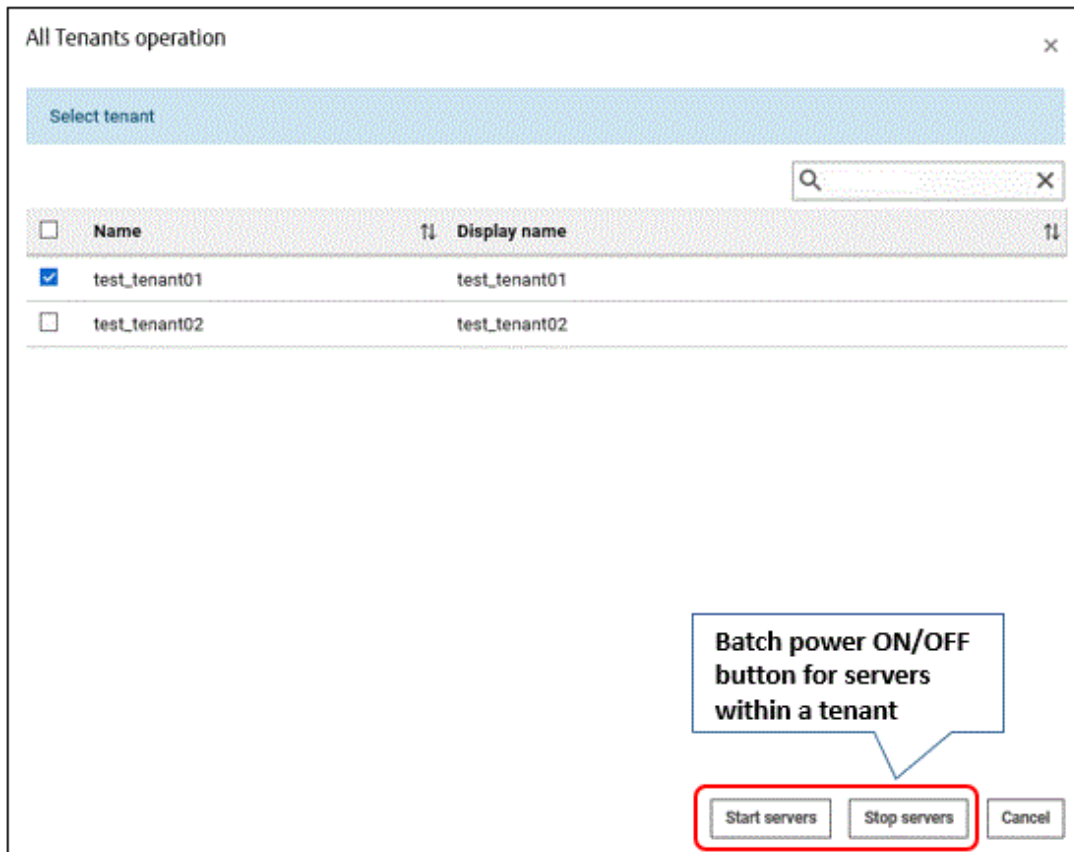
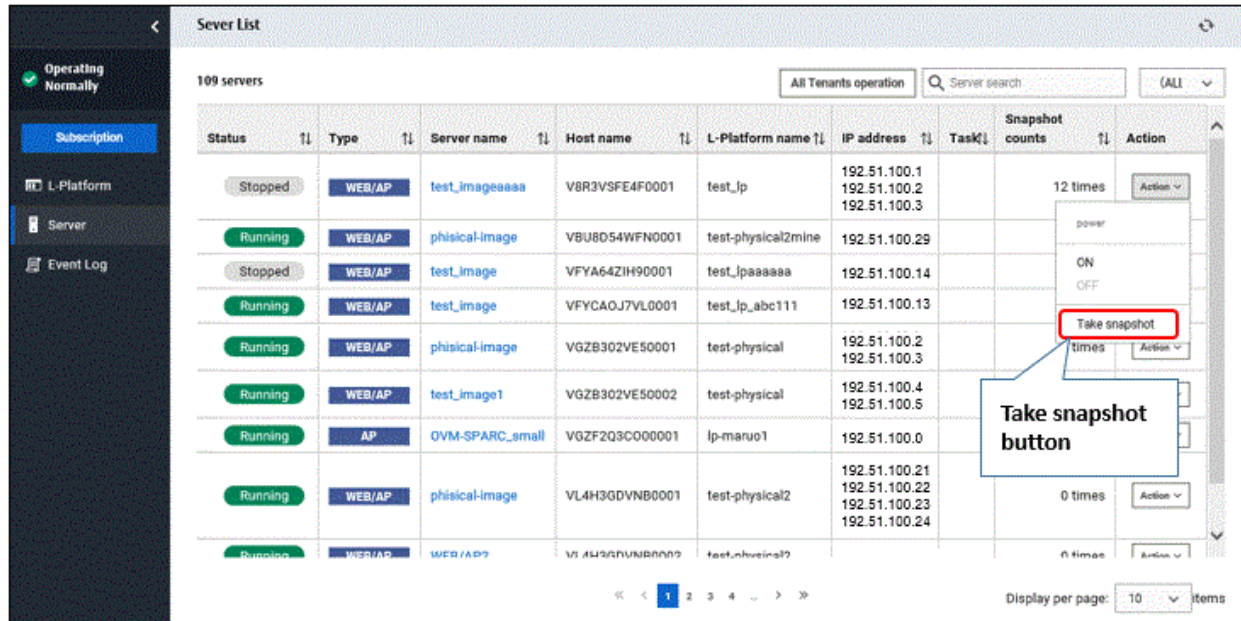


Figure 5.28 Batch Power Operations Within Tenants



It is also possible to take and restore snapshots. The snapshots and restorations are managed for three generations, and you can easily restore any of the generations.

Figure 5.29 Snapshot

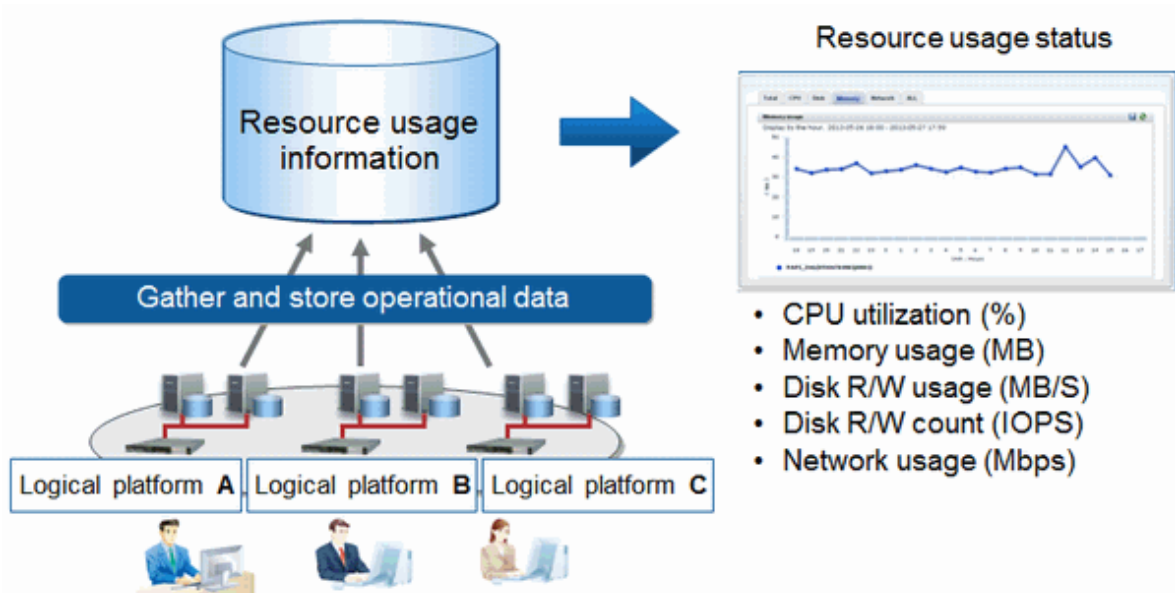


5.4.11 Monitoring the Operation Status of Resources

It is possible for you to understand at a glance the operation status and reconfiguration of a logical platform (L-Platform) and the operation status of the VM hosts.

The items that can be referenced can be limited through user roles.

Figure 5.30 Monitoring the Operation Status of Resources



5.4.12 Monitoring Resource Pool Use Rate

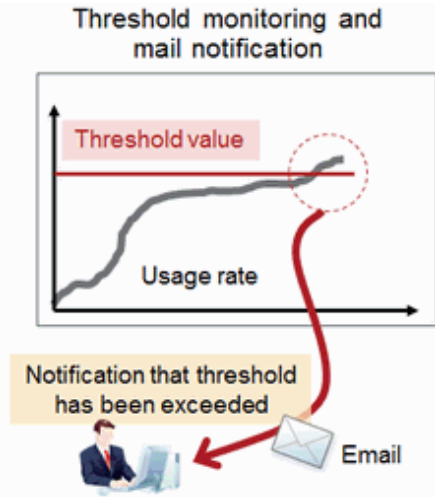
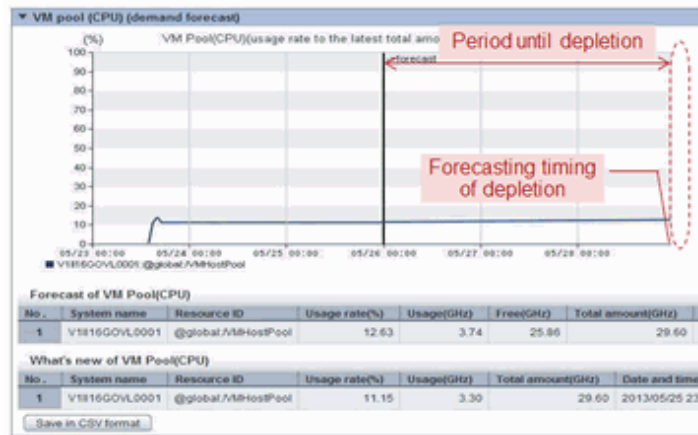
Prevention of Resource Depletion by Forecasting Resource Demand

It is possible to forecast demand by using the past resource usage in a resource pool.

It is possible to quickly discover deficiencies that are usually difficult to forecast using threshold monitoring of the resource pool use rates.

Figure 5.31 Prevention of Resource Depletion by Forecasting Resource Demand

Regression analysis of resource usage in resource pools

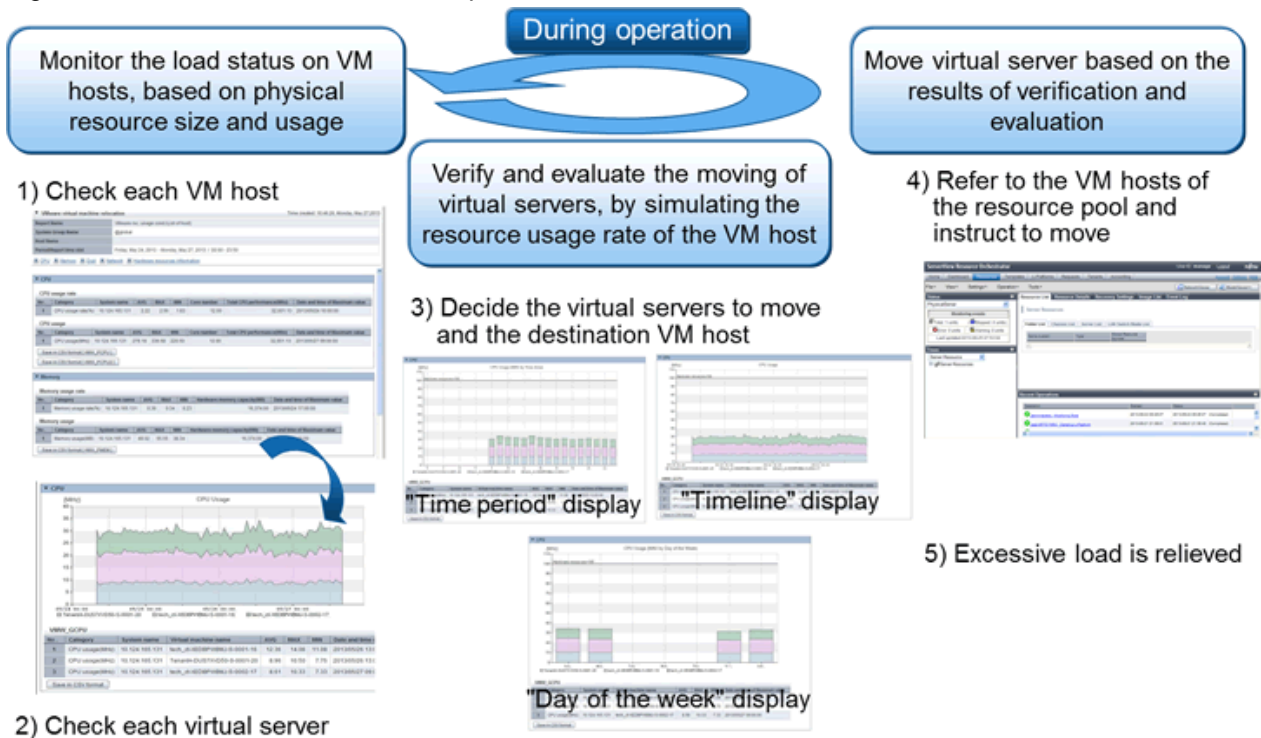


Prevention of Resource Depletion on VM hosts

It is possible to forecast demand by using the past resource usage in a resource pool.

It is possible to quickly discover deficiencies that are usually difficult to forecast using threshold monitoring of the resource pool use rates.

Figure 5.32 Prevention of Resource Depletion on VM hosts



5.4.13 Network Device Monitoring and Operation

In Resource Orchestrator, monitoring of managed network devices is performed as below.

- Alive Monitoring
 - Regular checks of whether the network devices of monitoring targets are operating.
- Status Monitoring
 - Regular checks of the port statuses of the network devices of monitoring targets.
 - The statuses may also be checked when receiving SNMP traps from the network devices of monitoring targets.

Using this monitoring, status changes due to network device failures can be discovered at early stage.

The following operations for the target network devices are possible using managed servers.

- Opening the web management window

The web management window provided by the target network device can be started.

The window of ServerView Fabric Manager can be started for Converged Fabric by registering ServerView Fabric Manager as Converged Fabric management software.

- Backing up and restoration of network device files

Network device files (network device configuration files or network device environment files) for target network devices can be backed up and restored.

Network device environments can be easily recovered by restoring backed-up network device files when replacing network devices.

- Switchover of management mode

By switching the "maintenance mode", it is possible to control whether the devices are regarded as targets of monitoring or auto-configuration.

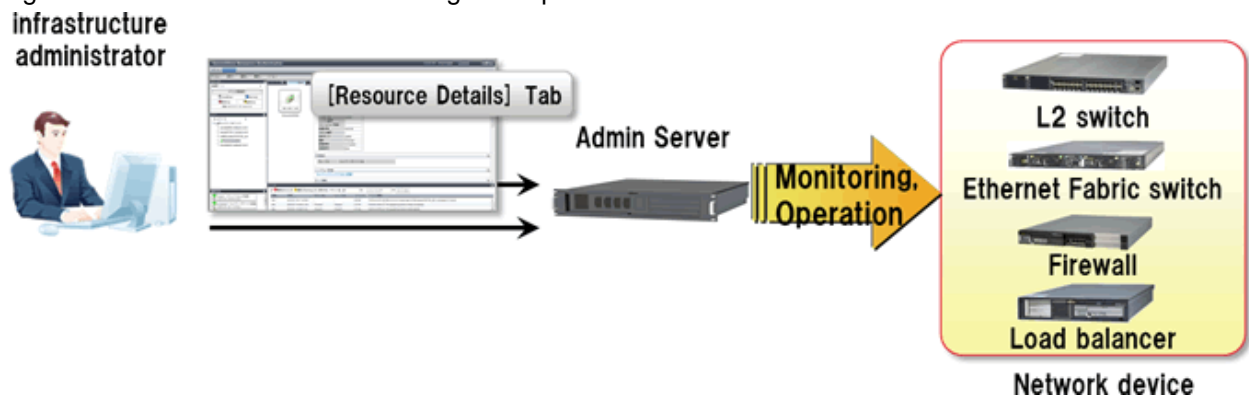
By switching the "auto-configuration targets", whether the devices are regarded as the targets of auto-configuration can be controlled.

- Operations

The following operations can be performed for the server load balancers deployed on the logical platform (L-Platform).

- Displaying load balancing information
- Incorporating and removing load balancing target servers

Figure 5.33 Network Device Monitoring and Operation



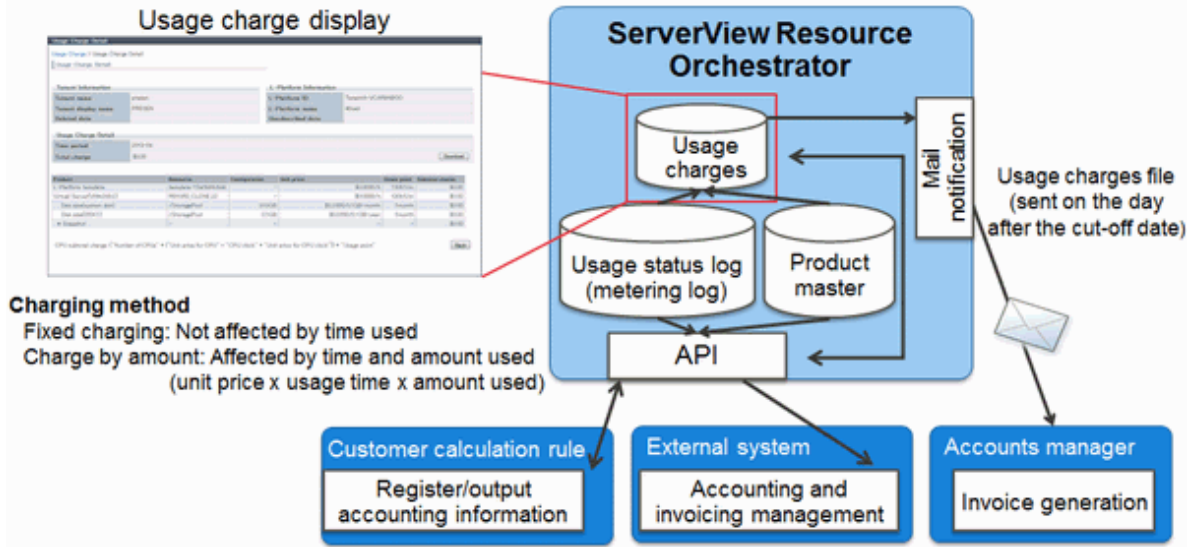
5.4.14 Accounting

Display the usage charges for each logical platform (L-Platform) for each tenant and send the usage charge files as emails.

The estimated charges are displayed when subscribing to the L-Platform, enabling the user to make the subscription with full awareness of cost-benefit performance.

The accounting API enables you to flexibly respond to different requirements for accounting.

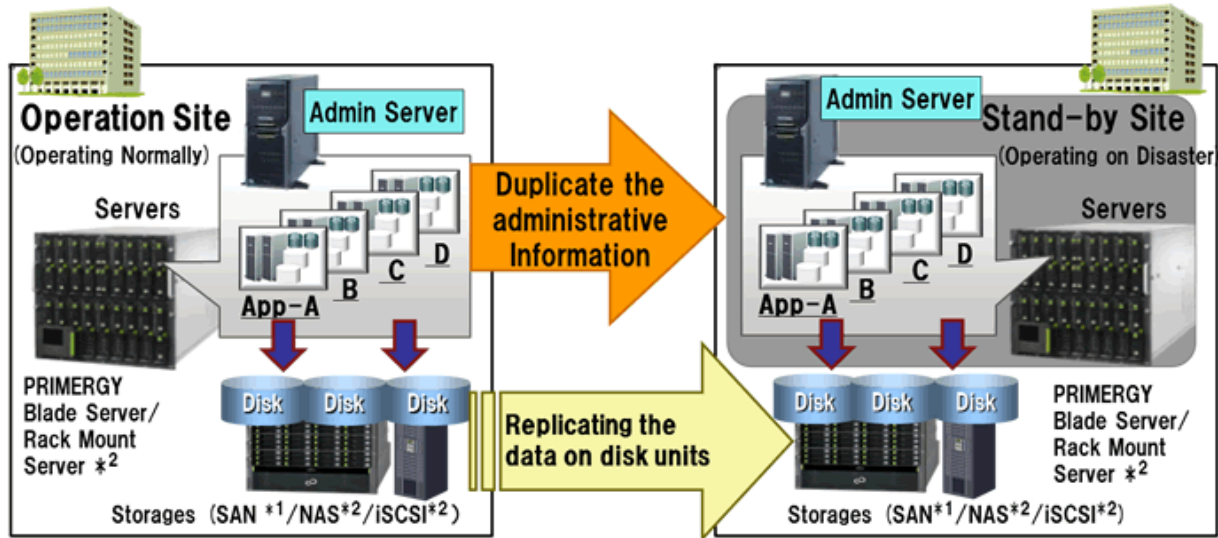
Figure 5.34 Reconfiguring after Operation has Started



5.4.15 Disaster Recovery of Systems

The contents of disks on the primary site can be copied to a standby site.
 Spare resources can be reduced by selecting the recovery targets and sharing the standby sites.
 DR option is necessary for this function.

Figure 5.35 Disaster Recovery of Systems



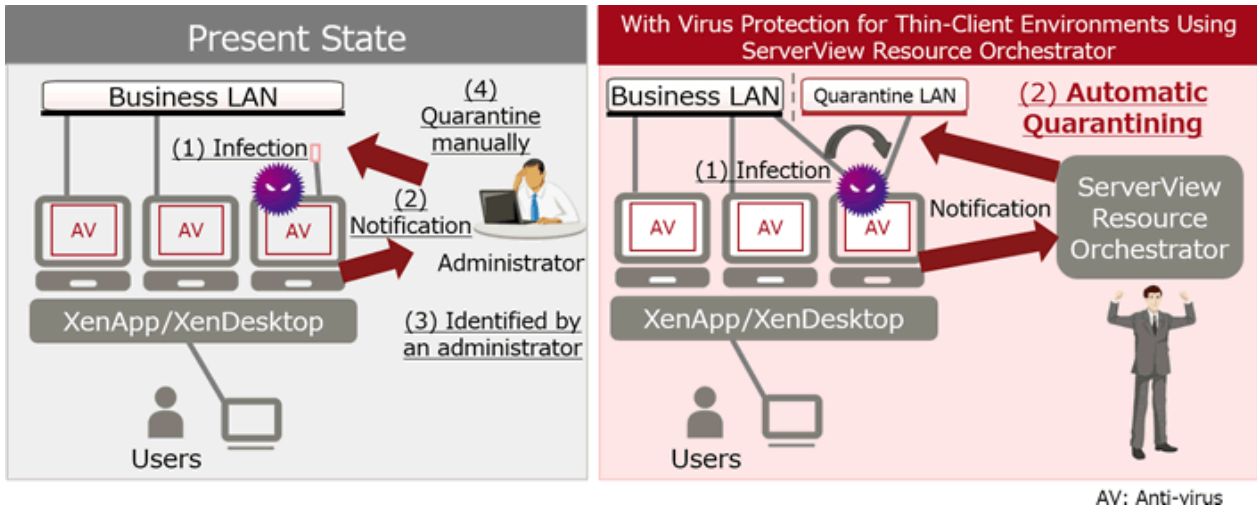
- *1: ServerView Virtual-IO Manager is required.
- *2: The targets of recovery are virtual machines, and VMware vSphere 5 is one of the targets. As only copying of data (VM areas) is performed, it is necessary to boot VM hosts using built-in disks on the server or USB Flash modules.

5.5 Automatic Quarantining to the Quarantine Network

When viruses or malware are detected, the affected virtual servers and physical servers are shifted from the business network to the quarantine network.
 After security risks have been resolved, virtual servers can be recovered to the business network.

Through automatic quarantining to the quarantine network it becomes possible to operate even thin client environments in the same way as physical PCs. In addition, real time response is possible on a virtual server level when servers are infected.

Figure 5.36 Automatic Quarantining to the Quarantine Network



As well as shifting servers to the quarantine network, it is also possible to select actions such as restarting virtual or physical servers on which security risks are detected, do nothing to the server when a security risk is detected but send an email to notify the administrator, etc.

Chapter 6 System Requirements

This chapter explains the operational environment of Resource Orchestrator.

6.1 Software Environment

Resource Orchestrator is composed of the following DVD-ROM.

- FUJITSU Software ServerView Resource Orchestrator (Windows version)
- FUJITSU Software ServerView Resource Orchestrator (Linux version)
- FUJITSU Software ServerView Resource Orchestrator (Solaris version)

Resource Orchestrator is comprised of the following software.

Table 6.1 Software Configuration

Software	Functional Overview
FUJITSU Software ServerView Resource Orchestrator V3.4.0 Manager (hereafter 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
FUJITSU Software ServerView Resource Orchestrator V3.4.0 Agent (hereafter 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)
FUJITSU Software ServerView Resource Orchestrator V3.4.0 HBA address rename setup service (hereafter 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.

When using Server Switchover with a manager of this version and agents of Solaris version, agent version must be upgraded V3.1.2(T009947SP-01 or later) or V3.2.0 or later.

*2: For details on HBA address rename setup, refer to "8.1 Deciding the Storage Environment" in the "Design Guide VE" or "10.1 Deciding the Storage Environment" in the "Design Guide CE".

6.1.1 Software Requirements (Virtual Edition)

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

6.1.1.1 Required Basic Software

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

Required Basic Software

Table 6.2 [Windows Manager] (*)

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2012 Datacenter	
Microsoft(R) Windows Server(R) 2012 R2 Standard	
Microsoft(R) Windows Server(R) 2012 R2 Datacenter	

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2016 Standard Microsoft(R) Windows Server(R) 2016 Datacenter	The Server Core installation option is not supported. Some of the functions provided by Resource Orchestrator cannot be used. For details, refer to " 6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016 ".

* Note: This service also can be run on a VM guest OS as virtualization software.

Table 6.3 [Linux Manager] (*1)

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.0 (for x86)	Prepare any required driver kits, update kits, or software.
Red Hat(R) Enterprise Linux(R) 6.0 (for Intel64)	For information about required software, refer to the manual of the server or the Linux installation guide.
Red Hat(R) Enterprise Linux(R) 6.1 (for x86)	For required packages, refer to " 6.1.1.3 Required Packages ".
Red Hat(R) Enterprise Linux(R) 6.1 (for Intel64)	The Linux Kernel version for each hardware model corresponds to the version supported by Fujitsu.
Red Hat(R) Enterprise Linux(R) 6.2 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.3 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.4 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.5 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.6 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.7 (for x86) (*2)	
Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64) (*2)	
Red Hat(R) Enterprise Linux(R) 6.9 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.10 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)	

*1: This service also can be run on a VM guest OS as virtualization software.

*2: Use the internal authentication function.

Table 6.4 Agent [Windows]

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter Microsoft(R) Windows Server(R) 2012 R2 Standard Microsoft(R) Windows Server(R) 2012 R2 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2016 Standard Microsoft(R) Windows Server(R) 2016 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2019 Standard	The Server Core installation option is not supported.

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2019 Datacenter	

Table 6.5 Agent [Hyper-V]

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard	The Server Core installation option is not supported. Switch on the role of Hyper-V. Only Windows managers are supported.
Microsoft(R) Windows Server(R) 2012 Datacenter	
Microsoft(R) Windows Server(R) 2012 R2 Essentials	
Microsoft(R) Windows Server(R) 2012 R2 Standard	
Microsoft(R) Windows Server(R) 2012 R2 Datacenter	
Microsoft(R) Windows Server(R) 2016 Standard	
Microsoft(R) Windows Server(R) 2016 Datacenter	

Table 6.6 Agent [Linux]

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.0 (for x86)	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. For required packages, refer to " 6.1.1.3 Required Packages ". The Linux Kernel version for each hardware model corresponds to the version supported by Fujitsu.
Red Hat(R) Enterprise Linux(R) 6.0 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.1 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.1 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.2 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.3 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.4 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.5 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.6 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.7 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.8 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.9 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.10 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 7.0 (for Intel64) (*1)	
Red Hat(R) Enterprise Linux(R) 7.1 (for Intel64) (*1, *2)	
Red Hat(R) Enterprise Linux(R) 7.2 (for Intel64) (*1, *2)	
Red Hat(R) Enterprise Linux(R) 7.4 (for Intel64) (*1, *2)	

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 7.5 (for Intel64) (*1, *2)	
Red Hat(R) Enterprise Linux(R) 7.6 (for Intel64) (*1, *2)	
SUSE(R) Linux Enterprise Server 10 SP2 for x86	
SUSE(R) Linux Enterprise Server 10 SP2 for AMD64, Intel64	
SUSE(R) Linux Enterprise Server 10 SP3 for x86	
SUSE(R) Linux Enterprise Server 10 SP3 for AMD64, Intel64	
SUSE(R) Linux Enterprise Server 11 for x86	
SUSE(R) Linux Enterprise Server 11 for AMD64, Intel64	
SUSE(R) Linux Enterprise Server 11 SP1 for x86	
SUSE(R) Linux Enterprise Server 11 SP1 for AMD64, Intel64	
Oracle Enterprise Linux Release 6.7 for x86 (32-bit)	
Oracle Enterprise Linux Release 6.7 for x86_64 (64-bit)	
Oracle Enterprise Linux Release 7.2 for x86 (32bit)	
Oracle Enterprise Linux Release 7.2 for x86_64 (64-bit)	

*1: When using the PRIMEQUEST series, RHEL 7 is not supported.

*2: Disable SELinux.

Table 6.7 Agent [Solaris] [Solaris Zones]

Basic Software (OS)	Remarks
Oracle Solaris 10	- Oracle Solaris 10
Oracle Solaris 11	05/09 (Update7) or later versions are supported.
Oracle Solaris 11.1	- Oracle Solaris 11
Oracle Solaris 11.2	11/11 or later versions are supported. (*)
Oracle Solaris 11.3	When using SAN boot, refer to the manual for Fibre Channel card driver, "SPARC Enterprise - ETERNUS SAN Boot Environment Build Guide".

* Note: Management using the following functions of Oracle Solaris 11 is not possible.

- Centralized management of clouds using OpenStack
- Independent and isolated environments using kernel zones
- Software-defined networking - elastic virtual switches
- Immutable global zones

Table 6.8 Agent [OVM for SPARC]

Basic Software (OS)	Remarks
Oracle Solaris 11	When using SAN boot, refer to the manual for Fibre Channel card driver, "SPARC Enterprise - ETERNUS SAN Boot Environment Build Guide".
Oracle Solaris 11.1	
Oracle Solaris 11.2	When a guest domain on OVM for SPARC is registered as a VM Host, it is necessary to install an agent in that guest domain.
Oracle Solaris 11.3	

Table 6.9 Agent [VMware]

Basic Software (OS)	Remarks
VMware vSphere 4.0	Install Resource Orchestrator on the VMware ESX host. Use the VMware Service Console for installation. (*)

Basic Software (OS)	Remarks
VMware vSphere 4.1	
VMware vSphere 5.0	
VMware vSphere 5.1	
VMware vSphere 5.5	
VMware vSphere 6.0	
VMware vSphere 6.5	
VMware vSphere 6.7	

* Note: VMware ESXi of VMware vSphere 4.0 or earlier cannot be used for managed servers.

VMware ESXi of VMware vSphere 4.1 or later can be used for managed servers.

There is no need to install Resource Orchestrator on VMware ESXi, but agents must be registered.

Table 6.10 Agent [Citrix Xen]

Basic Software (OS)	Remarks
Citrix(R) XenServer(R) 5.5	-
Citrix Essentials(TM) for XenServer 5.5, Enterprise Edition	
Citrix(R) XenServer(R) 5.6	
Citrix(R) XenServer(R) 5.6 SP2	
Citrix(R) XenServer(R) 6.0	
Citrix Essentials(TM) for XenServer 6.0, Enterprise Edition	

Table 6.11 Agent [Xen]

Basic Software (OS)	Remarks
Not supported from this version	-

Table 6.12 Agent [KVM]

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)	Intel64 and AMD64 are supported. (*)
Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)	

* Note: For details, refer to the following section in the "Red Hat Enterprise Linux 6 Virtualization Host Configuration and Guest Installation Guide".

- Chapter 2. System requirements

URL: https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Virtualization_Host_Configuration_and_Guest_Installation_Guide/index.html

The manuals for Red Hat Enterprise Linux can be referred to from the following URL.

URL:

https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/index.html

Table 6.13 HBA address rename Setup Service [Windows] (*)

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter Microsoft(R) Windows Server(R) 2012 R2 Standard Microsoft(R) Windows Server(R) 2012 R2 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2016 Standard Microsoft(R) Windows Server(R) 2016 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows(R) 7 Professional Microsoft(R) Windows(R) 7 Ultimate	-
Windows(R) 8.1 Pro Windows(R) 8.1 Enterprise	-

* Note: This service also can be run on a VM guest OS as virtualization software.

Table 6.14 HBA address rename Setup Service [Linux] (*)

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.0 (for x86) Red Hat(R) Enterprise Linux(R) 6.0 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.1 (for x86) Red Hat(R) Enterprise Linux(R) 6.1 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.2 (for x86) Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.3 (for x86) Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.4 (for x86) Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.5 (for x86) Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.6 (for x86) Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.7 (for x86) Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.8 (for x86) Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.9 (for x86) Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64) Red Hat(R) Enterprise Linux(R) 6.10 (for x86) Red Hat(R) Enterprise Linux(R) 6.10 (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. For required packages, refer to " 6.1.1.3 Required Packages ". The Linux Kernel version for each hardware model corresponds to the version supported by Fujitsu.

* Note: This service also can be run on a VM guest OS as virtualization software.



[VMware]

The free version of VMware ESXi cannot be used for managed servers.

When using VMware ESXi for managed servers, purchase the appropriate license.

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.

Required Basic Software: Admin Clients

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

Table 6.15 Required Basic Software: Admin Clients

Basic Software (OS)	Remarks
Microsoft(R) Windows(R) 7 Professional Microsoft(R) Windows(R) 7 Ultimate	-
Windows(R) 8.1 Pro Windows(R) 8.1 Enterprise	-
Windows(R) 10 Pro Windows(R) 10 Enterprise	-
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter Microsoft(R) Windows Server(R) 2012 R2 Standard Microsoft(R) Windows Server(R) 2012 R2 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2016 Standard Microsoft(R) Windows Server(R) 2016 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2019 Standard Microsoft(R) Windows Server(R) 2019 Datacenter	The Server Core installation option is not supported.

6.1.1.2 Required Patches

When using Resource Orchestrator, the following patches are required.

Table 6.16 [Windows Manager]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.17 [Linux Manager]

Basic Software (OS)	Patch ID/Bundle Update (*)
None	-

Table 6.18 Agent [Windows]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Necessary when using server switchover to a spare server on a managed server that is one of the following models:

- PRIMERGY BX920 S3 or later
- PRIMERGY BX924 S3 or later
- PRIMERGY BX2560 M1 or later
- PRIMERGY BX2580 M1 or later
- PRIMERGY RX200 S7 or later
- PRIMERGY RX300 S7 or later
- PRIMERGY RX2520 M1 or later
- PRIMERGY RX2530 M1 or later
- PRIMERGY RX2540 M1 or later
- PRIMERGY RX4770 M1 or later

Table 6.19 Agent [Hyper-V]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.20 Agent [Linux]

Basic Software (OS)	Patch ID/Bundle Update (*)
SUSE(R) Linux Enterprise Server 10 SP3 for AMD64, Intel64	Kernel-2.6.16.60-0.50.1 or later
SUSE(R) Linux Enterprise Server 11 for x86	Kernel-2.6.27.19-5 or later
SUSE(R) Linux Enterprise Server 11 for AMD64, Intel64	Kernel-2.6.27.19-5 or later
SUSE(R) Linux Enterprise Server 11 SP1 for x86	Kernel-2.6.32 or later
SUSE(R) Linux Enterprise Server 11 SP1 for AMD64, Intel64	Kernel-2.6.32 or later

* Note: Necessary when upgrading.

Table 6.21 Agent [Solaris] [Solaris Zones] [OVM for SPARC]

Basic Software (OS)	Patch ID/Bundle Update
Oracle Solaris 11	SRU12111(SRU1.4) or later (*)

* Note: Required when using OVM for SPARC for a managed server.

Table 6.22 Agent [VMware]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.23 Agent [Xen] [Citrix Xen] [KVM]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.24 HBA address rename setup service [Windows]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.25 HBA address rename Setup Service [Linux]

Basic Software (OS)	Patch ID/Bundle Update (*)
Red Hat(R) Enterprise Linux(R) 5.0 (for x86)	Bundle Update U09031 (5.3 compatible)
	Bundle Update U09091 (5.4 compatible)
	Bundle Update U10041 (5.5 compatible)
Red Hat(R) Enterprise Linux(R) 5.0 (for Intel64)	Bundle Update U09031 (5.3 compatible)
	Bundle Update U09091 (5.4 compatible)
	Bundle Update U10041 (5.5 compatible)

* Note: Necessary when upgrading.

6.1.1.3 Required Packages

The packages listed below are required when using Resource Orchestrator.

Install the required packages beforehand, if necessary.

The architecture of the required packages to be installed is shown enclosed by parenthesis "()".

For the packages followed by "(32bit)", install either the i386 or i686 package.

For the items with no architecture to be installed is specified, install the package of the same architecture as the OS.

Table 6.26 Required Packages of Manager for Red Hat Enterprise Linux 6 [Linux Manager]

Conditions	Required Packages
Always required	alsa-lib(32bit) apr(32bit) apr-util(32bit) audit compat-expat1(32bit) compat-libtermcap(32bit) compat-openldap(32bit) compat-readline5(32bit) cyrus-sasl-lib(32bit) db4(32bit) expat(32bit) glibc(32bit) keyutils-libs(32bit) krb5-libs(32bit) libcom_err(32bit) libgcc(32bit) libICE(32bit) libselinux(32bit)

Conditions	Required Packages
	libSM(32bit) libstdc++(32bit) libtool-ltdl(32bit) libuuid(32bit) libX11(32bit) libXau(32bit) libxcb(32bit) libXext(32bit) libXi(32bit) libXt(32bit) libXtst(32bit) ncurses-libs(32bit) net-snmp net-snmp-utils nspr nss nss-util nss-softokn-freebl(32bit) openssl(32bit) (*) openssl098e(32bit) (*) policycoreutils policycoreutils-python redhat-lsb sqlite(32bit) unixODBC(32bit) zlib(32bit)
Necessary when managing a managed server within a separate subnet to the admin server	openldap

* Note: For openssl(32bit) and openssl098e(32bit), install the latest package.

Table 6.27 Required Packages of Manager for Red Hat Enterprise Linux 5 [Linux Manager]

Conditions	Required Packages
None, as RHEL 5 is not supported from this version	-

* Note: For openssl(32bit), install the latest package.

Table 6.28 Required Packages of Agent for Red Hat Enterprise Linux 7 [Linux]

Conditions	Required Packages
Always required	alsa-lib(32bit) audit glibc(32bit) libgcc(32bit)

Conditions	Required Packages
	libICE(32bit)
	libSM(32bit)
	libstdc++(32bit)
	libtool-ltdl(32bit)
	libuuid(32bit)
	libX11(32bit)
	libXau(32bit)
	libxcb(32bit)
	libXext(32bit)
	libXi(32bit)
	libXt(32bit)
	libXtst(32bit)
	ncurses-libs(32bit)
	net-snmp-utils
	policycoreutils
	policycoreutils-python
	readline(32bit)
	sqlite(32bit)
	sysfsutils
	unixODBC(32bit)

Table 6.29 Required Packages of Agent for Red Hat Enterprise Linux 6 [Linux] [KVM]

Conditions	Required Packages
Always required	alsa-lib(32bit)
	audit
	glibc(32bit)
	libgcc(32bit)
	libICE(32bit)
	libSM(32bit)
	libstdc++(32bit)
	libtool-ltdl(32bit)
	libuuid(32bit)
	libX11(32bit)
	libXau(32bit)
	libxcb(32bit)
	libXext(32bit)
	libXi(32bit)
	libXt(32bit)
	libXtst(32bit)
	ncurses-libs(32bit)

Conditions	Required Packages
	net-snmp-utils policycoreutils policycoreutils-python readline(32bit) sqlite(32bit) sysfsutils unixODBC(32bit)
[KVM] Necessary when all of the following conditions are met: - The OS architecture is Intel64 - When using a Linux (SELinux) cloning image	fuse.x86_64 - For RHEL6.2 libguestfs-mount.x86_64 - For RHEL6.3 or later libguestfs-tools-c.x86_64
[KVM] Necessary when all of the following conditions are met: - The OS architecture is Intel64 - Necessary when using a Windows cloning image	libguestfs-tools.x86_64 libguestfs-tools-c.x86_64 libguestfs-winsupport.x86_64 (*) perl-libintl.x86_64 perl-Sys-Guestfs.x86_64 perl-Sys-Virt.x86_64 perl-XML-Parser.x86_64 perl-XML-Writer.noarch perl-XML-XPath.noarch For RHEL6.2, the following packages are necessary. guestfish.x86_64 libguestfs-mount.x86_64

* Note: Obtain libguestfs-winsupport from the "RHEL V2VWIN (v. 6 for 64-bit x86_64)" channel for Red Hat Network.

For details, refer to the following section in the "Virtualization Administration Guide".

- Chapter 16. Guest virtual machine disk access with offline tools

URL:
http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6/html/Virtualization_Administration_Guide/index.html

The manuals for Red Hat Enterprise Linux can be referred to from the following URL.

URL:
https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/index.html

Table 6.30 Required Packages of Agent for Red Hat Enterprise Linux 5 [Linux] [Xen]

Conditions	Required Packages
None, as RHEL 5 is not supported from this version	-

Table 6.31 Required Packages of HBA address rename Setup Service for Red Hat Enterprise Linux 6 [Linux]

Conditions	Required Packages
Always required	alsa-lib(32bit)

Conditions	Required Packages
	audit
	Desktop (*)
	glibc(32bit)
	libgcc(32bit)
	libICE(32bit)
	libSM(32bit)
	libstdc++(32bit)
	libtool-ltdl(32bit)
	libuuid(32bit)
	libX11(32bit)
	libXau(32bit)
	libxcb(32bit)
	libXext(32bit)
	libXi(32bit)
	libXt(32bit)
	libXtst(32bit)
	ncurses-libs(32bit)
	policycoreutils
	policycoreutils-python
	readline(32bit)
	sqlite(32bit)
	unixODBC(32bit)
	X-Window (*)

* Note: Install an OS, specifying a package.

Table 6.32 Required Packages of HBA address rename Setup Service for Red Hat Enterprise Linux 5 [Linux] [Xen]

Conditions	Required Packages
None, as RHEL 5 is not supported from this version	-

6.1.1.4 Required Software

The software listed below is required when using Resource Orchestrator.

Required Software (Windows Manager)

The required software for Windows manager is as follows.

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

When the ROR console is started on Windows manager, the required software of the admin client is also necessary.

Table 6.33 [Windows Manager]

Required Software	Version	Remarks
ServerView Operations Manager (*1)	V4.20.25 - V7.02 V7.11.07 V7.20.03 (*2) V7.20.08 (*2) V7.20.10 (*2) V8.10.01 (*2) V8.20.02 (*2) V8.21.00 (*2) V8.41.01 (*2) V8.51.00 (*2)	Necessary when using VIOM coordination or invoking the Web UI of server management software from the ROR console. Refer to "See Installation of Related ServerView Products". When using VIOM, refer to the VIOM manual and use a supported version of ServerView Operations Manager.
	V5.30 - V7.02 V7.11.07 V7.20.03 (*2) V7.20.08 (*2) V7.20.10 (*2) V8.10.01 (*2) V8.20.02 (*2) V8.21.00 (*2) V8.41.01 (*2) V8.51.00 (*2)	Necessary when using VMware ESXi as a managed server, or Single Sign-On. Use VMware ESXi or a version of ServerView Operations Manager that supports Single Sign-On. Not necessary when using VMware ESXi on another vendor's servers or when not using ServerView ESXi CIM Provider on VMware ESXi on Fujitsu rack mount servers.
BACS or Intel PROSet or OneCommand NIC Teaming and Multiple VLAN Manager	-	Necessary when performing redundancy of the admin LAN for admin servers. When using GLS, also apply the latest patches for GLS.
PRIMECLUSTER GLS for Windows	4.4 or earlier	
ServerView Virtual-I/O Manager	2.6 or later	Necessary when using VIOM's Virtual I/O. Refer to the README of VIOM for the managed servers supported by VIOM. When the basic software is Windows Server 2016, coordination with VIOM is not possible. For details, refer to " 6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016 ".
ServerView Infrastructure Manager	2.2	Necessary when using I/O virtualization using ISM.
Infrastructure Manager	2.3 2.4.0.c or later 2.5 2.6 or later	Necessary when performing physical server switchover for the following models of servers: - PRIMERGY RX series models M4 or later - PRIMERGY CX series models M4 or later

Required Software	Version	Remarks
		<p>As it is an appliance, it must be placed on a different server from the manager.</p> <p>Refer to the README of ISM for the managed servers supported by ISM.</p> <p>A DHCP server is necessary when using PXE boot in ISM.</p> <p>It is necessary to install a Resource Orchestrator agent on the DHCP server.</p> <p>ISM is used on server models that do not support VIOM to provide VIOM coordination functions.</p> <p>However, the following are not supported.</p> <ul style="list-style-type: none"> - Registration of server management software (ISM) using pre-configuration - High availability configurations of admin servers
<p>Microsoft(R) Windows Server(R) 2012 Standard Failover Cluster (MSFC)</p> <p>Microsoft(R) Windows Server(R) 2012 Datacenter Failover Cluster (MSFC)</p>	-	Required when admin servers are in a cluster configuration.
VMware vCenter Server	<p>4.0</p> <p>4.1</p> <p>5.0</p> <p>5.1</p> <p>5.5</p> <p>6.0</p> <p>6.5</p> <p>6.7</p>	<p>Required when using migration of VM guests on VMware.</p> <p>Can be placed on the same admin server as the manager or on another server.</p>
VMware vCenter Server Appliance	<p>6.0</p> <p>6.5</p> <p>6.7</p>	<p>Required when using migration of VM guests on VMware.</p> <p>Software which is equivalent to vCenter Server. However, as it is an appliance, it must be placed on a different server from the manager.</p>
<p>Microsoft(R) System Center 2012 Virtual Machine Manager</p> <p>or</p> <p>Microsoft(R) System Center 2012 R2 Virtual Machine Manager</p> <p>or</p> <p>Microsoft(R) System Center 2016 Virtual Machine Manager</p>	-	<p>Required when using migration, or setting or releasing VM maintenance mode of VM guests on Hyper-V.</p> <p>Can be placed on the same admin server as the manager or on another server. Configure control settings for a maximum of 31 sessions, referring to "SCVMM Server Web Services for Management Settings" in "9.2.1 Configuration Requirements" in the "Design Guide VE".</p> <p>When using Microsoft(R) System Center 2012 Virtual Machine Manager (or later versions), it is necessary to install Microsoft(R) SQL Server and Windows AIK or Windows ADK beforehand.</p> <p>When using Microsoft(R) System Center 2012 R2 Virtual Machine Manager (or later versions), it is necessary to install Microsoft(R) SQL Server and Windows ADK beforehand.</p> <p>For details, confirm the system requirements for the relevant product.</p>

Required Software	Version	Remarks
Windows PowerShell	2.0 or later	Required when using migration, or setting or releasing VM maintenance mode of VM guests on Hyper-V.
SNMP Service	-	Necessary for ServerView Operations Manager.
SNMP Trap Service (Standard OS service)	-	Necessary for ServerView Operations Manager. Necessary when receiving SNMP traps from servers and devices.
DHCP Server (Standard OS service)	-	Necessary when managing a managed server in a different subnet from the admin server.
ETERNUS SF Storage Cruiser Manager	14.2 or later (*3)	Necessary when using the storage affinity switchover method for server switchover. (The storage affinity switchover method for server switchover is not supported when the storage device is an ETERNUS DX 8900 S4/ETERNUS DX900 S5/ETERNUS DX600 S5/ETERNUS DX500 S5/ETERNUS AF650 S3.) <ul style="list-style-type: none"> - When managing ETERNUS DX200 S3/DX500 S3/DX600 S3/DX8700 S3/DX8900 S3/DX200F/DX200 S4/DX500 S4/DX600 S4/DX200 S5/AF250 S3 using ETERNUS SF Storage Cruiser 16.1 or later, note the following points: <ul style="list-style-type: none"> - Do not connect a managed server (SPARC M10/M12 or SPARC Enterprise) which uses the storage affinity switchover method for server switchover, to the CA port that is a target of CA port pairing performed using the Storage Cluster function. - Do not specify the CA port used by a managed server (SPARC M10/M12 or SPARC Enterprise) which uses the storage affinity switchover method for server switchover, as the target of CA port pairing performed using the Storage Cluster function.

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

*2: When installing ServerView Operations Manager, select [Intermediate] or [Old] on the [Security Configuration] window. [Modern] is not supported.

*3: When the OS of the agent is Oracle Solaris 11 11/11 or later, use 15.1 or later.

Required Software (Linux Manager)

Required Software for Linux Manager is as follows.

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

Table 6.34 [Linux Manager]

Required Software	Version	Remarks
ServerView Operations Manager	V4.81.05 - V7.00 V7.02 V8.41.01 (*1) V8.51.00 (*1)	Necessary when viewing the server management software Web UI from the ROR console.
	V5.30 - V7.00 V7.02 V8.41.01 (*1)	Necessary when using VMware ESXi as a managed server, or Single Sign-On. Use VMware ESXi or a version of ServerView Operations Manager that supports Single Sign-On.

Required Software	Version	Remarks
	V8.51.00 (*1)	Not necessary when using VMware ESXi on another vendor's servers or when not using ServerView ESXi CIM Provider on VMware ESXi on Fujitsu rack mount servers.
ServerView Virtual-IO Manager	2.6 or later	Necessary when using VIOM's Virtual I/O. Refer to the README of VIOM for the managed servers supported by VIOM.
ServerView Infrastructure Manager	2.2	Necessary when using I/O virtualization using ISM.
Infrastructure Manager	2.3 2.4.0.c or later 2.5 2.6 or later	Necessary when performing physical server switchover for the following models of servers: - PRIMERGY RX series models M4 or later - PRIMERGY CX series models M4 or later As it is an appliance, it must be placed on a different server from the manager. Refer to the README of ISM for the managed servers supported by ISM. A DHCP server is necessary when using PXE boot in ISM. It is necessary to install a Resource Orchestrator agent on the DHCP server. ISM is used on server models that do not support VIOM to provide VIOM coordination functions. However, the following are not supported. - Registration of server management software (ISM) using pre-configuration - High availability configurations of admin servers
VMware vCenter Server	4.0 4.1 5.0 5.1 5.5 6.0 6.5 6.7	Required when using migration of VM guests on VMware. VMware vCenter Server cannot be installed in Linux environments. For details on the installation environment, refer to the manuals provided by VMware. (*2)
VMware vCenter Server Appliance	6.0 6.5 6.7	Required when using migration of VM guests on VMware. Software which is equivalent to vCenter Server. However, as it is an appliance, it must be placed on a different server from the manager.
PRIMECLUSTER Enterprise Edition	4.2A00 or later	When an admin server is in a cluster configuration, one of the following software is necessary.
PRIMECLUSTER HA Server	4.2A00 or later	The supported standby cluster type is 1:1 hot standby.
PRIMECLUSTER GLS	4.4 or earlier	Necessary when performing redundancy of the admin LAN for admin servers.
ETERNUS SF Storage Cruiser Manager	14.2 or later (*3)	Necessary when using the storage affinity switchover method for server switchover. (The storage affinity switchover method for server switchover is not supported when the storage device is an ETERNUS DX 8900 S4/ETERNUS DX900 S5/ETERNUS DX600 S5/ETERNUS DX500 S5/ETERNUS AF650 S3.) - When managing ETERNUS DX200 S3/DX500 S3/DX600 S3/DX8700 S3/DX8900 S3/DX200F/DX200 S4/DX500 S4/DX600 S4/DX200 S5/AF250 S3 using ETERNUS SF Storage Cruiser 16.1 or later, note the following points:

Required Software	Version	Remarks
		<ul style="list-style-type: none"> - Do not connect a managed server (SPARC M10/M12 or SPARC Enterprise) which uses the storage affinity switchover method for server switchover, to the CA port that is a target of CA port pairing performed using the Storage Cluster function. - Do not specify the CA port used by a managed server (SPARC M10/M12 or SPARC Enterprise) which uses the storage affinity switchover method for server switchover, as the target of CA port pairing performed using the Storage Cluster function.
DHCP Server (Standard OS service)	-	Necessary when managing a managed server in a different subnet from the admin server.
Windows PE	5.1(amd64) 3.1(amd64) 3.1(x86)	<p>When using the following functions in this product, it is necessary to place the Windows PE on the manager of Resource Orchestrator.</p> <ul style="list-style-type: none"> - Backup and restore of physical servers - Collection and deployment of physical server cloning images - Server switchover of physical servers (backup and restore method)

*1: When installing ServerView Operations Manager, select [Intermediate] or [Old] on the [Security Configuration] window. [Modern] is not supported.

*2: Check the following VMware web site.

URL: <https://www.vmware.com/support/pubs/>

*3: When the OS of the agent is Oracle Solaris 11 11/11 or later, use 15.1 or later.

Required Software (Agent)

Table 6.35 Agent [Windows] [Hyper-V] (*1)

Required Software	Version	Remarks
ServerView Agents for Windows (*2)	V4.50.05 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.
BACS or Intel PROSet or OneCommand NIC Teaming and Multiple VLAN Manager	-	<p>Necessary when performing redundancy of the admin LAN and public LAN for managed servers.</p> <p>When using GLS, also apply the latest patches for GLS.</p>
PRIMECLUSTER GLS for Windows (*2)	4.4 or earlier	

*1: The above software is not required when installing an agent on a DHCP server that was installed for the purpose of enabling ISM coordination.

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

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

Table 6.36 Agent [Linux]

Required Software	Version	Remarks
ServerView Agents for Linux	V4.90.14 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.

Table 6.37 Agent [Red Hat Enterprise Linux]

Required Software	Version	Remarks
PRIMECLUSTER GLS	4.2A00 - 4.4	Necessary when performing redundancy of the admin LAN and public LAN for managed servers. When performing cloning, settings for redundancy of the public LAN are configured automatically. For details, refer to "17.6 Network Parameter Auto-Configuration for Cloning Images" in the "User's Guide VE".

Table 6.38 Agent [Solaris] [Solaris Zones] [OVM for SPARC]

Required Software	Version	Remarks
PRIMECLUSTER GLS	4.2 - 4.4	Necessary when performing redundancy of the admin LAN and public LAN for managed servers.
Oracle VM Server for SPARC Software	3.0 or later	Required when using the control domain of OVM for SPARC for an agent.

Table 6.39 Agent [VMware]

Required Software	Version	Remarks
ServerView Agents for VMware	V4.30-20 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST. Not necessary when using VMware ESXi for the agent.
ServerView ESXi CIM Provider	1.00 or later	Necessary when using VMware ESXi as a managed server. The compatible version varies depending on the version of ESXi you use. For details, refer to the operating environment conditions for ServerView ESXi CIM Provider. Not necessary when using VMware ESXi on another vendor's servers or when not using ServerView ESXi CIM Provider on VMware ESXi on Fujitsu rack mount servers.

Table 6.40 Agent [Xen] [KVM] [OVM for x86 3.x]

Required Software	Version	Remarks
ServerView Agents for Linux	V4.81-14 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.

Required Software (HBA address rename Setup Service)**Table 6.41 HBA address rename setup service [Windows]**

Required Software	Version	Remarks
Internet Explorer	9 10 11	Necessary for displaying the online help.

Table 6.42 HBA address rename Setup Service [Linux]

Required Software	Version	Remarks
Firefox	3	Necessary for displaying the online help.

Required Software: Admin Clients

The following software is necessary for admin clients.

Table 6.43 Required Software: Admin Clients

Required Software	Version	Remarks
Internet Explorer	9 (*1) 10 (*1, *2) 11 (*1, *2, *3)	Internet Explorer or Firefox is required to display the ROR console. When using Windows 10, Microsoft(R) Edge cannot be used.
Firefox	ESR24 ESR31 ESR38 ESR45 ESR52 ESR60 (*5) ESR68 (*5)	
Java(TM) 2 Runtime Environment Standard Edition	(*4)	Necessary for displaying the management window of ServerView Operations Manager or the VM management console on admin clients.
VMware Virtual Infrastructure Client	2.0 2.5	[VMware] Necessary on admin clients when using the functions for coordinating with VMware or the VM management software on managed servers.
VMware vSphere Client	4.0 4.1 5.0 5.1 5.5 6.0	
Hyper-V Manager	-	[Hyper-V] Necessary on admin clients when using the functions for coordinating with Hyper-V on managed servers.
Microsoft(R) System Center 2012 Virtual Machine Manager console or Microsoft(R) System Center 2012 R2 Virtual Machine Manager console or Microsoft(R) System Center 2016 Virtual Machine Manager console	-	[Hyper-V] Necessary on admin clients when using the function for coordinating with VM management software. Prepare the same version as VM management software for registration in Resource Orchestrator.
XenCenter	-	[Citrix Xen] Necessary on admin clients when using the function for coordinating with Citrix XenServer on managed servers.

*1: When connecting with the ROR console, use Compatibility View Settings.

*2: Only Internet Explorer (Desktop version) is supported.

*3: Set the resolution of the browser window as 100%.

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

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

*5: On ESR60 or later, the console connection function cannot be used.



See

Installation of Related ServerView Products

There are advisory notes regarding installation of the manager of "ServerView Operations Manager". Refer to "Required settings for ServerView Operations Manager 4.X for Windows" in "2.1.1.2 Software Preparation and Checks" in the "Setup Guide VE".

6.1.1.5 Exclusive Software

The combinations of Resource Orchestrator and software that cannot be used with Resource Orchestrator are as follows:

- Resource Orchestrator and the software listed in the table below
- Resource Orchestrator and the following software:
 - Resource Coordinator
 - Resource Orchestrator Base Edition
 - Resource Orchestrator

ServerView Resource Coordinator VE is the old name of this product. Earlier versions cannot be used in combination with Resource Orchestrator, but upgrading is possible. For upgrading, refer to "Appendix D Upgrading from Earlier Versions" in the "Setup Guide VE".

Table 6.44 Exclusive Software

Software	Product Name
[Windows Manager]	ServerView Installation Manager (*1)
	ServerView Deployment Manager
[Linux Manager]	Server System Manager
Agent [Windows] [Hyper-V]	Server System Manager
	ServerView Deployment Manager (*2)
Agent [Linux]	Server System Manager
	ServerView Deployment Manager (*2)
Agent [Solaris] [Solaris Zones] [OVM for SPARC]	Server System Manager (Manager only)
Agent [VMware]	ServerView Deployment Manager (*2)
Agent [Xen] [Citrix Xen] [KVM]	ServerView Deployment Manager (*2)
HBA address rename setup service [Windows]	ServerView Deployment Manager
HBA address rename Setup Service [Linux]	Server System Manager

*1: As the manager of Resource Orchestrator (version 1.x) contains a PXE server, it cannot be used together with the PXE server that is required for the remote installation function of ServerView Installation Manager.

*2: ServerView Deployment Manager can be installed after Resource Orchestrator has been installed. For details on installation, refer to "2.2 Agent Installation" in the "Setup Guide VE".



Note

- When using an Active Directory domain controller as an admin server, it can be installed by promoting it to a domain controller after manager installation.
- Resource Orchestrator managers contain some functions of DHCP servers and PXE servers.

Do not use products or services that use the functions of other DHCP servers or PXE servers on the admin server.

- However, these products can be in the same network as that of the Resource Orchestrator manager.

In this case, configure the managed servers of Resource Orchestrator to be excluded from being managed by any other DHCP server.

However, the following server is excluded:

- The DHCP server that is necessary when both of the following conditions are met:
 - I/O virtualization using ISM is used
 - PXE boot is used in ISM

Examples of Products Including DHCP Servers and PXE Servers

- The Windows Server 2016/Windows Server 2012 "Windows Deployment Service"
- Boot Information Negotiation Layer (BINLSVC)
- ServerView Deployment Manager (*)
- ServerStart (when using the remote installation function)
- ServerView Installation Manager
- Solaris JumpStart

* Note: As PXE server is included, the use of some functions is restricted when it is used on the same admin LAN as FUJITSU Software ServerView Resource Orchestrator. For details, refer to "B.2 Co-Existence with ServerView Deployment Manager" in the "Setup Guide VE".

- Resource Orchestrator managers contain some functions of TFTP servers.

On manager, do not use the OS standard TFTP services.

[Physical Servers]

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

6.1.1.6 Static Disk Space

The size of the required static disk space does not increase even after Resource Orchestrator is operated.

When using Resource Orchestrator, the disk space described in "6.1.1.7 Dynamic Disk Space" is required for each folder, in addition to the static disk space.

The amount of disk space may vary slightly depending on the environment in question.

Table 6.45 Static Disk Space

Software	Folder	Disk Space (Unit: MB)
[Windows Manager]	<i>Installation_folder</i> (*)	2000
[Linux Manager]	/opt	1000
	/etc/opt	30
	/var/opt	900
Agent [Windows] [Hyper-V]	<i>Installation_folder</i> (*)	320
Agent [Linux] [VMware] [Xen] [Citrix Xen] [KVM]	/opt	110
	/etc/opt	5
	/var/opt	5
Agent [Solaris] [Solaris Zones] [OVM for SPARC]	/opt	100
	/etc/opt	5
	/var/opt	5
HBA address rename setup service [Windows]	<i>Installation_folder</i> (*)	190
HBA address rename Setup Service [Linux]	/opt	110

Software	Folder	Disk Space (Unit: MB)
	/etc/opt	1
	/var/opt	10

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

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

- When using a 64-bit (x64) Windows OS

Default value: C:\Program Files (x86)\Resource Orchestrator

- When using a 32-bit (x86) Windows OS

Default value: C:\Program Files\Resource Orchestrator

6.1.1.7 Dynamic Disk Space

The size of the required dynamic disk space changes dynamically when Resource Orchestrator is operated.

When using Resource Orchestrator, the following disk space is required for each folder, in addition to static disk space.

Table 6.46 Dynamic Disk Space

Software	Folder	Disk Space (Unit: MB)
[Windows Manager]	<i>Installation_folder</i> (*1)	$2580 + \text{Number_of_managed_servers} * 4 + 16 * 10$ (*3)
		<i>Environmental_data_storage_area</i> (*4)
	<i>Image_file_storage_folder</i> (*2)	<i>Image_file_storage_area</i>
[Linux Manager]	/etc	2
	/var/opt	$2580 + \text{Number_of_managed_servers} * 4$
		<i>Environmental_data_storage_area</i> (*4)
<i>Image_file_storage_directory</i> (*2)	<i>Image_file_storage_area</i>	
Agent [Windows] [Hyper-V]	<i>Installation_folder</i> (*1)	60
Agent [Linux] [Solaris] [Solaris Zones] [VMware] [Xen] [Citrix Xen] [KVM] [OVM for SPARC]	/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

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

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

- When using a 64-bit (x64) Windows OS

Default value: C:\Program Files (x86)\Resource Orchestrator

- When using a 32-bit (x86) Windows OS

Default value: C:\Program Files\Resource Orchestrator

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

[Windows Manager]

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

- When using a 64-bit (x64) Windows OS

Default value: C:\Program Files (x86)\Resource Orchestrator\SVROR\ScwPro\depot

- When using a 32-bit (x86) Windows OS

Default value: C:\Program Files\Resource Orchestrator\SVROR\ScwPro\depot

[Linux Manager]

The default is as follows:

/var/opt/FJSVscw-deploysv/depot

*3: When an image operation is canceled or an error occurs, troubleshooting data regarding the image operation is backed up. During one backup, up to 16 MB or data for the last 10 times is backed up.

*4: Necessary when using power monitoring. For details, refer to "[Environmental Data Storage Area](#)".

Environmental Data Storage Area

The environmental data storage area is the area necessary when using power monitoring.

The environmental data storage area is located in the installation folder of the admin server, and is used to store environmental data collected from power monitoring targets and aggregate data.

The amount of space that is necessary for the environmental data storage area can be determined from the number of power monitoring targets being registered, the polling interval, and the period the environmental data is to be stored for.

For details on the settings, refer to "11.1.1 Settings for the Power Monitoring Environment" in the "Design Guide VE".

Estimate the necessary space using the following formula.

$\text{Necessary disk space (MB)} = (\text{detail_storage_period_ (months)} * 6 / \text{polling_interval_ (minutes)} + 10) * 3 * \text{number_of_power_monitoring_targets}$
--

Image_file_storage_area

The image file storage area is necessary when performing backup and cloning.

The image file storage area is secured on an admin server as an area to store the image files (system images and cloning images) collected through the backup and cloning of managed servers.



Note

Create the image file storage area on the local disk of the admin server, or SAN storage. It is not possible to specify folders on network drives, shared folders (NFS, SMB, etc.) on other machines on a network, or UNC format folders.

The space necessary for the image file storage area is the total amount of disk space necessary for the "system image storage area", the "cloning image storage area", and the "temporary work area".

Estimate the necessary space based on the disk space required for each storage area using the following formula.

Disk area required for image file storage area	=	A. Disk area required for system image storage area	+	B. Disk area required for cloning image storage area	+	C. Disk area required for temporary work area
--	---	---	---	--	---	---

Estimate the necessary space for the image file storage area using the following procedure.

1. Calculate the size of image files.

Calculate the image file sizes as base data for estimating the required disk space for A, B, and C indicated above.

The calculation method is given below.

$\text{File size of image files} = \text{disk_space_per_managed_server} * \text{compression_ratio}$
--

Disk_space_per_managed_server

When system construction using the same software configuration has been performed before, use the consumed disk space of that system (the sum of the disk space for each partition when dividing one disk into multiple partitions).

Check the consumed disk space using the relevant OS function.

When system construction using the same software configuration has not been performed before, calculate the disk space from the required disk space indicated in the installation guide for each piece of software.

For the OS, refer to "Example of Calculation".

Compression_ratio

The compression ratio involved when storing the consumed disk space of managed servers as an image file on the admin server.

Compression ratio is dependent on file content, and usually a compression ratio of around 50% can be expected. When there are many files that have already been compressed (installation media of software, image data, or other media), the overall compression ratio is lower.

For the OS, refer to "Example of Calculation".

An example of the calculation of disk space and the compression ratio directly after OS installation is given below.

Example

Example of Calculation

Used disk space: 1.9 GB -> After compression: 0.9 GB Compression ratio: $0.9/1.9 = 47\%$

2. Calculate the space required for the system image storage area.

The system image storage area is the area necessary when performing backup. Secure space for each managed server for which backup system images are made.

This is not necessary when not performing backup.

Calculate the size of the system image storage area based on the image file size of step 1. Estimate the area for each managed server for which system images are backed up using the following formula, and use the total as the estimated size.

$\text{Disk space required for the system image storage area} = \text{file_size_of_image_files} * \text{number_of_versions}$
--

Number_of_versions

The number of versions of system images. By default, up to three versions of system images can be managed.

Point

By reducing the number of versions of system images saved it is possible to reduce the amount of space required for the system image storage area.

For details on how to change the number of system images saved, refer to "5.8 rcxadm imagemgr" in the "Reference Guide (Command) VE".

The following is an example when three managed servers, A, B, and C are performing backup of system images, and the used disk space and compression ratios are expected to be the following values.

Example

Example of Estimation

Server A - *Image_file_size*: 3.0 GB (Used disk space: 6.0 GB, Compression ratio 50%)

Server B - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

Server C - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

$$(3.0 * 3) + (1.6 * 3) + (1.6 * 3) = 18.6 \text{ (GB)}$$

3. **Calculate the space required for the cloning image storage area.**

The cloning image storage area is the area necessary when performing cloning. Secure space for each managed server for which cloning images are collected.

This is not necessary when not performing cloning.

Calculate the size of the cloning image storage area based on the image file size of step 1. Estimate the area for each managed server from which cloning images are collected using the following formula, then set the total as the estimated size.

$$\text{Disk space required for the cloning image storage area} = \text{file_size_of_image_files} * \text{number_of_versions}$$

Number_of_versions

The number of versions of cloning images. By default, up to three versions of cloning images can be managed.



By reducing the number of versions of cloning images saved it is possible to reduce the amount of space required for the cloning image storage area.

For details on how to change the number of cloning images saved, refer to "5.8 rcxadm imagemgr" in the "Reference Guide (Command) VE".

The following is an example when managed servers A and B are used to collect cloning images, and the used disk space and compression ratios are expected to be the following values.



Example of Estimation

Server A - *Image_file_size*: 3.0 GB (Used disk space: 6.0 GB, Compression ratio 50%)

Server B - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

$$(3.0 * 3) + (1.6 * 3) = 13.8 \text{ (GB)}$$

4. **Calculate the space required for the temporary work area.**

When collecting system images or cloning images, the temporary work area is necessary to keep the former version of images until collection of new system images or cloning images is completed.

This is not necessary when not performing backup or cloning.

Calculate the size of the temporary work area based on the image file size of step 1.

Estimate the largest size of the image files of all managed servers, and determine the necessary area using the following formula.

$$\text{Disk space required for the temporary work area} = \text{largest_image_file_size} * \text{image_file_collection_multiplicity}$$

Estimate image file collection multiplicity using operational designs in which image file collection (system image backup and cloning image collection) is simultaneously performed at the limit of multiplicity for multiple managed servers under management of an admin server. However, as Resource Orchestrator is designed not to exceed four multiplicities in order to reduce the load on the admin servers, the maximum multiplicity is 4.

The following is an example when three managed servers, A, B, and C are used to collect system images or cloning images, and the file size of each image file is as below. In this example, the image file collection multiplicity is 3.



Example of Estimation

Server A - *Image_file_size*: 3.0 GB (Used disk space: 6.0 GB, Compression ratio 50%)

Server B - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

Server C - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

$3.0 * 3 = 9.0$ (GB)

5. Calculate the space necessary for the image file storage area based on the disk space calculated in steps 2 to 4.

Calculate the total amount of required space for A, B, and C calculated in steps 2 - 4. (A: Disk area required for system image storage area, B: Disk area required for cloning image storage area, C: Disk area required for temporary work area).

6.1.1.8 Memory Size

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

Consider the amount of memory necessary for required software as well as the amount of memory necessary for Resource Orchestrator.

Table 6.47 Memory Size

Software	Memory Size (Unit: MB)
[Windows Manager]	1700 (3400 when managing VM guests) (*)
[Linux Manager]	5200 (7000 when managing VM guests) (*)
Agent [Windows] [Hyper-V]	200
Agent [Linux]	500
Agent [Solaris] [Solaris Zones] [OVM for SPARC]	100
Agent [VMware]	500
Agent [Xen] [Citrix Xen] [KVM]	500
HBA address rename setup service [Windows]	300
HBA address rename Setup Service [Linux]	600

* Note: When enabling the function in "7.5.1 Enabling the Network Device Management Function" in the "User's Guide VE", an additional 600 MB are required.

6.1.2 Software Requirements (Cloud Edition)

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

6.1.2.1 Required Basic Software

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

Required Basic Software

Table 6.48 [Windows Manager] (*1) (*2)

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2012 Datacenter	Physical L-Servers do not support the following OSs.
Microsoft(R) Windows Server(R) 2012 R2 Standard	- Microsoft(R) Windows Server(R) 2012 R2 Standard
Microsoft(R) Windows Server(R) 2012 R2 Datacenter	- Microsoft(R) Windows Server(R) 2012 R2 Datacenter

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2016 Standard	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2016 Datacenter	Some of the functions provided by Resource Orchestrator cannot be used. For details, refer to " 6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016 ".

*1: This service also can be run on a VM guest OS as virtualization software.

*2: In order to use the Chinese display function of the ROR console, use an English OS.

Table 6.49 [Linux Manager] (*1)

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)	Prepare any required driver kits, update kits, or software.
Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)	For information about required software, refer to the manual of the server or the Linux installation guide.
Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)	For required packages, refer to " 6.1.2.3 Required Packages ".
Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)	The Linux Kernel version for each hardware model corresponds to the version supported by Fujitsu.
Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64) (*2)	
Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)	

*1: This service also can be run on a VM guest OS as virtualization software.

*2: Use the internal authentication function.

Table 6.50 Agent [Windows]

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2012 Datacenter	
Microsoft(R) Windows Server(R) 2012 R2 Standard	
Microsoft(R) Windows Server(R) 2012 R2 Datacenter	
Microsoft(R) Windows Server(R) 2016 Standard	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2016 Datacenter	

Table 6.51 Agent [Hyper-V]

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2012 Datacenter	Switch on the role of Hyper-V.
Microsoft(R) Windows Server(R) 2012 R2 Standard	Add MSFC.
Microsoft(R) Windows Server(R) 2012 R2 Datacenter	Only Windows managers are supported.
Microsoft(R) Windows Server(R) 2016 Standard	
Microsoft(R) Windows Server(R) 2016 Datacenter	

Table 6.52 Agent [Linux]

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.2 (for x86)	Prepare any required driver kits, update kits, or software.
Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)	

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.3 (for x86)	<p>For information about required software, refer to the manual of the server or the Linux installation guide.</p> <p>For required packages, refer to "6.1.2.3 Required Packages".</p> <p>The Linux Kernel version for each hardware model corresponds to the version supported by Fujitsu.</p>
Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.4 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.5 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.6 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.7 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.8 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.9 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.10 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 7.0 (for Intel64) (*1)	
Red Hat(R) Enterprise Linux(R) 7.4 (for Intel64) (*1, *2)	
Red Hat(R) Enterprise Linux(R) 7.5 (for Intel64) (*1, *2)	
Red Hat(R) Enterprise Linux(R) 7.6 (for Intel64) (*1, *2)	
SUSE(R) Linux Enterprise Server 11 for x86	
SUSE(R) Linux Enterprise Server 11 for EM64T	

*1: When using the PRIMEQUEST series, RHEL 7 is not supported.

*2: Disable SELinux.

Table 6.53 Agent [Solaris] [Solaris Zones]

Basic Software (OS)	Remarks
Oracle Solaris 10 (*1)	- Oracle Solaris 10
Oracle Solaris 11 (*1)	05/09 (Update7) or later versions are supported.
Oracle Solaris 11.1 (*1)	- Oracle Solaris 11
Oracle Solaris 11.2 (*1)	11/11 or later versions are supported. (*2)
Oracle Solaris 11.3 (*1)	For some functions, only 11.1 or later versions are supported.
	For details, refer to "11.1 Deciding Server Virtualization Software" in the "Design Guide CE".
	When using SAN boot, refer to the manual for Fibre Channel card driver, "SPARC Enterprise - ETERNUS SAN Boot Environment Build Guide".
	For required packages, refer to " 6.1.2.3 Required Packages ".

*1: [Solaris Zones]

Availability of features varies according to the version of the VM host. When directly operating a VM guest which corresponds to a virtual L-Server managed using Resource Orchestrator, if the VM guest is migrated between VM hosts of different versions, it will still be possible to manage the corresponding L-Server using Resource Orchestrator. However, the available functions will change depending on the version of the migration destination VM host.

*2: Management using the following functions of Oracle Solaris 11 is not possible.

- Centralized management of clouds using OpenStack
- Independent and isolated environments using kernel zones
- Software-defined networking - elastic virtual switches
- Immutable global zones

Table 6.54 Agent [OVM for SPARC]

Basic Software (OS)	Remarks
Oracle Solaris 11	When using SAN boot, refer to the manual for Fibre Channel card driver, "SPARC Enterprise - ETERNUS SAN Boot Environment Build Guide".
Oracle Solaris 11.1	
Oracle Solaris 11.2	When a guest domain on OVM for SPARC is registered as a VM Host, it is necessary to install an agent in that guest domain.
Oracle Solaris 11.3 (*)	

* Note: Coordination with BladeLogic is not possible.

Table 6.55 Agent [VMware]

Basic Software (OS)	Remarks
VMware vSphere 4.0	Install Resource Orchestrator on the VMware ESX host. (*)
VMware vSphere 4.1	When using VSAN datastores, install VMware vSphere 6 or later.
VMware vSphere 5.0	
VMware vSphere 5.1	
VMware vSphere 5.5	
VMware vSphere 6.0	
VMware vSphere 6.5	
VMware vSphere 6.7	

* Note: VMware ESXi of VMware vSphere 4.0 or earlier cannot be used for managed servers.

VMware ESXi of VMware vSphere 4.1 or later can be used for managed servers.

There is no need to install Resource Orchestrator on VMware ESXi, but agents must be registered.

 **Note**

When using Windows Server 2012 R2 or Windows Server 2016 as a guest OS, the following issue, as described by VMware, Inc., may cause the OS to not operate correctly.

URL:

https://kb.vmware.com/selfservice/search.do?cmd=displayKC&docType=kc&docTypeID=DT_KB_1_1&externalId=2059549

When using Windows Server 2012 R2 or Windows Server 2016 as a guest OS, configure the OS in advance, referring to the following.

"SCSI Controller Definition File" in "8.2.1 Creating Definition Files" in the "Setup Guide CE"

Table 6.56 Agent [Xen]

Basic Software (OS)	Remarks
Not supported from this version	-

Table 6.57 Agent [KVM]

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)	Intel64 and AMD64 are supported. (*)
Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)	

* Note: For details, refer to the following section in the "Red Hat Enterprise Linux 6 Virtualization Host Configuration and Guest Installation Guide".

- Chapter 2. System requirements

URL: https://access.redhat.com/documentation/en-US/Red_Hat_Enterprise_Linux/6/html/Virtualization_Host_Configuration_and_Guest_Installation_Guide/index.html

The manuals for Red Hat Enterprise Linux can be referred to from the following URL.

URL: https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/index.html

Table 6.58 Agent [OVM for x86 2.2]

Basic Software (OS)	Remarks
Oracle VM Server for x86 v2.2	-

Table 6.59 Agent [OVM for x86 3.x]

Basic Software (OS)	Remarks
Oracle VM Server for x86 v3.2.1	-
Oracle VM Server for x86 v3.2.2	
Oracle VM Server for x86 v3.2.3	
Oracle VM Server for x86 v3.2.4	
Oracle VM Server for x86 v3.2.6	
Oracle VM Server for x86 v3.2.7	
Oracle VM Server for x86 v3.2.8	
Oracle VM Server for x86 v3.3.1	
Oracle VM Server for x86 v3.3.2	
Oracle VM Server for x86 v3.3.3	
Oracle VM Server for x86 v3.3.4	

Table 6.60 Agent [Citrix Xen]

Basic Software (OS)	Remarks
Citrix(R) XenServer(R) 5.5 Citrix Essentials(TM) for XenServer 5.5, Enterprise Edition Citrix(R) XenServer(R) 5.6 Citrix(R) XenServer(R) 5.6 SP2	Citrix(R) XenServer(R) 6.0 or earlier versions of software support the same scope as ROR VE.

Basic Software (OS)	Remarks
Citrix(R) XenServer(R) 6.0 Citrix Essentials(TM) for XenServer 6.0, Enterprise Edition Citrix(R) XenServer(R) 6.0.2 Citrix(R) XenServer(R) 6.1.0 Citrix(R) XenServer(R) 6.2.0	

Table 6.61 HBA address rename Setup Service [Windows] (*)

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter Microsoft(R) Windows Server(R) 2012 R2 Standard Microsoft(R) Windows Server(R) 2012 R2 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2016 Standard Microsoft(R) Windows Server(R) 2016 Datacenter	The Server Core installation option is not supported.
Microsoft(R) Windows(R) 7 Professional Microsoft(R) Windows(R) 7 Ultimate	-
Windows(R) 8.1 Pro Windows(R) 8.1 Enterprise	-

* Note: This is necessary when creating physical L-Servers using rack mount or tower servers.

When using rack mount servers that are supported by VIOM or ISM, these servers can be managed using VIOM or ISM respectively.

This service also can be run on a VM guest OS as virtualization software.

Table 6.62 HBA address rename Setup Service [Linux] (*)

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.2 (for x86)	Prepare any required driver kits, update kits, or software.
Red Hat(R) Enterprise Linux(R) 6.2 (for Intel64)	For information about required software, refer to the manual of the server or the Linux installation guide.
Red Hat(R) Enterprise Linux(R) 6.3 (for x86)	For required packages, refer to " 6.1.2.3 Required Packages ".
Red Hat(R) Enterprise Linux(R) 6.3 (for Intel64)	The Linux Kernel version for each hardware model corresponds to the version supported by Fujitsu.
Red Hat(R) Enterprise Linux(R) 6.4 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.4 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.5 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.5 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.6 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.6 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.7 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.7 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.8 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.8 (for Intel64)	
Red Hat(R) Enterprise Linux(R) 6.9 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.9 (for Intel64)	

Basic Software (OS)	Remarks
Red Hat(R) Enterprise Linux(R) 6.10 (for x86)	
Red Hat(R) Enterprise Linux(R) 6.10 (for Intel64)	

* Note: This is necessary when creating physical L-Servers using rack mount or tower servers.

When using rack mount servers that are supported by VIOM or ISM, these servers can be managed using VIOM or ISM respectively.

This service also can be run on a VM guest OS as virtualization software.

Note

[VMware]

The free version of VMware ESXi cannot be used for managed servers.

When using VMware ESXi for managed servers, purchase the appropriate license.

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.

Certain functions of server virtualization software cannot be used when that software is managed using Resource Orchestrator.

[Hyper-V]

VMware ESX and Citrix(R) XenServer(TM) can be managed by SCVMM, but only VM hosts for Hyper-V can be managed when using SCVMM in Resource Orchestrator.

Table 6.63 List of Functions Not Supported by Resource Orchestrator

Server Virtualization Software	Function that Is not Supported
VMware vSphere 4.0 VMware vSphere 4.1 VMware vSphere 5.0 VMware vSphere 5.1 VMware vSphere 5.5 VMware vSphere 6.0 VMware vSphere 6.5 VMware vSphere 6.7	Cisco Nexus 1000V virtual switch
VMware vSphere 5.5 VMware vSphere 6.0 VMware vSphere 6.5 VMware vSphere 6.7	vSphere Flash Read Cache
Microsoft(R) System Center 2012 Virtual Machine Manager Microsoft(R) System Center 2012 R2 Virtual Machine Manager	Saving in the virtual machine library The following functions can be used together on Microsoft(R) System Center Virtual Machine Manager 2008 R2 SP1 or later. - Movement of storage areas

Server Virtualization Software	Function that Is not Supported
	- Movement changing the virtual machine storage destination
Oracle VM Manager	Template
Windows Server 2012 Windows Server 2012 R2 Windows Server 2016	Hyper-V replica

Note

- If an L-Server is created with a specified Windows image, when deploying the image use Sysprep, provided by Microsoft, to reconfigure 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, Sysprep can be executed a maximum of three times on the following OSs.
 - Microsoft(R) Windows(R) 7
 - Microsoft(R) Windows Vista(R)

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 that 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 have 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.
- [OVM for x86 2.2]

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

Required Basic Software: Admin Clients

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

Table 6.64 Required Basic Software: Admin Clients

Basic Software (OS)	Remarks
Microsoft(R) Windows(R) 7 Professional Microsoft(R) Windows(R) 7 Ultimate	-
Windows(R) 10 Pro Windows(R) 10 Enterprise	-
Microsoft(R) Windows Server(R) 2012 Standard Microsoft(R) Windows Server(R) 2012 Datacenter Microsoft(R) Windows Server(R) 2012 R2 Standard	The Server Core installation option is not supported.

Basic Software (OS)	Remarks
Microsoft(R) Windows Server(R) 2012 R2 Datacenter	
Microsoft(R) Windows Server(R) 2016 Standard	The Server Core installation option is not supported.
Microsoft(R) Windows Server(R) 2016 Datacenter	

6.1.2.2 Required Patches

When using Resource Orchestrator, the following patches are required.

Table 6.65 [Windows Manager]

Basic Software (OS)	Patch ID/Bundle Update
None	-

* Note: Necessary when managing a managed server in a different subnet from the admin server.

Table 6.66 [Linux Manager]

Basic Software (OS)	Patch ID/Bundle Update (*)
None	-

Table 6.67 Agent [Windows]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Necessary when using server switchover to a spare server on a managed server that is one of the following models:

- PRIMERGY BX920 S3 or later
- PRIMERGY BX924 S3 or later
- PRIMERGY BX2560 M1 or later
- PRIMERGY BX2580 M1 or later
- PRIMERGY RX200 S7 or later
- PRIMERGY RX300 S7 or later
- PRIMERGY RX2520 M1 or later
- PRIMERGY RX2530 M1 or later
- PRIMERGY RX2540 M1 or later
- PRIMERGY RX4770 M1 or later

Table 6.68 Agent [Hyper-V]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.69 Agent [Linux]

Basic Software (OS)	Patch ID/Bundle Update (*)
None	-

Table 6.70 Agent [Solaris] [Solaris Zones] [OVM for SPARC]

Basic Software (OS)	Patch ID/Bundle Update
Oracle Solaris 11	SRU12111(SRU1.4) or later (*)

* Note: Required when using OVM for SPARC for a managed server.

Table 6.71 Agent [VMware]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.72 Agent [Xen] [Citrix Xen] [KVM]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.73 Agent [OVM for x86 2.2] [OVM for x86 3.x]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.74 HBA address rename setup service [Windows]

Basic Software (OS)	Patch ID/Bundle Update
None	-

Table 6.75 HBA address rename Setup Service [Linux]

Basic Software (OS)	Patch ID/Bundle Update (*)
None	-

[Hyper-V]

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

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

6.1.2.3 Required Packages

The packages listed below are required when using Resource Orchestrator.

Install the required packages beforehand, if necessary.

The architecture of the required packages to be installed is shown enclosed by parenthesis "()".

For the packages followed by "(32bit)", install either the i386 or i686 package.

For the items with no architecture to be installed is specified, install the package of the same architecture as the OS.

Table 6.76 Required Packages of Manager for Red Hat Enterprise Linux 6 [Linux Manager]

Conditions	Required Packages
Always required	alsa-lib(32bit) apr(32bit) apr-util(32bit) audit audit-libs(32bit) cloog-ppl compat-expat1(32bit) compat-libtermcap(32bit)

Conditions	Required Packages
	compat-openldap(32bit) compat-readline5(32bit) cpp cracklib(32bit) cyrus-sasl-lib(32bit) db4(32bit) elfutils-libelf(32bit) expat(32bit) file gcc gcc-c++ glibc(32bit) glibc-devel(32bit) glibc-headers kernel-headers keyutils-libs(32bit) krb5-libs(32bit) libattr(32bit) libcap(32bit) libcom_err(32bit) libgcc(32bit) libgomp libICE(32bit) libselenium(32bit) libSM(32bit) libstdc++(32bit) libstdc++-devel libtool-ltdl(32bit) libuuid(32bit) libX11(32bit) libX11-common(noarch) libXau(32bit) libxcb(32bit) libXext(32bit) libXi(32bit) libxml2(32bit) libXp(32bit) libXt(32bit) libXtst(32bit)

Conditions	Required Packages
	make mpfr ncurses-libs(32bit) net-snmp net-snmp-utils nspr nss nss-util nss-softokn-freebl(32bit) openssl(32bit) (*1) openssl098e(32bit) (*1) pam(32bit) perl perl-libs perl-Module-Pluggable perl-Pod-Escapes perl-Pod-Simple perl-version policycoreutils policycoreutils-python ppl readline(32bit) redhat-lsb sqlite(32bit) sysstat tssh unixODBC(32bit) unzip X-Window (*2) zlib(32bit)
Necessary when managing a managed server within a separate subnet to the admin server	openldap

*1: For openssl(32bit) and openssl098e(32bit), install the latest package.

*2: Install an OS, specifying a package.

Table 6.77 Required Packages of Manager for Red Hat Enterprise Linux 5 [Linux Manager]

Conditions	Required Packages
None, as RHEL 5 is not supported from this version	-

Table 6.78 Required Packages of Agent for Red Hat Enterprise Linux 7 [Linux]

Conditions	Required Packages
Always required	alsa-lib(32bit) audit glibc(32bit) libgcc(32bit) libICE(32bit) libSM(32bit) libstdc++(32bit) libtool-ltdl(32bit) libuuid(32bit) libX11(32bit) libXau(32bit) libxcb(32bit) libXext(32bit) libXi(32bit) libXt(32bit) libXtst(32bit) ncurses-libs(32bit) net-snmp-utils policycoreutils policycoreutils-python readline(32bit) sqlite(32bit) sysfsutils unixODBC(32bit)

Table 6.79 Required Packages of Agent for Red Hat Enterprise Linux 6 [Linux] [KVM]

Conditions	Required Packages
Always required	alsa-lib(32bit) audit glibc(32bit) libgcc(32bit) libICE(32bit) libSM(32bit) libstdc++(32bit) libtool-ltdl(32bit) libuuid(32bit) libX11(32bit) libXau(32bit) libxcb(32bit)

Conditions		Required Packages
		libXext(32bit) libXi(32bit) libXt(32bit) libXtst(32bit) ncurses-libs(32bit) net-snmp-utils policycoreutils policycoreutils-python readline(32bit) sqlite(32bit) sysfsutils unixODBC(32bit)
Necessary when installing an agent (dashboard functions)	Necessary when the OS architecture is Intel64 or x86	redhat-lsb sysstat
	Necessary when the OS architecture is Intel64	libxml2(32bit)
	Necessary when the OS architecture is x86	ncurses
[KVM] Necessary when either of the following conditions is met: - The OS architecture is Intel64 and a Linux (SELinux) cloning image is being used - The OS architecture is Intel64, the OS type is Linux, and a cloning image with "Virtual Disk" configured for the storage location is being used		fuse.x86_64 - For RHEL6.2 libguestfs-mount.x86_64 - For RHEL6.3 or later libguestfs-tools-c.x86_64
[KVM] Necessary when all of the following conditions are met: - The OS architecture is Intel64 - When using a Windows cloning image		libguestfs-tools.x86_64 libguestfs-tools-c.x86_64 libguestfs-winsupport.x86_64 (*) perl-libintl.x86_64 perl-Sys-Guestfs.x86_64 perl-Sys-Virt.x86_64 perl-XML-Parser.x86_64 perl-XML-Writer.noarch perl-XML-XPath.noarch For RHEL6.2, the following packages are necessary. guestfish.x86_64 libguestfs-mount.x86_64

* Note: Obtain libguestfs-winsupport from the "RHEL V2VWIN (v. 6 for 64-bit x86_64)" channel for Red Hat Network.

For details, refer to the following section in the "Virtualization Administration Guide".

- Chapter 16. Guest virtual machine disk access with offline tools

URL:

http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/6/html/Virtualization_Administration_Guide/index.html

The manuals for Red Hat Enterprise Linux can be referred to from the following URL.

URL:

https://access.redhat.com/site/documentation/en-US/Red_Hat_Enterprise_Linux/index.html

Table 6.80 Required Packages of Agent for Red Hat Enterprise Linux 5 [Linux] [Xen]

Conditions	Required Packages
None	-

Table 6.81 Required Packages of HBA address rename Setup Service for Red Hat Enterprise Linux 6 [Linux]

Conditions	Required Packages
Always required	alsa-lib(32bit) audit Desktop (*) glibc(32bit) libgcc(32bit) libICE(32bit) libSM(32bit) libstdc++(32bit) libtool-ltdl(32bit) libuuid(32bit) libX11(32bit) libXau(32bit) libxcb(32bit) libXext(32bit) libXi(32bit) libXt(32bit) libXtst(32bit) ncurses-libs(32bit) policycoreutils policycoreutils-python readline(32bit) sqlite(32bit) unixODBC(32bit) X-Window (*)

* Note: Install an OS, specifying a package.

Table 6.82 Required Packages of HBA address rename Setup Service for Red Hat Enterprise Linux 5 [Linux] [Xen]

Conditions	Required Packages
None, as RHEL 5 is not supported from this version	-

Table 6.83 Required Packages of Agent [Solaris] [Solaris Zones] [OVM for SPARC] [OVM for x86 3.x]

Conditions	Required Packages
[Solaris] [Solaris Zones] [OVM for SPARC] The OS is Oracle Solaris 11	compatibility/ucb system/accounting/legacy-accounting
[OVM for x86 3.x] Always required	redhat-lsb sysstat

6.1.2.4 Required Software

The software listed below is required when using Resource Orchestrator.

Required Software (Windows Manager)

The required software for Windows manager is as follows.

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

When the ROR console is started on Windows manager, the required software of the admin client is also necessary.

Table 6.84 [Windows Manager]

Required Software	Version	Remarks
ServerView Operations Manager	V5.30 - V7.02 V7.11.07 V7.20.03 (*1) V7.20.08 (*1) V7.20.10 (*1) V8.10.01 (*1) V8.20.02 (*1) V8.21.00 (*1) V8.41.01 (*1) V8.51.00 (*1)	Necessary to use the following functions: - Single Sign-On - VIOM coordination - Calling of the Web UI of server management software from the ROR console - Using VMware ESXi as a managed server on PRIMERGY series or PRIMEQUEST servers - Starting the console window of a physical server
	V6.21 - V7.02 V7.11.07 V7.20.03 (*1) V7.20.08 (*1) V7.20.10 (*1) V8.10.01 (*1) V8.20.02 (*1) V8.21.00 (*1) V8.41.01 (*1) V8.51.00 (*1)	This is necessary when viewing the ServerView Fabric Manager Web UI from the ROR console.
BACS or Intel PROSet or	-	Necessary when performing redundancy of the admin LAN for admin servers. When using GLS, also apply the latest patches for GLS.

Required Software	Version	Remarks
OneCommand NIC Teaming and Multiple VLAN Manager		
PRIMECLUSTER GLS for Windows	4.4 or earlier	
ServerView Virtual-IO Manager	2.6 or later	<p>Necessary when creating physical L-Servers using blade servers.</p> <p>Refer to the README of VIOM for the managed servers supported by VIOM.</p> <p>When the basic software is Windows Server 2016, coordination with VIOM is not possible. For details, refer to "6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016".</p>
ServerView Infrastructure Manager	2.2	Necessary when using I/O virtualization using ISM.
Infrastructure Manager	2.3 2.4.0.c or later 2.5 2.6 or later	<p>Necessary when performing physical server switchover or physical L-Server deployment for the following models of servers:</p> <ul style="list-style-type: none"> - PRIMERGY RX series models M4 or later - PRIMERGY CX series models M4 or later <p>As it is an appliance, it must be placed on a different server from the manager.</p> <p>Refer to the README of ISM for the managed servers supported by ISM.</p> <p>A DHCP server is necessary when using PXE boot in ISM.</p> <p>It is necessary to install a Resource Orchestrator agent on the DHCP server.</p> <p>ISM is used on server models that do not support VIOM to provide VIOM coordination functions.</p> <p>However, the following are not supported.</p> <ul style="list-style-type: none"> - Registration of server management software (ISM) using pre-configuration - High availability configurations of admin servers
VMware vCenter Server	4.0 4.1 5.0 5.1 5.5 6.0 6.5 6.7	<p>[VMware]</p> <p>Necessary for management of VM guests and VM hosts.</p> <p>Can be placed on the same admin server as the manager or on another server.</p>
VMware vCenter Server Appliance	6.0 6.5 6.7	<p>[VMware]</p> <p>Necessary for management of VM guests and VM hosts.</p> <p>Software which is equivalent to vCenter Server. However, as it is an appliance, it must be placed on a different server from the manager.</p>

Required Software	Version	Remarks
		Also, when using VSAN datastores, it is not possible to configure a virtual machine storage policy other than the default for virtual disks.
SNMP Service	-	This is used to monitor events that occur on managed servers. It is used by ServerView Operations Manager.
SNMP Trap Service (Standard OS service)	-	This is used to monitor events that occur on managed servers. It is used by ServerView Operations Manager. Necessary when receiving SNMP traps from servers and devices.
DHCP Server (Standard OS service)	-	Necessary when managing a managed server in a different subnet from the admin server.
Microsoft(R) System Center 2012 Virtual Machine Manager or Microsoft(R) System Center 2012 R2 Virtual Machine Manager or Microsoft(R) System Center 2016 Virtual Machine Manager	-	[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. Cannot be placed on the same server as a VM host, when simplifying of network settings is used. Configure control settings for a maximum of 31 sessions, referring to "SCVMM Server Web Services for Management Settings" in "E.2.5 Pre-setup Preparations in Hyper-V Environments" in the "Design Guide CE". It is necessary to install Microsoft(R) SQL Server, Windows AIK, or Windows ADK beforehand, when using Microsoft(R) System Center 2012 Virtual Machine Manager. It is necessary to install Microsoft(R) SQL Server and Windows ADK beforehand, when using Microsoft(R) System Center 2012 R2 Virtual Machine Manager. For details, confirm the system requirements for the relevant product. When only using Microsoft(R) System Center 2012 Virtual Machine Manager or later, the content of disks deleted from virtual L-Servers can be saved.
Windows PowerShell	2.0 or later	[Hyper-V] Necessary for management of VM guests and VM hosts.
	3.0 or later	When performing the following operations using VSAN datastores, it is necessary to configure a virtual machine storage policy other than the default for virtual disks. - Creating L-Servers - Attaching virtual disks to L-Servers
ETERNUS SF Storage Cruiser Manager	14.2/14.2A	- Necessary on the managed server (SPARC M10/M12 or SPARC Enterprise) when using the storage affinity switchover method for server switchover. - Necessary on the managed server (PRIMERGY) when creating a physical L-Server with an ETERNUS LUN connected.

Required Software	Version	Remarks
		<ul style="list-style-type: none"> - Apply one of the following: <ul style="list-style-type: none"> - Patch T004615WP-08 or later for ETERNUS SF Storage Cruiser14.2 manager - Patch T005766WP-01 or later for ETERNUS SF Storage Cruiser14.2A manager
	15.0 or later	<ul style="list-style-type: none"> - Necessary on the managed server (SPARC M10/M12 or SPARC Enterprise) when using the storage affinity switchover method for server switchover. - Necessary on the managed server (PRIMERGY) when creating a physical L-Server with an ETERNUS LUN connected. <p>For ETERNUS LUN connected to a physical L-Server, the following functions of ETERNUS are supported in addition to the ones supported by 14.2/14.2A:</p> <ul style="list-style-type: none"> - Thin Provisioning - Dynamic LUN Mirroring - Automatic Storage Layering - Necessary when using the Disaster Recovery function of DR Option and ETERNUS storage.
	16.0 or later	<ul style="list-style-type: none"> - Necessary on the managed server (SPARC M10/M12 or SPARC Enterprise) when using the storage affinity switchover method for server switchover. - Necessary on the managed server (PRIMERGY) when creating a physical L-Server with an ETERNUS LUN connected. <p>For ETERNUS LUN connected to a physical L-Server, the following functions of ETERNUS are supported in addition to the ones supported by 14.2/14.2A:</p> <ul style="list-style-type: none"> - Thin Provisioning - Dynamic LUN Mirroring - Automatic Storage Layering - Necessary when using the Disaster Recovery function of DR Option and ETERNUS storage. <ul style="list-style-type: none"> - Apply the following patch: <ul style="list-style-type: none"> - Patch T009283WP-03 or later for ETERNUS SF Storage Cruiser 16.0 manager <p>When managing ETERNUS DX200 S3/DX500 S3/DX600 S3/DX8700 S3/DX8900 S3/DX200F/DX200 S4/DX500 S4/DX600 S4/DX200 S5/AF250 S3 using ETERNUS SF Storage Cruiser 16.1 or later, note the following points:</p> <ul style="list-style-type: none"> - Do not use the CA port that is a target of CA port pairing performed using the Storage Cluster function, on physical L-Servers. For how to specify the CA ports used by physical L-Servers, refer to "7.1.1 Creating Definition Files Combining Ports of SAN Storage" in the "Setup Guide CE".

Required Software	Version	Remarks
		<ul style="list-style-type: none"> - Do not connect a managed server (SPARC M10/M12 or SPARC Enterprise) which uses the storage affinity switchover method for server switchover, to the CA port that is a target of CA port pairing performed using the Storage Cluster function. - Do not specify the CA port used by an already created physical L-Server or a managed server (SPARC M10/M12 or SPARC Enterprise) which uses using the storage affinity switchover method for server switchover, as the target of CA port pairing performed using the Storage Cluster function. - When installing ETERNUS SF Storage Cruiser only to use VVOL as a disk for virtual L-Servers, it is not necessary to install it on the same server as the manager. - If the storage device is an ETERNUS DX8900 S4/ ETERNUS DX900 S5/ETERNUS DX600 S5/ETERNUS DX500 S5/ETERNUS AF650 S3, the storage affinity switchover method for server switchover and connecting the storage device to the physical L-Server are not supported.
ETERNUS SF AdvancedCopy Manager Copy Control Module	15.0 or later	<ul style="list-style-type: none"> - Necessary on managed servers (PRIMERGY) when creating physical L-Servers with ETERNUS LUNs connected and using the following ETERNUS functions on ETERNUS LUNs connected to physical L-Servers: <ul style="list-style-type: none"> - Dynamic LUN Mirroring - Necessary when using the Disaster Recovery function of DR Option and ETERNUS storage. - Necessary when using high availability for storage chassis on physical L-Servers with ETERNUS LUNs connected.
	16.0 or later	<ul style="list-style-type: none"> - Necessary on managed servers (PRIMERGY) when creating physical L-Servers with ETERNUS LUNs connected and using the following ETERNUS functions on ETERNUS LUNs connected to physical L-Servers: <ul style="list-style-type: none"> - Dynamic LUN Mirroring - Necessary when using the Disaster Recovery function of DR Option and ETERNUS storage. - Necessary when using high availability for storage chassis on physical L-Servers with ETERNUS LUNs connected. - Apply the following patch: <ul style="list-style-type: none"> - Patch T009283WP-03 or later for ETERNUS SF Storage Cruiser 16.0 manager
NaviSphere Manager	6.29	Necessary when connecting an EMC CLARiiON LUN to a physical L-Server.
NavisecCLI	7.30 or later	Necessary when connecting an EMC CLARiiON LUN or EMC VNX LUN to a physical L-Server.
SymCLI	-	Necessary when connecting an EMC Symmetrix DMX or EMC Symmetrix VMAX device to a physical L-Server.
Solutions Enabler	7.1.2 or later	Necessary when connecting an EMC Symmetrix DMX or EMC Symmetrix VMAX device to a physical L-Server.

Required Software	Version	Remarks
		<p>Necessary to connect the server on which Solutions Enabler is operated to storage using a Fibre Channel connection.</p> <p>Can be installed on the same admin server as the manager or on another admin server.</p>
Oracle VM Manager	2.2	<p>[OVM for x86 2.2]</p> <p>Necessary for management of VM guests and VM hosts.</p> <p>Oracle VM Manager cannot be installed in Windows environments.</p> <p>For details on the installation environment, refer to the manuals provided by Oracle. (*2)</p>
	3.2.1 or later	<p>[OVM for x86 3.x]</p> <p>Necessary for management of VM guests and VM hosts.</p> <p>Oracle VM Manager cannot be installed in Windows environments.</p> <p>For details on the installation environment, refer to the manuals provided by Oracle. (*2)</p>
BMC BladeLogic Server Automation	8.3 (*3)	<p>[Solaris Zones] [OVM for SPARC]</p> <p>Necessary when using the functions with "Yes (*)" described in "Table: Functional Differences Depending on Server Virtualization Software" in "11.1 Deciding Server Virtualization Software" in the "Design Guide CE".</p> <p>Can be placed on the same server as the manager (recommended) or on another server.</p> <p>When operating managers in clusters, place it on a different server.</p> <p>When the basic software is Windows Server 2016, coordination with BladeLogic is not possible. For details, refer to "6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016".</p>
BMC BladeLogic Server Automation Console	8.3	<p>[Solaris Zones] [OVM for SPARC]</p> <p>Necessary when using the functions with "Yes (*)" described in "Table: Functional Differences Depending on Server Virtualization Software" in "11.1 Deciding Server Virtualization Software" in the "Design Guide CE".</p> <p>Install it on the same server as the manager.</p> <p>When the basic software is Windows Server 2016, coordination with BladeLogic is not possible. For details, refer to "6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016".</p>
SAN Client CLI	7.00	<p>Necessary when connecting a Virtual Device of FalconStor NSS to a physical L-Server.</p> <p>Download this software from the FalconStor customer support portal.</p>
ServerView Fabric Manager	V2.00.40 or later	Necessary when registering ServerView Fabric Manager as Converged Fabric management software.
VMware Horizon View	5.2.x	Necessary for using the VDI coordination function.

Required Software	Version	Remarks
	5.3.x6.0.x	
VMware vSphere PowerCLI (32bit) (*4)	6.0 or later	When performing the following operations using VSAN datastores, it is necessary to configure a virtual machine storage policy other than the default for virtual disks. <ul style="list-style-type: none"> - Creating L-Servers - Attaching virtual disks to L-Servers
VMware HTML Console SDK	2.1.0	[VMware] Necessary when using the functions of VMware vSphere 6.5 or later for connecting with the virtual L-Server console. Obtain it from the VMware web site. (*5)

*1: When installing ServerView Operations Manager, select [Intermediate] or [Old] on the [Security Configuration] window. [Modern] is not supported.

*2: Check the following Oracle web site:

URL: <http://www.oracle.com/technetwork/documentation/vm-096300.html>

*3 [OVM for SPARC]

When using an Oracle Solaris 11.2 AI server and creating a virtual L-Server, it is necessary to apply a Hotfix.

Contact Fujitsu technical staff, and obtain the following Hotfix.

- 8.3 SP3 Hotfix Rev 194

*4: In order to use the function to connect to the console of VMware vSphere 6.5, VMware vSphere PowerCLI 6.5 or later is required.

*5: Obtain the VMware HTML Console SDK 2.1.0 from the following VMware web site.

VMware web site

URL: <https://www.vmware.com/support/developer/html-console/index.html>

Required Software (Linux Manager)

Required Software for Linux Manager is as follows.

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

Table 6.85 [Linux Manager]

Required Software	Version	Remarks
ServerView Operations Manager	V5.30 - V7.00 V7.02 V8.41.01 (*1) V8.51.00 (*1)	Necessary to use the following functions: <ul style="list-style-type: none"> - Single Sign-On - VIOM coordination - Calling of the Web UI of server management software from the ROR console - Using VMware ESXi as a managed server on PRIMERGY series or PRIMEQUEST servers - Starting the console window of a physical server
ServerView Virtual-IO Manager	2.6 or later	Necessary when creating physical L-Servers using blade servers. Refer to the README of VIOM for the managed servers supported by VIOM.
ServerView Infrastructure Manager	2.2	Necessary when using I/O virtualization using ISM.
Infrastructure Manager	2.3 2.4.0.c or later	Necessary when performing physical server switchover or physical L-Server deployment for the following models of servers: <ul style="list-style-type: none"> - PRIMERGY RX series models M4 or later

Required Software	Version	Remarks
	2.5 2.6 or later	<ul style="list-style-type: none"> - PRIMERGY CX series models M4 or later <p>As it is an appliance, it must be placed on a different server from the manager.</p> <p>Refer to the README of ISM for the managed servers supported by ISM.</p> <p>A DHCP server is necessary when using PXE boot in ISM.</p> <p>It is necessary to install a Resource Orchestrator agent on the DHCP server.</p> <p>ISM is used on server models that do not support VIOM to provide VIOM coordination functions.</p> <p>However, the following are not supported.</p> <ul style="list-style-type: none"> - Registration of server management software (ISM) using pre-configuration - High availability configurations of admin servers
PRIMECLUSTER GLS	4.4 or earlier	Necessary when performing redundancy of the admin LAN for admin servers.
VMware vCenter Server	4.0 4.1 5.0 5.1 5.5 6.0 6.5 6.7	<p>[VMware]</p> <p>Necessary for management of VM guests and VM hosts.</p> <p>VMware vCenter Server cannot be installed in Linux environments.</p> <p>For details on the installation environment, refer to the manuals provided by VMware. (*2)</p>
VMware vCenter Server Appliance	6.0 6.5 6.7	<p>[VMware]</p> <p>Necessary for management of VM guests and VM hosts.</p> <p>Software which is equivalent to vCenter Server. However, as it is an appliance, it must be placed on a different server from the manager.</p>
ETERNUS SF Storage Cruiser Manager	14.2/14.2A 15.0 or later	<ul style="list-style-type: none"> - Necessary on the managed server (SPARC M10/M12 or SPARC Enterprise) when using the storage affinity switchover method for server switchover. - Necessary on the managed server (PRIMERGY) when creating a physical L-Server with an ETERNUS LUN connected. - Apply one of the following: <ul style="list-style-type: none"> - Patch T004706LP-08 or later (x86), T004617LP-08 (Intel64) or later for ETERNUS SF Storage Cruiser14.2 manager - Patch T005768LP-01 or later (x86), T005769LP-01 (Intel64) or later for ETERNUS SF Storage Cruiser14.2A manager <p>For ETERNUS LUN connected to a physical L-Server, the following functions of ETERNUS are supported in addition to the ones supported by 14.2/14.2A:</p> <ul style="list-style-type: none"> - Thin Provisioning - Dynamic LUN Mirroring - Automatic Storage Layering

Required Software	Version	Remarks
	16.0 or later	<ul style="list-style-type: none"> - Necessary on the managed server (SPARC M10/M12 or SPARC Enterprise) when using the storage affinity switchover method for server switchover. - Necessary on the managed server (PRIMERGY) when creating a physical L-Server with an ETERNUS LUN connected. <p>For ETERNUS LUN connected to a physical L-Server, the following functions of ETERNUS are supported in addition to the ones supported by 14.2/14.2A:</p> <ul style="list-style-type: none"> - Thin Provisioning - Dynamic LUN Mirroring - Automatic Storage Layering - Apply the following patch: <ul style="list-style-type: none"> - Patch T009286LP-03 or later for ETERNUS SF Storage Cruiser 16.0 manager <p>When managing ETERNUS DX200 S3/DX500 S3/DX600 S3/DX8700 S3/DX8900 S3/DX200F/DX200 S4/DX500 S4/DX600 S4/DX200 S5/AF250 S3 using ETERNUS SF Storage Cruiser 16.1 or later, note the following points:</p> <ul style="list-style-type: none"> - Do not use the CA port that is a target of CA port pairing performed using the Storage Cluster function, on physical L-Servers. For how to specify the CA ports used by physical L-Servers, refer to "7.1.1 Creating Definition Files Combining Ports of SAN Storage" in the "Setup Guide CE". - Do not connect a managed server (SPARC M10/M12 or SPARC Enterprise) which uses the storage affinity switchover method for server switchover, to the CA port that is a target of CA port pairing performed using the Storage Cluster function. - Do not specify the CA port used by an already created physical L-Server or a managed server (SPARC M10/M12 or SPARC Enterprise) which uses using the storage affinity switchover method for server switchover, as the target of CA port pairing performed using the Storage Cluster function. - If the storage device is an ETERNUS DX 8900 S4/ETERNUS DX900 S5/ETERNUS DX600 S5/ETERNUS DX500 S5/ETERNUS AF650 S3, the storage affinity switchover method for server switchover and connecting the storage device to the physical L-Server are not supported.
ETERNUS SF AdvancedCopy Manager Copy Control Module	15.0 or later	<ul style="list-style-type: none"> - Necessary on managed servers (PRIMERGY) when creating physical L-Servers with ETERNUS LUNs connected and using the following ETERNUS functions on ETERNUS LUNs connected to physical L-Servers: <ul style="list-style-type: none"> - Dynamic LUN Mirroring - Necessary when using high availability for storage chassis on physical L-Servers with ETERNUS LUNs connected.
	16.0 or later	<ul style="list-style-type: none"> - Necessary on managed servers (PRIMERGY) when creating physical L-Servers with ETERNUS LUNs connected and using the following ETERNUS functions on ETERNUS LUNs connected to physical L-Servers: <ul style="list-style-type: none"> - Dynamic LUN Mirroring - Necessary when using high availability for storage chassis on physical L-Servers with ETERNUS LUNs connected. - Apply the following patch: <ul style="list-style-type: none"> - Patch T009286LP-03 or later for ETERNUS SF AdvancedCopy Manager 16.0 manager
NaviSphere Manager	6.29	Necessary when connecting an EMC CLARiON LUN to a physical L-Server.

Required Software	Version	Remarks
NavisecCLI	7.30 or later	Necessary when connecting an EMC CLARiiON LUN or EMC VNX LUN to a physical L-Server.
SymCLI	-	Necessary when connecting an EMC Symmetrix DMX or EMC Symmetrix VMAX device to a physical L-Server.
Solutions Enabler	7.1.2 or later	Necessary when connecting an EMC Symmetrix DMX or EMC Symmetrix VMAX device 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.
Oracle VM Manager	2.2	[OVM for x86 2.2] Necessary for management of VM guests and VM hosts. Oracle VM Manager may not be able to be installed in the same environment as the manager of Resource Orchestrator. For details on the installation environment, refer to the manuals provided by Oracle. (*3)
	3.2.1 or later	[OVM for x86 3.x] Necessary for management of VM guests and VM hosts. Oracle VM Manager may not be able to be installed in the same environment as the manager of Resource Orchestrator. For details on the installation environment, refer to the manuals provided by Oracle. (*3)
DHCP Server (Standard OS service)	-	Necessary when managing a managed server in a different subnet from the admin server.
BMC BladeLogic Server Automation	8.3	[Solaris Zones] [OVM for SPARC] Necessary when using the functions with "Yes (*)" described in "Table: Functional Differences Depending on Server Virtualization Software" in "11.1 Deciding Server Virtualization Software" in the "Design Guide CE". Can be placed on the same server as the manager (recommended) or on another server. When operating managers in clusters, place it on a different server.
BMC BladeLogic Server Automation Console	8.3	[Solaris Zones] [OVM for SPARC] Necessary when using the functions with "Yes (*)" described in "Table: Functional Differences Depending on Server Virtualization Software" in "11.1 Deciding Server Virtualization Software" in the "Design Guide CE". Install it on the same server as the manager.
SAN Client CLI	7.00	Necessary when connecting a Virtual Device of FalconStor NSS to a physical L-Server. Download this software from the FalconStor customer support portal.
Windows PE	5.1(amd64) 3.1(amd64) 3.1(x86)	When using the following functions in this product, it is necessary to place the Windows PE on the manager of Resource Orchestrator. <ul style="list-style-type: none"> - Backup and restore of physical servers - Collection and deployment of physical server cloning images - Server switchover of physical servers (backup and restore method) - Creation of physical L-Servers - Backup and restore of physical L-Servers - Collection and deployment of physical L-Server cloning images - Powering on of defined physical L-Servers (with image distribution)

Required Software	Version	Remarks
		<ul style="list-style-type: none"> - Creation of L-Platforms containing physical L-Servers - Addition of physical L-Servers using reconfiguration of L-Platforms

*1: When installing ServerView Operations Manager, select [Intermediate] or [Old] on the [Security Configuration] window. [Modern] is not supported.

*2: Check the following VMware web site.

URL: <https://www.vmware.com/jp/support/support-resources/pubs/>

*3: Check the following Oracle web site.

URL: <http://www.oracle.com/technetwork/documentation/vm-096300.html>

*4: For Linux manager, it is not possible to register ServerView Fabric Manager as Converged Fabric management software.

To register ServerView Fabric Manager as Converged Fabric management software, use Windows manager.

Required Software (Agent)

Table 6.86 Agent [Windows] (*)

Required Software	Version	Remarks
ServerView Agents for Windows	V4.50.05 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.
Intel PROSet or OneCommand NIC Teaming and Multiple VLAN Manager	-	Necessary when performing redundancy of the admin LAN and public LAN for managed servers. When using GLS, also apply the latest patches for GLS.
PRIMECLUSTER GLS for Windows	4.4 or earlier	
ETERNUS Multipath Driver	V2.0L10 or later	Necessary for multipath connections between servers and storage units (ETERNUS). Versions differ depending on the 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 the 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, EMC VNX, EMC Symmetrix DMX, or EMC Symmetrix VMAX). Versions differ depending on the OS and storage types. Refer to PowerPath support information.
DynaPath	v6.00 b1018 or later (For Windows Server 2008 R2)	Necessary for multipath connections between physical L-Servers and storage servers on which FalconStor NSS operates. Versions differ depending on the OS and storage types. Refer to DynaPath support information.

* Note: The above software is not required when installing an agent on a DHCP server that was installed for the purpose of enabling ISM coordination.

Table 6.87 Agent [Linux]

Required Software	Version	Remarks
ServerView Agents Linux	V4.90.14 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.
ETERNUS Multipath Driver	V2.0L02 or later	Necessary for multipath connections between servers and storage units (ETERNUS). Versions differ depending on the OS and storage types. Refer to ETERNUS Multipath Driver support information.
PowerPath	5.3	Necessary for multipath connections between servers and storage units (EMC CLARiON, EMC VNX, EMC Symmetrix DMX, or EMC Symmetrix VMAX). Versions differ depending on the OS and storage types. Refer to PowerPath support information.
DM-Multipath	OS standard	Necessary for multipath connections between physical L-Servers and storage servers on which FalconStor NSS operates.

Table 6.88 Agent [Red Hat Enterprise Linux]

Required Software	Version	Remarks
PRIMECLUSTER GLS	4.2A00 - 4.4	Necessary when performing redundancy of the admin LAN and public LAN for managed servers.

Table 6.89 Agent [Solaris] [Solaris Zones] [OVM for SPARC]

Required Software	Version	Remarks
PRIMECLUSTER GLS	4.2 - 4.4	Necessary when performing redundancy of the admin LAN and public LAN for managed servers.
BMC BladeLogic RSCD Agent	8.3	[Solaris Zones] [OVM for SPARC] Necessary when using the functions with "Yes (*)" described in "Table: Functional Differences Depending on Server Virtualization Software" in "11.1 Deciding Server Virtualization Software" in the "Design Guide CE".
Oracle VM Server for SPARC Software	3.0 or later	Required when using the control domain of OVM for SPARC for an agent.

Table 6.90 Agent [VMware]

Required Software	Version	Remarks
ServerView Agents for VMware	V4.30-20 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST. Not necessary when using VMware ESXi for the agent.
ServerView ESXi CIM Provider	1.10.01 or later	Necessary when using VMware ESXi as a managed server. The compatible version varies depending on the version of ESXi you use. For details, refer to the operating environment conditions for ServerView ESXi CIM Provider. Not necessary when using VMware ESXi on another vendor's servers or when not using ServerView ESXi CIM Provider on VMware ESXi on Fujitsu rack mount servers.

Table 6.91 Agent [Hyper-V] (*)

Required Software	Version	Remarks
ServerView Agents for Windows	V4.50.05 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.

Required Software	Version	Remarks
Intel PROSet	15.6.25.0 or later	<p>Necessary to automatically perform the following configurations using Intel PROSet on blade servers:</p> <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 uplink ports <p>This is not necessary when the following applies:</p> <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	4.4 or earlier	<p>After configuring redundancy for blade servers using GLS, this is necessary when performing the following configurations automatically:</p> <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 uplink ports <p>This is not necessary when the following applies:</p> <ul style="list-style-type: none"> - When not performing network redundancy for L-Servers using blade servers - When using servers other than blade servers <p>For details, refer to "2.2.7 Simplifying Networks" in the "Design Guide CE".</p>

* Note: The above software is not required when installing an agent on a DHCP server that was installed for the purpose of enabling ISM coordination.

Table 6.92 Agent [Xen]

Required Software	Version	Remarks
ServerView Agents for Linux	V4.81-14 or later	Necessary when using PRIMEQUEST series servers.
PRIMECLUSTER GDS	-	Necessary when using RHEL5-Xen servers.

Table 6.93 Agent [KVM]

Required Software	Version	Remarks
ServerView Agents for Linux	V5.1 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.

Table 6.94 Agent [Citrix Xen]

Required Software	Version	Remarks
ServerView Agents for Citrix XenServer	4.92.66 or later	Required for managing server information of PRIMERGY and PRIMEQUEST.

Table 6.95 Agent [OVM for x86 2.2] [OVM for x86 3.x]

Required Software	Version	Remarks
ServerView Agents for Linux	5.0 or later	Required for collecting and managing server information of PRIMERGY and PRIMEQUEST.

Required Software (HBA address rename Setup Service)

Table 6.96 HBA address rename setup service [Windows]

Required Software	Version	Remarks
Internet Explorer	11	Necessary for displaying the online help.

Table 6.97 HBA address rename Setup Service [Linux]

Required Software	Version	Remarks
Firefox	3	Necessary for displaying the online help.

Required Software: Admin Clients

The following software is necessary for admin clients.

Table 6.98 List of Required Software for Admin Clients

Required Software	Version	Remarks
Internet Explorer	11 (*1, *2, *3)	Internet Explorer or Firefox is required to display the ROR console.
Firefox (*7)	ESR68 (*8)	When using Windows 10, Microsoft(R) Edge cannot be used.
Adobe Flash Player	10.3.183.5 or higher	Used for displaying the ROR console and the dashboard on admin clients.
VMware vSphere(R) Client	4.0 (*4) 4.1 (*4) 5.0 (*4) 5.1 (*4) 5.5 (*4) 6.0 (*4)	[VMware] Necessary on admin clients when using the functions for coordinating with VMware or the VM management software on managed servers.
Hyper-V Manager	(*4)	[Hyper-V] Necessary on admin clients when using the functions for coordinating with Hyper-V on managed servers.
Microsoft(R) System Center 2012 Virtual Machine Manager console or Microsoft(R) System Center 2012 R2 Virtual Machine Manager console or Microsoft(R) System Center 2016 Virtual Machine Manager console	(*4)	[Hyper-V] Necessary on admin clients when using the functions for coordinating with VM management software and connecting with the L-Server console. Prepare the same version as VM management software for registration in Resource Orchestrator.
ETERNUS SF Storage Cruiser clients	14.2 or later	Necessary when checking the detailed information of storage using the admin client.
VMware Remote Console Plug-in	5.1 (*5)	[VMware] Necessary on admin clients when using the VMware vSphere functions for connecting with the virtual L-Server console. Obtain it from the VMware web site. (*6)

*1: When connecting with the ROR console, use Compatibility View Settings.

*2: Only Internet Explorer (Desktop version) is supported.

*3: Set the resolution of the browser window as 100%.

*4: When displaying the VM console screen on VMware vSphere 6.0 or earlier or on Hyper-V, use the vSphere client or the VMM management console to connect directly to VM guests.

It is also possible to display the VM console screen on the ROR console as usual by installing Java SE 8 on the admin client.

However, Oracle no longer supports Java SE 8, so security patches are no longer provided.

Therefore, when using Java SE 8, it is recommended to operate the admin client in a secured environment.

*5: Only 32-bit versions of web browsers are supported. When using VMware vSphere 6.5 or later, the VMware Remote Console Plug-in is not necessary.

*6: VMware Remote Console Plug-in is provided with the VMware Remote Console SDK. Obtain the VMware Remote Console SDK 5.1 at the following VMware web site.

VMware web site

URL: <http://www.vmware.com/support/developer/vmrc/index.html>

*7: Output of CSV files and printing from the [Pool Conditions] tab in the [Dashboard] tab of the ROR console cannot be performed in a 64-bit web browser. When performing output of CSV files and printing, use a 32-bit web browser.

*8: On ESR60 or later, the console connection function cannot be used.

6.1.2.5 Exclusive Software

Resource Orchestrator cannot be used in combination with the following products. When performing a new installation of Resource Orchestrator, do not use it on the same server as the following products. For exclusive software when upgrading from earlier versions, refer to "Table 6.100 [Admin Server] (Upgrade Installation)".

List of Exclusive Software

Table 6.99 [Admin Server] (New Installation)

Operating System Type	Product Name	Version and Level	Remarks
Windows	Systemwalker Resource Coordinator	All versions	Here "Systemwalker Resource Coordinator" includes the following products: - Systemwalker Resource Coordinator Systemwalker Resource Coordinator Base Edition Systemwalker Resource Coordinator Virtual server Edition
	Systemwalker Runbook Automation (Admin Server)	V15.1.1 or earlier V15.1.2 or later (*1)	-
	Systemwalker Runbook Automation (Linked Server/Relay Server/Business Server)	All versions	-
	Systemwalker Service Catalog Manager	V14g	-
	Systemwalker Software Configuration Manager	V14.0.0	-
	Systemwalker Software Configuration Manager (Admin Server)	V14.1.0 or later V15.4.0 or earlier	-

Operating System Type	Product Name	Version and Level	Remarks
	Systemwalker Software Configuration Manager (Linked Server/Public Server)	V15.4.0 or earlier	-
	Cloud Infrastructure Management Software	All versions	-
	SystemcastWizard	All versions	-
	SystemcastWizard Professional	All versions	-
	SystemcastWizard Lite	All versions	-
	ServerView Installation Manager (*2)	All versions	-
	ServerView Resource Coordinator VE	All versions	-
	FUJITSU Software ServerView Resource Orchestrator	All versions	-
	ServerView Deployment Manager (*3)	All versions	-
	Premeo Premium Agent	All versions	-
	TeamWARE Office Server	All versions	-
	TRADE MASTER	All versions	-
Linux	Server System Manager	All versions	-
	Systemwalker Resource Coordinator	All versions	Here "Systemwalker Resource Coordinator" includes the following products: - Systemwalker Resource Coordinator - Systemwalker Resource Coordinator Base Edition Systemwalker Resource Coordinator Virtual server Edition
	Systemwalker Runbook Automation (Admin Server)	V15.1.1 or earlier V15.1.2 or later (*1)	-
	Systemwalker Runbook Automation (Linked Server/Relay Server/Business Server)	All versions	-
	Systemwalker Service Catalog Manager	V14g	-
	Systemwalker Software Configuration Manager (Admin Server)	V15.4.0 or earlier	-
	Systemwalker Software Configuration Manager (Linked Server/Public Server)	V15.4.0 or earlier	-
	Cloud Infrastructure Management Software	All versions	-
	ServerView Resource Coordinator VE	All versions	-
	FUJITSU Software ServerView Resource Orchestrator	All versions	-
	Premeo Premium Agent	All versions	-
	Server System Manager	All versions	-

*1: This can be installed with this version. Contact Fujitsu technical staff for information on how to install it along with Resource Orchestrator.

*2: As the manager of Resource Orchestrator (version 1.x) contains a PXE server, it cannot be used together with the PXE server that is required for the remote installation function of ServerView Installation Manager.

*3: ServerView Deployment Manager can be installed after Resource Orchestrator has been installed.

 **Note**

- It is not possible to upgrade the manager environment of Resource Orchestrator configured using Systemwalker Runbook Automation.
- It is not possible to upgrade the manager environment of Resource Orchestrator configured using Systemwalker Software Configuration Manager (Admin Server).

Table 6.100 [Admin Server] (Upgrade Installation)

Operating System Type	Product Name	Version and Level	Remarks
Windows	INTERSTAGE	All versions	Here "INTERSTAGE" includes the following products: <ul style="list-style-type: none"> - INTERSTAGE - INTERSTAGE Standard Edition - INTERSTAGE Enterprise Edition
	Interstage Apcoordinator	All versions	-
	Interstage Application Server	All versions	Here "Interstage Application Server" includes the following products: <ul style="list-style-type: none"> - INTERSTAGE Application Server Standard Edition - INTERSTAGE Application Server Enterprise Edition - INTERSTAGE Application Server Web-J Edition - Interstage Application Server Standard Edition - Interstage Application Server Standard-J Edition - Interstage Application Server Enterprise Edition - Interstage Application Server Plus - Interstage Application Server Plus Developer - Interstage Application Server Web-J Edition
	Interstage Apworks	All versions	-
	Interstage Application Framework Suite	All versions	-
	Interstage Business Application Server	All versions	Here "Interstage Business Application Server" includes the following products: <ul style="list-style-type: none"> Interstage Business Application Server

Operating System Type	Product Name	Version and Level	Remarks
			Standard Edition Interstage Business Application Server Enterprise Edition
	Interstage Business Process Manager	All versions	-
	Interstage Business Process Manager Analytics	All versions	-
	Interstage BPM Flow	All versions	-
	Interstage Service Integrator	All versions	-
	Interstage Security Directory	All versions	-
	Interstage Shunsaku Data Manager	All versions	-
	Interstage Studio	All versions	-
	Interstage Traffic Director	All versions	-
	INTERSTAGE WEBCOORDINATOR	All versions	-
	Interstage Web Server	All versions	-
	ObjectDirector	All versions	-
	Systemwalker Centric Manager (Operation Management Server/Section Management Server/Job Server)	All versions (*1)	Here "Systemwalker Centric Manager" includes the following products: <ul style="list-style-type: none"> - SystemWalker/CentricMGR - SystemWalker/CentricMGR-M - SystemWalker/CentricMGR GEE - SystemWalker/CentricMGR EE - SystemWalker/CentricMGR SE - Systemwalker Centric Manager Global Enterprise Edition - Systemwalker Centric Manager Enterprise Edition - Systemwalker Centric Manager Standard Edition
	Systemwalker IT Change Manager	All versions	Here "Systemwalker IT Change Manager" includes the following products: <ul style="list-style-type: none"> - Systemwalker IT Change Manager Enterprise Edition

Operating System Type	Product Name	Version and Level	Remarks
			- Systemwalker IT Change Manager Standard Edition
	Systemwalker IT Process Master	All versions	-
	Systemwalker PKI Manager	All versions	-
	Securecrypto Library	All versions	-
	Systemwalker Resource Coordinator	All versions	Here "Systemwalker Resource Coordinator" includes the following products: - Systemwalker Resource Coordinator Systemwalker Resource Coordinator Base Edition Systemwalker Resource Coordinator Virtual server Edition
	Systemwalker Runbook Automation (Admin Server)	V15.1.1 or earlier V15.1.2 or later (*3)	-
	Systemwalker Runbook Automation (Linked Server/ Relay Server/Business Server)	All versions	-
	Systemwalker Service Quality Coordinator	All versions (*4)	-
	Systemwalker Service Catalog Manager	V14g	-
	Systemwalker Software Configuration Manager	V14.0.0	-
	Systemwalker Software Configuration Manager (Admin Server)	V14.1.0 or later V15.4.0 or earlier	-
	Systemwalker Software Configuration Manager (Linked Server/Public Server)	V15.4.0 or earlier	-
	Cloud Infrastructure Management Software	All versions	-
	SystemcastWizard	All versions	-
	SystemcastWizard Professional	All versions	-
	SystemcastWizard Lite	All versions	-
	ServerView Installation Manager (*5)	All versions	-
	ServerView Resource Coordinator VE	All versions	-

Operating System Type	Product Name	Version and Level	Remarks	
	FUJITSU Software ServerView Resource Orchestrator	All versions	-	
	ServerView Deployment Manager (*6)	All versions	-	
	Premeo Premium Agent	All versions	-	
	TeamWARE Office Server	All versions	-	
	TRADE MASTER	All versions	-	
	Linux	Interstage Application Server	All versions	<p>Here "Interstage Application Server" includes the following products:</p> <ul style="list-style-type: none"> - INTERSTAGE Application Server Standard Edition - INTERSTAGE Application Server Enterprise Edition - INTERSTAGE Application Server Web-J Edition - Interstage Application Server Standard Edition - Interstage Application Server Standard-J Edition - Interstage Application Server Enterprise Edition - Interstage Application Server Plus - Interstage Application Server Plus Developer - Interstage Application Server Web-J Edition

Operating System Type	Product Name	Version and Level	Remarks
Interstage Application Framework Suite		All versions	-
Interstage Business Application Server		All versions	Here "Interstage Business Application Server" includes the following products: <ul style="list-style-type: none"> - Interstage Business Application Server Standard Edition - Interstage Business Application Server Enterprise Edition
Interstage BPM Flow		All versions	-
Interstage Business Process Manager		All versions	-
Interstage Business Process Manager Analytics		All versions	-
Interstage Web Server		All versions	-
Interstage Service Integrator		All versions	Here "Interstage Service Integrator" includes the following products: <ul style="list-style-type: none"> - Interstage Service Integrator Enterprise Edition - Interstage Service Integrator Standard Edition
Interstage Shunsaku Data Manager		All versions	-
Interstage Traffic Director		All versions	-
Server System Manager		All versions	-
Systemwalker Centric Manager (Operation Management Server/Section Management Server/Job Server)		All versions (*1)	Here "Systemwalker Centric Manager" includes the following products: <ul style="list-style-type: none"> - SystemWalker/CentricMGR - SystemWalker/CentricMGR-M - SystemWalker/CentricMGR GEE - SystemWalker/CentricMGR EE - SystemWalker/CentricMGR SE

Operating System Type	Product Name	Version and Level	Remarks
			<ul style="list-style-type: none"> - Systemwalker Centric Manager Global Enterprise Edition - Systemwalker Centric Manager Enterprise Edition - Systemwalker Centric Manager Standard Edition
Systemwalker IT Process Master		All versions	-
Systemwalker IT Change Manager		All versions	<p>Here "Systemwalker IT Change Manager" includes the following products:</p> <ul style="list-style-type: none"> - Systemwalker IT Change Manager Enterprise Edition - Systemwalker IT Change Manager Standard Edition
Systemwalker Resource Coordinator		All versions	<p>Here "Systemwalker Resource Coordinator" includes the following products:</p> <ul style="list-style-type: none"> - Systemwalker Resource Coordinator - Systemwalker Resource Coordinator Base Edition - Systemwalker Resource Coordinator Virtual server Edition
Systemwalker Runbook Automation (Admin Server)		V15.1.1 or earlier V15.1.2 or later (*3)	-
Systemwalker Runbook Automation (Linked Server/ Relay Server/ Business Server)		All versions	-
Systemwalker Service Quality Coordinator		All versions (*4)	-
Systemwalker Service Catalog Manager		V14g	-
Systemwalker Software Configuration Manager (Admin Server)		V15.4.0 or earlier	-

Operating System Type	Product Name	Version and Level	Remarks
Systemwalker Software Configuration Manager (Linked Server/Public Server)		V15.4.0 or earlier	-
Cloud Infrastructure Management Software		All versions	-
ServerView Resource Coordinator VE		All versions	-
FUJITSU Software ServerView Resource Orchestrator		All versions	-
Premeo Premium Agent		All versions	-

*1: This can be installed with Systemwalker Centric Manager Enterprise Edition V10.0L21 or later (x86 version) or Systemwalker Centric Manager Standard Edition V10.0L21 or later (x86 version). Contact Fujitsu technical staff for information on how to install it along with these products.

*2: This can be installed with this version. Contact Fujitsu technical staff for information on how to install it along with Resource Orchestrator.

*3: This can only be installed with Systemwalker Service Quality Coordinator V15.0.1 (x86 version). When installing Resource Orchestrator along with Systemwalker Service Quality Coordinator, refer to "Appendix C Upgrading from Earlier Versions" in the "Setup Guide CE".

*4: As the manager of Resource Orchestrator (version 1.x) contains a PXE server, it cannot be used together with the PXE server that is required for the remote installation function of ServerView Installation Manager.

*5: ServerView Deployment Manager can be installed after Resource Orchestrator has been installed.

Table 6.101 [Managed Server Resource Agent]

Virtual Environment	Product Name	Version and Level	Remarks
VMware	ServerView Deployment Manager (*1)	All versions	-
Hyper-V	Server System Manager	All versions	-
	SystemcastWizard	All versions	-
	SystemcastWizard Professional	All versions	-
	SystemcastWizard Lite	All versions	-
	Systemwalker Service Quality Coordinator	All versions	-
	Systemwalker Service Catalog Manager	V14g	-
Linux	Server System Manager	All versions	-
	SystemcastWizard	All versions	-
	SystemcastWizard Professional	All versions	-
	SystemcastWizard Lite	All versions	-
	ServerView Deployment Manager (*1)	All versions	-

Virtual Environment	Product Name	Version and Level	Remarks
OVM for x86 2.2	ServerView Deployment Manager (*1)	All versions	-
Solaris zones	Server System Manager (Manager only)	All versions	-
OVM for SPARC	Systemwalker Service Quality Coordinator	V15.0.0 or earlier V15.0.1 (* 2)	-
	ETERNUS SF Disk Space Monitor	All versions	-
Citrix Xen	ServerView Deployment Manager (*1)	All versions	-
OVM for x86 3.x	ServerView Deployment Manager (*1)	All versions	-

*1: ServerView Deployment Manager can be installed after Resource Orchestrator has been installed.

Operating System Type	Product Name	Version and Level	Remarks
Windows	Systemwalker Service Catalog Manager	V14g	-
	ETERNUS SF Disk Space Monitor	All versions	-
Linux	Systemwalker Service Catalog Manager	V14g	-
	ETERNUS SF Disk Space Monitor	All versions	-
Solaris	Server System Manager (Manager only)	All versions	-
	ETERNUS SF Disk Space Monitor	All versions	-

6.1.2.6 Static Disk Space

The size of the required static disk space does not increase even after Resource Orchestrator is operated.

When using Resource Orchestrator, the disk space described in "6.1.2.7 Dynamic Disk Space" is required for each folder, in addition to the static disk space.

The amount of disk space may vary slightly depending on the environment in question.

Table 6.102 Static Disk Space

Software	Folder	Disk Space (Unit: MB)
[Windows Manager]	<i>Installation_folder</i> (*)	7600
[Linux Manager]	/opt	3200
	/etc/opt	50
	/var/opt	3600
Agent [Windows] [Hyper-V]	<i>Installation_folder</i> (*)	670
Agent [Linux]	/opt	400
	/etc/opt	20
	/var/opt	5
Agent [VMware] [Xen] [KVM] [OVM for x86 2.2] [Citrix Xen] [OVM for x86 3.x]	/opt	110
	/etc/opt	5
	/opt	5
Agent [Solaris] [Solaris Zones] [OVM for SPARC]	/opt	350
	/etc/opt	15
	/var/opt	5
HBA address rename setup service [Windows]	<i>Installation_folder</i> (*)	190

Software	Folder	Disk Space (Unit: MB)
HBA address rename Setup Service [Linux]	/opt	110
	/etc/opt	1
	/var/opt	10

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

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

Default value: C:\Program Files (x86)\Resource Orchestrator

6.1.2.7 Dynamic Disk Space

The size of the required dynamic disk space changes dynamically when Resource Orchestrator is operated.

When using Resource Orchestrator, the following disk space is required for each folder, in addition to static disk space.

Table 6.103 Dynamic Disk Space

Software	Folder	Disk Space (Unit: MB)
[Windows Manager]	<i>Installation_folder</i> (*1)	9080 + <i>Number_of_managed_servers</i> * 4
		<i>Environmental_data_storage_area</i> (*2)
		<i>Performance_display_information_storage_area</i> (*3)
		<i>Metering_log_storage_area</i> (*4)
	<i>Image_file_storage_folder</i> (*5)	<i>Image_file_storage_area</i> (*6)
	<i>Backup_storage_folder_for_configuration_definition_information</i>	<i>Backup_storage_area_for_configuration_definition_information</i>
	<i>Network_device_configuration_file_storage_folder</i> (*7)	<i>Network_device_configuration_file_storage_area</i> (*8)
[Linux Manager]	/etc	2
	/var/opt	9080 + <i>Number_of_managed_servers</i> * 4
		<i>Environmental_data_storage_area</i> (*2)
		<i>Performance_display_information_storage_area</i> (*3)
		<i>Metering_log_storage_area</i> (*4)
	<i>Image_file_storage_directory</i> (*5)	<i>Image_file_storage_area</i> (*6)
<i>Backup_storage_folder_for_configuration_definition_information</i>	<i>Backup_storage_area_for_configuration_definition_information</i>	
	<i>Network_device_configuration_file_storage_folder</i> (*7)	<i>Network_device_configuration_file_storage_area</i> (*8)
Agent [Windows]	<i>Installation_folder</i> (*9)	60
		<i>Log_data</i> (*10)
Agent [Hyper-V]	<i>Installation_folder</i> (*9)	60
		<i>Log_data</i> (*11)
Agent [Linux]	/etc	1
	/var/opt	1
		<i>Log_data</i> (*12)
Agent [VMware] [Xen] [KVM] [OVM for x86 2.2]	/etc	1
	/var/opt	1

Software	Folder	Disk Space (Unit: MB)
[Citrix Xen] [OVM for x86 3.x]		
Agent [Solaris] [Solaris Zones] [OVM for SPARC]	/etc	1
	/var/opt	1 <i>Log_data (*12)</i>
HBA address rename setup service [Windows]	<i>Installation_folder (*9)</i>	60
HBA address rename Setup Service [Linux]	/etc	1
	/var/opt	60

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

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

Default value: C:\Program Files (x86)\Resource Orchestrator

*2: Necessary when using power monitoring. For details, refer to "[Environmental_Data_Storage_Area](#)".

*3: For information disk capacity for performance display, there are storage areas for pool status information and usage condition information. The disk capacity necessary for resources is indicated below.

- Pool Condition Information

The necessary disk space will vary depending on the number of registered pools and L-Server templates.

Prepare the disk capacity, referring to the following formula.

For details on pools, refer to "Chapter 14 Registering Resources in Resource Pools" in the "User's Guide for Infrastructure Administrators (Resource Management) CE".

$\text{Disk capacity} = 12 * PA + 3 * (3 * T1 * (P1 + P3) + T2 * (P2 + 3 * P3)) + 40 \text{ (MB)}$
--

P1: Number of VM pools

P2: Number of server pools

P3: Number of storage pools

P4: Number of network pools

P5: Number of address pools

PA: PA= P2*P1+P2+P3+P4+P5

T1: Number of virtual L-Server templates

T2: Number of physical L-Server templates



Here the numbers of pools are a combination of the relevant pools in the global pool and the relevant pools in the local pool.

In addition, the number of resources registered in each pool has no relation to the formula.

Example

The following shows the formula when the numbers of pools and L-Server templates are as below.

- Number of Pools

	Global pools	Local pools
P1: VM Pool	3	2
P2: Server Pool	2	1
P3: Storage Pool	2	1
P4: Network Pool	1	1
P5: Address Pool	1	1

- Number of L-Server Templates

T1: Virtual L-Server Template	3
T2: Physical L-Server Template	2

Disk capacity= $12 * 20 + 3 * (3 * 3 * (5 + 3) + 2 * (3 + 3 * 3)) + 40$ (MB)

- Usage condition information

The size will increase and decrease depending on the numbers of VM hosts and VM guests.

The capacity differs depending on the VM management software.

Prepare the disk capacity, referring to the following formula. For the information storage area with 50 hosts and 1,000 VM (20VM/host), approximately 19.4 GB of space is required.

Disk capacity= $((N1 * \text{number of hosts}) + (N2 * \text{number of guests})) * 1.2$ (MB)
--

[VMware] N1 = 2.0, N2 = 16.5

[Hyper-V] N1 = 92.0, N2 = 26.0

[Xen] [KVM] [OVM for x86 3.x] N1 = 102.0, N2 = 7.0

[OVM for SPARC] N1 = 51.0, N2 = 3.0

*4: The necessary disk capacity for metering logs is indicated as follows:

Table 6.104 Formula of Disk Space Necessary for Metering Logs

Metering Logs per day * capacity for one year
$3.5 \text{ MB} * 365 = 1.3 \text{ GB}$

The conditions of the base for the formula for disk space above and the formula of the metering logs per day are indicated as below.

Table 6.105 Required Conditions for Metering Information Backup

Item	Estimated Value	
Number of operating L-Platforms	1000	
Number of resources per L-Platform	L-Server	1
	Expansion disk	1
	Software	2
Usage status	- The following operations are executed every day	

Item	Estimated Value
	<ul style="list-style-type: none"> - Return and deployment of 10 L-Platforms - Starting of 1,000 L-Servers when starting operations - Stopping of 1,000 L-Servers when finishing operations - Obtain regular logs every day - Keep metering logs for one year
Online backup frequency	<ul style="list-style-type: none"> - Execute monthly base backup (every 30 days) - Execute hourly difference backup.

Table 6.106 Formula for Metering Logs per Day

<ul style="list-style-type: none"> - Target capacity for metering logs <ul style="list-style-type: none"> - Event logs for an L-Platform: 2.3 KB/each time (A) - Event logs for other than an L-Platform: 0.6 KB/each time (B) - Regular logs: 2.3 * number of L-Platforms (KB) (C) - Metering logs per day <ul style="list-style-type: none"> (A) * operation number for L-Platforms per day + (B) * operation number for other than L-Platforms per day + (C) * number of operating L-Platforms = 2.3 KB * 20 + 0.6 KB * 2000 + 2.3 KB * 1000 = 3.5 MB
--

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

[Windows Manager]

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

Default value: C:\Program Files (x86)\Resource Orchestrator\SVROR\ScwPro\depot

[Linux Manager]

The default is as follows:

/var/opt/FJSVscw-deploysv/depot

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

For details on the amount of space necessary for the image storage area, refer to "[Image File for Physical Servers Storage Area](#)".

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

*7: The name of the storage folder (directory) specified for network device configuration files.

[Windows]

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

C:\Program Files (x86)\Resource Orchestrator\SVROR\Manager\var\netdevice

[Linux]

The default is as follows:

/var/opt/FJSVrcvmr/netdevice

*8: Size increases or decreases depending on the number of network devices managed by the network device file management function, and the number of generations of the network device configuration file of each network device.

The size required for each network device is equal to the number of generations of the network device configuration file * 512 KB.

The maximum number of network devices that can be managed by the network device configuration file management function is 72.

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

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

- When using a 64-bit (x64) Windows OS

Default value: C:\Program Files (x86)\Resource Orchestrator

- When using a 32-bit (x86) Windows OS

Default value: C:\Program Files\Resource Orchestrator

*10: The approximate estimate value is 60 MB.

* 11: The approximate estimate value is 60 MB * number of VM guests.

*12: The approximate estimate value is 100 MB.

The size of log data changes according to L-Server configurations.

When it is necessary to estimate the detailed data, refer to the "How to estimate the amount of space required for the log data ("Troubleshoot" directory)" section in the "Systemwalker Service Quality Coordinator Installation Guide".

Environmental Data Storage Area

The environmental data storage area is the area necessary when using power monitoring.

The environmental data storage area is located in the installation folder of the admin server, and is used to store environmental data collected from power monitoring targets and aggregate data.

The amount of space that is necessary for the environmental data storage area can be determined from the number of power monitoring targets being registered, the polling interval, and the period the environmental data is to be stored for.

For details of the settings, refer to "13.1.1 Settings for the Power Monitoring Environment" in the "Design Guide CE".

Estimate the necessary space using the following formula.

$$\text{Necessary disk space (MB)} = (\text{detail_storage_period_}(\text{months}) * 6 / \text{polling_interval_}(\text{minutes}) + 10) * 3 * \text{number_of_power_monitoring_targets}$$

Image File Storage Area for Physical Servers

The image file storage area for physical servers is necessary when performing backup and cloning.

The image file storage area is secured on an admin server as an area to store the image files (system images and cloning images) collected through the backup and cloning of managed servers.



Create the image file storage area on the local disk of the admin server, or SAN storage. It is not possible to specify folders on network drives, shared folders (NFS, SMB, etc.) on other machines on a network, or UNC format folders.

The space necessary for the image file storage area is the total amount of disk space necessary for the "system image storage area", the "cloning image storage area", and the "temporary work area".

Estimate the necessary space based on the disk space required for each storage area using the following formula.

$$\text{Disk area required for image file storage area} = \text{A. Disk area required for system image storage area} + \text{B. Disk area required for cloning image storage area} + \text{C. Disk area required for temporary work area}$$

Estimate the necessary space for the image file storage area using the following procedure.

1. Calculate the size of image files.

Calculate the image file sizes as base data for estimating the required disk space for A, B, and C indicated above.

The calculation method is given below.

$$\text{File size of image files} = \text{disk_space_per_managed_server} * \text{compression_ratio}$$

Disk_space_per_managed_server

When system construction using the same software configuration has been performed before, use the consumed disk space of that system (the sum of the disk space for each partition when dividing one disk into multiple partitions).

Check the consumed disk space using the relevant OS function.

When system construction using the same software configuration has not been performed before, calculate the disk space from the required disk space indicated in the installation guide for each piece of software.

For the OS, refer to "Example of Calculation".

Compression_ratio

The compression ratio involved when storing the consumed disk space of managed servers as an image file on the admin server.

Compression ratio is dependent on file content, and usually a compression ratio of around 50% can be expected. When there are many files that have already been compressed (installation media of software, image data, or other media), the overall compression ratio is lower.

For the OS, refer to "Example of Calculation".

An example of the calculation of disk space and the compression ratio directly after OS installation is given below.



Example

Example of Calculation

Used disk space: 1.9 GB -> After compression: 0.9 GB Compression ratio: $0.9/1.9 = 47\%$

2. Calculate the space required for the system image storage area.

The system image storage area is the area necessary when performing backup. Secure space for each managed server for which backup system images are made.

This is not necessary when not performing backup.

Calculate the size of the system image storage area based on the image file size of step 1. Estimate the area for each managed server for which system images are backed up using the following formula, and use the total as the estimated size.

$$\text{Disk space required for the system image storage area} = \text{file_size_of_image_files} * \text{number_of_versions}$$

Number_of_versions

The number of versions of system images. By default, up to three versions of system images can be managed.



Point

By reducing the number of versions of system images saved it is possible to reduce the amount of space required for the system image storage area.

For details on how to change the number of system images saved, refer to "5.9 rcxadm imagmgr" in the "Reference Guide (Command/XML) CE".

The following is an example when three managed servers, A, B, and C are performing backup of system images, and the used disk space and compression ratios are expected to be the following values.



Example

Example of Estimation

Server A - *Image_file_size*: 3.0 GB (Used disk space: 6.0 GB, Compression ratio 50%)

Server B - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

Server C - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

$$(3.0 * 3) + (1.6 * 3) + (1.6 * 3) = 18.6 \text{ (GB)}$$

.....

3. Calculate the space required for the cloning image storage area.

The cloning image storage area is the area necessary when performing cloning. Secure space for each managed server for which cloning images are collected.

This is not necessary when not performing cloning.

Calculate the size of the cloning image storage area based on the image file size of step 1. Estimate the area for each managed server from which cloning images are collected using the following formula, then set the total as the estimated size.

$$\text{Disk space required for the cloning image storage area} = \text{file_size_of_image_files} * \text{number_of_versions}$$

Number_of_versions

The number of versions of cloning images. By default, up to three versions of cloning images can be managed.

Point

.....

By reducing the number of versions of cloning images saved it is possible to reduce the amount of space required for the cloning image storage area.

For details on how to change the number of cloning images saved, refer to "5.9 rcxadm imagemgr" in the "Reference Guide (Command/XML) CE".

.....

The following is an example when managed servers A and B are used to collect cloning images, and the used disk space and compression ratios are expected to be the following values.

Example

Example of Estimation

Server A - *Image_file_size*: 3.0 GB (Used disk space: 6.0 GB, Compression ratio 50%)

Server B - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

$$(3.0 * 3) + (1.6 * 3) = 13.8 \text{ (GB)}$$

.....

4. Calculate the space required for the temporary work area.

When collecting system images or cloning images, the temporary work area is necessary to keep the former version of images until collection of new system images or cloning images is completed.

This is not necessary when not performing backup or cloning.

Calculate the size of the temporary work area based on the image file size of step 1.

Estimate the largest size of the image files of all managed servers, and determine the necessary area using the following formula.

$\text{Disk space required for the temporary work area} = \text{largest_image_file_size} * \text{image_file_collection_multiplicity}$

Estimate image file collection multiplicity using operational designs in which image file collection (system image backup and cloning image collection) is simultaneously performed at the limit of multiplicity for multiple managed servers under management of an admin server. However, as Resource Orchestrator is designed not to exceed four multiplicities in order to reduce the load on the admin servers, the maximum multiplicity is 4.

The following is an example when three managed servers, A, B, and C are used to collect system images or cloning images, and the file size of each image file is as below. In this example, the image file collection multiplicity is 3.

Example

Example of Estimation

Server A - *Image_file_size*: 3.0 GB (Used disk space: 6.0 GB, Compression ratio 50%)

Server B - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

Server C - *Image_file_size*: 1.6 GB (Used disk space: 4.0 GB, Compression ratio 40%)

$3.0 * 3 = 9.0$ (GB)

5. Calculate the space necessary for the image file storage area based on the disk space calculated in steps 2 to 4.

Calculate the total amount of required space for A, B, and C calculated in steps 2 - 4. (A: Disk area required for system image storage area, B: Disk area required for cloning image storage area, C: Disk area required for temporary work area).

6.1.2.8 Memory Size

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

Consider the amount of memory necessary for required software as well as the amount of memory necessary for Resource Orchestrator.

Memory Size

Software	Memory Size (Unit: MB)
[Windows Manager]	12000
[Linux Manager]	16000
Agent [Windows] [Hyper-V]	500
Agent [Linux]	700
Agent [Solaris] [Solaris Zones] [OVM for SPARC]	400
Agent [VMware]	700
Agent [Xen] [KVM]	700
Agent [Citrix Xen]	700
Agent [OVM for x86 2.2] [OVM for x86 3.x]	700
HBA address rename setup service [Windows]	300
HBA address rename Setup Service [Linux]	600

6.1.3 Advisory Notes when the Manager Is Installed on Windows Server 2016

When the manager is installed on Windows Server 2016, coordination with the following related software is not possible.

- [ServerView Virtual-IO Manager](#)
- [BladeLogic](#)

This section describes the functions that cannot be used as a result of this inability to coordinate with the above related software.

See

For details on the functions provided by Resource Orchestrator, refer to the following.

[Cloud Edition]

- "2.2 Resource Orchestrator User Roles and the Functions Available to Each User" in the "Design Guide CE"
- "Chapter 11 Deciding and Configuring Server Virtualization Software" in the "Design Guide CE"

[Virtual Edition]

- "2.2 Function Overview" in the "Design Guide VE"
- "9.1 Deciding Server Virtualization Software" in the "Design Guide VE"

6.1.3.1 ServerView Virtual-IO Manager

The following functions cannot be used.

[All Editions]

- Switchover of servers using the VIOM server profile switchover method

[Cloud Edition]

- Creation of physical L-Servers using blade servers
- Deployment of L-Platforms which include physical L-Servers using blade servers



Point

It is recommended that you use either of the following ServerView software to compensate for the above restricted functions.

- ServerView Infrastructure Manager 2.2
 - Infrastructure Manager 2.3 or later
-

6.1.3.2 BladeLogic

When using Solaris Zones or OVM for SPARC as the server virtualization software, the following functions cannot be used.

[Cloud Edition]

- Creation of virtual L-Servers
- Modification
 - Modification of specifications and basic information
 - Attaching and detaching of disks
- Deletion of L-Servers
- Operations for cloning images of virtual L-Servers
 - Collection, registration, and deletion
- Migration of L-Servers between VM hosts

6.2 Hardware Environment

This section explains the hardware environments.

6.2.1 All Editions

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

Required Hardware Conditions for Managers

Table 6.107 Required Hardware Conditions for Managers

Hardware	Remarks
PRIMERGY BX series servers	The CPU must be a multi-core CPU.

Hardware	Remarks
PRIMERGY RX series PRIMERGY TX series PRIMEQUEST 2000 series PRIMEQUEST 1000 series	For details on the amount of memory necessary for Resource Orchestrator, refer to " 6.1.1.8 Memory Size " and " 6.1.2.8 Memory Size ". Please consider the amount of memory necessary for required software as well as the amount of memory necessary for Resource Orchestrator.

Required Hardware Conditions for Agents

Table 6.108 Required Hardware Conditions for Agents

Product Name	Model	VE	CE										
			Physical L-Server	Virtual L-Servers [1]									
				vSphere 4.x/5.x/6.x [7] [8] [15] [16]	Hyper-V [9] [10] [15] [33]	OVM x86 V2.2	OVM x86 V3.x [15]	OVM SPARC	SPARC Solaris Zones	Citrix XenServer [15]	RHEL-Xen	RHEL-KVM [13] [15]	x86 Solaris Zones [14]
PRIMERGY BX900 PRIMERGY BX900 S2	BX920 S1 BX920 S2 BX920 S3 [5] BX920 S4 [5] BX922 S2 BX924 S2 BX924 S3 [5] BX924 S4 [5] BX960 S1 [30]	Yes	Yes	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No
	BX2560 M1 [5] [42] BX2560 M2 [5]	Yes	Yes	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No
	BX2580 M1 [5] [44] BX2580 M2 [5]	Yes	Yes	Yes	Yes	No	Yes	/	/	Yes	No	Yes	No
	PRIMERGY BX400 [53] BX920 S2 BX920 S3 [5] BX920 S4 [5]	Yes	Yes	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No

Product Name	Model	VE	CE										
			Physical L-Server	Virtual L-Servers [1]									
				vSphere 4.x/5.x/ 6.x [7] [8] [15] [16]	Hyper-V [9] [10] [15] [33]	OVM x86 V2.2	OVM x86 V3.x [15]	OVM SPARC	SPARC Solaris Zones	Citrix XenServer [15]	RHEL- Xen	RHEL- KVM [13] [15]	x86 Solaris Zones [14]
	BX922 S2 BX924 S2 BX924 S3 [5] BX924 S4 [5]												
	BX2560 M1 [5] [42] BX2560 M2 [5]	Yes	Yes	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No
	BX2580 M1 [5] [44] BX2580 M2 [5]	Yes	Yes	Yes	Yes	No	Yes	/	/	Yes	No	Yes	No
PRIMERGY BX600 [53]	BX620 S4 BX620 S5 BX620 S6	Yes	No	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No
PRIMERGY RX [53]	RX100 S5 [29] RX100 S6 [29]	Yes	No	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No
	RX100 S7 [29] RX100 S8 [29]	No	No	No	No	No	No	/	/	No	No	No	No
	RX900 S1 RX900 S2	No	No	No	No	No	No	/	/	No	No	No	No
	RX200 S4 RX200 S5 RX200 S6 RX300 S4 RX300 S5 RX300 S6 RX600 S4	Yes	Yes [4]	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No

Product Name	Model	VE	CE											
			Physical L-Server	Virtual L-Servers [1]										
				vSphere 4.x/5.x/6.x [7] [8] [15] [16]	Hyper-V [9] [10] [15] [33]	OVM x86 V2.2	OVM x86 V3.x [15]	OVM SPARC	SPARC Solaris Zones	Citrix XenServer [15]	RHEL-Xen	RHEL-KVM [13] [15]	x86 Solaris Zones [14]	
	RX600 S5 [30] RX600 S6 [31]													
	RX200 S7 RX300 S7 RX500 S7	Yes	Yes	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No	
	RX350 S7 RX350 S8 RX500 S8	No	No	No	No	No	No	/	/	No	No	No	No	
	RX200 S8 RX300 S8	Yes	Yes	Yes [43]	Yes	No	Yes	/	/	Yes	No	Yes	No	
	RX2520 M1	Yes	Yes	Yes [41] [43]	Yes	No	No	/	/	Yes	No	Yes	No	
	RX2530 M1 RX2540 M1 [28]	Yes	Yes	Yes [43]	Yes	No	No	/	/	No	No	Yes [45]	No	
	RX2530 M2 [51] RX2540 M2 [51]	Yes	Yes	Yes [43]	Yes	No	No	/	/	No	No	No	No	
	RX2520 M4 RX2530 M4 RX2540 M4	Yes [29] [63]	Yes [63]	Yes [43]	Yes	No	No	/	/	No	No	No	No	
	RX4770 M1 [60]	Yes	No	Yes [43]	Yes	No	Yes	/	/	No	No	No	No	
	RX4770 M2 [51] [60]	Yes	Yes	Yes [43]	Yes	No	No	/	/	No	No	No	No	

Product Name	Model	VE	CE										
			Physical L-Server	Virtual L-Servers [1]									
				vSphere 4.x/5.x/6.x [7] [8] [15] [16]	Hyper-V [9] [10] [15] [33]	OVM x86 V2.2	OVM x86 V3.x [15]	OVM SPARC	SPARC Solaris Zones	Citrix XenServer [15]	RHEL-Xen	RHEL-KVM [13] [15]	x86 Solaris Zones [14]
	RX4770 M3 [51] [60]												
	RX4770 M4	Yes [29] [46]	Yes [63]	Yes [43]	Yes	No	No	/	/	No	No	No	No
	RX1330 M1	No	No	No	No	No	No	/	/	No	No	No	No
PRIMERGY TX	TX150 S6 [29]	Yes	No	No	No	No	No	/	/	No	No	No	No
	TX150 S7 [29]												
	TX200 S4												
	TX200 S5												
	TX200 S6												
	TX300 S4												
	TX300 S5												
	TX300 S6												
	TX150 S8 [29]	No	No	No	No	No	No	/	/	No	No	No	No
	TX200 S7												
TX300 S7													
TX300 S8													
	TX1310 M1	No	No	No	No	No	No	/	/	No	No	No	No
	TX1320 M1												
	TX1330 M1												
	TX2540 M1												
PRIMERGY CX1000	CX122 S1	Yes	No	No	No	No	No	/	/	No	No	No	No
PRIMERGY CX400 [53]	CX210 S1 CX250 S1	No	No	No	No	No	No	/	/	No	No	Yes	No

Product Name	Model	VE	CE										
			Physical L-Server	Virtual L-Servers [1]									
				vSphere 4.x/5.x/6.x [7] [8] [15] [16]	Hyper-V [9] [10] [15] [33]	OVM x86 V2.2	OVM x86 V3.x [15]	OVM SPARC	SPARC Solaris Zones	Citrix XenServer [15]	RHEL-Xen	RHEL-KVM [13] [15]	x86 Solaris Zones [14]
	CX270 S1 CX250 S2 CX270 S2												
	CX2550M1 CX2570M1 CX2550M2 [51] CX2570M2 [51]	Yes [46]	No	Yes [43]	Yes	No	No	/	/	No	No	No	No
	CX2550M4 CX2560M4 CX2570M4	Yes [29] [46] [66]	Yes [66]	Yes [43]	Yes	No	No	/	/	No	No	No	No
x86 3rd party servers [2] [57]	Any VMware compatible server	No	No	Yes	No	No	No	/	/	No	No	No	No
PRIMEQUEST 1000 series	1400S 1400E 1400L 1800E 1800L 1400S2 1400E2 1800E2 1400L2 1800L2	Yes	No	Yes	Yes	No	No	/	/	No	Yes [13]	Yes	No
PRIMEQUEST 2000 series	2400S Lite 2400S 2400E 2400L 2800E 2800L	Yes	No	Yes	Yes	No	No	/	/	No	No	Yes	No

Product Name	Model	VE	CE										
			Physical L-Server	Virtual L-Servers [1]									
				vSphere 4.x/5.x/6.x [7] [8] [15] [16]	Hyper-V [9] [10] [15] [33]	OVM x86 V2.2	OVM x86 V3.x [15]	OVM SPARC	SPARC Solaris Zones	Citrix XenServer [15]	RHEL-Xen	RHEL-KVM [13] [15]	x86 Solaris Zones [14]
	2400S2 Lite	Yes [45]	No	Yes [45]	Yes [45]	No	No	/	/	No	No	Yes [45]	No
	2400S2												
	2400E2												
	2400L2												
	2800E2												
	2800L2												
	2400S3 Lite	Yes [45]	No	No	Yes [45]	No	No	/	/	No	No	Yes [45]	No
	2400S3												
	2400E3												
	2400L3												
	2800E3												
	2800L3												
SPARC Enterprise	M3000	Yes	No	/	/	/	/	/	/	Yes	/	/	/
	M4000												
	M5000												
	M8000												
	M9000												
	T5120	Yes	No	/	/	/	/	No	No	/	/	/	/
	T5220												
	T5140												
	T5240												
	T5440												
SPARC	M10-1	Yes	No	/	/	/	/	Yes	Yes	/	/	/	/
	M10-4												
	M10-4S												
	M12-1												
	M12-2												
	M12-2S												
	T4-1	Yes	No	/	/	/	/	No	Yes	/	/	/	/
	T4-2												

Product Name	Model	VE	CE											
			Physical L-Server	Virtual L-Servers [1]										
				vSphere 4.x/5.x/6.x [7] [8] [15] [16]	Hyper-V [9] [10] [15] [33]	OVMM x86 V2.2	OVMM x86 V3.x [15]	OVMM SPARC	SPARC Solaris Zones	Citrix XenServer [15]	RHEL-Xen	RHEL-KVM [13] [15]	x86 Solaris Zones [14]	
	T4-4													
	T5-2	No	No	/	/	/	/	No	No	/	/	/	/	/
	T5-4													
	T5-8													

Yes: Supported

No: Not supported

/: Strike means the combination is not available

[1] For hardware compatibility with each VM software, please confirm the following sites:

- VMware: <http://www.vmware.com/resources/compatibility/search.php?action=base&deviceCategory=san>
- Hyper-V: <http://www.windowsservercatalog.com/results.aspx?&chtext=&cstext=&cstxt=&chbtext=&bCatID=1333&cpID=14135&avc=10&ava=0&avq=0&OR=1&PGS=25&ready=0>
- OVM: <http://linux.oracle.com/pls/apex/f?p=117:1:8516554786821630::NO:RP::>
- RHEL KVM: <https://hardware.redhat.com/>

[2] For 3rd party blade servers, an individual server management unit is necessary for each blade. ROR does not manage blade chassis. Each blade server is managed as an individual server.

The verified server models are as follows:

- IBM: System x3550
- Dell PowerEdge 1950 III
- HP: ProLiant DL 320/360/380, ProLiant BL685c G7

[4] To use a physical L-Platform on a rack server, a two-port HBA daughter card is required.

[5] Note the following regarding BX servers:

- CNA LoM and mezzanine cards are supported, but only CNA LoM supports UMC.
- When the managed server OS is Windows, there is the following condition:

1) Install the required Microsoft patch file described below

<https://partners.ts.fujitsu.com/sites/dmsp/Publications/Service-partner/SB-PRI-12043.pdf>

[7] This note is effective only in Japan.

<http://jp.fujitsu.com/platform/server/primergy/software/vmware/pdf/esx-s.pdf>

[8] This note is effective only in Japan.

<http://jp.fujitsu.com/platform/server/primequest/os/vmware/>

[9] This note is effective only in Japan.

<http://jp.fujitsu.com/platform/server/primequest/os/windows/>

[10] This note is effective only in Japan.

<http://jp.fujitsu.com/platform/server/primergy/software/windows/support/>

[13] This note is effective only in Japan.

<http://jp.fujitsu.com/platform/server/primequest/os/linux/>

[14] L-Server/L-Platform functions are not supported.

[15] This note is effective only in Japan.

<http://jp.fujitsu.com/platform/server/primergy/software/primergy-os/>

[16] The conditions for combining with vSphere are given below.

vSphere	SVOM	CIM Provider	Supported Kits
4.0	(Not necessary)	(Not necessary)	Advanced, Enterprise, Enterprise+
4.1	5.30.06 or later	1.00.04 or later	Advanced, Enterprise, Enterprise+
5.0	5.30.06 or later	5.30.04 or later	Standard, Enterprise, Enterprise Plus, Essentials, Essentials Plus
5.1	5.50.09 or later	6.10.01 or later	Standard, Enterprise, Enterprise Plus, Essentials, Essentials Plus
5.5	7.00.05 or later	7.30.06 or later	Standard AK, Enterprise AK, Enterprise Plus AK, Essentials Kit, Essentials Plus Kit
6	7.02.02 or later	7.30.06 or later	vSOM Enterprise Plus, Standard, Enterprise Plus, Essentials, Essentials Plus
6.5	7.20.08 or later	7.31.06 or later	vSOM Enterprise Plus, Standard, Enterprise Plus, Essentials, Essentials Plus
6.7	8.41.01 or later	8.40.12 or later	vSOM Enterprise Plus, Standard, Enterprise Plus, Essentials, Essentials Plus

[28] SVOM 7.01.03 or later and VIOM 3.5.2 or later are required for RX2530 M1 and RX2540 M1.

[29] HBA address rename is not supported.

[30] HBA address rename is not supported.

[31] HBA address rename is not supported.

[33] Windows Server 2012 Hyper-V, Windows Server 2012 R2 Hyper-V, and Windows Server 2016 Hyper-V

[41] SVOM 6.31.04 or later and VIOM 3.3.08 or later are required for server switch over of ESXi hosts on RX2520 M1.

[42] SVOM 7.00.05 or later and VIOM 3.4.06 or later are required for BX2560 M1.

[43] No versions from V6.30.05 - V6.31.05 of SVOM can be used for ESXi hosts.

[44] SVOM 7.01.01 or later and VIOM 3.4.06 or later are required for BX2580 M1.

[45] EP function is not supported.

[46] VIOM cannot be used.

[51] Linux ROR manager is not supported.

[53] HBA address rename is not supported in UEFI mode.

[57] Operations on physical servers (i.e. power on/off/status monitoring) are not supported for servers that are incompatible with IPMI 2.0.

[60] In environments where an FC HBA card is mounted using PCI slot 2, 3, 6, or 7, it is not possible to use I/O virtualization using HBA address rename.

To use I/O virtualization using HBA address rename, refer to the mounting information of option cards in the system configuration chart of the server in advance. Confirm that all of the following conditions are satisfied:

- Mounting of the necessary number of FC HBA cards using PCI slots 1, 4, 5, 8, 9, and 10 has not been made impossible because you have mounted other cards with higher priorities for mounting than FC HBA cards using these PCI slots
- Mounting the necessary number of FC HBA cards using PCI slots 1, 4, 5, 8, 9, and 10 has not been made impossible because other cards have already been mounted using these PCI slots
- The necessary number of FC HBA cards are mounted in the proper order of priority for mounting, using PCI slots 1, 4, 5, 8, 9, and 10. Alternatively, configure the system so that the target PCI slot can be specified when mounting a card

[63] When using I/O virtualization for this server model, SVOM 8.20.02 or later or ISM 2.2.0 or later is required.

[64] The period of support of I/O virtualization for this server model is under consideration.

[65] It is not possible to use the link to the Web UI of management software on the [Resources] tab.

[66] When using I/O virtualization for this server model, SVOM 8.20.02 or later or ISM 2.2.0 or later is required.



PRIMERGY BX/RX/TX series, PRIMEQUEST series, other PC servers

- When using servers other than PRIMERGY BX servers

It is necessary to mount an IPMI-compatible (*1) server management unit (*2).

*1: Supports IPMI 2.0.

*2: This usually indicates a Baseboard Management Controller (hereinafter BMC). For PRIMERGY, it is called an integrated Remote Management Controller (hereinafter iRMC).

- When using HBA address rename [Virtual Edition]

The "I/O virtualization option" is required.

- FT model servers are not supported. [Virtual Edition]

- For Physical L-Servers [Cloud Edition]

The following servers cannot be used:

- PRIMERGY TX series
- PRIMERGY RX100 series servers
-
- PRIMEQUEST 1000 series
- PRIMEQUEST 2000 series
- Other PC Servers
- When using physical L-Servers for iSCSI boot [Cloud Edition]
 - VIOM is required.
 - iSCSI boot using CNA cannot be used. Use a NIC that is not a CNA.
- When configuring the UMC function (expansion of function numbers) for the onboard Converged Network Adapter on a physical L-Server, it is necessary to connect with the following LAN switch blade. No other switches are supported. [Cloud Edition]
 - LAN switch blade PY CB Eth Switch/IBP 10Gb 18/8

PRIMERGY BX series servers

- When using the CNA UMC (Universal Multi-Channel) function
 - Resource Orchestrator can only use Function 0 of each port on CNA.
 - The UMC functions can only be used for the onboard CNA of the following hardware.
 - PRIMERGY BX920 S3
 - PRIMERGY BX920 S4
 - PRIMERGY BX924 S3
 - PRIMERGY BX924 S4
 - PRIMERGY BX2560 M1
 - PRIMERGY BX2560 M2
 - PRIMERGY BX2580 M1
 - PRIMERGY BX2580 M2
 - iSCSI and FCoE cannot be used as the Type of a Function.

- Registration of the physical servers and physical L-Servers which use the UMC function as a VM host is not supported.
- The MMB must be one of the following versions:
 - When using BX400 chassis, the version must be 6.73 or later.
 - When using BX900 chassis, the version must be 5.41 or later.
- DR switchover and failback are not supported. [Cloud Edition]
- When the destination of a physical L-Server is a PRIMERGY BX920 series or BX922 series server and LAN switch blades (PY-SWB104(PG-SW109) or PY-SWB101(PG-SW201)) are mounted in CB1 and CB2, only NIC1 and NIC2 can be used. [Cloud Edition]

PRIMERGY RX/ CX series

- The following rack mount servers are supported by VIOM:
 - PRIMERGY RX200 S7 or later
 - PRIMERGY RX300 S7 or later
 - PRIMERGY RX2520 M1
 - PRIMERGY RX2530 M1/M2
 - PRIMERGY RX2540 M1/M2
 - PRIMERGY RX4770 M2/M3
- The following rack mount servers are supported by ISM:
 - PRIMERGY RX2520 M4
 - PRIMERGY RX2530 M4
 - PRIMERGY RX2540 M4
 - PRIMERGY RX4770 M4
 - PRIMERGY CX2550 M4
 - PRIMERGY CX2560 M4
 - PRIMERGY CX2570 M4

PRIMEQUEST series

- When using the PRIMEQUEST 2000 series, the following server virtualization software are not supported.
 - VMware vSphere 4.1 or earlier
 - RHEL5-Xen [Virtual Edition]
 - Citrix XenServer
 - OVM for x86 2.2 [Cloud Edition]
 - When using the PRIMEQUEST series, RHEL7 is not supported.
 - When using RHEL5-Xen as the server virtualization software [Cloud Edition]
- Only PRIMEQUEST 1000 series servers are supported for managed servers.

SPARC Enterprise M series

- To use power consumption monitoring, the XCP version should be 1090 or later.
 - Virtual L-Servers can be deployed. [Cloud Edition]
- For details, refer to "E.6 Solaris Zones" in the "Design Guide CE" and "8.7 Solaris Zones" in the "Setup Guide CE".
- Configured virtual machines can be used by associating them with virtual L-Servers. [Cloud Edition]
 - Configured physical servers can be used by associating them with physical L-Servers. [Cloud Edition]
- For details, refer to "Chapter 18 Linking L-Servers with Configured Physical Servers or Virtual Machines" in the "User's Guide for Infrastructure Administrators (Resource Management) CE".

- Servers can be managed. [Cloud Edition]

For details, refer to the "Design Guide VE".

SPARC Enterprise T5120/T5140/T5220/T5240/T5440

- The ILOM version should be 3.0 or later.
- Configured physical servers can be used by associating them with physical L-Servers. [Cloud Edition]

For details, refer to "Chapter 18 Linking L-Servers with Configured Physical Servers or Virtual Machines" in the "User's Guide for Infrastructure Administrators (Resource Management) CE".

- Servers can be managed. [Cloud Edition]

For details, refer to the "Design Guide VE".

SPARC M10/M12

- For SPARC M12 [Virtual Edition]

The XSCF version should be XCP3020 or later.

- For SPARC M10 [Virtual Edition]

The XSCF version should be XCP2322 or later.

- Virtual L-Servers can be deployed. [Cloud Edition]

For details, refer to the following:

- "E.6 Solaris Zones" in the "Design Guide CE"
- "E.7 OVM for SPARC" in the "Design Guide CE"
- "8.7 Solaris Zones" in the "Setup Guide CE"
- "8.8 OVM for SPARC" in the "Setup Guide CE"

- Configured virtual machines can be used by associating them with L-Servers. [Cloud Edition]

- Configured physical servers can be used by associating them with L-Servers. [Cloud Edition]

For details, refer to "Chapter 18 Linking L-Servers with Configured Physical Servers or Virtual Machines" in the "User's Guide for Infrastructure Administrators (Resource Management) CE".

- Servers can be managed. [Cloud Edition]

For details, refer to the "Design Guide VE".

Functions Available for Agents

The functions that agents can use differ depending on the hardware being used.

Table 6.109 Function Availability List

Functions	PRIMERGY Series Servers		PRIMEQUEST	SPARC M10/M12 and SPARC Enterprise	Other PC Servers
	Blade Models	Rack Mount/Tower Models			
Status Monitoring	Yes	Yes	Yes	Yes	Yes (*1)
Power Operations	Yes	Yes	Yes	Yes	Yes
Backup and restore (*2, *3)	Yes	Yes	Yes (*4)	No	Yes (*5)
Hardware maintenance	Yes	Yes (*16)	Yes (*6)	No	Yes (*5)
Maintenance LED	Yes	No	No	No	No

Functions		PRIMERGY Series Servers		PRIMEQUEST	SPARC M10/M12 and SPARC Enterprise	Other PC Servers
		Blade Models	Rack Mount/ Tower Models			
External management software		Yes	Yes	Yes	Yes	No
Server switchover	Backup and restore method (*3)	Yes	Yes	No	No	Yes (*5)
	HBA address rename method (*3, *7, *8)	Yes	Yes	No	No	No
	VIOM server profile switchover method (*9)	Yes	Yes	No	No	No
	ISM profile switchover method (*11)	No	Yes (*10)	No	No	No
	Storage affinity switchover method	No	Yes (*12)	No	Yes (*13)	No
Cloning (*2, *3, *14)		Yes	No	Yes (*15)	No	Yes (*5)
HBA address rename (*3, *7, *8)		Yes	Yes	No	No	No
VIOM coordination (*9)		Yes	Yes (*10)	No	No	No
ISM coordination (*11)		No	Yes (*12)	No	No	No
VLAN settings		Yes	No	No	No	No
Pre-configuration		Yes	Yes	Yes	Yes	Yes
Power consumption monitoring		Yes (*16)	Yes (*17)	No	Yes (*18)	No

Yes: Use possible.

No: Use not possible.

*1: Server monitoring in coordination with server management software is not possible.

*2: When agents are operating on iSCSI disks, image operations are not possible for the following disk configurations.

Perform operation using a single iSCSI disk configuration.

- iSCSI disk + internal disk
- iSCSI disk + SAN disk

*3: When using backup and restore, cloning, or HBA address rename, the NIC (or LAN expansion board) must support PXE boot.

*4: For the PRIMEQUEST 2000 series, backup and restore is only possible when using Windows managers. PXE boot is only supported by on-board LAN NICs.

*5: When using this function, contact Fujitsu technical staff.

*6: Maintenance LEDs cannot be operated.

*7: When using HBA address rename, the mounted HBA must be compatible with HBA address rename. Only configurations in which up to two HBA ports are mounted on a single managed server are supported.

*8: 16Gbps FC cards are not supported.

*9: VIOM is required.

*10: VIOM coordination is available only when using rack mount servers that are supported by VIOM.

*11: ISM is required.

*12: ISM coordination is available only when using rack mount servers that are supported by ISM.

*13: In the following cases, only configurations in which up to eight HBA ports are mounted on a single managed server are supported.

- SPARC Enterprise M3000
- SPARC Enterprise Partition Models without divided areas
- SPARC M10-1/M10-4/M12-1/M12-2
- SPARC M10-4S/M12-2S not in Building Block configurations
- SPARC Enterprise T5120/T5140/T5220/T5240/T5440

For the list of functions by OS, refer to "Table: Functions Available for Each Target Operating System" in "2.2 Function Overview" in the "Design Guide VE".

*14: Cloning of Linux agents operating on iSCSI disks is not possible.

*15: Only PRIMEQUEST 1000 series servers are supported. Cloning is only available when Legacy boot is specified for the boot option. When UEFI is specified, cloning is unavailable.

*16: BX900 S1 chassis and BX920 S1, BX920 S2, BX920 S3, BX920 S4, BX2560 M1, BX2560 M2, BX922 S2, BX924 S2, BX924 S3, BX924 S4, BX2580 M1, BX2580 M2, and BX960 S1 servers are supported.

*17: Only rack mount models (RX200/300/600/2520/2530/2540/4770) are supported.

*18: Only SPARC Enterprise M3000 and SPARC M10-1/M10-4/M10-4S/M12-1/M12-2/M12-2S are supported.

Required Hardware for Admin Clients

The following hardware is required for admin clients:

Table 6.110 Required Hardware for Admin Clients

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

Hardware Conditions of Power Monitoring Devices

Table 6.111 Supported Power Monitoring Devices

Hardware	Remarks
Symmetra RM 4000VA PG-R1SY4K/PG-R1SY4K2	The firmware version of the network management card is v2.5.4 or v3.0 or higher
Smart-UPS RT 10000 PY-UPAR0K/PG-R1SR10K	-
Smart-UPS RT 5000 PY-UPAC5K	-

6.2.2 Virtual Edition

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

Hardware Conditions When Using Monitoring Functions of Network Devices

Table 6.112 Supported Network Devices

Hardware			Version	Status Monitoring (*1)
Type	Vendor	Model		
L2 switches	SPARC	SR-X 300 series	V01 or later	Yes
		SR-X 500 series		
	Cisco	Catalyst 2900 series	IOS 12.2 or later	Yes
		Catalyst 2918 series		
		Catalyst 2928 series		
		Catalyst 2940 series		
		Catalyst 2955 series		
		Catalyst 2970 series		
		Catalyst 2975 series		
		Catalyst 3500 series		
Catalyst 3550 series				
Cisco	Catalyst 2950 series	IOS 12.2 or later	Yes	
	Catalyst 2960 series			
	Catalyst 3560 series			
	Catalyst 3750 series			
Cisco	Nexus 5000 series	NX-OS V5.2	Yes	
	Brocade	VDX 6710 series	NOS 2.0 or later	Yes
		VDX 6720 series		
VDX 6730 series				
Extreme Networks	VDX 6740			
	VDX 6740T			
	VDX 6940 series			
Ethernet Fabric	SPARC	PRIMERGY Converged Fabric Switch Blade (10 Gbps 18/8+2)	V01.00 or later	Yes
		Converged Fabric Switch	V01.00 or later	Yes
	Brocade	VDX 6710 series	NOS4.0 or later (*3)	Yes
		VDX 6720 series		
		VDX 6730 series		
	Extreme Networks	VDX 6740		
VDX 6740T				
VDX 6940 series (*2)				
Firewalls	SPARC	IPCOM EX IN series	E20L10 or later	Yes
		IPCOM EX SC series		
		IPCOM VA LS series	E20L21NF0301 or later	Yes
		IPCOM VA SC series		
	Cisco	ASA 5500 series	ASASoftware-8.3 or later	Yes

Hardware			Version	Status Monitoring (*1)
Type	Vendor	Model		
Server load balancers	SPARC	IPCOM EX IN series	E20L10 or later	Yes
		IPCOM EX LB series		
	F5 Networks	IPCOM VA LS series	E20L21NF0301 or later	Yes
		IPCOM VA LB series		
Management host	SPARC	IPCOM VX series	E10L11 or later	Yes

Yes: Use possible.

No: Use not possible.

*1: Status monitoring is enabled when the support range of network devices is expanded.

For details on the procedure to expand the support range of network devices, refer to "7.5.1 Enabling the Network Device Management Function" in the "User's Guide VE".

*2: 100 GbE ports cannot be displayed.

*3: NOS4.1.2ac is not supported.

6.2.3 Cloud Edition

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

For supported models, refer to the FUJITSU Software ServerView Resource Orchestrator web site.

Hardware Condition of Storage that can be Connected with Physical L-Server

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

Table 6.113 Storage Units that can Be Connected with L-Servers on Physical Servers

Hardware	Remarks
ETERNUS DX8900 S3	Thin provisioning is available for the following storage units:
ETERNUS DX8700 S3	
ETERNUS DX8000 S2 series	
ETERNUS DX8000 series	
ETERNUS DX600 S4	
ETERNUS DX600 S3	
ETERNUS DX500 S4	
ETERNUS DX500 S3	
ETERNUS DX400 series	
ETERNUS DX400 S2 series	
ETERNUS AF250 S3	
ETERNUS DX200 S5	
ETERNUS DX200 S4	
ETERNUS DX200 S3	
ETERNUS DX200F	
ETERNUS AF150 S3	
ETERNUS DX100 S5	

Hardware	Remarks
ETERNUS DX100 S4	- ETERNUS DX100 S5
ETERNUS DX100 S3	- ETERNUS DX100 S4
ETERNUS DX90 S2	- ETERNUS DX100 S3
ETERNUS DX90	- ETERNUS DX90 S2
ETERNUS DX80 S2	- ETERNUS DX80 S2
ETERNUS DX80	- ETERNUS DX60 S5
ETERNUS DX60 S5	- ETERNUS DX60 S4
ETERNUS DX60 S4	- ETERNUS DX60 S3
ETERNUS DX60 S3	For the following apparatuses, when disk resources are created with Resource
ETERNUS DX60 S2	Orchestrator, set the alias (if possible) based on the disk resource name in the LUN.
ETERNUS DX60	For ETERNUS other than the following, the alias name is set to the initial value set by
ETERNUS8000 series	ETERNUS as before.
	- ETERNUS DX8900 S3
	- ETERNUS DX8700 S3
	- ETERNUS DX8000 S2 series
	- ETERNUS DX600 S4
	- ETERNUS DX600 S3
	- ETERNUS DX500 S4
	- ETERNUS DX500 S3
	- ETERNUS DX400 S2 series
	- ETERNUS AF250 S3
	- ETERNUS DX200 S5
	- ETERNUS DX200 S4
	- ETERNUS DX200 S3
	- ETERNUS DX200F
	- ETERNUS AF150 S3
	- ETERNUS DX100 S5
	- ETERNUS DX100 S4
	- ETERNUS DX100 S3
	- ETERNUS DX90 S2
	- ETERNUS DX80 S2
	- ETERNUS DX60 S5
	- ETERNUS DX60 S4
	- ETERNUS DX60 S3
	- ETERNUS DX60 S2
	For the following apparatuses, if an alias has been set for the LUN, the alias name is
	displayed.
	- ETERNUS DX8900 S3
	- ETERNUS DX8700 S3
	- ETERNUS DX8000 S2 series

Hardware	Remarks
	<ul style="list-style-type: none"> - ETERNUS DX8000 series - ETERNUS DX600 S4 - ETERNUS DX600 S3 - ETERNUS DX500 S4 - ETERNUS DX500 S3 - ETERNUS DX400 series - ETERNUS DX400 S2 series - ETERNUS AF250 S3 - ETERNUS DX200 S5 - ETERNUS DX200 S4 - ETERNUS DX200 S3 - ETERNUS DX200F - ETERNUS AF150 S3 - ETERNUS DX100 S5 - ETERNUS DX100 S4 - ETERNUS DX100 S3 - ETERNUS DX90 S2 - ETERNUS DX90 - ETERNUS DX80 S2 - ETERNUS DX80 - ETERNUS DX60 S5 - ETERNUS DX60 S4 - ETERNUS DX60 S3 - ETERNUS DX60 S2 - ETERNUS DX60 <p>Dynamic LUN mirroring can be used with Resource Orchestrator with the following apparatuses.</p> <ul style="list-style-type: none"> - ETERNUS DX8900 S3 - ETERNUS DX8700 S3 - ETERNUS DX8000 S2 series - ETERNUS DX600 S4 - ETERNUS DX600 S3 - ETERNUS DX500 S4 - ETERNUS DX500 S3 - ETERNUS DX410 S2 - ETERNUS DX440 S2 - ETERNUS AF250 S3 - ETERNUS DX200 S5 - ETERNUS DX200 S4

Hardware	Remarks
	<ul style="list-style-type: none"> - ETERNUS DX200 S3 - ETERNUS DX200F - ETERNUS DX90 S2 <p>When using the target units for the following options, Automatic Storage Layering can be used with Resource Orchestrator.</p> <ul style="list-style-type: none"> - ETERNUS SF Storage Cruiser V16 Optimization Option - ETERNUS SF Storage Cruiser V15 Optimization Option <p>For the following devices, you should register devices to ETERNUS SF Storage Cruiser manager using the IP address in IPv4 form.</p> <ul style="list-style-type: none"> - ETERNUS DX8900 S3 - ETERNUS DX8700 S3 - ETERNUS DX8000 S2 series - ETERNUS DX600 S4 - ETERNUS DX600 S3 - ETERNUS DX500 S4 - ETERNUS DX500 S3 - ETERNUS DX400 S2 series - ETERNUS AF250 S3 - ETERNUS DX200 S5 - ETERNUS DX200 S4 - ETERNUS DX200 S3 - ETERNUS DX200F - ETERNUS AF150 S3 - ETERNUS DX100 S5 - ETERNUS DX100 S4 - ETERNUS DX100 S3 - ETERNUS DX90 S2 - ETERNUS DX80 S2 - ETERNUS DX60 S5 - ETERNUS DX60 S4 - ETERNUS DX60 S3 <p>If the migration destination is any of the following types of storage units with non-stop storage migration functionality, it is not possible to use Resource Orchestrator to operate any external RAID groups or external volumes that have been created on that device.</p> <ul style="list-style-type: none"> - ETERNUS DX8900 S3 - ETERNUS DX8700 S3 - ETERNUS DX600 S4 - ETERNUS DX600 S3 - ETERNUS DX500 S4 - ETERNUS DX500 S3

Hardware	Remarks
	<ul style="list-style-type: none"> - ETERNUS AF250 S3 - ETERNUS DX200 S5 - ETERNUS DX200 S4 - ETERNUS DX200 S3 - ETERNUS DX200F - ETERNUS AF150 S3 - ETERNUS DX100 S5 - ETERNUS DX100 S4 - ETERNUS DX100 S3 - ETERNUS DX60 S5 - ETERNUS DX60 S4 - ETERNUS DX60 S3
ETERNUS4000 series	<p>Model 80 and model 100 are not supported.</p> <p>Thin provisioning is not available for this series.</p>
ETERNUS2000 series	When an alias name is configured for a LUN, the alias name is displayed.
NetApp FAS6000 series NetApp FAS3100 series NetApp FAS2000 series NetApp V6000 series NetApp V3100 series	Data ONTAP 7.3.3 or later Data ONTAP 8.0.1 7-Mode
EMC CLARiiON CX4-120 EMC CLARiiON CX4-240 EMC CLARiiON CX4-480 EMC CLARiiON CX4-960 EMC CLARiiON CX3-10 EMC CLARiiON CX3-20 EMC CLARiiON CX3-40 EMC CLARiiON CX3-80 EMC VNX5100 EMC VNX5300 EMC VNX5500 EMC VNX5700 EMC VNX7500	Navisphere Manager and Access Logix must be installed on SP.
EMC Symmetrix DMX-3 EMC Symmetrix DMX-4 EMC Symmetrix VMAX	VolumeLogix must be installed on SP.
Storage Server on which FalconStor NSS operates	<p>It should be a model on which FalconStor guarantees the operation of FalconStor NSS.</p> <p>Please install FalconStor NSS in Storage Server.</p> <p>The following versions of FalconStor NSS are supported.</p>

Hardware	Remarks
	- V7.00
Storage unit connected with Storage Server on which FalconStor NSS operates	It should be a model on which FalconStor guarantees the operation of FalconStor NSS.
Fibre channel switch connected with Storage Server on which FalconStor NSS operates	It should be a model on which FalconStor guarantees the operation of FalconStor NSS.

When using storage management software, do not change or delete the content set for storage units by Resource Orchestrator.

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

Table 6.114 Fibre Channel Switches which can be Used when Connecting Storage Units 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	When there is MMB firmware that cannot obtain the fibre channel card information of blade servers, connect the fibre channel switch blade to the following connection blade. - CB5, CB6 For details on the MMB firmware, refer to "D.3.1 Configuring the Storage Environment" in the "Design Guide CE".
PRIMERGY BX400 Fibre Channel switch blades	When there is MMB firmware that cannot obtain the fibre channel card information of blade servers, connect the fibre channel switch blade to the following connection blade. - CB3, CB4 For details on the MMB firmware, refer to "D.3.1 Configuring the Storage Environment" in the "Design Guide CE".

Hardware Conditions of Storage that can be Connected to Virtual L-Servers

When connecting storage units to virtual L-Servers, the following storage units can be used:

[VMware]

Refer to "Supported Storage Configurations" in "E.1.3 Storage Preparations" in the "Design Guide CE".

[Hyper-V]

Refer to "Supported Storage Configurations" in "E.2.3 Storage Preparations" in the "Design Guide CE".

[Xen]

Refer to "Supported Storage Configurations" in "E.3.3 Storage Preparations" in the "Design Guide CE".

[OVM for x86 2.2]

Refer to "Supported Storage Configurations" in "E.4.3 Storage Preparations" in the "Design Guide CE".

[KVM]

Refer to "Supported Storage Configurations" in "E.5.3 Storage Preparations (SAN Configurations)" in the "Design Guide CE".

[Solaris Zones]

Refer to "Supported Storage Configurations" in "E.6.3 Storage Preparations" in the "Design Guide CE".

[OVM for SPARC]

Refer to "Supported Storage Configurations" in "E.7.3 Storage Preparations" in the "Design Guide CE".

[Citrix Xen]

Refer to "Supported Storage Configurations" in "E.8.3 Storage Preparations" in the "Design Guide CE".

[OVM for x86 3.x]

Refer to "Supported Storage Configurations" in "E.8.3 Storage Preparations" in the "Design Guide CE".

Network Hardware Conditions When Using Simplifying of Network Settings

Refer to the following sections for the LAN switch blades that are available when using simplifying of network settings:

- Physical L-Server

"7.3.1 Automatic Network Configuration" in the "Setup Guide CE"

- Virtual L-Server

- "8.2.4 Automatic Network Configuration" in the "Setup Guide CE"

- "8.3.4 Automatic Network Configuration" in the "Setup Guide CE"

Table 6.115 Supported Network Devices

Hardware			Version	Functions		
Type	Vendor	Model		Status Monitoring	Network Device Automatic Configuration	Network Device Configuration File Management
L2 switches (*1)	SPARC	SR-X 300 series SR-X 500 series	V01 or later	Yes	Yes	Yes
	Cisco	Catalyst 2900 series Catalyst 2918 series Catalyst 2928 series Catalyst 2940 series Catalyst 2950 series Catalyst 2955 series Catalyst 2960 series Catalyst 2970 series Catalyst 2975 series Catalyst 3500 series Catalyst 3550 series Catalyst 3560 series Catalyst 3750 series	IOS 12.2 or later	Yes	Yes	Yes
	Cisco	Nexus 5000 series (*3)	NX-OS V5.2	Yes	Yes	Yes
	Brocade	VDX 6710 series VDX 6720 series VDX 6730 series	NOS 2.0 or later	Yes	Yes (*4)	No
	Extreme Networks	VDX 6740 VDX 6740T VDX 6940 series				

Hardware			Version	Functions		
Type	Vendor	Model		Status Monitoring	Network Device Automatic Configuration	Network Device Configuration File Management
Ethernet Fabric	SPARC	PRIMERGY Converged Fabric Switch Blade (10 Gbps 18/8+2) (*5)	V01.00 or later	Yes	Yes	No
		Converged Fabric Switch (*5)	V01.00 or later	Yes	Yes	No
	Brocade	VDX 6710 series VDX 6720 series VDX 6730 series	NOS4.0 or later (*7)	Yes	No	No
		Extreme Networks				
Firewall (*2)	SPARC	IPCOM EX IN series IPCOM EX SC series	E20L10 or later	Yes	Yes	Yes
		IPCOM VA LS series IPCOM VA SC series	E20L21NF0301 or later	Yes	Yes (*8)	Yes
	Cisco	ASA 5500 series (*9)	ASASoftware-8.3 or later	Yes	Yes	Yes
Server load balancer (*2)	SPARC	IPCOM EX IN series IPCOM EX LB series	E20L10 or later	Yes	Yes (*10)	Yes
		IPCOM VA LS series IPCOM VA LB series	E20L21NF0301 or later	Yes	Yes (*11)	Yes
	F5 Networks	BIG-IP Local Traffic Manager series	BIG-IP V11.2	Yes	Yes	Yes
Management host	SPARC	IPCOM VX series	E10L11 or later	Yes	No	No

Yes: Use possible.

No: Use not possible.

*1: L2 switches are essential in the following cases.

- When placing an L2 switch between a firewall and rack mount or tower servers
- When placing an L2 switch between a firewall and LAN switch blades
- When placing an L2 switch between a firewall and server load balancer
- When placing an L2 switch between a server load balancer and a rack mount or tower server

*2: Necessary when placing a firewall or a server load balancer on an L-Platform.

*3: Nexus 2000 series (except Nexus B22 Blade Fabric Extender) connected to Nexus 5000 series using a fabric interface are used as part of the Nexus 5000 series (module related).

*4: Sample scripts for automatic configuration and operation are not provided. It is necessary to create the rulesets for configuring definitions.

*5: Network mode and host mode are supported as the operation mode.

*6: 100 GbE ports cannot be displayed.

*7: NOS4.1.2ac is not supported.

*8: Sample scripts are supported by E20L30NF0201 or later. Sample scripts for automatic configuration are not available for the IPCOM VA SC series. It is necessary to create the rulesets for configuring definitions.

*9: Cisco ASA5505 is not supported.

*10: Sample scripts for automatic configuration and operation are not provided for the IPCOM EX LB series. It is necessary to create the rulesets for configuring definitions.

*11: Sample scripts are supported by E20L30NF0201 or later. Sample scripts for automatic configuration are not available for the IPCOM VA LB series. It is necessary to create the rulesets for configuring definitions.

In addition, an L3 switch is necessary when using a separate admin LAN network for each tenant.