

# **FUJITSU Software**

## **ServerView Resource Orchestrator**

### **Virtual Edition V3.4.0**

A decorative horizontal band with a red-to-dark-red gradient, featuring abstract, glowing white and red lines that swirl and intersect, creating a sense of motion and technology.

## **Design Guide**

Windows/Linux

J2X1-7671-08ENZ0(03)  
October 2020

# Preface

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## Purpose of This Document

This manual provides an outline of FUJITSU Software ServerView Resource Orchestrator Virtual Edition (hereinafter Resource Orchestrator) and the design and preparations required for setup.

## Intended Readers

This manual is written for people who will install Resource Orchestrator.

When setting up systems, it is assumed that readers have the basic knowledge required to configure the servers, storage, and network devices to be installed.

## Structure of This Document

This manual is composed as follows:

### [Chapter 1 Documentation Road Map](#)

Explains the documentation road map, and how to read it.

### [Chapter 2 Overview](#)

Provides an overview of Resource Orchestrator.

### [Chapter 3 Flow of Resource Orchestrator Design and Preconfiguration](#)

Explains the flow of design and pre-configuration for Resource Orchestrator.

### [Chapter 4 System Configuration Design](#)

Explains points to keep in mind when setting up a Resource Orchestrator environment.

### [Chapter 5 Defining User Accounts](#)

Explains the user accounts used in Resource Orchestrator.

### [Chapter 6 Defining and Configuring the Server Environment](#)

Explains how to define and configure server environments.

### [Chapter 7 Defining and Configuring the Network Environment](#)

Explains how to define and pre-configure the network environment.

### [Chapter 8 Deciding and Configuring the Storage Environment](#)

Explains how to decide and configure the storage environment.

### [Chapter 9 Deciding and Configuring Server Virtualization Software](#)

Explains how to decide and configure server virtualization software.

### [Chapter 10 Configuring Single Sign-On](#)

Explains the function to perform Single Sign-On in coordination with ServerView Operations Manager.

### [Chapter 11 Deciding and Configuring the Power Monitoring Environment](#)

Explains how to decide and configure the power monitoring environment.

### [Appendix A Port List](#)

Explains the ports used by Resource Orchestrator.

### [Appendix B HTTPS Communications](#)

Explains the HTTPS communication protocol used by Resource Orchestrator and its security features.

### [Appendix C Hardware Configuration](#)

Explains how to configure hardware.

## Appendix D Ethernet Fabric Devices

Explains the methods for managing Ethernet fabric devices.

## Appendix E IPCOM VX Series Devices

Explains the methods for managing IPCOM VX series devices.

## 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

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## Revision History

Month/Year Issued, Edition	Manual Code
July 2012, First Edition	J2X1-7671-01ENZ0(00)
October 2012, Second Edition	J2X1-7671-02ENZ0(00)
December 2012, Third Edition	J2X1-7671-03ENZ0(00)
January 2013, Fourth Edition	J2X1-7671-04ENZ0(00)
January 2013, Edition 4.1	J2X1-7671-04ENZ0(01)
January 2013, Edition 4.2	J2X1-7671-04ENZ0(02)
March 2013, Edition 4.3	J2X1-7671-04ENZ0(03)
June 2013, Edition 4.4	J2X1-7671-04ENZ0(04)
August 2013, Edition 4.5	J2X1-7671-04ENZ0(05)
December 2013, Fifth Edition	J2X1-7671-05ENZ0(00)
February 2014, Edition 5.1	J2X1-7671-05ENZ0(01)
February 2014, Edition 5.2	J2X1-7671-05ENZ0(02)
April 2014, Edition 5.3	J2X1-7671-05ENZ0(03)
April 2014, Edition 5.4	J2X1-7671-05ENZ0(04)
June 2014, Edition 5.5	J2X1-7671-05ENZ0(05)
June 2014, Edition 5.6	J2X1-7671-05ENZ0(06)
April 2015, Sixth Edition	J2X1-7671-06ENZ0(00)
July 2015, Edition 6.1	J2X1-7671-06ENZ0(01)
August 2015, Edition 6.2	J2X1-7671-06ENZ0(02)
September 2015, Edition 6.3	J2X1-7671-06ENZ0(03)
December 2015, Edition 6.4	J2X1-7671-06ENZ0(04)
January 2016, Edition 6.5	J2X1-7671-06ENZ0(05)
June 2016, Edition 6.6	J2X1-7671-06ENZ0(06)
September 2016, Edition 6.7	J2X1-7671-06ENZ0(07)
December 2016, Edition 6.8	J2X1-7671-06ENZ0(08)

Month/Year Issued, Edition	Manual Code
February 2017, Edition 6.9	J2X1-7671-06ENZ0(09)
February 2017, Edition 6.10	J2X1-7671-06ENZ0(10)
February 2017, Edition 6.11	J2X1-7671-06ENZ0(11)
April 2017, Seventh Edition	J2X1-7671-07ENZ0(00)
May 2017, Edition 7.1	J2X1-7671-07ENZ0(01)
August 2017, Edition 7.2	J2X1-7671-07ENZ0(02)
September 2017, Edition 7.3	J2X1-7671-07ENZ0(03)
December 2017, Edition 7.4	J2X1-7671-07ENZ0(04)
February 2018, Edition 7.5	J2X1-7671-07ENZ0(05)
March 2018, Edition 7.6	J2X1-7671-07ENZ0(06)
October 2018, Eighth Edition	J2X1-7671-08ENZ0(00)
December 2018, Edition 8.1	J2X1-7671-08ENZ0(01)
December 2018, Edition 8.2	J2X1-7671-08ENZ0(02)
October 2020, Edition 8.3	J2X1-7671-08ENZ0(03)

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# Chapter 1 Documentation Road Map

For the documentation road map, refer to "Documentation Road Map".

# Chapter 2 Overview

This chapter provides an overview of Resource Orchestrator.

## 2.1 Features

Resource Orchestrator is server management software that improves the usability and availability of server systems. It uniformly manages physical servers as well as virtual servers created using server virtualization software (VMware and others).

The level of functionality provided by Resource Orchestrator differs depending on the managed hardware environment. For details, refer to "Functions Available for Agents" in "6.2.1 All Editions" in the "Overview".

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

### - **Integrated management of physical and virtual servers**

Resource Orchestrator provides an integrated management console for environments composed of physical and virtual servers. It helps administrators manage server configurations, monitor hardware failures, and determine the cause and impact of system errors by automatically detecting and displaying the following information.

- Resource Orchestrator provides a tree-based view of chassis and server hardware and their operating systems (physical OS, VM host, or VM guest).  
This enables easy confirmation and tracking of relationships between chassis, servers, and operating systems.
- Resource Orchestrator monitors server hardware and displays icons representative of each server's status.

Resource Orchestrator also allows administrators to manage both physical and virtual servers in a uniform manner. Once registered, resources can be managed uniformly regardless of server models, types of server virtualization software, or differences between physical and virtual servers.

### - **Auto-Recovery of failed servers**

The function allows failed applications to automatically be recovered onto an available spare server by pre-allocating spare servers to managed servers.

Depending on the server's boot method, one of the four following switchover methods can be used to recover applications on a spare server:

- Backup and restore

This method is used in local boot environments where servers boot from an internal disk. Backing up the system disk of a primary server in advance allows automatic restoration and startup of the spare server when the primary server fails.

- HBA address rename

This method is used in SAN boot environments where servers start from boot disks located in SAN storage arrays. If the primary server fails, its World Wide Name (WWN) is inherited by the spare server, which then automatically starts up from the same SAN disk. This is made possible by the I/O virtualization (\*) capabilities of the HBA address rename function, which is able to dynamically reconfigure the WWN of an I/O adapter (HBA).

- Profile exchange

This method is used in environments where servers start from boot disks located in SAN storage arrays or on a storage device connected to the LAN. If the primary server fails, the World Wide Name (WWN), MAC address, boot configuration, and network configuration set in its profile in advance using I/O virtualization using VIOM or ISM are inherited by the spare server, which then automatically starts up from the same boot disk.

For details on profiles, refer to the manuals of ServerView Virtual-IO Manager or ServerView Infrastructure Manager.

\* Note: Refer to "[I/O Virtualization](#)".

- Storage affinity switchover method

This method is used in SAN boot environments where servers start from boot disks located in SAN storage arrays. If the primary server fails, its switch zoning and host affinity configurations set in the fibre channel switch and the SAN storage using ESC are inherited by the WWN (World Wide Name) of the spare server, which then automatically starts up from the same SAN disk.

The following LAN switch settings can also be exchanged between primary and spare servers during server switchover. This feature supports the backup and restore, HBA address rename, and profile switchover methods.

- VLAN
- Port groups (For PRIMERGY BX900/BX400 LAN switch blades operating in IBP mode)

Several servers can share one or more common spare servers, irrespective of the kind of servers used (physical or virtual), or the applications that are running on them.

Spare servers can also be shared between physical and virtual servers. This is done by combining Auto-Recovery with the high availability feature provided with the server virtualization software used.

Note that the Auto-Recovery function differs from clustering software (such as PRIMECLUSTER) in the following respect:

- Server failure detection

The Auto-Recovery function can detect hardware failures using server management software (such as ServerView Agents) and server management devices (management blades, management boards, or remote management controllers). It cannot detect system slowdowns.

#### - **Automated server installation and setup**

The following three features simplify server installation and setup:

- Deploying multiple servers via server cloning

Server cloning is a feature that distributes a cloning image (collected from the system disk of a reference server) to other physical servers.

When a cloning image is created, network-specific settings such as host names and IP addresses are removed from the cloning image. This network-specific configuration is dynamically reconfigured on the servers to which the cloning image is distributed. This makes it possible to create duplicates of existing servers that will use the same operating system and software.

- Simplified server installation using I/O virtualization

I/O virtualization via HBA address rename (\*) allows storage devices to be configured independently and prior to the rest of the server installation process. Servers can then be installed and set up without the involvement of storage administrators.

\* Note: Refer to "[I/O Virtualization](#)".

- Multiple server installations using the pre-configuration feature

The pre-configuration feature can be used to configure all settings required for a Resource Orchestrator setup in a system configuration file, which can then be easily imported from the ROR console.

The system configuration file is in CSV format and can be edited easily even in environments where Resource Orchestrator is not installed.

#### - **Streamlined server maintenance**

The following features help to identify which servers need to be replaced, and assist administrators with maintenance required after replacement of a server:

- Automatic maintenance LED activation on failed servers. (\*)

\* Note: Depending on the hardware being used, this feature may or may not be available.

For details, refer to "Functions Available for Agents" in "6.2.1 All Editions" in the "Overview".

- In SAN boot environments, I/O virtualization (\*) provided by HBA address rename, VIOM, or ISM makes it possible to restore a failed server's original WWN definition to the replacement server. Resource Orchestrator is able to quickly reconnect a replaced server to its original volumes and start it up from the same operating system without accessing any storage device.

Moreover, with the ability to automatically re-define MAC addresses, boot configuration, and network configuration using VIOM or ISM, it is no longer necessary to reconfigure network devices or applications that depend on MAC address values.

\* Note: Refer to "[I/O Virtualization](#)".

- In local boot environments, a system image backed up beforehand can be easily restored to the replaced server to simplify server replacement.

### - **Easy server monitoring**

When managing PRIMERGY BX servers, BladeViewer can be used to easily check server statuses and perform other daily operations. In BladeViewer, server statuses are displayed in a format similar to the physical configuration of a blade server system, making server management and operation more intuitive. BladeViewer provides the following features:

- Display of the mount statuses of server blades.
- An intuitive way to monitor and control the mount statuses of multiple server blades.
- Easier visualization of which applications are running on each server blade. This helps to quickly identify any affected applications when a hardware fault occurs on a server blade.

### - **Simple network monitoring**

For PRIMERGY BX servers, Resource Orchestrator provides a NetworkViewer function, which helps visualize and relate physical networks (between servers and LAN switches) together with virtualized networks (from VLANs or virtual switches used in server virtualization software). It has the following features.

- Automatic detection and display of network connections (topology) and link statuses between heterogeneous network resources.
- Facilitates overall network consistency diagnostics and identification of the resources (physical and virtual) affected by a network issue.
- Displays comprehensive content that can be used in communication between server and network administrators, thus smoothing out coordination between the two parties.

### - **Monitoring of power consumption**

By activating the power monitoring feature, it is possible to monitor trends in power consumption for resources equipped with power monitoring capabilities, or resources connected to a registered power monitoring device (PDU or UPS). The power consumption data regularly collected from the power monitoring environment can be output to a file in CSV format or as a graph.

### - **Relocation of VM guests**

By integrating with VM management software (such as VMware vCenter Server or others) and VM hosts (such as Citrix XenServer or others), Resource Orchestrator provides the ability to migrate VM guests between physical servers directly from the ROR console. When used with other Resource Orchestrator functions, this enables the following:

- Regrouping of all VM guests to a subset of servers and shut down of any unused servers or chassis to reduce overall power consumption.
- When server maintenance becomes necessary, VM guests can be migrated to alternative servers and their applications kept alive during maintenance work.

## **I/O Virtualization**

I/O adapters (HBA) for servers are shipped with an assigned physical address that is unique across the world. This World Wide Name (WWN) is used by the storage network to identify servers. Until now, the WWN settings on storage networks needed to be updated whenever servers were added, replaced, or switched over. Resource Orchestrator uses I/O virtualization technology that makes server-side I/O control possible. It does this by replacing physically-bound WWNs with virtual WWNs assigned to each server based on its role in the system. Resource Orchestrator can handle different I/O virtualization technologies (VIOM, ISM, and HBA address rename).

With VIOM or ISM, the ability to re-define MAC addresses of network interfaces, boot configuration, and network configuration means that it is no longer necessary to reconfigure network devices or applications that depend on MAC address values.



### **Note**

- The "I/O virtualization option" is required when using HBA address rename.
- ServerView Virtual-IO Manager should be installed on the admin server when integrating Resource Orchestrator with VIOM.
- When coordinating with ISM, install the ServerView Infrastructure Manager virtual appliance on a server other than the admin server.



- The following features are unavailable when ServerView Deployment Manager is used in the same subnet as Resource Orchestrator (the admin LAN). In this case, use ServerView Virtual-IO Manager or ServerView Infrastructure Manager instead of ServerView Deployment Manager.

- Cloning
- Backup and restore
- HBA address rename
- Server switchover (based on the backup-restore and HBA address rename methods)

For details, refer to "B.2 Co-Existence with ServerView Deployment Manager" in the "Setup Guide VE".

## 2.2 Function Overview

The following functions are provided by Resource Orchestrator.

Table 2.1 Functions Available for Managed Servers

Function	Description	Benefits	Target resource		
			Physical OS	VM host (*1)	VM guest (*1)
Monitoring	A function for monitoring resource statuses of servers and displaying if the status is normal or not by using the GUI.	Helps identify the cause of a failure and determine its impact on servers, thereby streamlining hardware maintenance.	Yes (*2)	Yes (*2)	Yes
Power control	A function for turning servers ON or OFF.	Enables remote control of a managed server's power state without having direct access to it. This simplifies periodic maintenance tasks that involve power control operations.	Yes	Yes	Yes
Backup and restore (*3, *4)	Creates system image backups of servers that can be easily restored when needed. System images are centrally stored on a disk on the admin server.	Creating backups before any configuration change, OS or software installation, or patch application can drastically reduce the time to restore a server to its original state when hardware or software problems occur.	Yes (*5)	Yes (*5, *6)	No
Hardware maintenance	Functions to simplify hardware replacement. When connected with a SAN, it is not necessary to reconfigure storage units by configuring the I/O virtualization settings. Moreover, with the ability to re-define MAC addresses, boot configuration, and network configuration using VIOM or ISM, it is no longer necessary to reconfigure network devices or applications that depend on MAC address values.	Lightens the workload associated with hardware replacement and reduces the risk of operational errors.	Yes	Yes	-
Server switchover (*4)	Recover applications upon hardware failure by switching over primary servers with pre-assigned spare servers.	Shortens and simplifies the recovery procedure in the event of server failure.	Yes (*7)	Yes (*7)	No

Function	Description	Benefits	Target resource		
			Physical OS	VM host (*1)	VM guest (*1)
Cloning (*3, *4)	Creates a cloning image of a reference server and deploys it to other managed servers. Cloning images are centrally stored on a disk on the admin server.	Simplifies OS and software installation when servers are added. Allows servers with identical OS and software configurations to share common backups.	Yes	No	No

Yes: Supported

No: Not supported

-: Not applicable

\*1: For details on the functions available depending on the server virtualization software used for VM hosts and VM guests, refer to "9.1 Deciding Server Virtualization Software" for details.

\*2: Depending on the hardware being used, this feature may or may not be available.

For details, refer to "Functions Available for Agents" in "6.2.1 All Editions" in the "Overview".

\*3: Not necessary when ServerView Deployment Manager shares the same subnet (admin LAN).

\*4: It is necessary to create Windows PE in advance. For details, refer to the "Windows PE Creation Script Guide".

\*5: Back up and restoration of managed servers that are in clusters is not supported.

However, it is possible to back up and restore managed servers that have been removed from clusters beforehand.

Back up and restoration of a VM host is possible when both of the following conditions are satisfied:

- The target VM host is not in a cluster.

\*6: When backing up a VM host containing VM guests on its own boot disk, behavior differs according to the server virtualization product used. For details, refer to "9.2.2 Functional Differences between Products".

\*7: Performing server switchover of managed servers that are in clusters is not supported.

Table 2.2 Functions Available for Each Target Operating System

Function		OS (Physical OS, VM Host)											
		Windows		Linux		VMware		Solaris			Xen		KVM
		Windows	Hyper-V (*1, *2)	Red Hat/Oracle	SUSE (*3)	vSphere 4 (*4, *5, *6)	Infrastructure 3	Solaris	Solaris Zones	OVM for SPARC	Citrix	Red Hat	Red Hat
Monitoring		Yes	Yes	Yes (*7)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Power control		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Backup and restore (*8)		Yes (*9)	Yes (*9)	Yes (*10)	Yes (*11)	No	Yes	No	No	No	Yes (*11, *12)	Yes (*13)	Yes (*13)
Server switchover (*8)	Back up and restore method	Yes (*9)	Yes (*9)	Yes	Yes (*14)	No	Yes	No	No	No	Yes (*15)	Yes	Yes
	HBA address rename	Yes (*9)	Yes (*9)	Yes	Yes (*14)	Yes	Yes	No	No	No	Yes (*15)	Yes	Yes

Function		OS (Physical OS, VM Host)											
		Windows		Linux		VMware		Solaris			Xen		KVM
		Windows	Hyper-V (*1, *2)	Red Hat/Oracl e	SUSE (*3)	vSphere 4 (*4, *5, *6)	Infrastru cture 3	Solari s	Solari s Zone s	OVM for SPARC	Citrix	Red Hat	Red Hat
	method												
	VIO M server profile switc hover method	Yes (*9)	Yes (*9)	Yes	Yes (*14)	Yes	Yes	No	No	No	Yes	Yes	Yes
	ISM profile switc hover method	Yes (*9)	Yes (*9)	Yes	Yes (*14)	Yes	Yes	No	No	No	Yes	Yes	Yes
	Stora ge affinit y switc hover method	No	No	No	No	No	No	Yes (*16 , *17, *18, *19, *20)	Yes (*16 , *17, *18, *19, *20, *21)	Yes (*17, *19, *20, *21, *22, *23)	No	No	No
	Ping monitoring (*24)	Yes	Yes	Yes	Yes	Yes (*25)	Yes	Yes (*17 )	Yes (*17 )	Yes (*17)	Yes	Yes	Yes
	Cloning (*8)	Yes (*26 )	No	Yes (*10 )	Yes (*11, *27)	No	No	No	No	No	No	No	No
	VLAN settings (*28)	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes
	Pre-configuration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes (*29)	Yes	Yes	Yes

Yes: Supported

No: Not supported

\*1: Only supported when the manager is running on Windows.

\*2: VM guest migrations and VM maintenance mode settings require Microsoft(R) System Center Virtual Machine Manager 2008 R2 or later. In addition, PowerShell 2.0 or later should be installed on the manager.

\*3: Disable the use of persistent network device names.

\*4: With BIOS time settings, it is only possible to set UTC (Coordinated Universal Time) for VMware ESX/ESXi of VMware vSphere 4 or later version servers, and local time for Windows servers. Therefore, as the same settings cannot be made, operation with spare servers being shared between VMware ESX/ESXi of VMware vSphere 4 and later versions of servers, and Windows servers is not possible.

\*5: When upgrading from VMware Infrastructure 3, system images of VM hosts that were collected prior to the upgrade will be available after the upgrade is complete. However, even if system images from before the upgrade are used for server switchover (using the backup

and restore method), the VM hosts will not operate properly. Be sure to release spare server settings for server switchover using the backup and restore method before performing upgrades. It is recommended to delete all system images collected before change, unless those images are specifically needed.

- \*6: Management of VM guests with VMware Fault Tolerance enabled is not supported by Resource Orchestrator.
- \*7: Oracle Enterprise Linux is reported as Red Hat Enterprise Linux.
- \*8: It is necessary to create Windows PE in advance. For details, refer to the "Windows PE Creation Script Guide".
- \*9: You must have a volume license for the version of Windows to be installed on managed servers by Resource Orchestrator. With Windows Server 2012 or later, OEM license can be applied. However, OEM licenses are also necessary for restoration target servers, spare servers, and servers after replacement.
- \*10: When performing operations using Resource Orchestrator, ensure that the file system is NTFS, ext3, ext4, or LinuxSwap.
- \*11: When using the backup and restore functions, ensure that the file system is an ext3 file system.
- \*12: When performing restoration using Resource Orchestrator, do so using hardware with the same NIC configuration as when the backup was made. When performing restoration after NICs have been replaced or reconfigured, reinstall XenServer referring to the manual for Citrix XenServer.
- \*13: VM maintenance mode is not supported by this server virtualization product. As a result, system images can be backed up and restored without having to set or release the target VM hosts from VM maintenance mode.
- \*14: When using the backup and restore method of Resource Orchestrator for server switchover, configure the same SCSI WWID for the source and target.
- \*15: XenServer 5.7 or later cannot be used. When using the server switchover functions, select a profile switchover method.
- \*16: When configuring the OS file system using UFS, enable logging in the mount settings for UFS file systems in order to prevent fsck execution at startup. Refer to the Solaris System Administration Guide for details on the UFS logging settings.
- \*17: Recovery, including server switchover, cannot be performed for PRIMEQUEST, SPARC Enterprise Partition Models with divided areas, or SPARC M10/M12 in Building Block configurations.
- \*18: When using SPARC M10/M12, perform server switchover in the factory-default configuration using the primary server and the spare server.
- \*19: When using SPARC M10/M12, the configuration information saved in the XSCF of the spare server may be overwritten with the configuration information saved in the XSCF of the primary server, while performing switchover.
- \*20: Only MPxIO can be used as the multipath configuration for storage.
- \*21: In cases where zones are created in ZFS storage pools, server switchover can be performed on Solaris 11.1 or later.
- \*22: Oracle VM Server for SPARC 3.0/3.1 is supported. However, server switchover is not possible when using Oracle VM Server for SPARC 3.1 and an I/O domain to which physical I/O is allocated for each PCIe end point device.
- \*23: When using SPARC M10/M12, execute switchover with domain configuration information other than the factory-default saved on the primary server.
- \*24: For details on how to configure these settings, refer to "Chapter 8 Configuring Monitoring Information" in the "Setup Guide VE".
- \*25: For VMware ESXi, this function is not supported.
- \*26: You must have a volume license for the version of Windows to be installed on managed servers by Resource Orchestrator.
- \*27: Auto-configuration of network parameters cannot be used.
- \*28: Only supported for blade models.
- \*29: Agent registration information of guest domains is not supported.

**Table 2.3 Functions Available for Blade Chassis**

Function	Description	Benefits
Power control	A function for turning chassis ON or OFF.	Enables remote control of a chassis' power state without needing to connect to its management blade. This simplifies periodic maintenance tasks that involve power control operations.

**Table 2.4 Functions Available for the Admin Server**

Function	Description	Benefits
Pre-configuration	Systems made up of multiple servers can be easily configured or modified using the pre-configuration function to import a pre-defined system configuration file.	Prevents setup mistakes by performing numerous setup operations in a single action. System configuration files can be easily edited on machines where Resource Orchestrator is not installed.
Backup and restore	Backs up or restores a Resource Orchestrator installation.	Performing backups after configuration changes are made in Resource Orchestrator enables prompt recovery of the admin

Function	Description	Benefits
		server in case its internal data is damaged due to administration mistakes or other problems.

Table 2.5 Functions Available for LAN Switches

Function	Description	Benefits	LAN Switch Blades (*1)						LAN Switch
			Switch Mode	IBP Mode	End-Host Mode	Converged Fabric Mode	DCB SW (*2)	FEX Nexus B22 (*3)	
Monitoring	Monitors LAN switches and displays their statuses (normal or error) graphically.	Simplifies identification of the cause and impact of LAN switch failure on servers and speeds up hardware maintenance.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Network Viewer	Helps visualize and relate physical networks (between servers and LAN switch blades) together with virtualized networks (from VLANs or virtual switches used in server virtualization software).	Automatically detects and displays network connections (topology) and link statuses for different kinds of resources (network equipment or server virtualization software).	Yes	Yes	Yes	Yes (*4)	Yes	Yes (*4)	Yes
VLAN settings	Automates VLAN settings (port VLAN or tagged VLAN) on LAN switches adjacent to servers.	Simplifies the VLAN configuration of LAN switches when adding new servers. During automatic recovery of a failed server, VLANs are automatically reconfigured to preserve connectivity and avoid manual network reconfigurations.	Yes	No	Yes	No	Yes (*5)	No	No
Port group settings	Automates port group settings on LAN switch blades in IBP mode during server switchover.	Reduces the number of steps necessary to recover the network configuration of a failed server.	No	Yes	No	No	No	No	No
Restore	Restores a LAN switch to its most recent VLAN configuration.	Restores the VLAN configuration on a replaced LAN switch to the configuration that was active before replacement.	Yes	No	Yes	No	Yes (*5)	No	No

Yes: Supported

No: Not supported

\*1: For PRIMERGY BX600 LAN switches, refer to the "switch mode" column.

\*2: DCB SW is recognized as the omitted description indicating when using or not using VCS mode for LAN switch blade PY CB DCB SW 10Gb 18/6/6.

\*3: FEX Nexus B22 is recognized as the omitted description indicating LAN switch blade PY CB 10Gb FEX Nexus B22.

\*4: Only internal network connections (topology) are displayed.

\*5: VLANs can only be configured for the internal ports.

**Table 2.6 Functions Available for Power Monitoring Targets**

Function	Description	Benefits
Power consumption monitoring (*)	Monitors power consumption trends for resources equipped with power monitoring capabilities, or resources connected to power monitoring devices (PDU or UPS). Collects and outputs power consumption data over a given period.	This function can be used to measure the effectiveness of environmental policies and cost-saving initiatives on power consumption.

\* Note: For details on supported devices, refer to "[2.5 Hardware Environment](#)". For VMware ESXi, this function is not supported.

**Table 2.7 Functions Available for Virtual Machines**

Function (*)	Description	Benefits
Migration of VM guests between servers	Migrates a VM guest from one physical server to another.	Facilitates optimization of VM guest deployments according to server load or planned maintenance.
VM maintenance mode control	Sets (or releases) VM hosts to (or from) a specific state that allows safe server maintenance.	VM hosts can be easily set out of and back into operation.
VM Home Position setting, migration and clearing	Functions for setting, migrating, and clearing VM Home Positions.	Even if VM guests are migrated to different locations, they can be easily returned to their original locations.

\* Note: Available functions may vary according to the server virtualization software used. For details, refer to "[9.1 Deciding Server Virtualization Software](#)".

## **2.3 Functional Differences Depending on Product**

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For details, refer to "1.3 Functional Differences Depending on Product" in the "Overview".

## **2.4 Software Environment**

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For details, refer to "6.1 Software Environment" in the "Overview".

## **2.5 Hardware Environment**

---

For details, refer to "6.2 Hardware Environment" in the "Overview".

## **2.6 System Configuration**

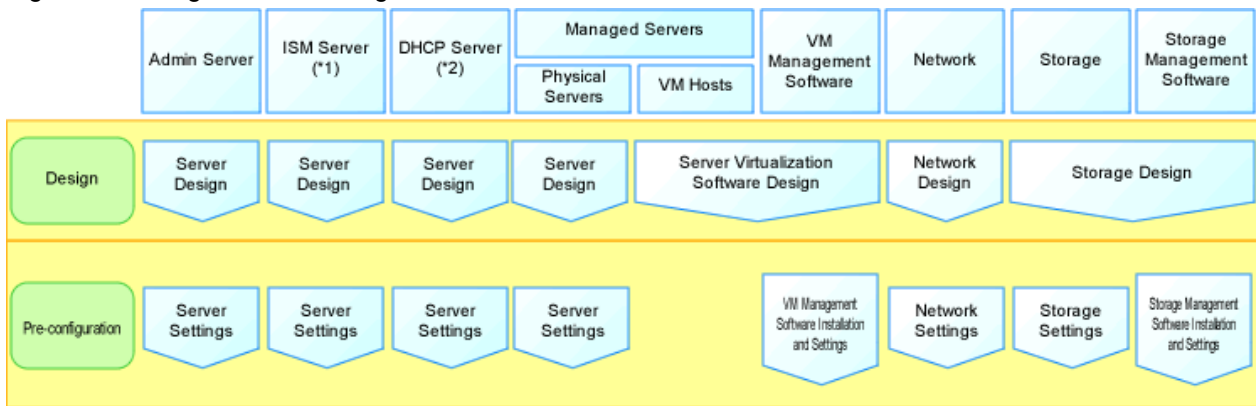
---

For details, refer to "[Chapter 4 System Configuration Design](#)".

# Chapter 3 Flow of Resource Orchestrator Design and Preconfiguration

This chapter explains the flow of Resource Orchestrator Design and Preconfiguration.

Figure 3.1 Design and Preconfiguration for Resource Orchestrator Installation



\*1: Necessary when using I/O virtualization using ISM.

\*2: Necessary when using PXE boot in ISM.

## Resource Orchestrator Setup Design

Design the following content when installing this product.

- System Configuration Design  
For details, refer to "[Chapter 4 System Configuration Design](#)".
- Defining User Accounts  
For details, refer to "[Chapter 5 Defining User Accounts](#)".
- Defining the Server Environment  
Define the server environment to manage with the admin server and this product.  
For details, refer to "[6.1 Defining the Server Environment](#)".
- Defining the Network Environment  
For details, refer to "[Chapter 7 Defining and Configuring the Network Environment](#)".
- Deciding the Storage Environment  
For details, refer to "[8.1 Deciding the Storage Environment](#)".
- Deciding Server Virtualization Software  
Decide the server virtualization software to manage with this product.  
For details, refer to "[9.1 Deciding Server Virtualization Software](#)".
- Installing and Defining Single Sign-On  
Deciding whether Single Sign-On is to be used, and its environment.  
Refer to "[Chapter 10 Configuring Single Sign-On](#)".
- Deciding the Power Monitoring Environment  
For details, refer to "[11.1 Deciding the Power Monitoring Environment](#)".

## Preconfiguration for a Resource Orchestrator Installation

Preconfiguration is necessary before the manager of this product is installed.

Perform it according to the following procedure.

- Configuring the Server Environment

The server environment managed with the admin server and this product is set.

Refer to "[6.2 Configuring the Server Environment](#)".

- Configuring the Network Environment

For details, refer to "[Chapter 7 Defining and Configuring the Network Environment](#)".

- Configuring the Storage Environment

For details, refer to "[8.2 Configuring the Storage Environment](#)".

- Settings for Server Virtualization Software

Set the server virtualization software managed with this product.

For details, refer to "[9.2 Configuring Server Virtualization Software](#)".

- Configuring Single Sign-On

In order to use Single Sign-On, configure the Single Sign-On environment.

Refer to "[Chapter 10 Configuring Single Sign-On](#)".

- Configuring the Power Monitoring Environment

For details, refer to "[11.2 Configuring the Power Monitoring Environment](#)".



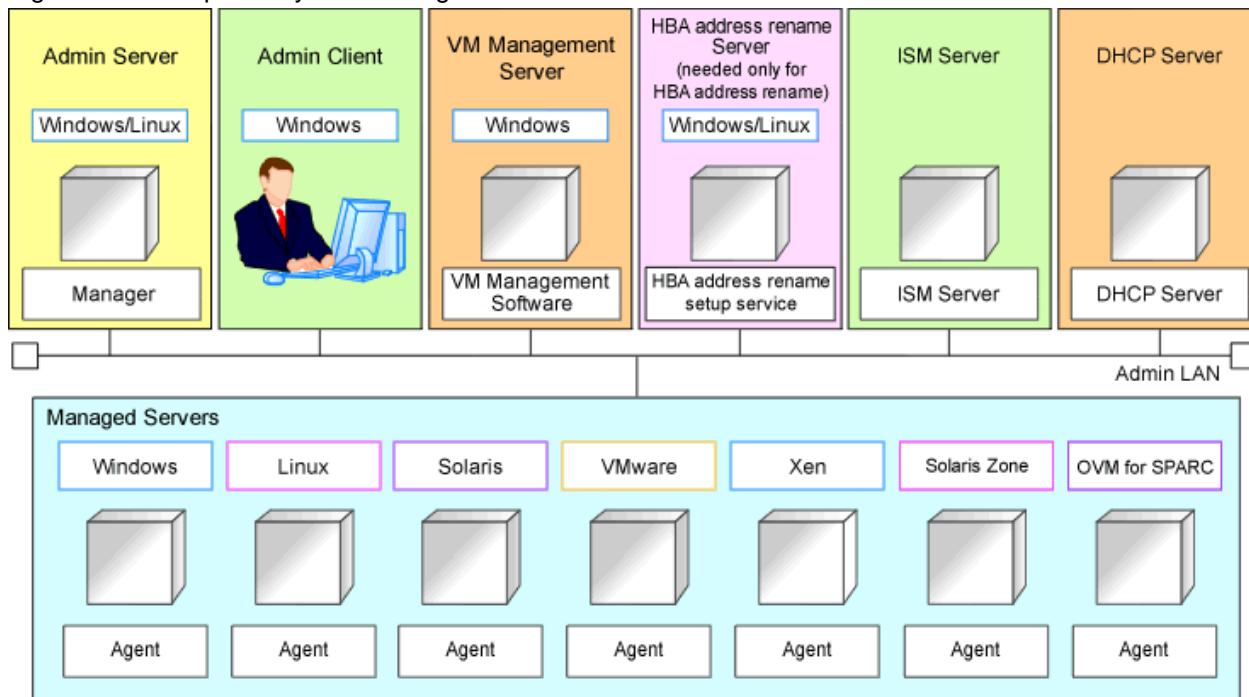
# Chapter 4 System Configuration Design

This chapter explains points to keep in mind when setting up a Resource Orchestrator environment:

## Example of System Configuration

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

Figure 4.1 Example of System Configuration



## Admin Server

The admin server is a server used to manage several managed servers.

The admin server operates in a Windows or Linux environment.

The Resource Orchestrator manager should be installed on the admin server. When performing I/O virtualization with VIOM, also install ServerView Virtual-I/O Manager. When performing switchover using the storage affinity switchover method, also install ETERNUS SF Storage Cruiser Manager.

The admin server can be made redundant by using clustering software.

It can also be used with the admin client.

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

It is possible to configure the admin server on a VM guest and manage the VM host on which the VM guest operates.

For the VM guest on which the admin server is running, set the server role (Manager).

For details, refer to "9.10 Changing Server Roles" in the "User's Guide VE".

## Note

[VMware]

Register VMware ESXi as the target in ServerView Operations Manager when using VMware ESXi.

[Hyper-V]

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

[Xen]

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

---

## Managed Server

Managed servers are the servers used to run applications. They are managed by the admin server.

Managed servers are primary servers operating in the following environments.

- Windows Environments
- Linux Environments
- Solaris Environments
- Server Virtualization Software Environments

For details on the types of server virtualization software, refer to "[9.1 Deciding Server Virtualization Software](#)".

- Spare servers used as backup for primary servers

Install agents on primary servers.

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



When using VMware ESXi, there is no need to install Resource Orchestrator agents on managed servers because VMs and guest OSs are managed directly from the admin server.

Install ServerView ESXi CIM Provider.

---

[Windows]

- Depending on the domain type, there may be cases in which backup and restore, cloning, and server switchover using the backup and restore method cannot be used, or additional operations on managed servers are necessary.

Table 4.1 Function Restrictions Based on Domain Type

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

Yes: Use possible.

No: Use not possible.

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

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

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

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

- When the domain type is domain controller, agents cannot be installed while the status promoted to domain controller.
- When the domain type is member server or work group, agents can be installed when logged in using a local account that belongs to the Administrators group.

## Admin Client

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

Admin clients should run in a Windows environment.

Install Web browsers on admin clients.

If a server virtualization software client is installed on an admin client, the software can be started from the client screen of Resource Orchestrator.

## VM Management Server

A server on which VM management software to integrate multiple server virtualization software products has been installed.

For details on the VM management software which can be registered in Resource Orchestrator, refer to "7.2 Registering VM Management Software" in the "User's Guide VE".

The VM management server can be standardized with the admin server.

## ISM Server

A server on which the functions of ISM operate.

This server is necessary when using I/O virtualization using ISM.

ISM is provided as a virtual appliance.

When using PXE boot while coordinating with ISM, configuration of a DHCP server is also necessary.

For details, refer to "6.2 Settings for ISM Coordination" in the "Setup Guide VE".

## DHCP Server

Necessary when both of the following apply:

- You are using I/O virtualization using ISM
- You are using PXE boot in ISM

For details, refer to "6.2 Settings for ISM Coordination" in the "Setup Guide VE".

## HBA address rename Setup Service Server

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

This server is required to use server I/O virtualization using HBA address rename (it is not required when using only server I/O virtualization using VIOM or ISM).

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

The HBA address rename server operates in a Windows or Linux environment.

Install the HBA address rename setup service on this server.

It is not possible to use the HBA address rename server as an admin server and a managed server at the same time.

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

For details, refer to "[8.1.2 HBA and Storage Device Settings](#)" and "[C.2 WWN Allocation Order during HBA address rename Configuration](#)".

## Admin LAN

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

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

Using network redundancy software for the admin LAN enables redundancy for monitoring, power operations, and other functions.

Use the redundant line control function of GLS as network redundancy software if you want to perform redundancy of the admin LAN and use backup and restoration of system images even when errors have occurred for some LANs.

## Points to Keep in Mind when Setting Up a Resource Orchestrator Environment

- The maximum of managed servers can be registered in Resource Orchestrator is limited, and depends on the Resource Orchestrator license purchased.

For details on the limit of managed servers, refer to license documentation.

An error will occur when trying to register more managed servers than the above limit. This limit includes the spare servers used by recovery settings. However, it does not include VM guests.

- Clustering software can be used on managed servers.

However, the following operations are not supported.

- Managed Server Switchover
- Backup and Restore

- Use of the Windows Server 2012 or later BitLocker drive encryption function (Windows BitLocker Drive Encryption) is not supported.

If the admin server or managed servers are running under Windows Server 2012 or later, do not encrypt the system disk using the BitLocker drive encryption function.

# Chapter 5 Defining User Accounts

This chapter explains the user accounts used in Resource Orchestrator.

## Overview

Managing user accounts in Resource Orchestrator prevents unsafe operations by unauthorized users, resulting in safer system administration.

User accounts are categorized into the following user types:

Table 5.1 User Types

User Types	Authority Level	Description
Privileged User	Manage	Can perform all operations on resources.
General User	Monitoring	Can only perform resource monitoring.

It is required to create at least one privileged user. The creation of general users is optional and depends on your own administration policy.

User accounts consist of the following:

- User name
- Password
- Authority level ("Manage" or "Monitor")

These Resource Orchestrator user accounts differ from the operating system user accounts on the admin server.

Refer to "A.2.1 List of Menus" in the "User's Guide VE" for information on the functions that these user accounts can execute.

## Defining User Accounts

User accounts are categorized into the following user types:

- Privileged User  
Privileged users can execute all operations for resources.
- General User  
General users can execute only reference operation of resources.

For details on the menus available from user accounts, refer to "A.2.1 List of Menus" in the "User's Guide VE".

## User Account Conditions

Configure the following parameters for user accounts to be created on Resource Orchestrator:

### User ID

The user ID must start with an alphabetical character, and can contain up to 16 alphanumeric characters, underscores ("\_"), hyphens ("-"), and periods (".").

When using the directory service provided with ServerView Operations Manager for the directory service used by Single Sign-On, the user ID (uid attribute) must be unique in the directory service.

### Password (Confirm password)

- When Using Single Sign-On  
The string must be composed of alphanumeric characters and symbols, and can be between 8 and 64 characters long.
- When not using Single Sign-On  
The string must be composed of alphanumeric characters and symbols, and can be up to 16 characters long.

#### Authority Level

Select either "Manage" or "Monitor". There must be a privileged user.

# Chapter 6 Defining and Configuring the Server Environment

This chapter explains how to define and configure server environments.

## 6.1 Defining the Server Environment

This section explains how to define setting values for server environments.

In this product, it corresponds to the following kind of servers. Decide the value to set for the server according to the kind of the server.

- Blade Servers

For details, refer to "[6.1.1 Settings for Blade Servers](#)".

- Rack Mount and Tower Servers

For details, refer to "[6.1.2 Settings for Rack Mount and Tower Servers](#)".

- PRIMEQUEST

For details, refer to "[6.2.3 Configuring PRIMEQUEST](#)".

- SPARC Enterprise M3000/T Series and SPARC M10-1/M10-4/M12-1/M12-2

For details, refer to "[6.1.4 Setting Values for SPARC Enterprise \(M3000/T5120/T5140/T5220/T5240/T5440\) and SPARC M10-1/M10-4/M12-1/M12-2/M12-1/M12-2](#)".

When switching over SPARC Enterprise servers, refer to "[6.1.6 Settings when Switching Over SPARC M10/M12 or SPARC Enterprise Servers](#)".

- SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S

Refer to "[6.1.5 Setting Values for SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S/M12-2S](#)".

When switching over SPARC Enterprise servers, refer to "[6.1.6 Settings when Switching Over SPARC M10/M12 or SPARC Enterprise Servers](#)".

Servers that do not use the server management software will be treated as "Rack Mount and Tower Servers".

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

For details on modifying values for monitoring timeout of power control operations, refer to "Changing Monitoring Timeout Values of Physical Server Power Operations" in "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".

### 6.1.1 Settings for Blade Servers

Choose values for the following management blade settings, given the following criteria:

#### Chassis name

This name is used to identify the chassis on the admin server. Each chassis name must be unique within the system.

The first character must be alphabetic, and the name can contain up to 10 alphanumeric characters and hyphens ("-").

#### Admin IP address (IP address of the management blade)

These IP addresses can be used to communicate with the admin server.

#### SNMP community name

This community name can contain up to 32 alphanumeric characters, underscores ("\_"), and hyphens ("-").

#### SNMP trap destination

This must be the IP address of the admin server.

## Monitoring Timeout Values of Power Operations

For details on modifying values for monitoring timeout of power control operations, refer to "Changing Monitoring Timeout Values of Physical Server Power Operations" in "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".



### Note

To enable server switchover and cloning between servers in different chassis, use the same SNMP community for each chassis.

## 6.1.2 Settings for Rack Mount and Tower Servers

---

Resource Orchestrator supports the following types of remote management controllers to manage servers.

- For PRIMERGY Servers
  - iRMC
- For HP Servers
  - iLO2 (integrated Lights-Out)
- For DELL or IBM Servers
  - BMC (Baseboard Management Controller)

### Settings for Remote Management Controller

Choose values for the following remote management controller settings according to the criteria listed below.

#### Admin IP address (IP address of the IPMI controller)

These IP addresses can be used to communicate with the admin server.

#### User name

Name of the user account used to log in the remote management controller and gain control over the managed server.

A user account with at least administration privileges within the remote management controller must be specified.

The user name can contain up to 16 alphanumeric characters and symbols (ASCII characters 0x20 to 0x7e).

If a user account with a name of 17 or more characters has already been set up, either create a new user account or rename it with a name of up to 16 characters.

#### Password

Password used to log in the remote management controller with the above user name.

The user name can contain up to 16 alphanumeric characters and symbols (ASCII characters 0x20 to 0x7e).

If a user account with password of 17 or more characters has already been set up, either create a new user account or change the password with one of up to 16 characters.

#### SNMP trap destination

The destination for SNMP traps sent by the remote management controller should be set as the admin server's IP address.

### Monitoring Timeout Values of Power Operations

For details on modifying values for monitoring timeout of power control operations, refer to "Changing Monitoring Timeout Values of Physical Server Power Operations" in "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".



## Settings for External Server Management Software (ServerView Agents)

For PRIMERGY servers, the server status can be monitored from external server management software (ServerView Agents). In that case, choose a value for the following setting.

### SNMP community name

Name of the SNMP community used to communicate with the server management software (ServerView Agents) on the managed server.

This community name can contain up to 32 alphanumeric characters, underscores ("\_"), and hyphens ("-").

### Monitoring Timeout Values of Power Operations

For details on modifying values for monitoring timeout of power control operations, refer to "Changing Monitoring Timeout Values of Physical Server Power Operations" in "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".



Use the same SNMP community for each server when using server switchover and cloning functions.

## 6.1.3 Settings for PRIMEQUEST

---

Choose values for the following management board settings, given the following criteria:

### Chassis name

This name is used to identify the PRIMEQUEST chassis on the admin server. Each chassis name must be unique within the system. The first character must be alphabetic, and the name can contain up to 10 alphanumeric characters and hyphens ("-").

### Admin IP address (Virtual IP address of the management board)

These IP addresses can be used to communicate with the admin server.

### User name

Name of the user account used to log into remote server management and gain control over the managed server. A user account with at least administration privileges within the remote server management must be specified. This password must be between 8 and 16 alphanumeric characters long.

### Password

Password used to log in the remote management controller with the above user name. This password must be between 8 and 16 alphanumeric characters long.

### SNMP community name

This community name can contain up to 32 alphanumeric characters, underscores ("\_"), and hyphens ("-").

### SNMP trap destination

This must be the IP address of the admin server.

### Monitoring Timeout Values of Power Operations

For details on modifying values for monitoring timeout of power control operations, refer to "Changing Monitoring Timeout Values of Physical Server Power Operations" in "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".



- To enable server cloning between servers in different chassis, use the same SNMP community for each chassis.
- When using a PRIMEQUEST 2000 series, the following partitions can be registered as managed servers.
  - PPAR partitions with "Extended Partitioning Mode" set to "Disable"

- Extended partitions configured on PPAR partitions with "Extended Partitioning Mode" set to "Enable"

Do not change the Extended Partitioning Mode or PPAR Extended Partition configuration after server registration.

When the Extended Partitioning Mode is changed to "Enable" after server registration, "Extended Partitioning Mode" is displayed, but the PPAR cannot be used.

When changing the Extended Partitioning Mode or Extended Partition configuration, first delete the server from the managed server on the ROR console. Then register the server again after changing the Extended Partitioning Mode or Extended Partition configuration.

---

## 6.1.4 Setting Values for SPARC Enterprise (M3000/T5120/T5140/T5220/T5240/T5440) and SPARC M10-1/M10-4/M12-1/M12-2

---

Resource Orchestrator is able to manage SPARC Enterprise servers by using their XSCF interface for the M3000 series and the ILOM interface for the T series as a remote management controller.

### For SPARC Enterprise M3000 and SPARC M10-1/M10-4/M12-1/M12-2

For M3000, choose values for the following XSCF settings according to the criteria listed below.

#### Admin IP address (IP address of the IPMI controller)

These IP addresses can be used to communicate with the admin server.

Set it to lan#0 of XSCF.

#### User name

Name of the user account used to log into XSCF and gain control over the managed server.

A user account with "platadm" privileges within XSCF must be specified.

The user name must start with an alphabet character, and can contain up to 31 alphanumeric characters, underscores ("\_"), and hyphens ("-").

The user name reserved for the system cannot be used. Create a different user name.

For details, refer to the XSCF manual.

#### Password

Password used to log into the remote management controller with the above user name.

The user password can contain up to 32 alphanumeric characters, blank spaces (" "), and any of the following characters.

"! ", "@", "#", "\$", "%", "^", "&", "\*", "[", "]", "{", "}", "(", ")", "-", "+", "=", "~", ";", ">", "<", "/", "", "?", ":", ";"

#### SNMP trap destination

The destination for SNMP traps sent by XSCF should be set to the admin server's IP address.

#### SNMP community name

Name of the SNMP community used to communicate with XSCF.

This community name can contain up to 32 alphanumeric characters, underscores ("\_"), and hyphens ("-").

#### Monitoring Timeout Values of Power Operations

For details on modifying values for monitoring timeout of power control operations, refer to "Changing Monitoring Timeout Values of Physical Server Power Operations" in "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".

### For T Series

For the T series, choose values for the following ILOM settings according to the criteria listed below.

#### Admin IP address (IP address of the IPMI controller)

These IP addresses can be used to communicate with the admin server.

### User name

The name of the user account used to log into ILOM and gain control over the managed server.  
A user account with Admin privileges within ILOM must be specified.

The user name must start with an alphabet character, and can contain between 4 and 16 alphanumeric characters, underscores ("\_"), and hyphens ("-").

### Password

Password used to log into the remote management controller with the above user name.

The user password can contain between 8 and 16 alphanumeric characters, blank spaces (" "), and any of the following characters.  
"! ", "@", "#", "\$", "%", "^", "&", "\*", "[", "]", "{", "}", "(, ")", "-", "+", "=", "~", ";", ">", "<", "/", " ", "?", ":", ":", "

### SNMP trap destination

The destination for SNMP traps sent by ILOM should be set to the admin server's IP address.

### SNMP community name

Name of the SNMP community used to communicate with ILOM.

This community name can contain up to 32 alphanumeric characters, underscores ("\_"), and hyphens ("-").

### Monitoring Timeout Values of Power Operations

For details on modifying values for monitoring timeout of power control operations, refer to "Changing Monitoring Timeout Values of Physical Server Power Operations" in "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".

## 6.1.5 Setting Values for SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S

---

Resource Orchestrator is able to manage SPARC Enterprise M4000/M5000/M8000/M9000 servers and servers in SPARC M10-4S/M12-2S by using their XSCF interface as a remote management controller.

Choose values for the following XSCF settings according to the criteria listed below.

### Chassis name

This name is used to identify the chassis for SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S on the admin server. Each chassis name must be unique within the system.

The first character must be alphabetic, and the name can contain up to 10 alphanumeric characters and hyphens ("-").

### Admin IP address

These IP addresses can be used to communicate with the admin server.

Set it to lan#0 of XSCF.

### User name

Name of the user account used to log into XSCF and gain control over the managed server.

A user account with "platadm" privileges within XSCF must be specified.

This name can contain up to 31 alphanumeric characters, hyphens ("-"), and underscores ("\_").

The user name reserved for the system cannot be used. Create a different user name.

For details, refer to the XSCF manual.

### Password

Password used to log into the remote management controller with the above user name.

The user password can contain up to 32 alphanumeric characters, blank spaces (" "), and any of the following characters.  
"! ", "@", "#", "\$", "%", "^", "&", "\*", "[", "]", "{", "}", "(, ")", "-", "+", "=", "~", ";", ">", "<", "/", " ", "?", ":", ":", "

### SNMP trap destination

The destination for SNMP traps sent by XSCF should be set to the admin server's IP address.

## SNMP community name

Name of the SNMP community used to communicate with XSCF.

This community name can contain up to 32 alphanumeric characters, underscores ("\_"), and hyphens ("-").

## Changing Monitoring Timeout Values of SPARC M10-4S/M12-2S Power Operations

When using SPARC M10-4S/M12-2S, the length of time from starting to completion of power operations increases proportionally to the scale of Building Block configurations. Estimate the timeout values based on actual measured values, by performing power operations with an actual machine, after creating Building Block configuration environments.

The timeout values are changed for all M10-4S/M12-2S managed by the manager. When there are servers in multiple Building Block configurations, estimate the timeout values using the largest Building Block configuration environment.

When changing the timeout value, create the following definition file:

### Storage Location of the Definition File

[Windows Manager]

*Installation\_folder*\SVROR\Manager\etc\customize\_data

[Linux Manager]

/etc/opt/FJSVrcvnr/customize\_data

### Definition File Name

power\_timeout.rcxprop

### Definition File Format

In the definition file, enter the configuration information (model name, timeout value of server powering on, timeout value of server powering off, etc.) for each server in a single line, separated by commas (","). Each line is entered in the following format.

```
model,boot_timeout,shutdown_timeout
```

- Blank spaces before and after commas (",") are ignored.
- When adding comments, start the line with a number sign ("#").

### Definition File Items

Specify the following items.

#### model

Enter the model name of the server to change the timeout value for. Enter M10-4S/M12-2S.

#### boot\_timeout

Enter the timeout value for powering on of the server.

Enter an integer. The unit is seconds.

When descriptions other than the above are entered, the default timeout value is used. (default value: 2700 seconds)

#### shutdown\_timeout

Enter the timeout value for powering off of the server.

Enter an integer. The unit is seconds.

When descriptions other than the above are entered, the default timeout value is used. (default value: 1200 seconds)



## Example

```
M10-4S,2700,1200
```

## Modification Procedure of Definition Files

It is not necessary to restart the manager after creating or modifying definition files. The entered descriptions are reflected after modification of definition files.

## 6.1.6 Settings when Switching Over SPARC M10/M12 or SPARC Enterprise Servers

---

When integrating with ESC, it should be configured first. Register the Fibre Channel switches and storage units connected to managed servers on ESC.



When integrating with ESC, do not register servers used as spare server for Resource Orchestrator on ESC.

After registration, collect WWNs of HBAs set on physical servers or WWNs of CAs set on storage units.

### Collection of WWNs of HBA Set on Physical Servers

From the client window of ESC, collect the WWNs for HBAs contained in the registered servers.  
For servers that are not registered on ESC, collect WWNs from the seals, drivers, and utilities provided with HBA cards.  
Refer to the storage device manual of each storage device for details.

### Collection of WWNs of CA Set on Storage Units

From the client window of ESC, collect the WWNs for HBAs contained in the registered storage.  
Refer to the storage device manual of each storage device for details.

Collected WWNs are reflected in the relationship between physical servers and HBA WWNs from the perspective of the server, and in the relationship between the storage CA and WWNs from the perspective of storage devices.

System configuration requires that the relationship between HBA WWNs, storage CA WWNs, and volumes from the perspective of storage devices be defined clearly.

When using a multi-path configuration, design the values to match the order of HBAs configured as primary servers or spare servers with those of the corresponding CAs.



For integration with ESC, Resource Orchestrator supports configurations where managed servers have up to eight HBA ports mounted.

### [OVM for SPARC]

For OVM for SPARC environments, configure the boot settings of the primary server as follows:

- XSCF physical partition operation mode

Autoboot(Guest Domain): off

For details, refer to the "Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 XSCF Reference Manual".

- OBP settings of all domains (control domain, guest domain, IO domain)

auto-boot?: true

For details, refer to "Oracle VM Server for SPARC Administration Guide" provided by Oracle.

For the status of the OVM for SPARC environment after server switchover, refer to "Appendix A Notes on Operating ServerView Resource Orchestrator" in the "Operation Guide VE".

For OVM for SPARC environments, only LUN (/dev/dsk/cXtXdXs2) can be used as the virtual disk of the guest domain.



## Note

- If Autoboot(Guest Domain) for XSCF is "on", when the control domain is started, the guest domain is started accordingly.  
Due to the specifications of OVM for SPARC, the boot order of the IO domain and the guest domain cannot be controlled. Therefore, if booting of the guest domain starts before the IO domain, booting of the guest domain may fail.  
Perform configuration to boot the IO domain and the guest domain in order using the server switchover process of Resource Orchestrator.  
For details, refer to "18.5.3 Definition File of IO Domain" in the "User's Guide VE".
- If Autoboot(Guest Domain) for XSCF is "off", when the control domain is powered on, the guest domain is not powered on. In this case, each guest domain must be powered on respectively.
- If auto-boot? for the guest domain or IO domain is "false", after the server switchover, the boot process of the guest domain or the IO domain is only processed until it reaches the OBP. In this case, after server switchover, manually start the guest domain or IO domain.
- If the auto-boot? for the control domain is "false", after server switchover the boot process of the control domain is only processed until it reaches the OBP, so server switchover will fail.
- When configuring server switchover settings, set Autoboot(Guest Domain) for the physical partition operation mode on XSCF on the stand-by server to "off".
- If server switchover ends abnormally, it will be necessary to restore the environment manually.  
In case of such an event, record the information of the environment when performing configuration.  
For details on the ldm command, refer to the "Oracle VM Server for SPARC Administration Guide" provided by Oracle.
  - The port number used for the console of the guest domain (if a fixed console number has been set)
  - Physical I/O device information allocated to the control domain and the IO domainFor details, refer to "2.5 Server Switchover and Failback Issues" in "Troubleshooting".

## Prerequisites for Server Switchover

For details on prerequisites of server switchover, refer to "9.3 Server Switchover Conditions" in the "Setup Guide VE".

## 6.2 Configuring the Server Environment

---

This section describes how to configure servers and chassis for Resource Orchestrator.

Set it according to the value decided in "6.1 Defining the Server Environment" as follows.

- Configuring Blade Servers  
For details, refer to "6.2.1 Configuring Blade Servers".
- Configuring Rack Mount and Tower Servers  
For details, refer to "6.2.2 Configuring Rack Mount and Tower Servers".
- Settings for PRIMEQUEST  
For details, refer to "6.2.3 Configuring PRIMEQUEST".
- Configuring SPARC Enterprise M3000 and SPARC M10-1/M10-4/M12-1/M12-2  
Please refer to the following.  
["6.2.4 Configuring SPARC Enterprise M3000 and SPARC M10-1/M10-4/M12-1/M12-2/M12-1/M12-2"](#)  
["6.2.9 Configuring OBP \(Open Boot Prom\) Settings \(SPARC M10/M12 and SPARC Enterprise\)"](#)
- Configuring SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S  
Please refer to the following.

["6.2.5 Configuring SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S/M12-2S"](#)

["6.2.9 Configuring OBP \(Open Boot Prom\) Settings \(SPARC M10/M12 and SPARC Enterprise\)"](#)

- Settings for SPARC Enterprise T Series

Please refer to the following.

["6.2.6 Configuring SPARC Enterprise T5120/T5140/T5220/T5240/T5440"](#)

["6.2.9 Configuring OBP \(Open Boot Prom\) Settings \(SPARC M10/M12 and SPARC Enterprise\)"](#)

On the following servers, configure the settings as described in ["6.2.7 Configuring BIOS Settings of Managed Servers"](#).

- Blade Servers (only when not using VIOM)
- Settings for rack mount (only when not using VIOM or ISM) and tower servers
- PRIMEQUEST

When an OS has been installed on the managed server, configure the settings as described in ["6.2.8 Configuring OS Settings of Managed Servers"](#).

When VMware ESXi has been installed on the managed server, configure the settings as described in ["6.2.10 Configuring ServerView Operations Manager \(VMware ESXi\)"](#).

## 6.2.1 Configuring Blade Servers

---

Refer to the management blade manual to apply the settings chosen in ["6.1.1 Settings for Blade Servers"](#) to the management blade. Note that the SNMP community must be set to Write (read and write) access.

- Admin IP address (IP address of the management blade)
- SNMP community name
- SNMP trap destination

This must be the IP address of the admin server.

Refer to the management blade manual to set the following SNMP agent settings.

- Set Agent SNMP Enable  
Set to "enable".
- Set Agent SNMP Security Enable  
Set to "disable".



### Note

When powering off a chassis together with its enclosed server blades, servers are shut down using the graceful shutdown option of the management blade. To enable this feature, all servers within the chassis should have ServerView Agents installed.

## 6.2.2 Configuring Rack Mount and Tower Servers

---

Refer to the remote management controller manual to configure the following on the IPMI controller.

- Admin IP address (IP address of the IPMI controller)
- User name

- Password
- SNMP trap destination

This must be the IP address of the admin server.

### 6.2.3 Configuring PRIMEQUEST

---

Refer to the management board manual to apply the settings chosen in "[6.1.3 Settings for PRIMEQUEST](#)" to the management board. Note that the SNMP community must be set to Write (read and write) access.

- Admin IP address (Virtual IP address of the management board)
- User name
- Password
- SNMP community name
- SNMP trap destination

This must be the IP address of the admin server.

Enable the following function referring the instructions given in the management board's manual.

- SNMP Agent

### 6.2.4 Configuring SPARC Enterprise M3000 and SPARC M10-1/M10-4/M12-1/M12-2

---

Refer to the management controller (XSCF) manual to apply the settings chosen in "[6.1.4 Setting Values for SPARC Enterprise \(M3000/T5120/T5140/T5220/T5240/T5440\) and SPARC M10-1/M10-4/M12-1/M12-2/M12-1/M12-2](#)" to the management controller.

- Admin IP address (IP address of the IPMI controller)
- User name
- Password
- SNMP community name
- SNMP trap destination

This must be the IP address of the admin server.

Refer to the remote management controller (XSCF) manual to configure the following on the IPMI controller.

- SNMP Agent (Also enable SP\_MIB)
- SSH Service
- HTTPS Service



#### Note

- When assigning multiple IP addresses to multiple network interfaces on a XSCF module, ensure that the IP address used by Resource Orchestrator is assigned to the first of those network interfaces.
- For SNMP settings in XSCF, enable SNMPv1 communication.

Set as follows to automatically start up the OS when powering on.

- Set the "Autoboot" of the Domain Mode to "on".



- Set the mode switch of the operator panel to "Locked".

## 6.2.5 Configuring SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S

---

Refer to the management controller (XSCF) manual to apply the settings chosen in "[6.1.5 Setting Values for SPARC Enterprise M4000/M5000/M8000/M9000 and SPARC M10-4S/M12-2S/M12-2S](#)" to configure the following on the IPMI controller.

Note that the SNMP community must be set to Write (read and write) access.

- Admin IP address (IP address of the remote management controller)
- User name
- Password
- SNMP community name
- SNMP trap destination

This must be the IP address of the admin server.

Refer to the instructions given in the XSCF manual and enable the following functions.

- SNMP Agent (Also enable SP\_MIB)
- SSH Service
- HTTPS Service
- Domain Autoboot



### Note

- When assigning multiple IP addresses to multiple network interfaces on a XSCF module, ensure that the IP address used by Resource Orchestrator is assigned to the first of those network interfaces.
- For SNMP settings in XSCF, enable SNMPv1 communication.

Set as follows to automatically start up the OS when powering on.

- Set the "Autoboot" of the Domain Mode to "on".
- Set the mode switch of the operator panel to "Locked".

## 6.2.6 Configuring SPARC Enterprise T5120/T5140/T5220/T5240/T5440

---

Refer to the management controller (ILOM) manual to apply the settings chosen in "[6.1.4 Setting Values for SPARC Enterprise \(M3000/T5120/T5140/T5220/T5240/T5440\) and SPARC M10-1/M10-4/M12-1/M12-2/M12-1/M12-2](#)" to configure the following on the IPMI controller.

- Admin IP address (IP address of the IPMI controller)
- User name
- Password
- SNMP community name

- SNMP trap destination

This must be the IP address of the admin server.

Refer to the instructions given in the ILOM manual and enable the following functions.

- SNMP Agent
- SSH Configuration
- HTTPS Configuration
- IPMI Status



## Note

For SNMP settings in ILOM, enable SNMPv1 communication.

## 6.2.7 Configuring BIOS Settings of Managed Servers

---

BIOS settings of managed servers must be set if neither VIOM or ISM is used.

If VIOM or ISM is used, boot order settings must be configured in the VIOM or ISM profile. For details, refer to "7.1.1 Registering Profiles" in the "User's Guide VE".

The following BIOS configurations must be modified.

### System BIOS

This is the system BIOS for a managed server.

Enable or disable the internal SCSI BIOS and FC-HBA BIOS as appropriate, and set up the appropriate boot order.



## Note

- The BIOS settings of server blades include an option to automatically start up servers when their enclosing chassis is powered on. For details, refer to the server blade manual.
- For PRIMERGY BX900/BX400, when a PG-LND203 is mounted as the LAN expansion card of the server blade, do not set the NIC of the LAN expansion card as [disable] in the server blade's BIOS settings. The connections between server blades and LAN switch blades are not shown correctly, when [disable] is set. The following functions do not operate correctly.
  - Changing and setting the VLAN for LAN switch blades (internal and external ports)
  - Server switchover (changing network settings while a server is switched over)
- For PRIMERGY BX900/BX400 series, if "UEFI" and "Legacy" are displayed when configuring boot settings from the network interface, select [Legacy].
- Set PXE VLAN Support to [Disabled] when the server switchover method is HBA address rename.

### Internal SCSI BIOS

These are the BIOS settings for the internal SCSI disk(s) of a managed server.

Enable or disable booting from internal disks as appropriate.

### FC-HBA BIOS

This is a BIOS setting that relates to FC-HBAs that have been installed as an expansion card in the blade server.

Enable or disable SAN boot as well as the connection of a SAN storage environment by means of a Fibre Channel switch.

Configure the following settings depending on the operating environment.

## - When Using the Backup/Restore or Cloning Function

### System BIOS

Set the boot order as follows.

1. Boot from the first admin LAN network interface (NIC1 (Index1))
2. Boot from the network interface used by the admin LAN (NIC2 (Index2))
3. Boot from CD-ROM (when a CD-ROM drive is connected)
4. Boot from the disk

For servers with a system BIOS providing [Keep Void Boot Options] in their Boot menu, set [Enabled] for [Keep Void Boot Options].

Furthermore, when using a managed server as a spare server, after storage connected due to server switchover is recognized by BIOS, perform BIOS settings.

Otherwise, the boot order may be changed.



- Do not change the boot order once a managed server has commenced operation. Even when booting from disk, there is no need to change the boot order.
- Step 2 is only required for a redundant admin LAN configuration.
- NICs other than NIC1 and NIC2 can also be used for the admin LAN. In this case, switch the order of step 1 and step 2. When using NICs other than NIC1 and NIC2 for the admin LAN, specify the same NIC configured in this procedure when registering the server.  
For details, refer to "7.3 When Using Blade Servers" and "7.4 When Using Rack Mount and Tower Servers" in the "User's Guide VE"

### Internal SCSI BIOS

The servers to which a cloning image is deployed should have the same internal SCSI BIOS settings as those of the server from which the image was collected. Similarly, when using server switchover, primary servers and their spare servers should have the same internal SCSI BIOS settings.

### FC-HBA BIOS

When using HBA address rename and SAN storage only for data storing purposes, disable boot from the SAN. Refer to the manual of each FC-HBA for details on FC-HBA BIOS settings.

This setting is only required if a SAN storage system is used.

## - When using HBA address rename for SAN boot

### System BIOS

Enable the FC-HBA BIOS.

Set the boot order as follows:

1. Boot from the first admin LAN network interface (NIC1 (Index1))
2. Boot from the network interface used by the admin LAN (NIC2 (Index2))
3. Boot from CD-ROM (when a CD-ROM drive is connected)
4. Boot from a storage device

For servers with a system BIOS providing [Keep Void Boot Options] in their Boot menu, set [Enabled] for [Keep Void Boot Options].

Furthermore, when using a managed server as a spare server, after storage connected due to server switchover is recognized by BIOS, perform BIOS settings.

Otherwise, the boot order may be changed.

## Note

- Do not change the boot order once a managed server has commenced operation. Even when booting from disk, there is no need to change the boot order.
- NICs other than NIC1 and NIC2 can also be used for the admin LAN. In this case, switch the order of step 1 and step 2. When using NICs other than NIC1 and NIC2 for the admin LAN, specify the same NIC configured in this procedure when registering the server.  
  
For details, refer to "7.3.2 Registering Blade Servers" or "7.4.1 Registering Rack Mount or Tower Servers" in the "User's Guide VE".
- If "UEFI" and "Legacy" are displayed when configuring boot settings from the network interface, select "Legacy".

### Internal SCSI BIOS

If the managed server does not have an internal SCSI disk, disable the option to boot from an internal SCSI disk. However, in some cases (depending on a combination of factors such as server model, HBA model, and firmware), this option should either be enabled or disabled. Refer to the FC-HBA manual for instructions on whether or not to enable or disable boot from internal SCSI disk.

### FC-HBA BIOS

Enable booting from SAN storage devices.

Refer to the manual of each FC-HBA for details on FC-HBA BIOS settings.

## Note

- Restart the server saving BIOS configuration changes.
- HBA address rename may not work properly with older BIOS firmware versions. Please obtain and update the latest BIOS firmware from the following web site.

URL: <http://www.fujitsu.com/global/services/computing/server/ia/>

### - When Using VIOM or ISM (SAN Boot)

#### System BIOS

Enable the FC-HBA BIOS.

Set the boot order as follows:

1. Boot from the first admin LAN network interface (NIC1 (Index1))
2. Boot from the network interface used by the admin LAN (NIC2 (Index2))
3. Boot from CD-ROM (when a CD-ROM drive is connected)
4. Boot from a storage device

## Note

NICs other than NIC1 and NIC2 can also be used for the admin LAN. In this case, switch the order of step 1 and step 2. When using NICs other than NIC1 and NIC2 for the admin LAN, specify the same NIC configured in this procedure when registering the server.  
  
For details, refer to "7.3.2 Registering Blade Servers" or "7.4.1 Registering Rack Mount or Tower Servers" in the "User's Guide VE".

### Internal SCSI BIOS

Apply the same settings as those described in the above "When using HBA address rename for SAN boot" section.

## FC-HBA BIOS

Apply the same settings as those described in the above "When using HBA address rename for SAN boot" section.

### - When Using VIOM (iSCSI Boot)

#### System BIOS

Enable iSCSI boot for the NIC that is used for the iSCSI LAN.

Use the VIOM server profile for the iSCSI boot parameter settings.

For details on server profile setup, refer to the ServerView Virtual-IO Manager manual.

Set the boot order as follows:

1. Boot from the first admin LAN network interface (NIC1 (Index1))
2. Boot from the network interface used by the admin LAN (NIC2 (Index2))
3. Boot from the network interface used for the iSCSI LAN (NIC3(Index3))
4. Boot from the network interface used for the iSCSI LAN (NIC4(Index4))



#### Note

- Do not change the boot order once a managed server has commenced operation. Even when booting from disk, there is no need to change the boot order.
- NICs other than NIC1 and NIC2 can also be used for the admin LAN. In this case, switch the order of step 1 and step 2. When using NICs other than NIC1 and NIC2 for the admin LAN, specify the same NIC configured in this procedure when registering the server.

For details, refer to "7.3.2 Registering Blade Servers" or "7.4.1 Registering Rack Mount or Tower Servers" in the "User's Guide VE".

- When using NIC3 or NIC4 for the admin LAN, use NICs other than NIC3 and NIC4 for the iSCSI LAN. In this case, switch the order of step 3 and step 4.

## Internal SCSI BIOS

If the managed server does not have an internal SCSI disk, disable the option to boot from an internal SCSI disk. However, in some cases (depending on a combination of factors such as server, model, and firmware), this option should either be enabled or disabled. Refer to the hardware manual for instructions on whether or not to enable or disable boot from internal SCSI disk.

## FC-HBA BIOS

Disable the function.

### - When Using VIOM or ISM (Local Boot)

Apply the same settings as those described in the above "When using the backup/restore or cloning function" section.

## 6.2.8 Configuring OS Settings of Managed Servers

---

When using the following functions, configure the OS to respond to ping commands.

- Auto-Recovery (for rack mount or tower servers)
- Configuration of monitoring information (ping monitoring)

## 6.2.9 Configuring OBP (Open Boot Prom) Settings (SPARC M10/M12 and SPARC Enterprise)

---

When managing SPARC M10/M12 or SPARC Enterprise servers from Resource Orchestrator, set the "auto-boot?" option to "true" in the OBP configuration. Otherwise, the operating system will not automatically start up when powering on SPARC M10/M12 or SPARC Enterprise servers.

### - SAN Boot Settings

Configure the following settings on OBP for automatic boot from SAN storage devices.

#### - auto-boot?

Set to "true".

#### - boot-device

Set with a boot disk identifier at the beginning.

Configure the following settings on OBP for HBAs connected to the boot disk.

#### - HBA boot

Enable the function.

#### - Topology

Set to NPORT connection.

#### - Target devices

Configure based on the values set in "[6.1.6 Settings when Switching Over SPARC M10/M12 or SPARC Enterprise Servers](#)".

For details, refer to "SPARC Enterprise SAN Boot Environment Build Guide" of the Fibre Channel card driver manual.

## 6.2.10 Configuring ServerView Operations Manager (VMware ESXi)

---

When managing VMware ESXi using Resource Orchestrator, register the target VMware ESXi with ServerView Operations Manager.

For details, refer to the ServerView Operations Manager manual.

### Point

.....  
In ServerView Operations Manager, it is necessary to monitor target VMware ESXi using ServerView ESXi CIM Provider.  
.....

### Note

.....  
When modifying the VM search settings of ServerView Operations Manager, configure the settings to display VMware ESXi as the virtual platform.  
.....

# Chapter 7 Defining and Configuring the Network Environment

This chapter explains how to define and pre-configure the network environment.

## 7.1 Network Configuration

The following will define the network configuration required by the system.

For each server, choose the network interfaces to use for the following purposes.

- Network interface assigned to the admin LAN
- Network interface assigned to the iSCSI LAN (Only when iSCSI is used)
- Network interface assigned to the public LAN

Choose the following settings to fit the system environment.

- Network redundancy settings
- Network Configuration of LAN Switch Blades (when using PRIMERGY BX Servers)

Refer to "Example of VLAN network configuration (with PRIMERGY BX600)" and the description below to design a network configuration.

- Admin LAN

The admin LAN is the network used by the manager to communicate with agents on the managed servers and other managed devices.

- Admin Server and Managed Servers

The number of network interfaces required for the admin server and managed servers can be determined as follows.

For a non-redundant configuration: one network interface

For a redundant configuration: two network interfaces

If HBA address rename is used, two network interfaces (named NIC1 and NIC2) are required regardless of network redundancy.

For details, refer to "[Required Network Configuration when Using HBA address rename](#)".

### For PRIMERGY Managed Servers

- For a non-redundant configuration  
NIC1 (Index1)
- For a redundant configuration, or when using HBA address rename  
NIC1 (Index1) and NIC2 (Index2)

The NICs above used by managed servers are the default values, and they can be changed when registering managed servers.

For details, refer to "7.3.2 Registering Blade Servers" or "7.4.1 Registering Rack Mount or Tower Servers" in the "User's Guide VE".

### For PRIMEQUEST Managed Servers

- For a non-redundant configuration  
The smallest NIC number of the GSPB allocated to a partition (\*)
- For a redundant configuration  
The smallest and second smallest Onboard LAN NIC numbers of the GSPB allocated to a partition (\*)

\* Note: For the PRIMEQUEST 2000 series, take "GSPB" as meaning "IOU". For Extended Partition, allocate IOU GbE.

## Information

For blade servers, depending on the model of LAN switch blade used in the same chassis, the network interfaces whose index numbers are between 3 and 6 (NIC3 - NIC6) may not be available.

### - Admin client

Set up routing to enable communications from the admin client to the admin server. It is also suggested to allow communications from the admin client to managed servers, server management units, and switch blades. Such routing configuration is necessary to allow access to ServerView and other management consoles.

There is no need to set up routing if the admin client is already located within the admin LAN.

## Note

- When using blade servers, connecting the management blade to a LAN switch blade will make the management blade inaccessible in the event of a LAN switch blade failure. Therefore, it is recommended that the management blade be connected to the admin LAN using a LAN switch outside the chassis.
- When performing I/O virtualization using HBA address rename, if specifying a 10Gbps expansion card (NIC) for the admin LAN, backup and restore, and cloning cannot be used.
- Do not place a DHCP server or a PXE server on the admin LAN.
- Do not configure multiple IP addresses for network interfaces used on the admin LAN.
- When the same cloning image is deployed to multiple servers, IGMP snooping should be enabled on admin LAN switches. If IGMP snooping is not enabled, transfer performance may deteriorate when ports with different speeds co-exist in the same network, or multiple image operations are run simultaneously.
- For PRIMERGY BX900/BX400 LAN switch blades operating in IBP mode, the admin LAN should not be included in the ServiceLAN or the ServiceVLAN group configuration.
- Do not change the MTU value for the admin LAN from the default (1500).

### - iSCSI LAN

The iSCSI LAN is designed for communication between managed servers and storage devices.

The number of network interfaces required for managed servers is as follows:

For a non-redundant configuration: one network interface

For a redundant configuration: two network interfaces

The iSCSI LAN must be a different LAN from the public and admin LANs.

## Note

Keep the following points regarding the iSCSI LAN in mind.

- Tagged VLANs cannot be used.
- Teaming is not available.
- Use is not possible in cluster configurations.
- The STP of connected switches must be turned off.
- DHCP cannot be used for iSCSI LAN IP addresses. Fixed IP addresses should be configured.

Refer to the hardware manual for details on other points.

### - Public LAN

The public LAN is the network used by managed servers to provide services over internal or external networks (such as intranets or the Internet).



It is recommended to use a NIC other than the one for the admin LAN when using a public LAN for managed servers, in order to prevent admin LAN communication being affected.

Regarding advisory notes for network settings used by VM guests, refer to "[Configuration Requirements for Each Server Virtualization Product](#)" of "[9.2.1 Configuration Requirements](#)".

A network interface can be shared between multiple public LANs by using a redundant configuration and tagged VLAN.

## Information

For blade servers, depending on the model of LAN switch blade used in the same chassis, the network interfaces whose index numbers are between 3 and 6 (NIC3 - NIC6) cannot be used.

Instead, it is possible to use two more interfaces for the public LAN by adding expansion cards (NIC7 and NIC8) and a LAN switch blade, or by sharing the NIC used for the admin LAN.

All network interfaces shared between the admin LAN and the public LAN for managed servers should be configured with tagged VLAN IDs.

### - Network Configuration of LAN Switch Blades (when using PRIMERGY BX Servers)

In a blade system environment, multiple subnets can be consolidated onto LAN switch blades by using VLANs.

For PRIMERGY BX900/BX400 LAN switch blades operating in IBP mode, the above can also be achieved by using port group settings for IBP instead of VLAN settings.

Each port of a LAN switch blade can be set with VLAN IDs.

Only those ports set with a same VLAN ID can communicate with each other.

Setting up different VLAN IDs then results in multiple subnets (one per VLAN ID) co-existing within the same switch.

Define the VLANs to set on both the internal (server blade side) and external ports of each LAN switch blade.

#### - Internal Ports

Ensure that port VLANs are configured for the ports corresponding to the NICs (refer to "Admin LAN") connected to the admin LAN.

If NICs connected to the admin LAN are used for public LANs, configure tagged VLANs.

For the ports corresponding to the NICs (refer to "Public LAN") connected to the public LAN, assign a VLAN ID (port or tagged VLAN) other than VLAN ID1 (the default VLAN ID) for each subnet.

Using tagged VLANs on LAN switch ports also requires configuring the network interfaces of managed servers with tagged VLANs. As Resource Orchestrator cannot set tagged VLANs to network interfaces on managed servers, this must be done manually.

#### - External Ports

Choose the LAN switch blade ports to connect to external LAN switches, and the VLAN IDs to use for both the admin and public LANs.

When choosing a tagged VLAN configuration, the VLAN ID chosen for a LAN switch blade's external port must be the same as that used on its adjacent port on an external LAN switch.

## Note

### - To change the VLAN ID for the admin LAN, perform the following.

#### 1. Enable communications between the admin server and the LAN switch blade.

Manually change the following two settings.

- Change the VLAN ID of the external port(s) used for the admin LAN.

- Change the VLAN ID used by the admin IP address of the LAN switch blade.

#### 2. Change the VLAN ID used by the managed server on the admin LAN.

- VLAN settings for LAN switch blades are not included in cloning images. Configure VLAN settings for the target servers before deploying a cloning image.

- In the following cases, VLANs cannot be configured using the ROR console.

#### **Configuring VLANs on external ports**

- Link state group
- Port backup function
- LAN switch blade PY CB DCB SW 10Gb 18/6/6

#### **Configuring VLANs on internal ports**

- A LAN switch blade PY CB DCB SW 10Gb 18/6/6 is used, and AMPP has been configured for the internal ports

#### **Configuring VLANs on external and internal ports**

- Link aggregation

However, the following models are excluded.

- LAN switch blade PY CB Eth Switch/IBP 10Gb 18/8
- LAN switch blade PY CB Eth Switch 10/40Gb 18/8+2 (switch mode, end host mode)
- LAN switch blade PY CB Eth Switch/IBP 1Gb 36/8+2
- LAN switch blade PY CB Eth Switch/IBP 1Gb 36/12
- LAN switch blade PY CB Eth Switch/IBP 1Gb 18/6
- Deactivated (depends on LAN switch blade model)
- When a LAN switch blade operates in Converged Fabric mode, or when a LAN switch blade PY CB 10Gb FEX Nexus B22 is used
- LAN switch blade PY CB DCB SW 10Gb 18/6/6
- Each port VLAN configuration must meet all of the conditions below.
  - Do not configure more than one port VLAN.
  - Do not configure the same VLAN ID for the port VLAN and the tagged VLAN.
- Mount the following LAN switch blades in the connection blade slots except for CB5/6 when using a PRIMERGY BX900 chassis.
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 36/8+2
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 36/12
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 18/6
- When using a LAN switch blade PY CB 10Gb FEX Nexus B22 in a PRIMERGY BX900 chassis, server blades installed in slot 17 or slot 18 cannot use internal ports because the switch has only 16 internal ports.

Choose VLAN IDs as well as VLAN types (port or tagged VLAN) for the ports on LAN switch blades that are connected to each server blade's network interfaces. For each of a physical server's network interfaces, choose:

- Physical server name
- NIC index
- VLAN ID
- VLAN type (port or tagged VLAN)

#### **Note**

On servers, operating systems associate each physical network interface with a connection name (Local area connection *X* in windows and eth*X* in Linux).

If more than one network interface is installed, depending on the OS type and the order of LAN driver installation, the index numbers (*X*) displayed in their connection name may differ from their physically-bound index (defined by each interface's physical mount order). The relations between physically-bound indexes and displayed connection names can be confirmed using OS-provided commands or tools.

For details, refer to network interface manuals.

Also, note that Resource Orchestrator uses the physical index of a network interface (based on physical mount order).

[Windows] [Hyper-V]

When using the backup, restore, or cloning functions, enable the managed server's NetBIOS over TCP/IP.

Note that the managed server should be restarted after enabling NetBIOS over TCP/IP.

### Example of VLAN Network Configuration (with PRIMERGY BX600)

Figure 7.1 With Port VLANs

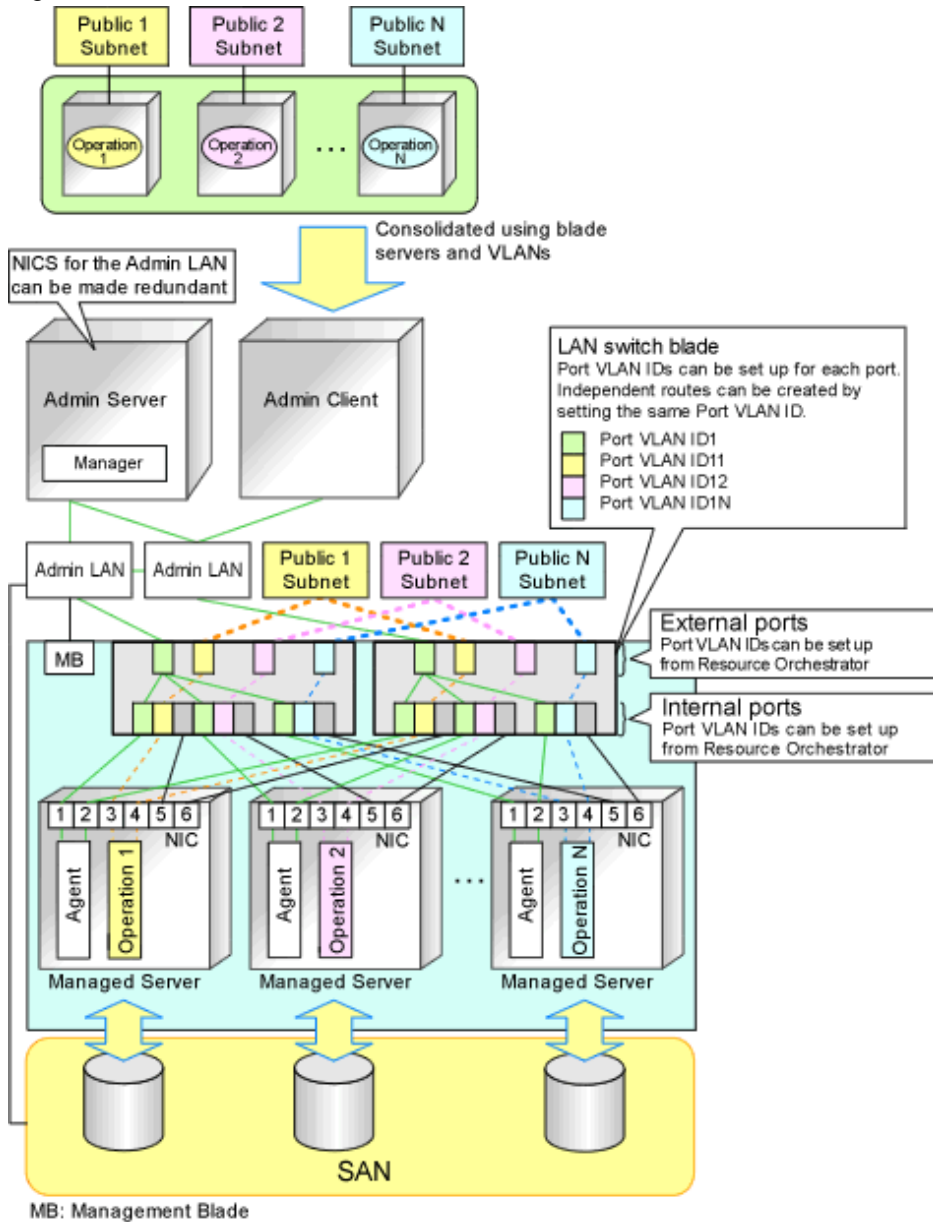
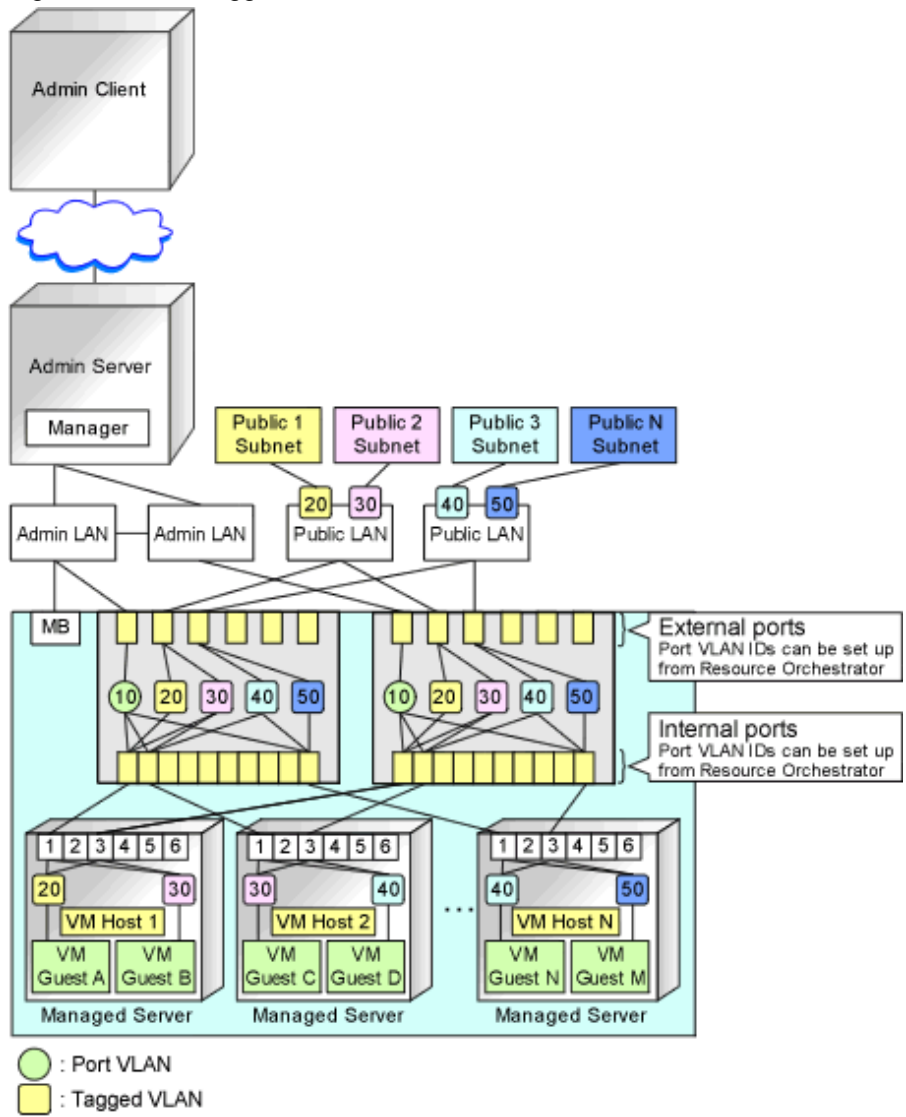


Figure 7.2 With Tagged VLANs



**Information**

It is recommended that a dedicated admin LAN be installed as shown in "Example of VLAN network configuration (with PRIMERGY BX600)".

If you need to use the following functions, a dedicated admin LAN is required in order to allocate admin IP addresses to the managed servers using the DHCP server included with Resource Orchestrator.

- Backup and restore
- Collection and deployment of cloning images
- HBA address rename

In a configuration using a LAN switch blade, a VLAN has to be configured if the LAN switch blade is shared by an admin and public LANs where a dedicated admin LAN is required.

**Network Configuration Required for ISM Coordination**

In order to coordinate with ISM, install the ServerView Infrastructure Manager virtual appliance on a server other than the admin server. For details, refer to the manuals of ServerView Infrastructure Manager.

For details on how to configure ISM coordination settings, refer to "7.1 Registering VIOM/ISM Coordination" in the "User's Guide VE". The following diagram shows an example of how the HBA address rename setup service can be configured.

Figure 7.3 Sample Configuration for ISM Coordination (With an External DHCP Server)

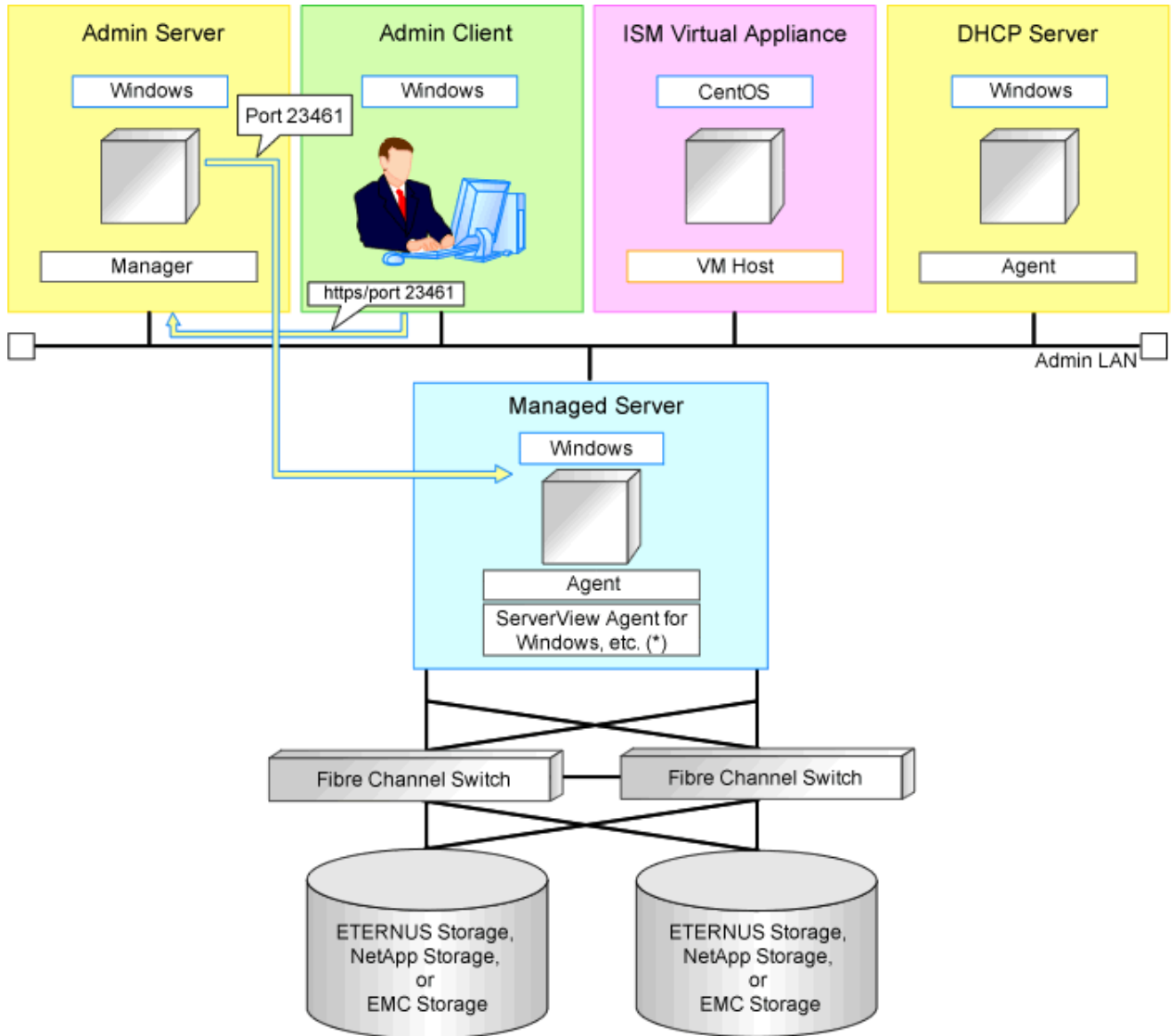
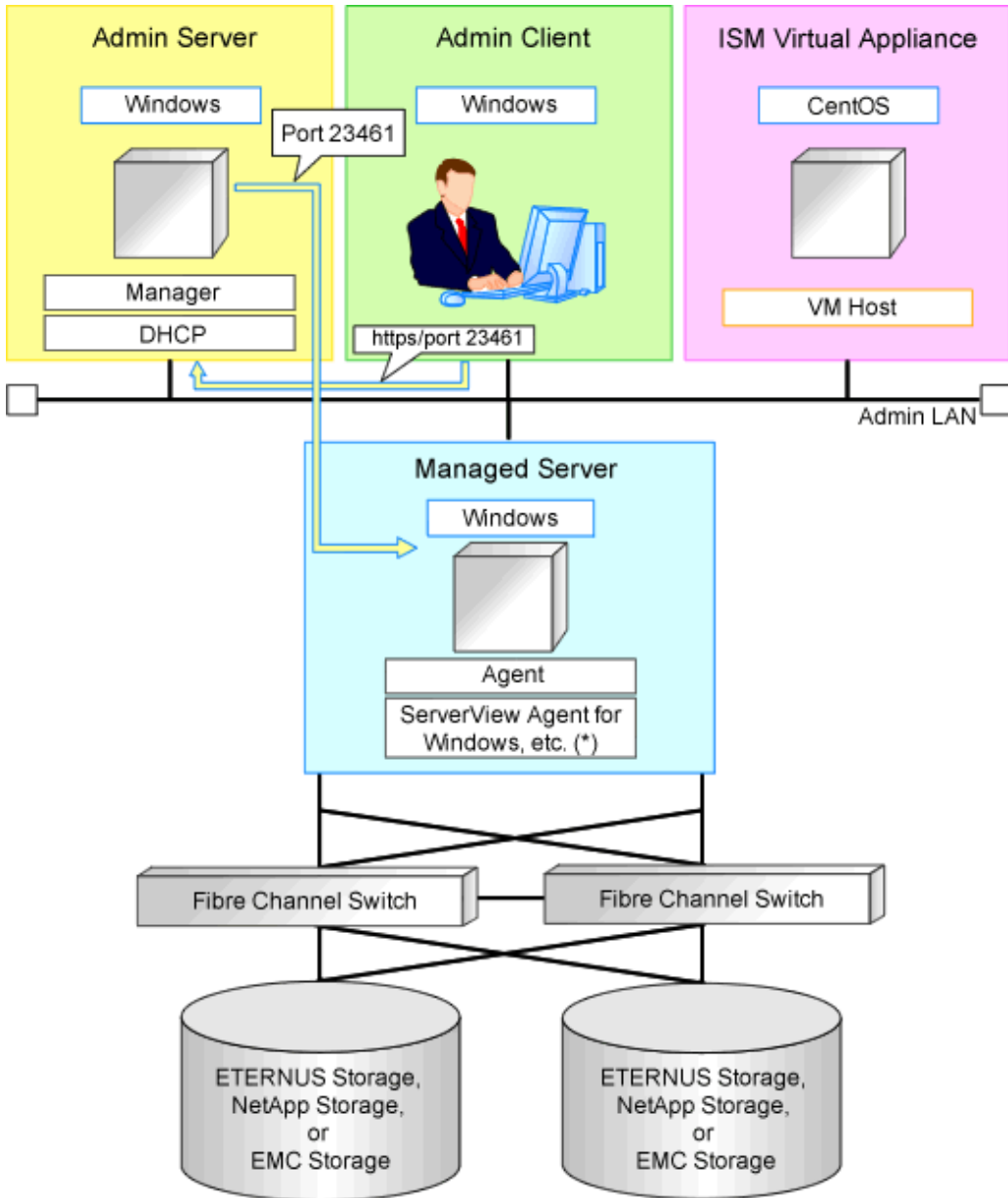


Figure 7.4 Sample Configuration for ISM Coordination (Without an External DHCP Server)

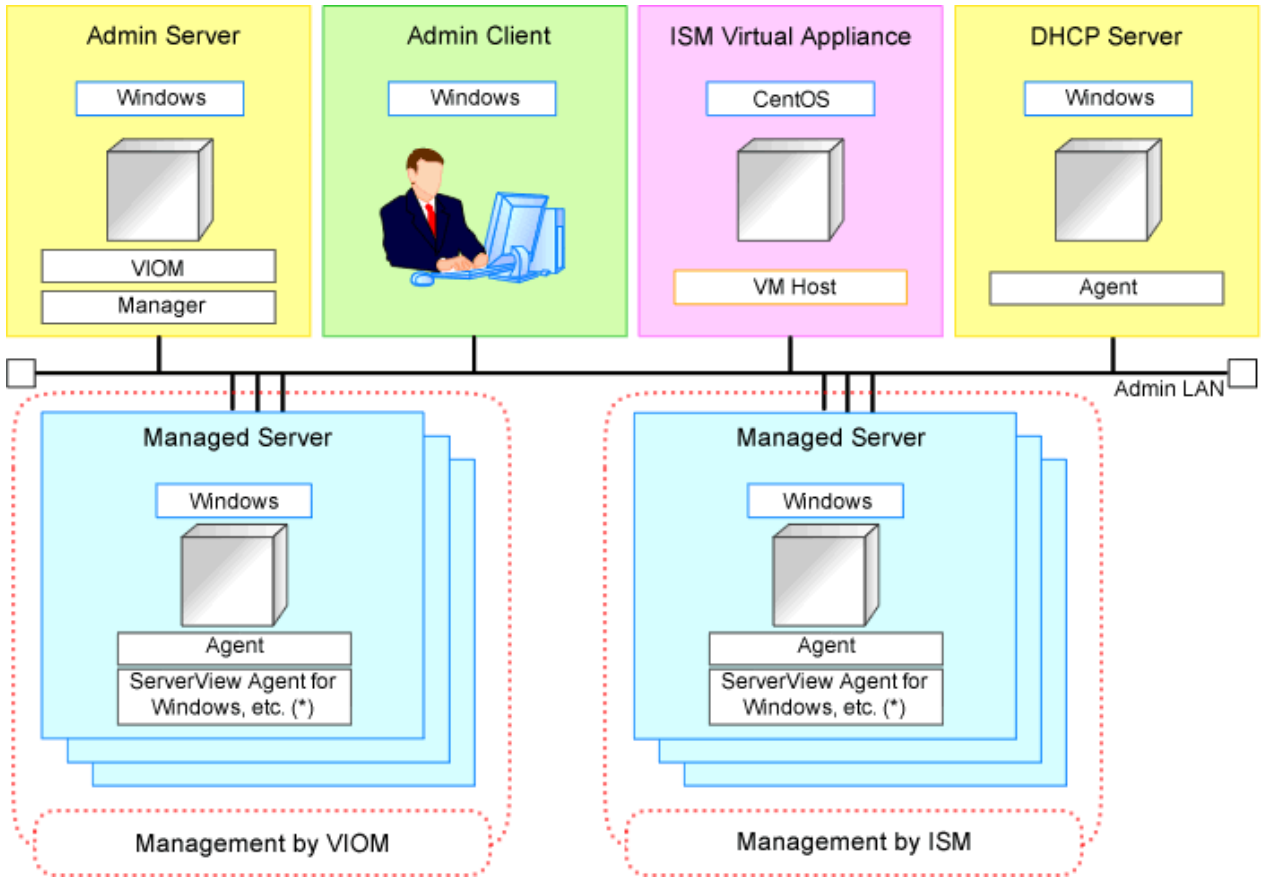


**Example of System Configuration Using I/O Virtualization (In an Environment in which ISM and VIOM Co-Exist)**

An example system configuration in an environment in which ISM and VIOM co-exist is given below.

- The PRIMERGY BX managed servers are registered for management by VIOM.
- The PRIMERGY RX managed servers are registered for management by ISM.

Figure 7.5 Sample System Configuration in an Environment in which ISM and VIOM Co-Exist

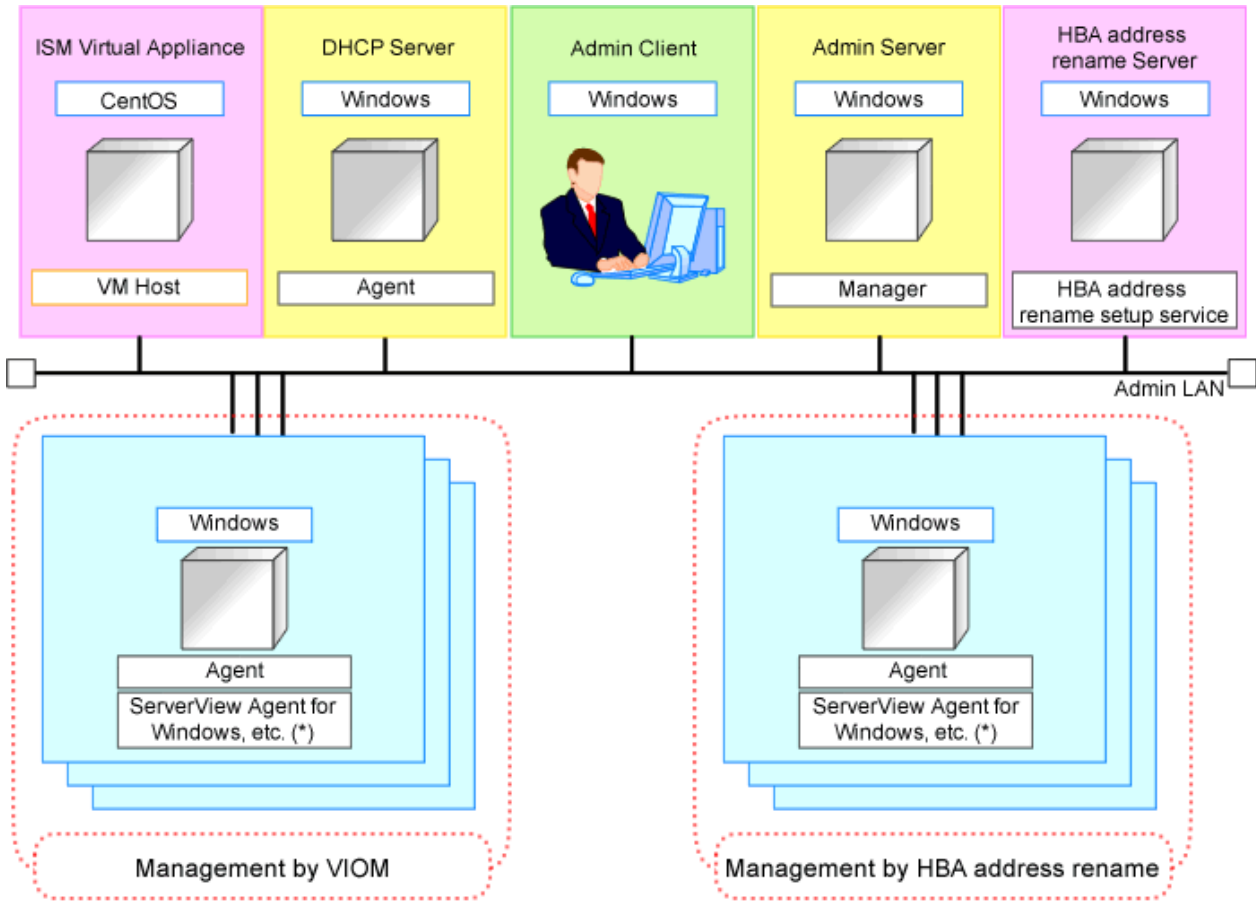


**Example of System Configuration Using I/O Virtualization (In an Environment in which ISM and HBA address rename Co-Exist)**

An example system configuration in an environment in which ISM and HBA address rename co-exist is given below.

- None of the managed servers are managed by both ISM and HBA address rename.

Figure 7.6 Sample System Configuration in an Environment in which ISM and HBA address rename Co-Exist



### Required Network Configuration when Using HBA address rename

At startup a managed server set with HBA address rename needs to communicate with the Resource Orchestrator manager. To enable startup of managed servers even when the manager is stopped, Resource Orchestrator should be set according to one of the following configurations.

- Manager cluster configuration with admin LAN redundancy using the redundant line control function of GLS  
For details, refer to "Appendix C Manager Cluster Operation Settings and Deletion" in the "Setup Guide VE".
- A dedicated HBA address rename server

This section describes the network configuration that is required for an environment with a dedicated HBA address rename server.

For details of settings for the HBA address rename setup service, refer to "6.1 HBA address rename Setup Service" in the "Setup Guide VE".

- This service must be placed in an admin LAN in the same segment as the admin server.
- Only one HBA address rename setup service operates on the admin LAN. Do not start more than one instance of this service.
- This service uses NIC2 (Index2).  
Connect NIC2 of the managed server to the admin LAN.

NIC2 is the default value, and it can be changed when registering managed servers.

For details, refer to "7.3.2 Registering Blade Servers" or "7.4.1 Registering Rack Mount or Tower Servers" in the "User's Guide VE".

- This service periodically obtains information about managed servers from the admin server and operates using this information. For this reason, it should be installed on a server that can be left active all the time.
- There must be two LAN cables between LAN switches (cascade connection) on the admin server and on the managed server.

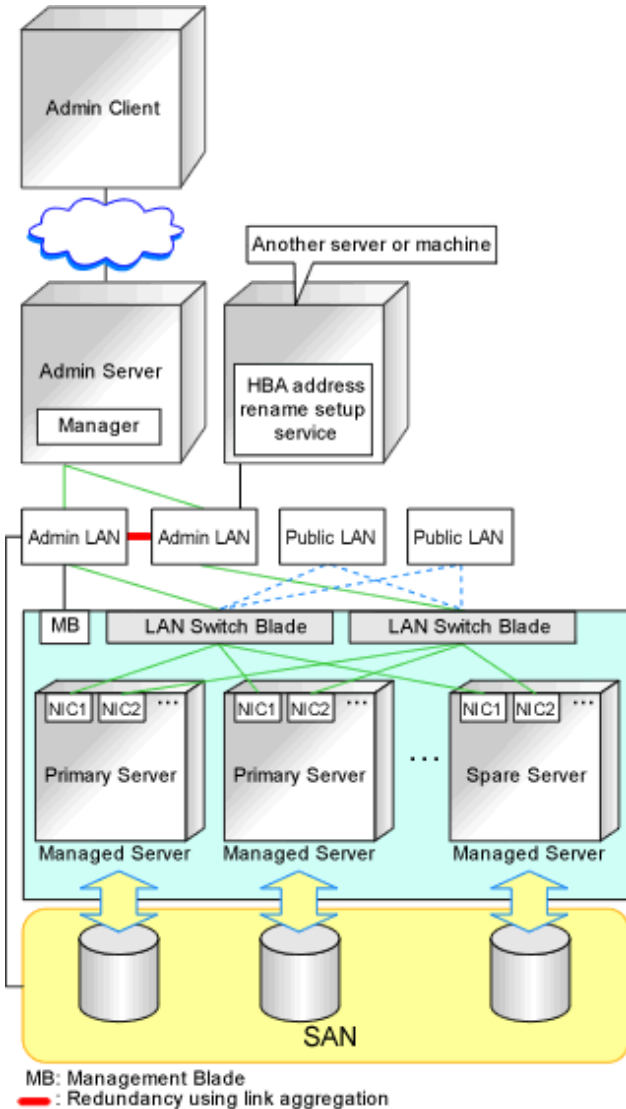


## Note

The HBA address rename setup service cannot operate on the same server as ServerView Deployment Manager, or on a server where any other DHCP or PXE service is running.

The following diagram shows an example of how the HBA address rename setup service can be configured.

Figure 7.7 Sample Configuration Showing the HBA address rename Setup Service (with PRIMERGY BX600)



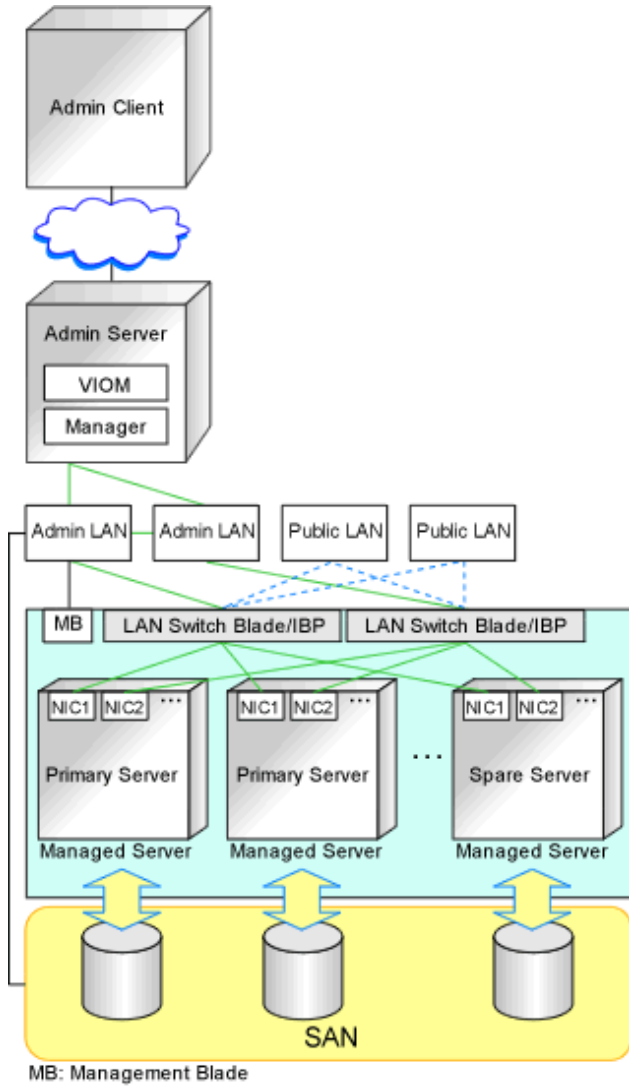
- Connections between LAN switches on the admin LAN can be made redundant using link aggregation.
- Connect NIC2 (Index2) to the admin LAN (when it is the default).
- Configure the HBA address rename setup service on a server connected to the admin LAN. This server must be different from the admin server.
- Ensure that the server or personal computer that is used to operate the HBA address rename setup service is always on when the managed servers are active.

## Network Configuration Required for VIOM Coordination

When coordinating with VIOM, the network configuration is defined by LAN switch blades and IBPs. For details, refer to the ServerView Virtual-IO Manager manual.

For details on how to configure VIOM coordination settings, refer to "7.1 Registering VIOM/ISM Coordination" in the "User's Guide VE". The following diagram shows an example of how the HBA address rename setup service can be configured.

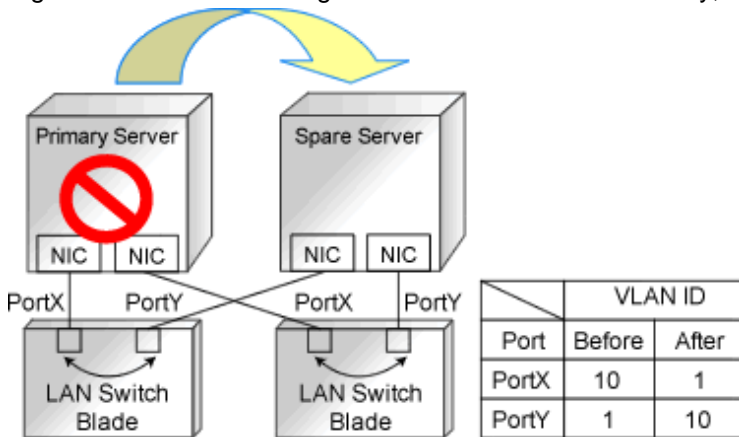
Figure 7.8 Sample Configuration for VIOM Integration (on PRIMERGY BX900 Servers Using a SAN)





ports connected to the spare server, as shown in "[Figure 7.10 VLAN Exchange Mechanism for Auto-Recovery, Server Switchover, and Server Failback](#)".

Figure 7.10 VLAN Exchange Mechanism for Auto-Recovery, Server Switchover, and Server Failback



- Exchange of port groups in LAN switch blades during server switchovers

When a server switchover occurs, the port group configuration of related LAN switch blades (if in IBP mode) is automatically adjusted to preserve the network connectivity of applications.

### Note

The targets of such VLAN ID and port group exchanges are the LAN switch blade ports connected to the switched over managed servers. If the switched over servers are connected to different LAN switch blades (e.g. when switching over managed servers in different chassis) the external ports of those LAN switches should be set with the same VLAN or port group configuration, and the switch blades placed in the same network.

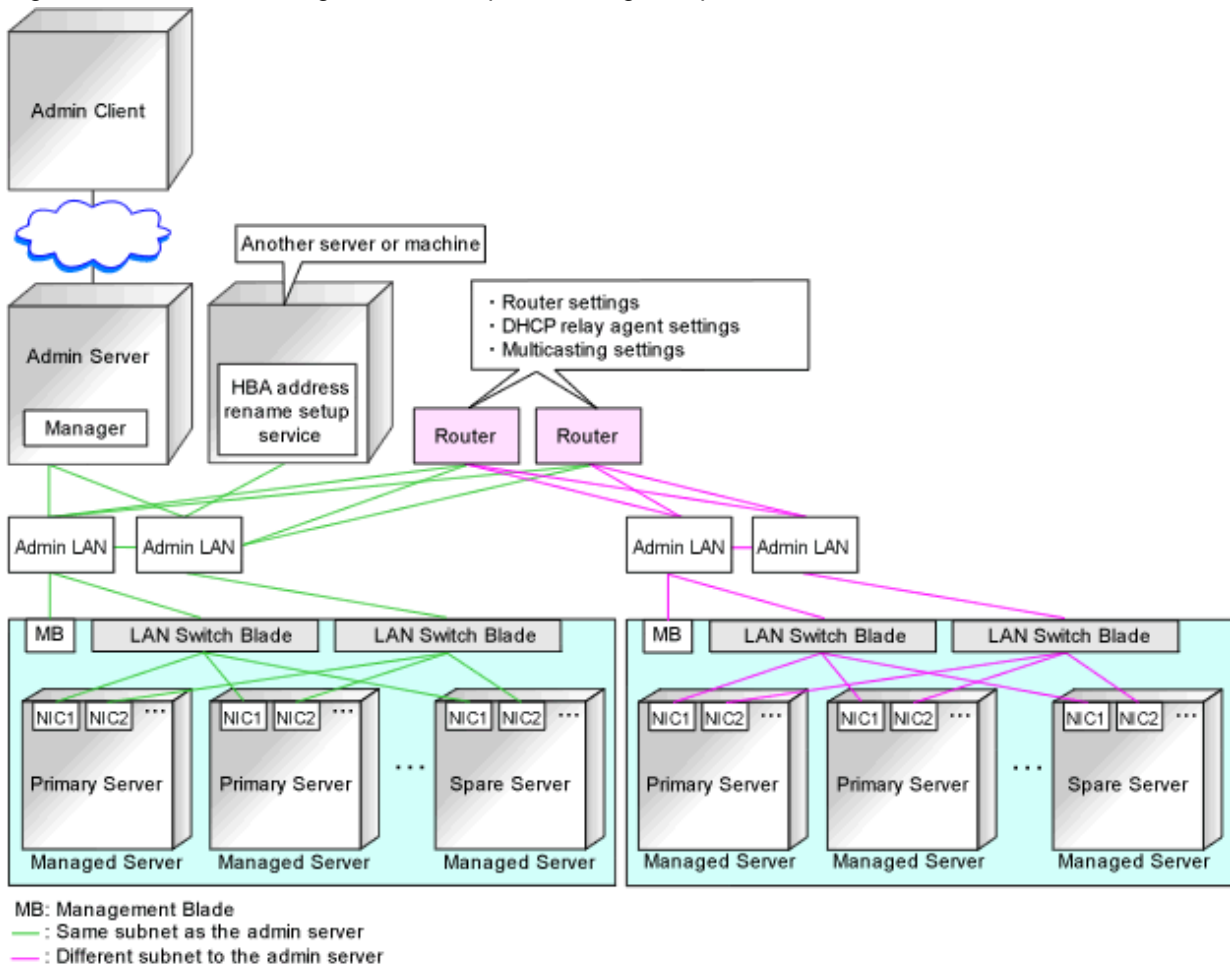
### Network Configuration in Cases with Multiple Admin LAN Subnets

In cases with multiple admin LAN subnets, configure the router settings.

For details on how to configure these settings, refer to "[7.6 Configuring the Network Environment](#)".

The following diagram shows an example of how configuring the network environment can be performed.

Figure 7.11 Network Configuration Example Involving Multiple Admin LAN Subnets



## 7.2 IP Addresses (Admin LAN)

This section describes how to choose IP addresses for devices to be set on the admin LAN.

- IP address used by the admin server for management purposes

Choose an IP address for the network interface used to communicate with managed servers.

This IP address will be asked during the manager's installation.

Note that clients can also access the manager via IP addresses other than this admin LAN IP address, as long as those addresses were set within the admin server operating system.

- IP addresses used by managed servers for management purposes

These IP addresses are used to communicate with the admin server.

They are specified when a managed server is registered.

For details on how to register managed servers, refer to "7.3.2 Registering Blade Servers" and "7.4.1 Registering Rack Mount or Tower Servers" in the "User's Guide VE".

When registering a server that will be used as a spare server, assign an IP address that does not conflict with IP addresses of other managed servers.

Configure routing or gateway settings to enable communication with the admin server when placing the admin server in the different subnet.

- IP addresses used by other devices for management purposes

Configure routing or gateway settings to enable communication with the admin server when placing the admin server in the different subnet.

- LAN Switch Blades

- Server management units such as management blades or IPMI controllers
- Power monitoring devices

When using a LAN switch blade which operates in Converged Fabric mode, set an admin IP address that belongs to a different subnet from the one that the representative virtual IP address of the fabric and the representative virtual IP address of the domain belong to.

### Information

The maximum value of the subnet mask of the network that Resource Orchestrator supports is 255.255.255.255 (32-bit mask). The minimum value is 255.255.0.0 (16-bit mask). However, 255.255.255.254 is not supported.

A management IP address must also be chosen for each of the following devices if they are to be registered into Resource Orchestrator. For the following components, IP addresses can be chosen either within or outside of the admin LAN.

- VM management software
  - IP address of the server which was installed using VM management software.
- LAN switches other than LAN switch blades
  - IP address used by the admin server to track network connections (topology) between managed servers (PRIMERGY BX) and their adjacent LAN switches, and display them in the NetworkViewer.

## 7.3 IP Addresses (iSCSI LAN)

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This section describes how to choose IP addresses for devices to be set on the iSCSI LAN.

Ensure that all of the IP addresses chosen here are on the same subnet.

- IP Address of iSCSI Initiator
  - Choose an IP address for the network interface to use for communication with managed servers.
- IP address of iSCSI target
  - The IP address of the storage devices with which the iSCSI initiator will communicate.

### Note

- IP addresses chosen for iSCSI should be static and do not used DHCP.
- When using a multi-path configuration, separate the networks using different ports.

## 7.4 Public LAN Settings for Managed Servers

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The network parameters for the NIC of the managed server will be configured automatically when a cloning image is deployed. Refer to "17.6 Network Parameter Auto-Configuration for Cloning Images" in the "User's Guide VE", and define the settings.

## 7.5 Network Device Management Settings

---

Choose the following settings for network devices that will be managed by Resource Orchestrator.

- Login User Name
  - This user name can contain up to 64 alphanumeric characters (upper or lower case), underscores ("\_"), and hyphens ("-").

- Password

This password can contain up to 80 alphanumeric characters (upper or lower case) and symbols (ASCII characters 0x20, 0x21, and 0x23 to 0x7e) with the exception of double quotation marks ( " ).

- Administrator Password

This password can contain up to 80 alphanumeric characters (upper or lower case) and symbols (ASCII characters 0x20, 0x21, and 0x23 to 0x7e) with the exception of double quotation marks ( " ).

- SNMP community name

This user name can contain up to 32 alphanumeric characters (upper or lower case), underscores ( "\_ " ), and hyphens ( "- " ).

- SNMP trap destination

This must be the admin IP address of the admin server.

### Note

Depending on the network device used, setting an SNMP trap destination may restrict SNMP access to that device.

When a LAN switch blade is registered with the Converged Fabric mode of PY CB Eth Switch 10/40Gb 18/8+2 and the representative virtual IP address of the fabric is specified, it is not possible to receive SNMP traps.

In a clustered manager configuration, when managing network devices, set the physical IP addresses of both the primary and secondary nodes as SNMP trap destinations.

If the network device is set to only grant access from known IP addresses, be sure to give permissions to the physical IP addresses of both the primary and secondary cluster nodes, as is done with SNMP trap destination settings.

For details, refer to network device manuals.

### Information

Character limitations vary depending on the network device used.

For details, refer to network device manuals.

In order to track the network connections between managed servers (PRIMERGY BX) and adjacent LAN switches, and display them in the NetworkViewer, the following protocols should be first enabled on each LAN switch blade and network device.

- LLDP (Link Layer Discovery Protocol)
- CDP (Cisco Discovery Protocol)

If the VLAN settings are to be performed on the ports with link aggregation set on the following LAN switch blades, set the apparatuses as follows.

#### LAN Switch Blades

- PY CB Eth Switch/IBP 10Gb 18/8
- PY CB Eth Switch 10/40Gb 18/8+2 (switch mode, end host mode)
- PY CB Eth Switch/IBP 1Gb 36/8+2
- PY CB Eth Switch/IBP 1Gb 36/12
- PY CB Eth Switch/IBP 1Gb 18/6

#### Configuration

- LLDP

When setting LLDP, disable the setting for [VLAN name information]. Make the other settings valid.

When using a LAN switch blade PY CB 10Gb FEX Nexus B22, VLAN configuration cannot be performed on it, thus the following functions cannot be used. Manually configure VLAN settings from a Nexus 5000 series that connects to a LAN switch blade PY CB 10Gb FEX Nexus B22 in advance.

- Changing and setting the VLAN for LAN switch blades (internal and external connection ports)
- Restoration of LAN switch blades

## Note

- Adjacent network devices should be set to use the same protocol.  
For details, refer to network device manuals.  
If a network device adjacent to a LAN switch blade does not support either LLDP or CDP, it should be set up to use the supported protocol.
- Resource Orchestrator cannot detect the network connections between a LAN switch blade set in IBP mode and its adjacent network devices.
- For the following LAN switch blades, the settings described below should be set to the same values in order to enable proper detection of network links.

### LAN Switch Blades

- PY CB Eth Switch/IBP 1Gb 36/12
- PY CB Eth Switch/IBP 1Gb 36/8+2
- PY CB Eth Switch/IBP 1Gb 18/6

### Expected Values:

- hostname set from the hostname command
- system name set from the snmp-server sysname command

## Example

When setting both the hostname and system name to "swb1".

```
# hostname swb1
# snmp-server sysname swb1
```

- For the following LAN switch blade, the settings described below should be set to the same value to enable proper detection of network links.

### LAN Switch Blades

- PY CB Eth Switch/IBP 10Gb 18/8
- PY CB Eth Switch 10/40Gb 18/8+2 (switch mode, end host mode)

### Configuration

- Using the snmp agent address command, set the admin IP address of the LAN switch blade for the agent address.
- Network connections may not be displayed properly if two or more network devices are set with a conflicting system name (sysName).

## 7.6 Configuring the Network Environment

This section explains how to configure the network environment.

### Configurations for LAN Switch Blades

Refer to the LAN switch blade manual to apply the following settings.



- VLAN IDs for the admin LAN ports used to communicate with the admin server, as chosen in ["7.1 Network Configuration"](#)
- Settings chosen in ["7.5 Network Device Management Settings"](#)

## Information

VLAN settings for switch blade ports not used for the admin LAN can also be set from the ROR console. For details, refer to ["7.3.4 Configuring VLANs on LAN Switch Blades"](#) in the ["User's Guide VE"](#).

## Note

- After setting up a LAN switch blade, perform a backup of the LAN switch blade's configuration definition information. For details on how to back up the configuration definition information of a switch blade, refer to the manual of the LAN switch blade.
- Resource Orchestrator uses telnet or SSH to log into LAN switch blades and automate settings. When telnet or SSH (version 2) connection is disabled, enable it. Refer to the manual of the relevant product. Some models of LAN switch blades may restrict the number of simultaneous connections. In this case, log out from other telnet connections.
- If telnet or SSH is unavailable, the following features are also unavailable.
  - Registration of LAN switch blades
  - Changing of LAN switch blade settings
  - Changing and setting the VLAN for LAN switch blades (internal and external ports)
  - Restoration of LAN switch blades
  - Server switchover (changing network settings while a server is switched over)
- SSH connection (SSH version 2) can be selected for the following LAN switch blades.
  - LAN switch blade PY CB Eth Switch/IBP 10Gb 18/8 (1.00 or later version)
  - LAN switch blade PY CB Eth Switch 10/40Gb 18/8 (1.00 or later version)
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 36/8+2 (4.16 or later version)
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 36/12 (3.12 or later version)
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 18/6 (3.12 or later version)
  - LAN switch blade PY CB DCB SW 10Gb 18/6/6 (2.1.1\_fuj or later version)
- For PY CB Eth Switch/IBP 10Gb 18/8, the maximum unregistered VLAN ID is used for the oob port in the LAN switch blade. When the maximum VLAN ID, "4094", is set in the LAN switch blade and the oob port is used to connect the telnet, the following functions cannot be used.
  - Changing and setting the VLAN for LAN switch blades (internal and external ports)
  - Restoration of LAN switch blades
  - Server switchover (changing network settings while a server is switched over)
- When using end host mode, use the default pin-group and do not create new pin-groups. Also, disable the Automatic VLAN uplink Synchronization (AVS) setting. This setting is not necessary, since there are no pin-group or AVS functions for PY CB Eth Switch/IBP 10Gb 18/8 and PY CB Eth Switch 10/40Gb 18/8+2.
- When using the following LAN switch blades, do not enable classic-view:
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 36/8+2
  - LAN switch blade PY CB Eth Switch/IBP 1Gb 36/12

- LAN switch blade PY CB Eth Switch/IBP 1Gb 18/6
- When using Converged Fabric mode of PY CB Eth Switch 10/40Gb 18/8+2, set the oob IP address or representative virtual IP address of the fabric.
- When the switch ID of PY CB Eth Switch/IBP 1Gb 36/8+2 is something other than 1, port and VLAN information cannot be displayed correctly. Set "1" for the Switch ID.
- The stacking function of LAN switch blades is not supported.

However, settings other than VLAN settings should be made directly on the LAN switch blade.

## Setting Network Devices Other Than LAN Switch Blades

Refer to the manuals of the network devices to manage with Resource Orchestrator to apply the settings chosen in "[7.5 Network Device Management Settings](#)".

### Router Settings

For the router connections between different subnets, configure the following router settings.

- For managed servers, configure routing to enable communication with the admin LAN IP address of the admin server.
- On the admin server, configure the following multicast routing settings for the resources to manage.

225.1.0.1 - 225.1.0.8
-----------------------

- When using the following functions, configure DHCP relay agents to enable the manager to receive DHCP requests from managed servers belonging to different subnets.
  - Backup and restoration of managed servers
  - Collection and deployment of cloning images
  - SAN boot using HBA address rename

When specifying the IP address of the DHCP server during registration of ISM coordination, it is also necessary to configure DHCP relay agents for the DHCP server.

- When using the HBA address rename setup service, configure DHCP relay agents to enable the HBA address rename setup service to receive DHCP requests from managed servers belonging to different subnets.
- When setting firewalls, etc. for the router, permit connections for the ports used by Resource Orchestrator. Refer to "[Appendix A Port List](#)", for details on the ports used by Resource Orchestrator.
- For information about multicast routing setting and DHCP relay agents, refer to the router manual.

## 7.7 When Managing Network Devices as Resources

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Preparation required in advance to manage network devices as resources is explained in this section.

For details on supported network devices, refer to "6.2.2 Virtual Edition" in the "Overview".

### 7.7.1 Settings for Managed Network Devices

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When managing a network device as a resource, define the information to be configured on each managed drive.

For details on the procedure to enable the function for managing network devices as resources, refer to "7.5.1 Enabling the Network Device Management Function" in the "User's Guide VE".

#### 7.7.1.1 Settings for Management

Define configuration information necessary for management.

- Device name

Define the name of the managed device.

This name can contain up to 32 alphanumeric characters (upper or lower case), underscores ("\_"), hyphens ("-"), and periods (".").

- IP addresses used by managed network devices for management purposes

Choose an IP address to be used for communication with the admin server.

- SNMP community name

Define the name of the SNMP community to be used when collecting MIB information using the monitoring function of the network device.

This user name can contain up to 32 alphanumeric characters (upper or lower case), underscores ("\_"), and hyphens ("-").

When registering VCS fabrics as network devices, configuration is not necessary.

- Administrator information (user name and password)

- Login User Name

Define the login user name to be used for login to the network device.

This user name can contain up to 32 alphanumeric characters (upper or lower case), underscores ("\_"), and hyphens ("-").

- Password

Define the password for the login user name to be used for direct login to the network device.

Specify a character string of up to 64 alphanumeric characters (upper or lower case) and symbols (!\$%()\*+,-./:;=@[]^\_`{|}~ and blank spaces).

- Administrator Password

Define the login password for the administrator to be used for logging into the network device as an administrator.

Specify a character string of up to 64 alphanumeric characters (upper or lower case) and symbols (!\$%()\*+,-./:;=@[]^\_`{|}~ and blank spaces).

- SNMP host information

This must be the admin IP address of the admin server.

- SNMP trap destination

This must be the admin IP address of the admin server.

- Monitoring method (PING, SNMP, NETCONF)

Define the monitoring method for the network devices (firewalls, server load balancers, L2 switches, Ethernet fabrics, and management hosts).

Choose PING for alive monitoring, and choose SNMP for status monitoring.

It is possible to monitor using only one method or both methods.

Note that NETCONF is the monitoring method for VCS only.

## 7.7.1.2 Settings for Pre-configuration

Define settings necessary for pre-configuration.

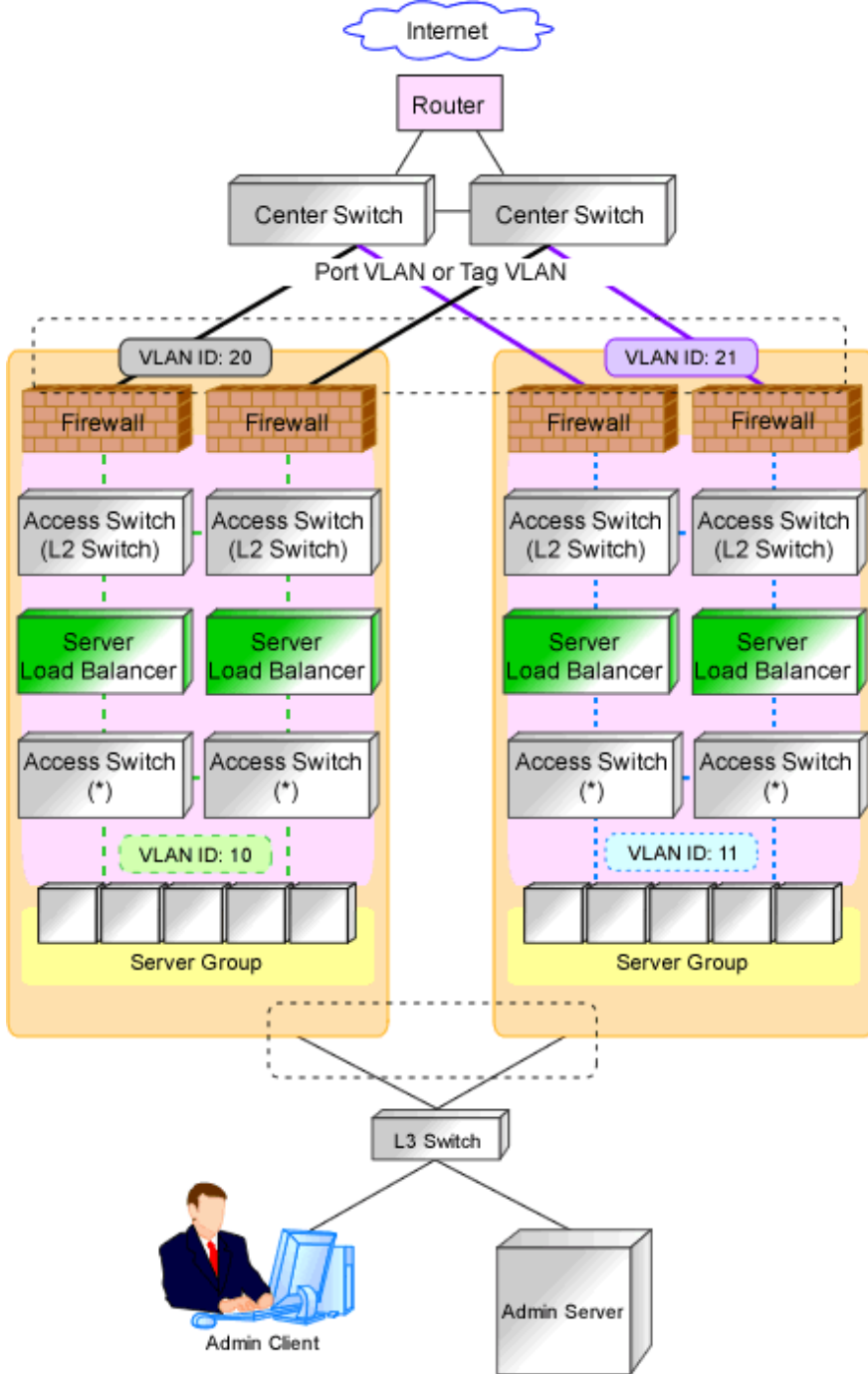
- Public LAN Pre-configuration Settings

Check the connection configuration of the LAN ports to be used for the public LAN to be connected with the center switches, and define the necessary settings accordingly.

- Admin LAN Pre-configuration Settings

Check the connection configuration of the LAN ports to be used for the admin LAN to be connected with the L3 switches, and define the necessary settings accordingly.

Figure 7.12 Managed Device Pre-configuration Scope



   : Range of preparations by the user  
   : Connected using a port VLAN or a tagged VLAN

\* Note: L2 switches or Ethernet Fabric switches.

### Information

- Character limitations vary depending on the network device used.

For specific settings of individual devices, define the settings according to the specifications of the network devices, within the limitations of types and number of characters described above.

The information necessary to be configured based on the public and admin LAN connection configurations also depends on the specifications of network devices.

For details on the specifications for each network device, refer to the manual for each device.

- When targets to manage are the Ethernet Fabric switches (Converged Fabric), design of the following is required.
  - Design the port types for each port of the relevant devices.
  - When using virtual fabrics (VFAB), design all virtual fabrics to use in advance.
  - When using virtual fabrics, it is recommended to use the LAN ports belonging to the default VFAB as the LAN ports for the admin LAN.

For details on the outline of Ethernet Fabric switches (Converged Fabric), refer to "[Appendix D Ethernet Fabric Devices](#)".

- When targets to manage are IPCOM VX/IPCOM VA, design of the following is required.
  - The VFAB VLAN ID of the virtual fabric must be same as the TPID of the VLAN ID defined in the virtual machine interface definitions of IPCOM VX.

For details on how to configure TPID, refer to the manual of each device.

- Use of virtual fabrics using Ethernet fabric switches (Converged Fabric) is required. Design virtual fabrics to use for each IPCOM VA.

During design, note the following information:

- Set the operation mode of the virtual fabric to Network mode.
- Configure the IEEE802.1ad frame communication port for the connection port with IPCOM VX.

Define the S-TAG value of the virtual fabric for the VLAN ID of the virtual machine interface of IPCOM VX.

The S-TAG value of the virtual fabric can be calculated using the following formula:

- For default VFAB  
2 fixed value
- For other than default VFAB  
VFAB ID + 100

For details on virtual machine interface definitions for IPCOM VX, refer to the manuals of IPCOM VX.

For the relationship between IPCOM VX/IPCOM VA and virtual fabrics, refer to "[Appendix E IPCOM VX Series Devices](#)".

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## 7.7.2 Pre-configuring Managed Network Devices

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Configure the information defined in "[7.7.1 Settings for Managed Network Devices](#)" on network devices.

In order to track the network connections between managed servers (PRIMERGY BX series) and adjacent network devices (L2 switches, etc.), and display them in the NetworkViewer, the following protocols should be first enabled on each LAN switch blade and network device.

- LLDP (Link Layer Discovery Protocol)
- CDP (Cisco Discovery Protocol)

It is necessary to configure a port type for each port of the relevant devices, in order to correctly display the port information of Ethernet Fabric switches (Converged Fabric) on the [Resource Details] tab.



### Note

- The same protocol needs to be set on the LAN switch blade and the network devices it is connected to.
- It is not possible to automatically detect the connection relationship between LAN switch blades set in the IBP mode and network devices.
- Network connections may not be displayed properly if two or more network devices are set with a conflicting system name (sysName).

## When Monitoring Network Devices

When managing Ethernet fabric switches as resources, configure the following types of accounts:

Vendor	Unit Name	Account Type (*)	Protocol to Use
Fujitsu	PRIMERGY Converged Fabric Switch Blade (10 Gbps 18/8+2)	Account with user privileges	SSH
	Converged Fabric Switch	Account with user privileges	SSH
Brocade Extreme Networks	VDX	Account with user privileges or administrator privileges	NETCONF

\*Note: When using an account with user privileges, an administrator password is required.

## 7.7.3 Creating Network Configuration Information (XML Definition)

Create network configuration information (XML definition files) for registering network devices based on the network device information (admin IP address, account information, connection information) obtained from the network device administrator.

- [When Registering Network Devices as Network Devices before Installing Them](#)
- [When Batch Registering or Modifying Multiple Network Devices](#)
- [When Managing Login Information](#)
- [When Registering a Network Device that Provides a Web Interface for Management](#)
- [When Registering Redundant Network Devices as Network Devices](#)
- [When Visualizing Networks](#)
- [When Registering Unsupported Network Device Models](#)
- [When Regularly Monitoring Network Devices Registered as Network Device Resources](#)
- [When Registering an Ethernet Fabric Switch \(Converged Fabric\)](#)
- [When Registering an Ethernet Fabric Switch \(VCS\)](#)
- [When Registering IPCOM VX](#)
- [When Registering IPCOM VA](#)

### When Registering Network Devices as Network Devices before Installing Them

When a network device is registered as a network device, the monitoring function starts monitoring the state of that device. To avoid unnecessary monitoring, specify "true" for the Maintenance element when registering devices.

This setting enables the maintenance mode, excluding that device from monitored devices. After installing a network device and making it a monitoring target, release the maintenance mode.

The Maintenance element can be specified on individual network devices (individual Netdevice elements) to be registered.

### When Batch Registering or Modifying Multiple Network Devices

- When registering or modifying multiple network devices at the same time, it is possible to register link information.

When specifying the device information (Devices) in the link information (in the Links element), it is necessary to specify the port name used to connect the network device.



The methods to confirm port names are as follow:

- When the network device is something other than an Ethernet Fabric switch

If the ifName of the standard MIB of the network device is unknown, use the snmpwalk command to confirm the port name.

### Example

```
snmpwalk -v 1 -c [SNMP_community_name] [IP_address] ifName
```

If the information is available from the manual or vendor of the destination device, obtain it from there.

- When the network device is an Ethernet Fabric switch (Converged Fabric)

Login remotely to the representative virtual IP address of the fabric of the corresponding device and confirm the name of the connection port necessary for registration, using the following command:

```
# show running-config
```

Port name and port type are displayed in the following form.

```
interface domain_id/switch_id/chassis_id/port  
type type
```

Port name is displayed following "interface". Port type is displayed following "type" after that.

### Example

```
interface 3/1/0/3  
type cir
```

The port names of the following port types can be specified for "unit connection port name" of the link information.

- "type cir"  
The port that connects to an external network device.
- "type endpoint"  
The port that connects to a server.
- "type linkaggregation group"  
The port that is "type cir" or "type endpoint" and uses link aggregation.

For details on the display contents of commands, refer to Ethernet Fabric switch manuals.

- When the network device is an Ethernet Fabric switch (VCS)

Login remotely to the representative virtual IP address of the fabric of the corresponding device and confirm the name of the connection port necessary for registration, using the following command:

```
# show running-config
```

Port name and port type are displayed in the following form.

```
interface interface_name rbridge-id/slot/port
```

Port name is displayed following the interface name of "interface".

### Example

```
interface TenGigabitEthernet 2/0/1
```

For details on the display contents of commands, refer to Ethernet Fabric switch manuals.

- It is not necessary to specify the logical link information between IPCOM VX and IPCOM VA when the IPCOM VX firmware version is E10L12 or later.
  - When registering multiple network devices at once with the link information already registered, if link information (under the Links element) is defined in the network configuration information, already registered link information is processed according to the setting of the registration mode (the Mode element).
    - When "add" is specified  
The same link information is not overwritten.
    - When "modify" is specified  
Already registered link information is deleted, and then defined link information is registered.
- Already registered connection information can be retrieved using the rcxadm netconfig export command.

## When Managing Login Information

Specify the administrator information defined in "7.7.1 Settings for Managed Network Devices" in the XML definition file.

To check in advance whether the specified account information is correct, specify "check=true" for the LoginInfo element. This allows the login process to be performed using the specified account to check that login is possible.

However, if the account information has not been registered, because you do not use any function that uses account information, it is not necessary to specify the LoginInfo element.

The LoginInfo element can be specified on individual network devices (individual Netdevice tags) to be registered.

When "telnet" has been specified in the protocol element, only account information for network devices satisfying all of the following conditions can be confirmed.

Vendor	Unit Name	Prompt Type	Prompt Character
Fujitsu	SR-X Ethernet Fabric (*1)	Login prompt	Login:
		Password prompt	Password:
		Command prompt (*2)	<i>Arbitrary string</i> #
	<i>Arbitrary string</i> >		
	IPCOM EX IPCOM VX IPCOM VA	Login prompt	login:
		Password prompt	Password:
Command prompt (*2)		<i>Arbitrary string</i> #	
		<i>Arbitrary string</i> >	
Cisco	Catalyst ASA	Login prompt	Username:
		Password prompt	Password:
		Command prompt (*2)	<i>Arbitrary string</i> #
	<i>Arbitrary string</i> >		
	Nexus	Login prompt	login:
		Password prompt	Password:
Command prompt (*2)		<i>Arbitrary string</i> #	
		<i>Arbitrary string</i> >	
Brocade Extreme Networks	VDX	Login prompt	Login:
		Password prompt	Password:
		Command prompt (*2)	<i>Arbitrary string</i> #
			<i>Arbitrary string</i> >



Vendor	Unit Name	Prompt Type	Prompt Character
F5 Networks	BIG-IP (*3)	Login prompt Password prompt Command prompt	There are no restrictions.

\*1: Fujitsu PRIMERGY Converged Fabric switch blades (10 Gbps 18/8+2) or Fujitsu Converged Fabric switch are the targets.

\*2: The "#" or ">" following *arbitrary string* is used as a prompt character for the command prompt.

\*3: The model name for the BIG-IP LTM series is handled as "BIG-IP".

### When Registering a Network Device that Provides a Web Interface for Management

When a problem occurs on the system, sometimes investigation may be performed using the Web interface provided by the network device. In such cases, it was necessary to start the web interface of the network device from another Web browser. However, specifying a URL for opening the web interface of the network device for the MgmtURL element when registering the network device makes it be possible to quickly open the web interface of the network device from the ROR console.

The MgmtURL element can be specified on individual network devices (individual Netdevice tags) to be registered.

### When Registering Redundant Network Devices as Network Devices

Network devices that have the same "vendor name" and "device name" can be registered for redundant configurations. When registering a network device that has the same vendor name and device name, specify the same value as the registered network device for "Group\_ID" of the Redundancy group\_id element to treat that device as being in a redundant configuration.

For the "vendor name" and "device name" of a network device, collect MIB information from the network device when registering it, and confirm that the "vendor name" and "device name" are same as the ones of the registered device.

### When Visualizing Networks

Register following network link information enables visualization of their connection relationships.

- Link information between two network devices
- Link information between network devices and LAN switch blades
- Link information between network devices and rack mount servers or tower servers

For details on visualization of networks, refer to "Chapter 13 NetworkViewer" in the "User's Guide VE".

For details on how to specify link information, refer to "8.1.1 Creation" in the "Reference Guide (Command) VE".

### Information

When visualizing the link information between network devices and rack mount servers or tower servers, the following links are displayed for each server depending on the specifications of the link information of the network configuration information (XML definition).

Table 7.1 Displayed Link Information

Specification of the Connection Port Name of the Network Configuration Information	Displayed Link Information
Connection port name of the device (Port)	The link to the NIC with the number specified in <Port> is displayed.
Connection port name of the device for display (NicIndex)	The link to the NIC with Index specified in <NicIndex> is displayed.
The connection port name of the device (Port) and the connection port name of the device for display (NicIndex)	The link to the NIC with Index specified in <NicIndex> is displayed. The link to the NIC with the number specified in <Port> is not displayed.

## When Registering Unsupported Network Device Models

Add the model of the network device to be registered to the model definition for network devices, and register the network device after updating the model definition file.

For details on model definitions, refer to "8.2 Network Device Model Definition" in the "Reference Guide (Command) VE".

## When Regularly Monitoring Network Devices Registered as Network Device Resources

When the workload of the network or network devices is temporarily increased, the response to the communication of regular monitoring may be delayed. When this delay exceeds the time-out period, the communication for regular monitoring will be executed again.

Therefore, if the monitoring interval (Interval element) or timeout period (Timeout element) specified during registration is short, the number of communications for regular monitoring may increase. It is recommended to use the default values in order to avoid increasing the load on the network and network devices.

## When Registering an Ethernet Fabric Switch (Converged Fabric)

- About the port name to specify for the link information

Specify a port with the type EP (End Point) and CIR (Clean Interface with Redundancy).

For details on how to confirm the port name to specify, refer to "[When Batch Registering or Modifying Multiple Network Devices](#)".

- About the admin IP address to specify as network device information

Specify the representative virtual IP address of the fabric.

## When Registering an Ethernet Fabric Switch (VCS)

- About the admin IP address to specify as network device information

Specify the Virtual IP of the VCS set in "vcs virtual ip".

For details, refer to the manual of the relevant product.



### Note

- Register a VCS fabric which has been configured using Management Cluster mode, and has "vcs virtual ip" set.
- Set the same character string for all VDX system names used for configuring the VCS fabric.

## When Registering IPCOM VX

- Specify "ManagementHost" in the Type element.

- Register the link information of Ethernet Fabric switches (Converged Fabric) and IPCOM VA.

For details on the IPCOM VA link information, refer to "[When Registering IPCOM VA](#)".

## When Registering IPCOM VA

- For the type (Type element), specify either "SLB" or "Firewall" or specify both "Firewall" and "SLB", according to the model of the IPCOM VA.

When registering as an integrated network device with multiple types, specify multiple values for this element.

- For the ApplianceType element, specify "virtual".

- For the IP address of the admin host (the ManagementHost element), specify the admin IP address of IPCOM VX.

- For the S-TAG ID (the StagId element), specify the VLAN ID defined in the virtual machine interface definitions for IPCOM VX. It is not necessary to specify the S-TAG ID (StagId element) when the IPCOM VX firmware version is E10L12 or later.

For details on virtual machine interface definitions for IPCOM VX, refer to the manuals of IPCOM VX.

- IPCOM VX Link Information

Register the connection relationship between IPCOM VA ports and IPCOM VX ports as the link information.

Specify "virtual" for the device type (the kind attribute of the Device element) of IPCOM VA.

It is not necessary to specify the logical link information between IPCOM VX and IPCOM VA when the IPCOM VX firmware version is E10L12 or later.

## Example

Link Information to be Defined when 3/1/0/11 of the C-Fabric and LAN.0 of IPCOM VX and LAN0.0 of IPCOM VX and LAN0.0 of IPCOM VA are Connected

```
<Links>
  <Link>
    <Devices>
      <Device ip="172.16.1.52" kind="netdevice" name="ipcom_vx">
        <Port>LAN0.0</Port>
      </Device>
      <Device ip="172.16.1.53" kind="virtual" name="ipcom_va">
        <Port>LAN0.0</Port>
      </Device>
    </Devices>
  </Link>
  <Link>
    <Devices>
      <Device ip="172.16.1.52" kind="netdevice" name="ipcom_vx">
        <Port>LAN0.0</Port>
      </Device>
      <Device ip="172.16.3.3" kind="netdevice" name="cfabric">
        <Port>3/1/0/11</Port>
      </Device>
    </Devices>
  </Link>
</Links>
```

## Information

Necessary definitions based on the number of devices to be registered.

- When registering each network device individually

The Netdevice element must be the first.

- When registering all network devices at once

Starting with the Netconfig element, define the settings for each network device under the Netdevices element.

When registering multiple network devices at once, connection information can be also defined under the Links element.

## See

- For details on network configuration information (XML definitions), refer to "8.1 Network Configuration Information" in the "Reference Guide (Command) VE".
- For details on the rxadm netconfig command, refer to "3.2 rxadm netconfig" in the "Reference Guide (Command) VE".
- For details on releasing maintenance mode, refer to "20.1 Switchover of Maintenance Mode" in the "User's Guide VE".
- For details on model definitions for network devices, refer to "8.2 Network Device Model Definition" in the "Reference Guide (Command) VE".

# Chapter 8 Deciding and Configuring the Storage Environment

This chapter explains how to define and configure the storage environment.

## 8.1 Deciding the Storage Environment

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

### 8.1.1 Storage Configuration

Decide the storage configuration necessary for the system.

The storage configurations supported by Resource Orchestrator are as follow:

Table 8.1 Supported Storage Configurations

Configuration	System Disk	Data Disk(s)
1	SAN storage	SAN storage
2	Local disk (*1)	Local disk (*1), NAS
3	Local disk (*1)	SAN storage
4	iSCSI storage	iSCSI storage (*2)
5 (*)	Local disk (*1)	iSCSI storage
6 (*4)	SAN storage	Local disk

\*1: A local disk refers either to a server's internal disk, or to one stored in a storage blade.

\*2: When using data disks, use the hardware initiator. As there is a chance that data will be damaged, do not perform collection or distribution of a cloning image using a software initiator.

\*3: When using this configuration, use a combination of the settings for the VLAN settings for LAN switch ports connected to the software initiator and the LAN for iSCSI disks. Configure the VLAN settings for LAN switch ports connected to primary servers and iSCSI storage. Do not configure the settings for ports connected to spare servers and servers that are the target of cloning image deployment.

\*4: In configuration 6, the settings can be used in the range excluding use of the backup and restore, server switchover, and cloning functions.

#### Information

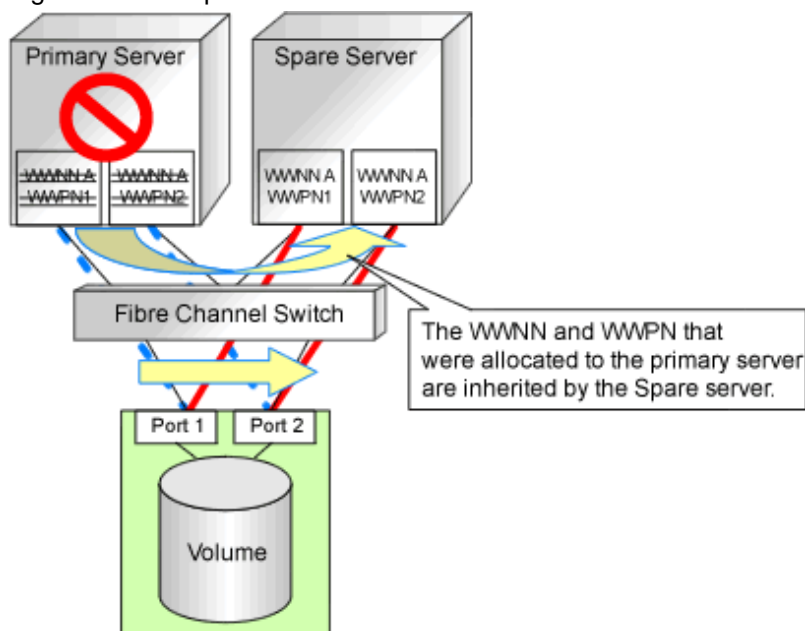
- Configurations 1, 3, and 4 support I/O virtualization.
- SPARC series servers only support server switchover when configuration 1 is used.
- When using HBA address rename, server switchover can only be performed on servers that are connected to a single SAN/iSCSI storage system.  
Resource Orchestrator does not support a server's switchover when it is connected to multiple SAN storage systems.
- When performing server switchover using VIOM or ISM, multiple storage devices can be connected to a single server.  
This is because the storage startup order for BIOS settings can be inherited during server switchover.
- Server switchover using the storage affinity switchover method is possible when a single server is connected with a single SAN storage.  
Resource Orchestrator does not support a server's switchover when it is connected to multiple SAN storage systems.
- A SAN storage system can be used as a shared cluster disk.  
However, a server that is defined in a cluster cannot be switched over.
- Resource Orchestrator supports both single path and multi-path storage connections for SAN/iSCSI.

- When server switchover is performed in configuration 5, the settings to automatically change VLAN settings during server switchover are necessary.
- The following operations are necessary when collecting cloning images in configuration 5.
  - [Windows]  
After completing collection of cloning images, restart the server or mount the iSCSI disks.
  - [Linux]  
Before collecting cloning images, remove the fsck check on OS startup, for the mounting settings of iSCSI disks. Also, after completing collection of cloning images, restart the server or mount the iSCSI disks.
- When deploying cloning images in configuration 5, after completing deployment, change the software initiator settings before configuring VLAN settings of LAN switch ports connected to the LAN for iSCSI disks on the destination server. When there are multiple servers with the same software initiator settings, check if there are any problems in the modified settings, as there is a chance that data may be damaged.

## Functions Provided by Resource Orchestrator

Resource Orchestrator allow spare servers to inherit the WWN of HBA on the primary servers, the MAC address of NICs, and boot and network configurations by utilizing I/O virtualization features that use HBA address rename, VIOM, and ISM functions. As a result, there is no longer any need to reconfigure the storage devices connected to the involved servers. In environments where I/O virtualization cannot be used, the server can be switched, by changing the configurations of the Fibre Channel Switch and storage unit connected to the servers. Note that WWN is a general term for both WWNN and WWPN. WWNN stands for node name and WWPN stands for port name. The following example shows how server switchovers occur.

Figure 8.1 Example of a Server Switchover Based on I/O Virtualization (When WWNs are Switched)



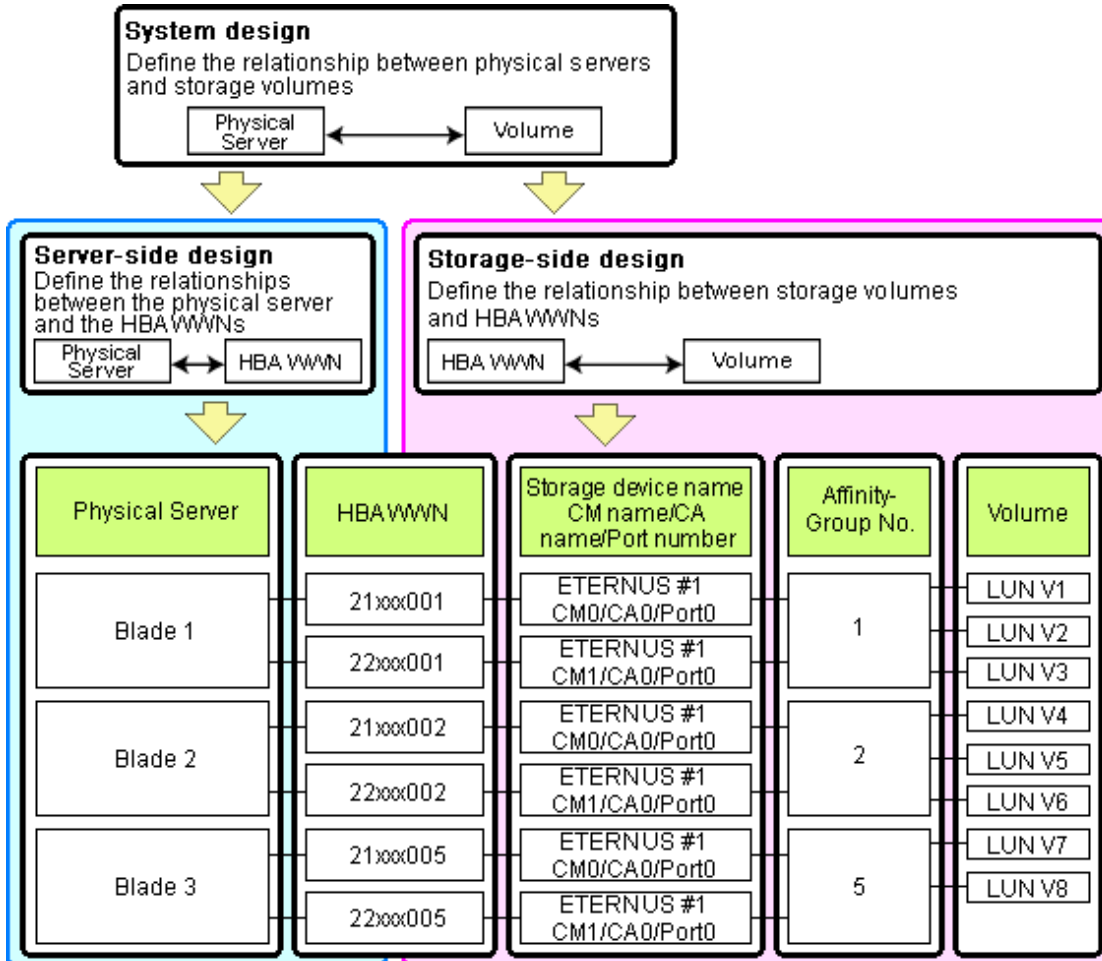
## 8.1.2 HBA and Storage Device Settings

System configuration requires that the relationship between physical servers and HBA WWNs from the perspective of the server, and the relationship between storage volumes and HBA WWNs from the perspective of storage devices be defined clearly. An example where blades connect to storage devices via multiple paths using two HBA ports is shown below. Refer to the storage device manual of each storage device for details.

## Note

- For server switchover using the HBA address rename method, only configurations with two or less HBA ports on the managed server are supported.
- For server switchover using the storage affinity switchover method, only configurations with eight or less HBA ports on the managed server are supported.

Figure 8.2 WWN System Design



## Choosing WWNs

When using HBA address rename, VIOM, or ISM, choose the WWNs to use.

After WWNs have been chosen, associate them with their corresponding operating systems (applications) and physical servers (on the server side), and with the corresponding volumes (on the storage side).

Using HBA address rename, VIOM, or ISM, the storage-side settings can be defined without prior knowledge of the actual WWN values of the HBAs of servers. This makes it possible to design a server and storage system without having the involved physical servers on hand.

When HBA address rename or ISM is used, the values provided by the "I/O virtualization option" are used as the WWN.

When VIOM is used, set either of the following for each WWN value:

- The value provided by the "I/O virtualization option"
- The value selected automatically from the address range at VIOM installation

To prevent data damage by WWN conflict, you are advised to use the value provided by "I/O virtualization option".

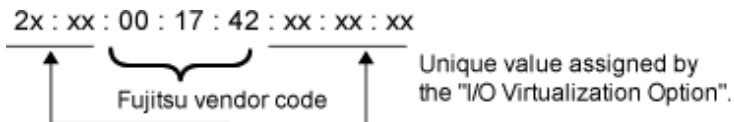
## Information

Specify the unique WWN value provided by the "I/O virtualization option". This can prevent unpredictable conflicts of WWNs.

## Note

Do not use the same WWN among combinations of HBA address rename, VIOM, and ISM. If the same WWN is used, there is a chance data will be damaged.

The WWN format used by HBA address rename, VIOM, and ISM is as follows.



The "2x" part at the start of the provided WWN can define either a WWNN or a WWP. Define and use each of them as follows.

- 20: Use as a WWNN
- 2x: Use as a WWP

With HBA address rename, x will be allocated to the I/O addresses of HBA adapters in descending order. I/O addresses of HBA adapters can be confirmed using the HBA BIOS or other tools provided by HBA vendors.

## Note

With HBA address rename, as WWNs are allocated to the I/O addresses of HBAs in descending order, the order may not match the port order listed in the HBA.

For details, refer to ["C.2 WWN Allocation Order during HBA address rename Configuration"](#).

The WWN chosen here would be used for the system design of the servers and storage.

- Server-side Design

WWNs are used in server-side design by assigning one unique to each server.

- Storage-side Design

One or more volumes are chosen for each server, and the corresponding WWN assigned to each server in the server-side design is configured on the storage-side for those volumes.

## Defining WWN Settings for VIOM/ISM

When using VIOM or ISM, configure that software before configuring the WWN settings. In addition, storage devices should be configured in accordance with the WWN settings that were defined within VIOM or ISM.

When the value provided by the "I/O virtualization option" is used as the WWN, do not configure the address range during installation. (For VIOM)

- WWN Address Range

When creating a VIOM or ISM profile, the "2x" part at the start of the provided WWN can define either a WWNN or a WWP. Define and use each of them as follows:

- 20: Use as a WWNN
- 2x: Use as a WWP

For details on profiles, refer to the manuals of ServerView Virtual-IO Manager or ServerView Infrastructure Manager.

## Example

For a blade server with an HBA with 2 ports, allocation is performed as follows:

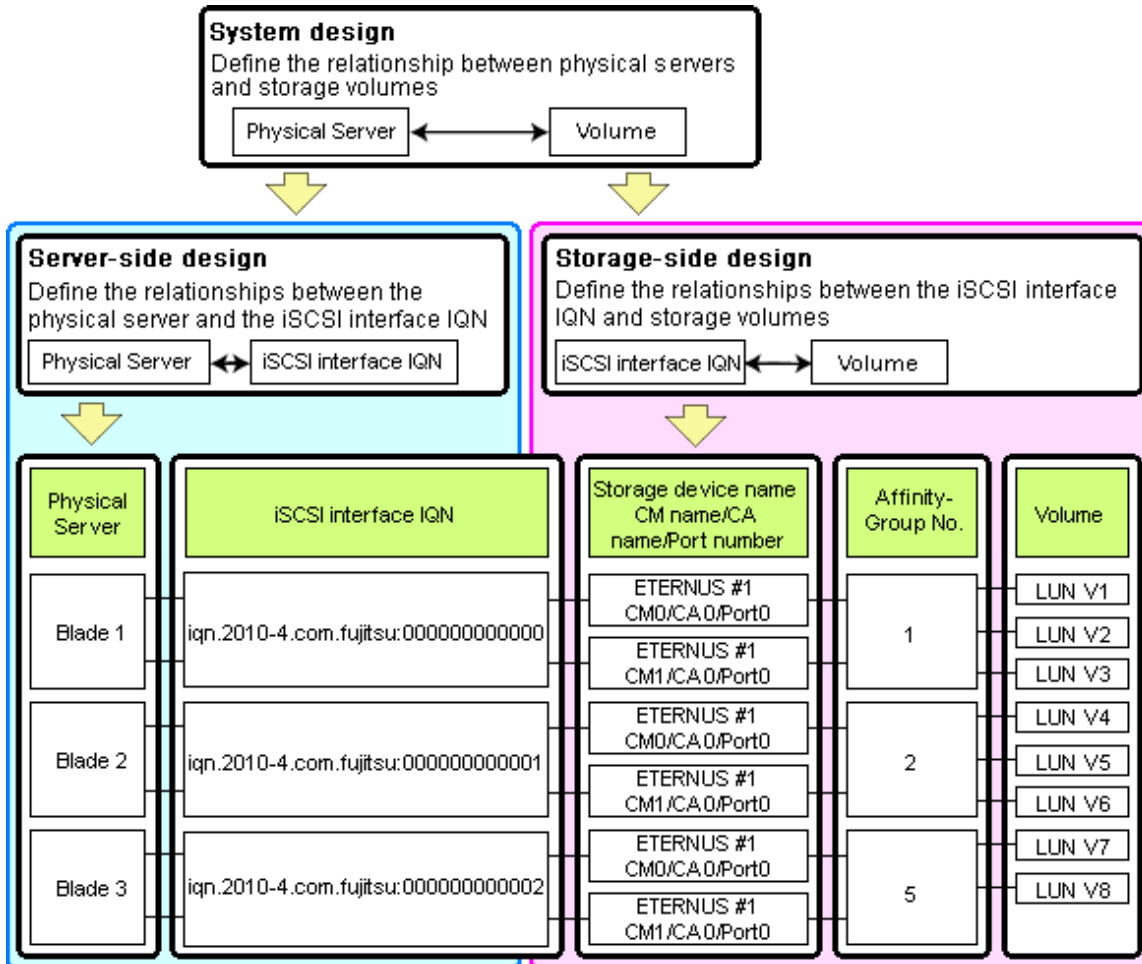
```

WWN value provided by "I/O Virtualization Option" : 20:00:00:17:42:51:00:00
WWNN value for ports 1 and 2 of the HBA          : 20:00:00:17:42:51:00:00
WWPN value for HBA port 1                        : 21:00:00:17:42:51:00:00
WWPN value for HBA port 2                        : 22:00:00:17:42:51:00:00
  
```

### 8.1.3 iSCSI Interface and Storage Device Settings (iSCSI)

System configuration requires that the relationship between physical servers and the IQN of the iSCSI adapter from the perspective of the server, and the relationship between storage volumes and the IQN of iSCSI from the perspective of storage devices, be defined clearly. An example where blades connect to storage devices via multiple paths using two iSCSI interface ports is shown below. Refer to the storage device manual of each storage device for details.

Figure 8.3 IQN System Design



#### Choosing IQNs

Choose the IQNs to use with the iSCSI.

After IQNs have been chosen, associate them with their corresponding operating systems (applications) and physical servers (on the server



side), and with corresponding volume(s) (on the storage side).  
IQNs are made up of the following:

- Type Identifier "iqn."
- Domain Acquisition Date
- Domain Name
- Character String Assigned by Domain Acquirer

IQNs must be unique.

Create a unique IQN by using the server name, or the MAC address provided by the "I/O virtualization option" that is to be allocated to the network interface of the server, as part of the IQN.

If IQNs overlap, there is a chance that data will be damaged when accessed simultaneously.

An example of using the virtual MAC address allocated by the "I/O virtualization option" is given below.



## Example

When the MAC address is 00:00:00:00:00:FF

IQN iqn.2010-04.com.fujitsu:0000000000ff

The IQN chosen here would be used for the system design of the servers and storage.

- Server-side Design

IQNs are used in server-side design by assigning one unique to each server.

- Storage-side Design

One or more volumes are chosen for each server, and the corresponding IQN assigned to each server in the server-side design is configured on the storage-side for those volumes.

## 8.2 Configuring the Storage Environment

---

This section describes how to configure storage devices for Resource Orchestrator.

### Storage Unit Configuration

When using the HBA address rename method, the VIOM server profile switchover method, the ISM profile switchover method, or the storage affinity switchover method, perform configuration of storage in advance.

When using VIOM or ISM, configure storage devices according to the WWN assigned to each server.

SAN storage settings can be configured using storage management software (such as ETERNUSmgr, ETERNUS SF Storage Cruiser or others). For details, refer to the manual of the relevant product.

If storage settings (zoning, LUN masking or any other security setting) were already made for SAN, those settings should be canceled and re-defined using the server-side WWN settings chosen in "[8.1.2 HBA and Storage Device Settings](#)".

#### Setting Up Logical Volumes and Affinity Groups

The logical volumes for storage devices and affinity groups allocated for servers must be configured.

These settings can be configured easily using either storage management software (such as ETERNUSmgr or the Storage Volume Configuration Navigator feature of ETERNUS SF Storage Cruiser).

#### Access Path Settings

When using the HBA address rename method or a profile switchover method, perform configuration in advance.

Access paths between servers and storage devices must be made by applying the WWPN values chosen in "[8.1.2 HBA and Storage Device Settings](#)" to each server HBA. This will allow servers to access storage devices.

To configure storage devices and Fibre Channel switches on SAN, use the appropriate storage management software.

Note that these configurations are best performed using the ETERNUS SF Storage Cruiser's storageadm zone command.

- Using the ETERNUS SF Storage Cruiser's storageadm zone command for SAN settings

After registering the storage for management in the ETERNUS SF Storage Cruiser manager, set up access paths using the "add" parameter of the storageadm zone command, based on the storage-side designs that were chosen in "[8.1.2 HBA and Storage Device Settings](#)".

The WWPN of the target storage device CA port must be specified with the storageadm zone command.

As it is necessary to specify the WWPN of the CA port of the relevant storage, do so using either storage management software (such as ETERNUSmgr) or ETERNUS SF Storage Cruiser after the storage device has been configured.

Refer to the ETERNUS SF Storage Cruiser manual for details on the storageadm zone command, configurable storage devices, and the graphical interface used to check access path settings.

## Note

When using the storage affinity switchover method, the following settings are required.

- For access paths, point-to-point WWPN zoning is required.  
Zoning (or port zoning) is required for configuring access paths.
- For the WWN of HBA of physical servers and the WWPN of storage devices, one-to-one host affinity configuration is required.

# Chapter 9 Deciding and Configuring Server Virtualization Software

This chapter explains how to decide and configure server virtualization software.

## 9.1 Deciding Server Virtualization Software

This section explains how to decide the settings for server virtualization software.

### Select the Server Virtualization Software to Use

Select the server virtualization software.

Resource Orchestrator can perform resource management using the server virtualization software indicated below.

- VMware
- Hyper-V
- Xen
- RHEL-KVM
- Solaris Zones
- OVM for SPARC

### Available Functions by Server Virtualization Software

The functions that can be used differ depending on the server virtualization software.

Table 9.1 Functions Related to VM Hosts

Function	Server Virtualization Products						
	VMware	Hyper-V	Xen		KVM	Solaris Zones (*1)	OVM for SPARC
			Citrix	Red Hat			
Monitoring	Yes	Yes (*2)	Yes	Yes	Yes	Yes	Yes (*3)
Power control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Server switchover, failback, takeover (based on backup and restore)	No (*4, *5)	Yes (*6, *7)	Yes (*8)	Yes	Yes	No	No
Server switchover, failback, and continuity (based on HBA address rename)	Yes	Yes (*6)	Yes (*8)	Yes	Yes	No	No
Server switchover, failback, and continuity (using the VIOM server profile switchover method or the ISM profile switchover method)	Yes	Yes (*6)	Yes	Yes	Yes	No	No
Server switchover, failback, and takeover (based on storage affinity methods)	No	No	No	No	No	Yes (*9)	Yes
Sharing of spare servers between physical OSs and VM guests (based on I/O virtualization) (*10)	Yes	Yes	Yes (*11)	Yes	Yes	No	No
Backup and restore (*12, *13)	No (*4, *5)	Yes (*7)	Yes	Yes	Yes	No	No
Cloning	No	No	No	No	No	No	No

Function	Server Virtualization Products						
	VMware	Hyper-V	Xen		KVM	Solaris Zones (*1)	OVM for SPARC
			Citrix	Red Hat			
VM maintenance mode settings (*14)	Yes	Yes (*15)	Yes (*11)	No	No	No	No
Launch of the VM management console	Yes (*15)	Yes	Yes	No	No	No	No
VM Home Position	Yes (*16, *17)	Yes (*16)	Yes	Yes	Yes	No	No
NetworkViewer	Yes (*18)	Yes	No	No	No	No	No

\*1: When registering the guest domain of OVM for SPARC as a VM host, Solaris Zones configured on the guest domain can be managed as VM hosts.

\*2: Must be set to allow remote management. For details, refer to "9.2.1 Configuration Requirements".

\*3: When a Solaris Zone is configured on a guest domain, a non-global zone operating on the configured Solaris Zone cannot be monitored. The guest domain is displayed as a VM guest.

\*4: Not supported for VMware vSphere 4 or later.

\*5: Not supported for VMware ESXi.

\*6: Do not share the networks of VM hosts and VM guests. For details, refer to "9.2.1 Configuration Requirements".

\*7: Configurations in which VM hosts are in clusters are not supported.

\*8: Only Citrix XenServer 5.5 is supported.

\*9: Server switchover cannot be performed for the guest domain of OVM for SPARC registered as a VM host on Solaris Zones, since the operations are for the VM host on the physical server.

\*10: Spare servers can only be shared between physical OSs and VM guests when using the I/O virtualization switchover method.

\*11: Not available for the pool master when using Citrix XenServer.

\*12: Backup and restoration of VM hosts that are in clusters is not supported.

Backup and restoration can be performed when both of the following conditions are satisfied:

- The target VM host is not in a cluster.

- All VM guests that were operating on the target VM host have been migrated to other VM hosts.

\*13: When backing up a VM host containing VM guests on its own boot disk, behavior differs according to the server virtualization product used. For details, refer to "9.2.2 Functional Differences between Products".

\*14: Only available from the command-line.

\*15: Not supported for VMware vSphere 6.5 or later.

\*16: VM management software (such as System Center Virtual Machine Manager) must be registered.

\*17: A VM guest migrated to somewhere other than the cluster configured in the VM management software cannot be returned to the original status using VM Home Position.

\*18: The network links are only displayed when using the standard switches. When using switches other than the standard switches, such as distributed virtual switches, the network links are not displayed.

Table 9.2 Functions Related to VM Guests

Function	Server Virtualization Products						
	VMware	Hyper-V	Xen		KVM	Solaris Zones (*1)	OVM for SPARC
			Citrix	Red Hat			
Monitoring (*2)	Yes (*3)	Yes	Yes (*3)	Yes (*3, *4)	Yes (*3)	Yes	Yes
Power control (*3)	Yes	Yes	Yes (*5)	Yes (*5)	Yes (*5)	Yes	Yes
Migration between physical servers	Yes (*6, *7)	Yes (*6, *7)	Yes (*7)	Yes (*7)	Yes (*7)	No	No
Launch of the VM management console	Yes (*8)	Yes	Yes	Yes (*9)	No	No	No

\*1: When registering the guest domain of OVM for SPARC as a VM host, Solaris Zones configured on the guest domain can be managed. A non-global zone operating in Solaris Zones can be managed as a VM guest.

\*2: VM guests are automatically detected after VM host registration. The result of further VM guest creation, modification, removal, or migration is also automatically reflected in Resource Orchestrator.

\*3: Depending on the virtualization software used, this function may require specific settings. For details, refer to ["9.2.1 Configuration Requirements"](#).

\*4: When using Red Hat Enterprise Linux 5 Linux Virtualization (Xen-based), powered off VM guests cannot be registered. To register VM guests, they must be powered on first.

\*5: An error may happen when using the high-availability function of server virtualization software. For details, refer to ["9.2.2 Functional Differences between Products"](#).

\*6: VM management software (such as VMware vCenter Server, System Center Virtual Machine Manager) must be registered.

\*7: When migrating VM guests between different storage, perform the migration using VM management software.

\*8: Not supported for VMware vSphere 6.5 or later.

\*9: Not supported with Red Hat Enterprise Linux 5 Linux Virtualization (Xen-based).

The following shows the list of the contents displayed in [Resource Details] when using the server virtualization software as a managed server.

Table 9.3 General Area

Content Displayed	Server Virtualization Products						
	VMware	Hyper-V	Xen		KVM	Solaris Zones	OVM for SPARC
			Citrix	Red Hat			
Server name	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Admin LAN (IP address) (*1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Status	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Type	Yes	Yes	Yes	Yes	Yes	Yes	Yes
OS	Yes	Yes	Yes	Yes (*2)	Yes	Yes	Yes
Physical server name (*1)	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\*1: Not displayed for VM guests.

\*2: Not supported with Red Hat Enterprise Linux 5 Linux Virtualization (Xen-based).

Table 9.4 VM Host Information Area

Content Displayed	Server Virtualization Products						
	VMware	Hyper-V	Xen		KVM	Solaris Zones (*1)	OVM for SPARC
			Citrix	Red Hat			
VM type	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VM software name	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VM software VL	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of VM guests	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VM management software	Yes	No	No	No	No	No	No
VM guests	Yes	Yes	Yes	Yes	Yes	Yes	Yes

\*1: When registering the guest domain of OVM for SPARC as a VM host, Solaris Zones configured on the guest domain can be managed as VM hosts. The contents of Solaris Zones are displayed in the VM host information.

Table 9.5 VM Guest Information Area

Content Displayed	Server Virtualization Products						
	VMware	Hyper-V	Xen		KVM	Solaris Zones (*1)	OVM for SPARC
			Citrix	Red Hat			
VM type	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VM host name	Yes	Yes	No	No	No	Yes	Yes
VM name	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VM management software	Yes	No	No	No	No	No	No

\*1: When registering the guest domain of OVM for SPARC as a VM host, Solaris Zones configured on the guest domain can be managed. The contents of the non-global zone that is operating in Solaris Zones are displayed in the VM guest information.



When registering managed servers to the manager, the password for the administrator privilege user of the managed server is required. Configure the password for the administrator account of managed server in advance.

## 9.2 Configuring Server Virtualization Software

Server virtualization software must be configured appropriately for Resource Orchestrator.

### 9.2.1 Configuration Requirements

This section describes the settings required to properly configure each different server virtualization product for use with Resource Orchestrator.

#### Configuration Requirements for Each Server Virtualization Product

The required configuration differs with each server virtualization product. For details on the configuration of each virtualization product, refer to the manual of each product.

[VMware]

Installation of VMware Tools is required to properly display the host names of guest OSs and enable their remote shutdown via the power control functions of Resource Orchestrator.

Install VMware Tools after installing an operating system in a VM guest.

[Hyper-V]

- Use the following procedure to enable remote management.

1. Enable remote WMI settings.

- a. In each VM host, access the Control Panel and open the [Administrative Tools]-[Computer Management]. The [Computer Management] window is displayed.
- b. Open [Services and Applications], right-click on [WMI Control] and select [Properties] from the displayed menu. The [WMI Control Properties] dialog is displayed.
- c. Open the [Security] tab, select [Root]-[virtualization] and click [Security]. The [Security for ROOT\virtualization] window is displayed.
- d. Select the login user for the VM host, and check [Allow] from [Remote Enable].
- e. Click the [OK] button.

When using Windows Server 2012 R2 or later, the following configuration is also needed.

f. Select the [Security] tab, then [Root]-[virtualization]-[v2] and click [Security].

The [Security for ROOT\virtualization\v2] window is displayed.

g. Select the login user for the VM host, and check the "Allow" check box from "Remote Enable".

h. Click the [OK] button.

The remote WMI settings are enabled.

## 2. Configure the Windows firewall to enable remote WMI management.

a. On each VM host, run the "GPedit.msc" command.

The [Local Group Policy Editor] dialog is displayed.

b. Select the following folder:

[Computer Configuration]-[Administrative Templates]-[Network]-[Network Connections]-[Windows Firewall]

c. If the VM host is a member of a domain, double-click [Domain Profile]; otherwise double-click [Standard Profile].

Either one of the [Domain Profile] or [Standard Profile] screen is displayed.

d. On the displayed window, right-click [Windows Firewall: Allow inbound remote administration exception] and select [Properties] from the displayed menu.

The [Windows Firewall: Allow inbound remote administration exception] dialog is displayed.

e. Select [Enabled] and click the [OK] button.

## 3. Configure DCOM.

a. On each VM host, run the "Dcomcnfg.exe" command.

b. In the [Component Services] dialog, expand [Component Services]-[Computers], right-click [My Computer] and select [Properties] from the displayed menu.

The [My Computer Properties] window is displayed.

c. Select the [COM Security] tab.

d. Click the [Edit Limits] button from [Launch and Activation Permissions].

The [Launch and Activation Permission] window is displayed.

e. Select the VM host's user name under [Groups or user names:], and select the [Allow] checkbox for [Remote Activation] and click the [OK] button.

f. Click the [Edit Limits] button under [Access Permissions].

The [Access Permission] window is displayed.

g. Select [ANONYMOUS LOGON] under [Group or user names], and check the [Allow] checkbox for [Remote Access] and then click the [OK] button.

- Perform configuration so that the networks of VM hosts and VM guests are configured separately.

### 1. Prepare two or more physical NICs.

The physical NIC that the VM host uses for the admin LAN and communication with external servers should only be used for physical servers. Do not configure it for virtual networks.

### 2. Create a virtual network for the VM guests to use for communication.

- For Hyper-V 2.0

Open the Hyper-V Manager, then [Virtual Network Manager] to create the virtual network. Configure the [Allow management operating system to share this network adapter] checkbox as follows: (By default, the checkbox is unselected)

- When using ping monitoring functions of GLS

Check the checkbox.

- When not using ping monitoring functions of GLS

Clear the checkbox.

- For Hyper-V 1.0

On each VM host, access the Control Panel and open the [Network Connections]. Configure external virtual network connections for the VM host that are displayed as [Local Area Connection] as follows:

- When using ping monitoring functions of GLS

Enable all relevant virtual networks.

- When not using ping monitoring functions of GLS

Disable all relevant virtual networks.

### Information

With NIC redundancy using GLS, "warning" is temporarily displayed for the managed server status after server switchover. No action is necessary, since the status returns to "normal" after a while.

- Installation of VMware Tools is required to properly display the host names of guest OSs and enable their remote shutdown via the power control functions of Resource Orchestrator.

Install OSs on VM guests and then install the integration service on those OSs.

[Citrix Xen]

With Citrix XenServer, perform settings to enable remote shutdown of VM guests via the power control functions of Resource Orchestrator.

Install XenServer Tools after installing an operating system in a VM guest.

[Solaris Zones]

Set SSH access permission, and enable password authentication for accounts with administrator privileges.

This setting is required for collecting VM guest information and performing power operations.

When the Logical Domains Manager daemon is enabled, VM hosts can be registered as Solaris Zones by configuring the definition files. For details, refer to "[9.2.3 Definition Files of Each Product](#)".

[OVM for SPARC]

Set SSH access permission, and enable password authentication for accounts with administrator privileges.

This setting is required for collecting VM guest information and performing power operations.

Enabling the Logical Domains Manager daemon, and then configure the definition files for enabling Solaris Zones to register VM hosts based on whether the Logical Domains Manager daemon is enabled or disabled.

For details, refer to "[9.2.3 Definition Files of Each Product](#)".

### Note

When using multiple server virtualization software with the same manager, set differing names for the following on each server virtualization software.

- Port Groups
- Virtual Switches
- Virtual Network
- Virtual Bridges

[VMware]

When configuring a port group, for the name of port groups using the same VLAN ID, it is necessary to use a common name on all VM hosts.

[Hyper-V]

- When configuring a virtual network, it is necessary to use a common name on all VM hosts for the name of virtual networks using the same VLAN ID.
- If a VM host belongs to a domain, ensure that its host name can be properly resolved by the admin server (from the VM host IP address). If host name resolution fails, perform the necessary DNS (or hosts file) settings to enable host name resolution.



[Xen] [Citrix Xen] [KVM]

- When configuring a virtual bridge, it is necessary to use a common name on all VM hosts for the name of virtual bridges using the same VLAN ID.
  - Make sure that each VM host is able to resolve the host name of the admin server from its IP address (on the admin LAN). If host name resolution fails, perform the necessary DNS (or hosts file) settings to enable host name resolution.
  - A resource pool of Citrix XenServer indicates multiple VM hosts grouped using Citrix XenServer. When using a Citrix XenServer resource pool in a Citrix XenServer environment, confirm that a Home server is set for each VM guest. If no Home server is set, Resource Orchestrator is only able to recognize active VM guests.
  - When using a Citrix XenServer resource pool in a Citrix Essentials for XenServer environment, high-availability should be enabled for that resource pool. If high-availability is not enabled, and the pool master becomes unreachable, Resource Orchestrator will not be able to control or get information from the VM hosts and VM guests placed in that Citrix XenServer resource pool. If VM guest statuses become out-of-date, or operations on VM hosts or VM guests fail, check the status of the pool master. If the pool master is not reachable, resolve any communication problem that may prevent the manager from communicating with it (if necessary, change the pool master to another VM host). For details, refer to the manual of server virtualization software.
- 

## Configuration Requirements for System Center Virtual Machine Manager

The following settings are required when registering and using System Center Virtual Machine Manager (hereafter SCVMM) as VM management software.

1. Install Windows PowerShell.

When Windows PowerShell 2.0 or later has not been installed on the admin server, install it.

2. Configure Windows Remote Management settings.

- VM management software

Configure remote administration on VM management software registered with Resource Orchestrator.

- a. Log in to the SCVMM server as the administrator.
- b. Execute the following command from the command prompt.

```
>winrm quickconfig <RETURN>
```

- c. Enter "y", when requested.

- Admin server

Configure Windows Remote Management authentication settings on the admin server.

- a. Log on to the admin server as the administrator.
- b. Execute the following command to record the configuration details for TrustedHosts.

```
>winrm get winrm/config/client <RETURN>
```

Record the displayed details in TrustedHosts.

### Example

When multiple SCVMMs are registered

```
***.***.***.***,***.***.***.***
```

---

When a single asterisk ("\*") is displayed, the following procedure is unnecessary as all hosts will be trusted in the configuration.

- c. Execute the following command.

Enter the result obtained from b. for *Recorded\_content\_in\_b*

```
>winrm set winrm/config/client @{TrustedHosts="Recorded_content_in_b",  
"Additionally_registered_SCVMM_address"} <RETURN>
```

### Example

The command specification when multiple SCVMMs are registered

```
>winrm set winrm/config/client @{TrustedHosts="***.***.***.***, ***.***.***.***,  
Additionally_registered_SCVMM_address"} <RETURN>
```

- d. Execute the following command to check the details for TrustedHosts.

```
>winrm get winrm/config/client <RETURN>
```

If the address of the SCVMM additionally registered has been added to the details recorded in b., there are no problems.

### Note

- When registering multiple SCVMMs in Resource Orchestrator as VM management software, specify the IP addresses for multiple VM management software separated by commas (",") using the command for registering TrustedHosts.
- When communication from the admin server uses Windows remote management (WinRM) and is performed via a proxy server, operations such as registration of resources with Resource Orchestrator will fail. Therefore, perform configuration of Windows remote management (WinRM) on the admin server so that a proxy server is not used.

3. Configure the settings to enable communication with the admin LAN addresses of managed VM hosts.

From the server on which VM management software is operating, configure the settings to enable communication with the admin LAN IP addresses of the managed VM hosts to register in Resource Orchestrator. Even if a multi-homed VM host has multiple IP addresses, it is necessary to enable communication from SCVMM with the interface connected to the admin LAN of the VM host.

## SCVMM Server Web Services for Management Settings

Resource Orchestrator controls SCVMM using PowerShell Web Services for Management (hereinafter WS-Management).

Change the following settings concerned with WS-Management on the SCVMM server.

- MaxShellsPerUser
- MaxMemoryPerShellMB
- MaxConcurrentUsers
- MaxConnections

Change the values of MaxShellsPerUser (the maximum number of processes that can start shell operations for each user) and MaxConcurrentUsers (the maximum number of users who can execute a remote operation from a remote shell at the same time). For Resource Orchestrator, change settings to enable a maximum of 31 sessions.

However, since WS-Management is used for Windows administration tools and Resource Orchestrator, set a value 31 or larger for each value.

Change the MaxShellsPerUser and MaxConcurrentUsers settings using the following procedure:

1. Execute Windows PowerShell as an administrator.
2. Change the current directory using the Set-Location commandlet.

```
PS> Set-Location -Path WSMAN:\localhost\Shell <RETURN>
```

3. Check the current MaxShellsPerUser and MaxConcurrentUsers settings using the Get-ChildItem commandlet.  
The contents displayed in MaxShellsPerUser and MaxConcurrentUsers are the current settings.

```
PS WSMAN:\localhost\Shell> Get-ChildItem <RETURN>
```

### Example

```
PS WSMAN:\localhost\Shell> Get-ChildItem
WSManConfig: Microsoft.WSMan.Management\WSMan::localhost\Shell

Name                               Value                               Type
----                               -
AllowRemoteShellAccess             true                                System.String
IdleTimeout                         180000                             System.String
MaxConcurrentUsers                  5                                  System.String
MaxShellRunTime                    2147483647                          System.String
MaxProcessesPerShell               15                                  System.String
MaxMemoryPerShellMB                150                                 System.String
MaxShellsPerUser                   5                                  System.String
```

4. Configure MaxShellsPerUser and MaxConcurrentUsers using the Set-Item commandlet.

### Example

When setting MaxShellsPerUser and MaxConcurrentUsers as "36"

```
PS WSMAN:\localhost\Shell> Set-Item .\MaxShellsPerUser 36 <RETURN>
PS WSMAN:\localhost\Shell> Set-Item .\MaxConcurrentUsers 36 <RETURN>
```

Next, change the MaxMemoryPerShellMB setting.  
For Resource Orchestrator, change the setting to over 1024 MB.

Change the MaxMemoryPerShellMB setting using the following procedure:

1. Check the current MaxMemoryPerShellMB setting using the Get-ChildItem commandlet.  
The content displayed in MaxMemoryPerShellMB is the current setting.

```
PS WSMAN:\localhost\Shell> Get-ChildItem <RETURN>
```

2. Configure MaxShellsPerUser using the Set-Item commandlet.

### Example

When setting MaxMemoryPerShellMB as "1024"

```
PS WSMAN:\localhost\Shell> Set-Item .\MaxMemoryPerShellMB 1024 <RETURN>
```

Finally, change the MaxConnections setting. In Resource Orchestrator, the maximum number of sessions is 31, so change the setting. Since WS-Management is used for Windows administration tools and Resource Orchestrator, set a value of 32 or larger.

Change the MaxConnections setting using the following procedure:

1. Change the current directory using the Set-Location commandlet.

```
PS> Set-Location -Path WSMAN:\localhost\Service <RETURN>
```

2. Check the current MaxConnections setting using the Get-ChildItem commandlet.

The content displayed in MaxConnections is the current setting.

```
PS WSMAN:\localhost\Service> Get-ChildItem <RETURN>
```

3. Configure MaxConnections using the Set-Item commandlet.

### Example

When setting MaxConnections as "46"

```
PS WSMAN:\localhost\Shell> Set-Item .\MaxConnections 46 <RETURN>
```

## Configuration Requirements for VM Guest Switchovers

Depending on the virtualization product being used, the following settings should be made to enable switchover of a newly created VM guest.

[VMware]

The VM guest's UUID must be changed.

Perform the following settings before switchover of a VM guest.

From the VM management client, add the following parameter to the VM guest's virtual machine configuration.

Name	Value
uuid.action	keep

For details on how to add parameters to a virtual machine configuration, refer to the help section of the VM management client.

Without this setting, a confirmation dialog is shown each time a virtual machine is started after being moved to a different VM host. Enabling this setting will prevent such confirmation dialogs from being shown, and the virtual machine will be set to always keep its UUID when moved between different servers.

[Hyper-V]

No specific configuration is required.

[Xen] [Citrix Xen] [KVM]

No specific configuration is required.

[OVM for SPARC]

VCPU and memory settings are required. For details, refer to the manual of basic software.

## Starting VM Management Software Clients

[VMware]

VMware Infrastructure Client or VMware vSphere Client should be installed on the Resource Orchestrator admin client.

## Note

From VMware vSphere 6.5, all installable client software has been removed. For this reason, starting of VM management software clients is not supported.

Use VMware Host Client or VMware vSphere Web Client instead.

[Hyper-V]

Hyper-V Manager or a VMM Administrator Console (\*) should be installed on the Resource Orchestrator admin client.

\* Note: When System Center Virtual Machine Manager (SCVMM) is registered, this VMM Administrator Console is used to control the VM hosts managed by SCVMM.

[Citrix Xen]

When using Citrix XenServer, XenCenter should be installed on the Resource Orchestrator admin client.

## Configuring for Receiving SNMP Traps from VM Management Software (VMware vCenter Server)

Configure the following settings when receiving SNMP traps from VM management software (VMware vCenter Server).

### - SNMP trap destination configuration

Configure the IP address of the admin server as the SNMP trap destination on VM management software (VMware vCenter Server). For details on the configuration method, refer to the VM management software (VMware vCenter Server) manual.

### - VM management software (VMware vCenter Server) alarm creation

Create an alarm for VM management software (VMware vCenter Server), and configure the conditions to send SNMP traps. For details on the configuration method, refer to the VM management software (VMware vCenter Server) manual.

### - VM management software (VMware vCenter Server) registration

Register VM management software (VMware vCenter Server) on the admin server. At this point, register the SNMP trap source IP address of the VM management software (VMware vCenter Server).

The SNMP trap source IP address can be checked and changed using the following procedure.

1. Log in to the VM management software (VMware vCenter Server) server.
2. Access the Control Panel and open the "Network Connections".  
The [Network Connections] window is displayed.
3. From the menu, select [Advanced]-[Advanced Settings].  
The [Advanced Settings] window is displayed. The IP address in [Connections] on the [Adapters and Bindings] tab that has the highest priority and is allocated to an enabled network interface is the current SNMP trap source IP address.
4. To change the SNMP trap source IP address, select the network interface with the IP address you want to change from [Connections], and move it to the top of the list.
5. Click the [OK] button.
6. Restart the server if necessary.

## Note

- The traps received from VM management software (VMware vCenter Server) are always displayed as warning level for Resource Orchestrator. Therefore, configure an alarm for VM management software (VMware vCenter Server) in order to send SNMP traps when an event with a level higher than warning occurs.

- When the language of the VM management software (VMware vCenter Server) and the manager are different, received SNMP trap messages may turn into garbled characters.

- When using VMware vSphere 6.7, SNMP traps for hardware health alarms may not be sent from the VM management software (VMware vCenter Server).

As this may be caused by a known issue of VMware, take corrective action referring to the release notes of vCenter Server.

## 9.2.2 Functional Differences between Products

---

This section describes the functional differences of each server virtualization product when used with Resource Orchestrator.

### Display of VM Guest Names

The names of VM guests displayed in Resource Orchestrator vary according to the server virtualization product used.

[VMware]

The ROR console displays either a VM guest's VM name (as defined within VMware), or the hostname of its guest OS.

The guest OS hostname is displayed only after VMware Tools have been installed and the VM guest has been restarted once. The following conditions illustrate this behavior.

- VMware Tools were not installed yet: the *VM name* is displayed
- VMware Tools were installed, but the VM guest was not restarted yet: the *VM name* is displayed
- VMware Tools were installed, and the VM guest restarted: the *hostname of the guest OS* is displayed

If symbols were used in the VM name, those may be shown as percent signs ("%") or a pair of hexadecimal characters (example: "%5c"). Such behavior is similar to that of some parts of VMware's management console.

[Hyper-V]

The ROR console displays either a VM guest's VM name (as defined within Hyper-V), or the hostname of its guest OS.

The guest OS hostname is displayed after the VM guest has been started up at least once.

[Xen] [Citrix Xen]

The ROR console displays the Xen VM names obtained at the time of VM host registration.

Once a VM guest is registered, VM name changes made from the Xen admin client will not be reflected in the ROR console.

[KVM]

The VM guest name displayed in the ROR console is the VM name specified during VM creation.

[Solaris Zones]

The VM guest names displayed on the ROR console are the Solaris zone names set when creating Solaris zones.

[OVM for SPARC]

The VM guest names displayed on the ROR console are the guest domain names.

### Power Control of VM Guests

[Xen] [Citrix Xen] [KVM]

- When using Citrix XenServer in a high-availability configuration, VM guests cannot be shut down if the automatic reboot option (for VM guests) is enabled.  
For details, refer to the manual of server virtualization software.
- When using Red Hat Enterprise Linux 5 Virtualization (Xen-based), Resource Orchestrator cannot perform power operations on suspended VM guests. Suspended VM guests should first be resumed directly from the VM host console.

[OVM for SPARC]

When starting the OS when starting a VM guest, specify "true" for the auto-boot? variable of the guest domain.

When the function is not supported by OVM for SPARC, stopping and rebooting of the VM guest cannot be performed.

Based on the virtual machine status, either directly operate the virtual machine, or perform a forced stop or forced reboot.

When executing power control of VM guests in Resource Orchestrator, binding/unbinding of resources is also executed.

- When starting a VM guest  
Binding of resources is executed
- When stopping a VM guest  
Unbinding of resources is executed

- When restarting a VM guest  
Binding/unbinding of resources is not executed

## VM Guest Statuses [Solaris Zones]

The Solaris zone from before installation of the OS is not displayed as the VM guest.

## High-Availability Features of Each Product

Each server virtualization product provides its own high-availability feature. For details about such features, refer to the manual of each product.

Table 9.6 High-availability Features of Each Product

Server Virtualization Products	High-availability Feature
VMware	VMware HA
Hyper-V	Failover clustering
Xen/KVM	HA
Solaris Zones/OVM for SPARC	None

## Sharing of Spare Servers between Physical Servers and VM Guests

Resource Orchestrator allows sharing of spare servers between physical servers and VM guests by combining its own spare server functionality with the high-availability features available in each server virtualization product. This can be done using the following procedure.

- Choose a VM host that is not running any VM guest, and set it as a VM guest recovery server using the high-availability feature of the virtualization product used
- In Resource Orchestrator, set the server chosen in a as the spare server of other physical servers

Refer to "[9.1 Deciding Server Virtualization Software](#)" for details on which server virtualization product can be used to share a common spare server with Resource Orchestrator.

## Backup and Restore of VM Hosts when VM Guests are Stored on their Boot Disk

Depending on the virtualization product used, the behavior of backup and restore functions differs whether or not VM guests are stored on the VM host's boot disk.

[VMware]

VM guests are not included in the VM host's backup and restore.

[Hyper-V]

VM guests are included in the VM host's backup and restore. However, only the data stored on the VM host's boot disk is subject to backup and restore.

[Xen] [Citrix Xen] [KVM]

VM guests are included in the VM host's backup and restore. However, only the data stored on the VM host's boot disk is subject to backup and restore.

[Solaris Zones] [OVM for SPARC]

Not supported.

Table 9.7 Backup and Restore Behavior for Each Virtualization Product

Disk	Partition	Backup and Restore Target					
		VMware	Hyper-V	Xen	KVM	Solaris Zones	OVM for SPARC
First disk	VM host	Yes	Yes	Yes	Yes	No	No
	swap	No (*1)	-	No (*1)	No (*1)	No	No
	VM guest	No (*2)	Yes	Yes	Yes	No	No
	Data	Yes	Yes	Yes	Yes	No	No
Second disk	VM guest	No	No	No	No	No	No
	Data	No	No	No	No	No	No

\*1: During backup, data cannot be collected from the swap area. During restoration, the partition settings of the swap area are restored.

\*2: VMFS partitions are not subject to backup and restore.

### VM Guest Migration

For VMware or Hyper-V environments, VMware vCenter Server or System Center Virtual Machine Manager should be registered as VM management software to enable VM guest migrations.

Depending on the server virtualization software used, the following remarks apply. For details, refer to the manual of server virtualization software.

[VMware]

The source and destination VM hosts should be registered as part of the same cluster on the VM management software.

For details on clusters on VM management software, refer to the server virtualization software manual.

[Hyper-V]

The source and destination VM hosts should be part of the same Windows failover cluster.

For details on failover clusters, refer to the Windows operating system manual.

[Citrix Xen]

With Citrix XenServer, a migrated VM guest may be temporarily suspended before migration. Refer to the Citrix XenServer manual for details on the migration process for VM guests and the conditions behind this behavior.

[KVM]

When cold migration is specified for migration from the powered on status, the migration may fail.

Turn off the power, perform migration, and then wait for a while before turning on the power.

To perform migration in Resource Orchestrator, it is necessary to specify "lun" for the disk device in the XML configuration file of the device.

Configure the XML configuration file of the VM guest as below.

```
<devices>
...
<disk type='block' device='lun'>
...
</disk>
...
</devices>
```

For details on how to edit the XML configuration file, refer to the manual of the server virtualization software.

The terminology used to describe different types of VM guest migration may differ depending on each virtualization vendor. For unification purposes, Resource Orchestrator uses the following terminology.



Table 9.8 Migration Terminology

Resource Orchestrator Terminology	VMware Terminology	Meaning
Live migration	VMotion	Migration of an active virtual machine (without interruption)
Cold migration	Cold migration	Migration of a powered off virtual machine

### VM Guest Statuses

Displayed VM guest statuses may differ depending on the configuration of its server virtualization environment.

[VMware]

- If no VM management software was registered in Resource Orchestrator  
VM guest statuses can be one of the following: "normal", "unknown", or "stop".
- If VM management software was registered in Resource Orchestrator  
VM guest statuses can be one of the following: "normal", "warning", "error", "unknown", or "stop".

[Hyper-V]

- If no VM management software was registered in Resource Orchestrator  
VM guest statuses can be one of the following: "normal", "unknown", or "stop".
- If VM management software was registered in Resource Orchestrator  
VM guest statuses can be one of the following: "normal", "stop", "unknown", or "error".

[Xen] [Citrix Xen] [KVM]

VM guest statuses can be one of the following: "normal", "stop", "unknown", or "error".

[Solaris Zones]

VM guest statuses can be one of the following: "normal", "unknown", or "stop".

[OVM for SPARC]

VM guest statuses can be one of the following: "normal", "stop", "unknown", or "error".

### VM Maintenance Mode

The terminology used to describe VM maintenance mode may differ depending on each virtualization vendor. For details on VM maintenance mode settings and their requirements, refer to the manual of each product.

Table 9.9 VM Maintenance Mode Terminology

Server Virtualization Products	Vendor Terminology
VMware	Maintenance mode
Hyper-V	Maintenance mode (*1)
Xen	Maintenance mode (*2)
Solaris Zones/OVM for SPARC	None

\*1: Only available with System Center Virtual Machine Manager (SCVMM). Maintenance mode for Hyper-V is made available in Resource Orchestrator by integrating directly with SCVMM.

\*2: Only available with Citrix XenServer. Red Hat Enterprise Linux 5 Virtualization (Xen-based) does not provide similar functionality. Moreover, the following restrictions may apply depending on the server virtualization product used.

[VMware]

When a VM host is set to VM maintenance mode, VM guests on the VM host will migrate automatically.

To set a VM host to VM maintenance mode without migrating the VM guests, perform the setting from a VMware vCenter Server.

The behavior after setting will depend on the VM guest's status as shown below.

Table 9.10 VM Maintenance Mode Behavior

	vSphere DRS Enabled	vSphere DRS Disabled
There are powered on VM guests	VM guests migrate and the VM host will be set to maintenance mode.	VM guests do not migrate and setting of the VM host maintenance mode will fail.
There are no powered on VM guests	VM guests migrate and the VM host will be set to maintenance mode.	VM guests migrate and the VM host will be set to maintenance mode.

[Hyper-V]

Target VM hosts should be registered in SCVMM and SCVMM in turn properly registered in Resource Orchestrator.

[Citrix Xen]

With Citrix XenServer, a VM host assigned as a pool master cannot be put into maintenance mode.

To put such a VM host into VM maintenance mode, the pool master role should first be assigned to a different VM host (within the same Citrix XenServer resource pool).

## Migration Conflicts

VM guest migration may fail if another migration was already launched from outside (\*) or Resource Orchestrator. In this case, the operation of Resource Orchestrator has failed but the operation of the coordinated server virtualization software may have been completed successfully. As the server virtualization software status is reflected onto Resource Orchestrator when periodical update is performed, check the status after a while and take corrective action.

When using the ROR console, select [Operation]-[Update] from the ROR console menu to refresh the screen and check that the VM guest is not already being migrated.

[Citrix Xen]

With Citrix XenServer, "Home server" should be set for VM guests running on the VM hosts registered in the Citrix XenServer resource pool. Otherwise, powered off VM guests will no longer be recognized by Resource Orchestrator. If a VM guest is no longer displayed in the ROR console after a screen update, confirm that "Home server" is set.

\* Note: This may happen when using an automatic migration feature within the server virtualization software, or when a migration was run directly from a VM management console. Refer to the virtualization software manual for details on automatic migration features.

## Notes on Citrix XenServer Resource Pool Usage [Citrix Xen]

When using a Citrix XenServer resource pool in a Citrix XenServer environment, if the pool master becomes inaccessible from the Resource Orchestrator manager, the statuses of VM hosts and VM guests belonging to that Citrix XenServer resource pool will change to "unknown", and the affected VM guests will no longer be manageable from Resource Orchestrator. In such cases, check the status of the pool master, and resolve any communication problem that may prevent the manager from communicating with it (if necessary, change the pool master to another VM host that is accessible from the manager). If the pool master is not reachable, resolve any communication problem that may prevent the manager from communicating with it (if necessary, change the pool master to another VM host).

When using Citrix XenServer in a high-availability configuration, the pool master is automatically changed to another VM host if it becomes unreachable. As a result, VM guests can then be controlled normally from Resource Orchestrator.

For details on the Citrix XenServer resource pool and high availability configurations, refer to the Citrix XenServer manual.

## Regarding VM Host Names when VM Management Software Has Been Registered

This section explains the names of the VM hosts displayed in Resource Orchestrator when VM management software has been registered, based on the server virtualization product used.

When VM management software has been registered, the host names displayed in the ROR console will be the names of the VM hosts acquired from VM management software.

[VMware]

The VM host names that are recognized for vCenter Server are the host names displayed when connecting to vCenter Server using vSphere Client or vSphere Web Client.

[Hyper-V]

The VM host names that are recognized for SCVMM are the host names shown when displaying hosts in the SCVMM administrator console.

## 9.2.3 Definition Files of Each Product

---

This section describes the different definition files for server virtualization software, when configuring server virtualization software as managed servers.

### Definition Files for Enabling Solaris Zones [Solaris Zones] [OVM for SPARC]

Define if registering VM hosts as Solaris Zones regardless of whether the Logical Domains Manager daemon is enabled or disabled. These definitions are used for registering agents of VM hosts. The types of already registered VM hosts are not affected.

Storage Location of the Definition File

[Windows Manager]

*Installation\_folder*\SVROR\Manager\etc\customize\_data

[Linux Manager]

/etc/opt/FJSVrcvmr/customize\_data



#### Information

---

In the storage location above, the sample definition file (sparc\_vm.rcxprop.sample) is stored. When using the sample as the definition file, delete the ".sample" included in the file name.

---

Definition File Name

sparc\_vm.rcxprop

Character Code

UTF-8

Line Break Code

[Windows Manager]

CR/LF

[Linux Manager]

LF

Definition File Format

In the definition file, an item to define is entered on each line. Enter each line in the following format.

<i>Key = Value</i>
--------------------

Definition File Items

One of the following items can be specified.

Key	Description
ALWAYS_ZONE	Specify if registering VM hosts as Solaris Zones regardless of whether the Logical Domains Manager daemon is enabled or disabled.

Key	Description
	<ul style="list-style-type: none"> <li>- If "true" is specified Registers VM hosts as Solaris Zones regardless of whether the Logical Domains Manager daemon is enabled or disabled.</li> <li>- If "false" is specified Registers VM hosts based on whether the Logical Domains Manager daemon is enabled or disabled.</li> </ul>

### Example

When registering VM hosts as Solaris Zones regardless of whether the Logical Domains Manager daemon is enabled or disabled

```
ALWAYS_ZONE=true
```

### Note

- When more than two lines are written, the configurations described in the last line are valid.
- Blank spaces and tabs directly before and after an equal sign ("=") are ignored.
- Describe the definitions carefully, as entry is case-sensitive.
- If you edit and save a UTF-8 text file using Windows Notepad, the Byte Order Mark (BOM) is stored in the first three bytes of the file, and the information specified on the first line of the file will not be analyzed correctly. When using Notepad, specify the information from the second line.
- The definition file configurations are reflected without restarting the manager in Resource Orchestrator.

## Definition Files for Saving of VM Guest Configurations [OVM for SPARC]

Define whether to automatically save VM guest configurations when there is a change made to VM guest configurations. This definition is applied to all VM hosts.

The target operation is as follows:

- When the following operations are performed from Resource Orchestrator
  - Power control of VM guests (ON/OFF/OFF(Forced)/Reboot/Reboot(Forced))
- When the following operations are performed from the control domain
  - Creation/deletion of guest domains
  - Binding/unbinding of resources
  - Starting/stopping of guest domains
  - Modification of VCPU numbers and memory sizes of guest domains
  - Adding/removal of Virtual disks to guest domains
  - Migration of guest domains

### Storage Location of the Definition File

[Windows Manager]  
*Installation\_folder*\SVROR\Manager\etc\customize\_data

[Linux Manager]  
 /etc/opt/FJSVrcvmr/customize\_data

## Information

In the storage location above, the sample definition file (sparc\_vm.rcxprop.sample) is stored.  
When using the sample as the definition file, delete the ".sample" included in the file name.

### Definition File Name

sparc\_vm.rcxprop

### Character Code

UTF-8

### Line Break Code

[Windows Manager]

CR/LF

[Linux Manager]

LF

### Definition File Format

In the definition file, an item to define is entered on each line. Enter each line in the following format.

```
Key = Value
```

When adding comments, start the line with a number sign ("#").

### Definition File Items

One of the following items can be specified.

Key	Description
OVM_AUTO_SAVE_CONFIG	Specify whether to save VM guest configurations. <ul style="list-style-type: none"><li>- If "true" is specified VM guest configurations are automatically saved.</li><li>- If "false" is specified VM guest configurations are not automatically saved.</li></ul>

## Example

When saving VM guest configurations

```
OVM_AUTO_SAVE_CONFIG=true
```

## Note

- When more than two lines are written, the configurations described in the last line are valid.
- Blank spaces and tabs directly before and after an equal sign ("=") are ignored.
- Describe the definitions carefully, as entry is case-sensitive.
- Under the following conditions, operation becomes the same as when "true" is specified.
  - When a definition is omitted
  - When value other than "true" and "false" is specified

- If you edit and save a UTF-8 text file using Windows Notepad, the Byte Order Mark (BOM) is stored in the first three bytes of the file, and the information specified on the first line of the file will not be analyzed correctly. When using Notepad, specify the information from the second line.
  - The definition file configurations are reflected without restarting the manager in Resource Orchestrator.
-

# Chapter 10 Configuring Single Sign-On

This chapter explains the function to perform Single Sign-On in coordination with ServerView Operations Manager.

## External Software

Resource Orchestrator can be coordinated with ServerView Operations Manager V5.0 or later and Single Sign-On.

## Function Overview

Single Sign-On coordination makes the following operations possible:

- When logged in to ServerView Operations Manager using Single Sign-On  
Login to Resource Orchestrator is possible without entering the user ID and password.
- When logged in to Resource Orchestrator using Single Sign-On  
Login to ServerView Operations Manager is possible without entering the user ID and password.



### Note

- In order to use Single Sign-On, Resource Orchestrator and ServerView Operations Manager must be installed on the same server.
- It is not possible to use this function when executing cluster operations.

The procedure differs depending on whether you are configuring Single Sign-On during or after installation.

## When Configuring Single Sign-On during Installation

1. Decide the Directory Service to Use  
Refer to "[10.1 Deciding the Directory Service to Use](#)".
2. Set up ServerView Operations Manager and the Directory Service Environment  
For details, refer to "[10.2 Setting Up ServerView Operations Manager and the Directory Service Environment](#)".
3. Register Administrators  
For details, refer to "[10.3 Registering Administrators](#)".

## When Configuring Single Sign-On after Installation

1. Decide the Directory Service to Use  
Refer to "[10.1 Deciding the Directory Service to Use](#)".
2. Set up ServerView Operations Manager and the Directory Service Environment  
For details, refer to "[10.2 Setting Up ServerView Operations Manager and the Directory Service Environment](#)".
3. Register User Information  
Register a user to the directory service.  
For details on the user registration method, refer to the example in "[10.3 Registering Administrators](#)".
4. Stop the Manager
5. Register the Directory Service  
Execute the `rcxadm authctl sync` command and configure the connection information for the directory service.

For details on the `rcxadm authctl sync` command, refer to "5.3 `rcxadm authctl`" in the "Reference Guide (Command) VE".

## 6. Register Certificates

For details, refer to "13.1.1.2 Registering Certificates" in the "Operation Guide VE".

## 7. Start the Manager

If you cannot log in to the ROR console, configuration of the environment may have failed.

For details, refer to "13.1 When Configuring Single Sign-On" in the "Operation Guide VE".

# 10.1 Deciding the Directory Service to Use

---

Decide the directory service to use with the ServerView Operations Manager function. The directory services which can be used in Resource Orchestrator use the ServerView Operations Manager settings.

- Directory Services Provided with ServerView Operations Manager
- Active Directory

When already using Active Directory for user management of another system, it can be used instead of the directory service provided with ServerView Operations Manager.



After deployment of Resource Orchestrator, only the password of the directory server's administrator can be changed.

# 10.2 Setting Up ServerView Operations Manager and the Directory Service Environment

---

Set up ServerView Operations Manager and the Directory Service Environment.

The following settings can be made for coordination of Resource Orchestrator and a directory service.

- [To Use a User already Registered with Active Directory as a Resource Orchestrator User](#)
- [Single Sign-On When Using the ServerView Operations Manager Console](#)
- [When Installing ServerView Operations Manager Again](#)



Do not modify the LDAP port number of the directory service.

## 10.2.1 To Use a User already Registered with Active Directory as a Resource Orchestrator User

---

When installing ServerView Operations Manager, specify the following items related to the directory service.

- Select Directory Server

Select "Other directory server".

When using SVOM 7.11 or later, additionally select [Authorization on other directory server].

- Directory Service Settings

- Host

The fully-qualified name of the server on which Active Directory is running.



- Port

The port number used for access to Active Directory. Specify the port number for SSL communication.

- SSL

Select "Yes".

- SVS Base DN

Set the highest level of the Active Directory tree.

Example

DC=fujitsu,DC=com

- User Search Base

The starting point for the user search in Active Directory.

Example

CN=Users,DC=fujitsu,DC=com

- User Search Filter

The filter for user searches.

Specify the sAMAccountName attribute or cn attribute. Specify the same value as the value of the attribute specified for the User Search Filter as the value of the User ID of all the users of Resource Orchestrator.

Example

sAMAccountName=%u

- User

Specify a user account with write privileges for Active Directory.

Example

CN=Administrator,CN=Users,DC=fujitsu,DC=com

- Password / Confirm password

Specify the password of the user who specified it as the "User".

For more details, refer to the following manual.

- "Menu-Driven Installation of the Operations Manager Software" in the "ServerView Suite ServerView Operations Manager Installation Guide"

For details on how to change the directory service of ServerView Operations Manager, refer to the following manual.

- "Configuring directory service access" in "ServerView Suite User Management in ServerView"

## 10.2.2 Single Sign-On When Using the ServerView Operations Manager Console

---

In the "Resource" tab of the ROR console, you can open the screen of ServerView Operations Manager using the function to open the server management screen. This section explains how to set up Single Sign-on. You can use it access the server management screen of ServerView Operations Manager without being prompted to log in.

Assign roles to users on ServerView Operations Manager.

Assign roles to users in the following procedure.

When Using Directory Services Provided with ServerView Operations Manager

- **ServerView Operations Manager V5.5 or later**

1. Start the "User Management Wizard" of ServerView Operations Manager.

2. Add the user who will coordinate Resource Orchestrator and Single Sign-On, and assign them a suitable role.
3. Log in to the ROR console as a user with administrative privileges.
4. Register the user registered in step 2 on the ROR console.

For details on the "User Management Wizard", refer to the following manual.

- "Configuring directory service access" and "ServerView user management with OpenDS" in "ServerView Suite User Management in ServerView"

**- ServerView Operations Manager V5.5 of earlier**

1. Create an ldif file.

An example of how to assign the Administrator role to the "roruser" user account is indicated below.

```
dn: cn=roruser,ou=Users,dc=example,dc=local
changetype: add
objectclass: inetOrgPerson
cn: roruser
sn: roruser
uid: roruser
userPassword: mypassword

dn: cn=Administrator,OU=AuthorizationRoles,OU=CMS,OU=Departments,OU=SVS,dc=fujitsu,dc=com
changetype: modify
add: member
member: cn=roruser,ou=users,dc=fujitsu,dc=com

dn:
cn=Administrator,OU=AuthorizationRoles,OU=DEFAULT,OU=Departments,OU=SVS,dc=fujitsu,dc=com
changetype: modify
add: member
member: cn=roruser,ou=users,dc=fujitsu,dc=com
```

2. Specify the ldif file created in step 1 and execute the ldapmodify command of the directory service.

Before executing the ldapmodify command of the directory service, set the installation directory of the Java Runtime Environment (JRE) for the environment variable JAVA\_HOME. An execution example is shown below.

[Windows]

```
>"C:\Program Files (x86)\Fujitsu\ServerView Suite\Directory service\bat\ldapmodify.bat" -p 1473 -f user.ldif
-D "cn=Directory Manager" -w admin -c <RETURN>
```

[Linux]

```
# /opt/fujitsu/ServerViewSuite/Directory service/bin/ldapmodify -p 1473 -f user.ldif -D "cn=Directory
Manager" -w admin -c <RETURN>
```

The meanings of the options of the ldapmodify command are as follow.

- p: the port number when not using SSL communication for the directory service (the default value is 1473).
- f: the ldif file
- D: the directory service administrator DN("cn=Directory Manager")
- w: the password of the directory service administrator DN.

3. Log in to the ROR console as a user with administrative privileges.
4. Register the user registered in step 2 on the ROR console.

**When Using Active Directory**

Refer to the following manual.

- "Integrating ServerView user management into Microsoft Active Directory" of the "ServerView Suite User Management in ServerView"

## 10.2.3 When Installing ServerView Operations Manager Again

It is necessary to perform the following operations, when installing ServerView Operations Manager again or performing an upgrade installation.

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

- Backup and restoration of user information in the directory service  
(When using the directory service provided with ServerView Operations Manager)

Back up the user information of the directory service, before uninstalling ServerView Operations Manager.  
Restore the user information in the directory service after installing ServerView Operations Manager again.  
For details on the backup and restoration of the directory service, refer to the ServerView Operations Manager manual.

- Registering CA Certificates of ServerView Operations Manager

The CA certificate of ServerView Operations Manager will be created again.

Refer to "13.1.1.2 Registering Certificates" in the "Operation Guide VE" and register the certificate in Resource Orchestrator.

## 10.3 Registering Administrators

Register an administrator user (privileged user) to be specified when installing Resource Orchestrator with the directory service.

Use the following object classes.

Table 10.1 Object Class

Directory Service	Object Class	Attribute Used for the Login User ID
Directory Services Provided with ServerView Operations Manager	inetOrgPerson	uid or cn
Active Directory	user	sAMAccountName or cn (*)

\* Note: Specify these either as the User Search Filter in the Directory Service Settings of ServerView Operations Manager. Specify the same value as the value of the attribute specified as the User Search Filter as the value of the User ID of all the users including the privileged user (an administrator) of Resource Orchestrator.

When using the directory service provided with ServerView Operations Manager, the user ID (uid attribute) must be unique in the directory service.

When using the directory service provided with ServerView Operations Manager, a predefined user exists when installing ServerView Operations Manager.

When using the predefined "Administrator"(ServerView Administrator) as an administrator user in Resource Orchestrator, the following procedure is unnecessary.

For details on predefined user information, refer to the following ServerView Operations Manager manual.

- "Configuring directory service access" and "ServerView user management with OpenDS" in "ServerView Suite User Management in ServerView"

An example of how to register a privileged user of Resource Orchestrator in the directory service provided with ServerView Operations Manager is indicated below.

- **ServerView Operations Manager V5.5 or later**

1. Start the "User Management Wizard" of ServerView Operations Manager.
2. Add an administrator user. Allocate the appropriate role of ServerView Operations Manager.

For details on the "User Management Wizard", refer to the following manual.

- "Configuring directory service access" and "ServerView user management with OpenDS" in "ServerView Suite User Management in ServerView"

**- ServerView Operations Manager V5.5 or earlier**

1. Add an administrator user. Allocate the appropriate role of ServerView Operations Manager.

For details on the "User Management Wizard", refer to the following manual.

- "Configuring directory service access" and "ServerView user management with OpenDS" in "ServerView Suite User Management in ServerView"

2. Create an ldif file.

```
dn: cn=manager,ou=users,dc=fujitsu,dc=com
changetype: add
objectclass: inetOrgPerson
cn: manager
sn: manager
uid: manager
userPassword: mypassword
```

3. Use the directory service client function to register the ldif file created in step 2 with the directory service.

Before executing the ldapmodify command of the directory service, set the installation directory of the Java Runtime Environment (JRE) for the environment variable JAVA\_HOME.

For details on the command, refer to the directory service manual.

[Windows]

```
>"Directory_service_installation_folder\bat\ldapmodify.bat" -p Port_number -f ldif_file -D
Directory_service_administrator_user_DN -w Password <RETURN>
```

[Linux]

```
# "Directory_service_installation_folder/bin/ldapmodify" -p Port_number -f ldif_file -D
Directory_service_administrator_user_DN -w Password <RETURN>
```

SSL communication is not required when registering a user in the directory service provided with ServerView Operations Manager. The default value of the port number when not using SSL communication is "1473" in the directory service provided with ServerView Operations Manager.

For details on how to configure connection settings of the directory service provided with ServerView Operations Manager, refer to README and the manual "ServerView Suite User Management in ServerView".

 **Example**

```
>"C:\Program Files (x86)\Fujitsu\ServerView Suite\Directory service\bat\ldapmodify.bat" -p 1473 -f manager.ldif -D
"cn=Directory Manager" -w admin <RETURN>
```

# Chapter 11 Deciding and Configuring the Power Monitoring Environment

This chapter explains how to decide and configure the power monitoring environment.

## 11.1 Deciding the Power Monitoring Environment

This section explains how to define the power monitoring environment settings required for a Resource Orchestrator setup.

For VMware ESXi, this function is not supported.

### 11.1.1 Settings for the Power Monitoring Environment

To monitor power consumption, choose values for the following settings.

#### Polling interval

This determines the time interval for collecting the power consumption data.

The possible values that can be set are any value (at one-minute intervals) between 1 and 6 minutes, or 10 minutes. The default is 5 minutes.

#### Data storage period

This defines the storage period for the collected environmental data.

Table 11.1 Storage Period Values for Power Monitoring Data

Data Sampling Rate	Lifespan (Unit: month)	
	Default Value	Maximum Value
Finest sampling (The most detailed data secured at the polling interval)	1	12
Hourly sampling	1	60
Daily sampling	12	120
Monthly sampling	60	300
Yearly sampling	60	600

### 11.1.2 Power Monitoring Device Settings

Choose values for the following power monitoring device (PDU or UPS) settings. If any of those settings have been already determined by other software, use those values.

#### Device name

This is the name that identifies the power monitoring device. Each device name should be unique within the system. The first character must be alphabetic, and the name can contain up to 15 alphanumeric characters and hyphens ("-").

#### Admin IP address

This IP address must be in the same subnet as the admin server.

#### SNMP community name

This community name can contain up to 32 alphanumeric characters, underscores ("\_"), and hyphens ("-").

#### Voltage

This is the voltage (V) supplied to the power monitoring device.

## Comments

These comments can be any description desired for the power monitoring device. The comments can contain up to 128 characters.

# **11.2 Configuring the Power Monitoring Environment**

---

This section describes how to configure power monitor devices for Resource Orchestrator.

Apply the following settings to power monitoring targets. Refer to the manual of each power monitoring target for configuration instructions.

### Admin IP address

This IP address is used by the admin server to communicate with a power monitoring target.

### SNMP community name

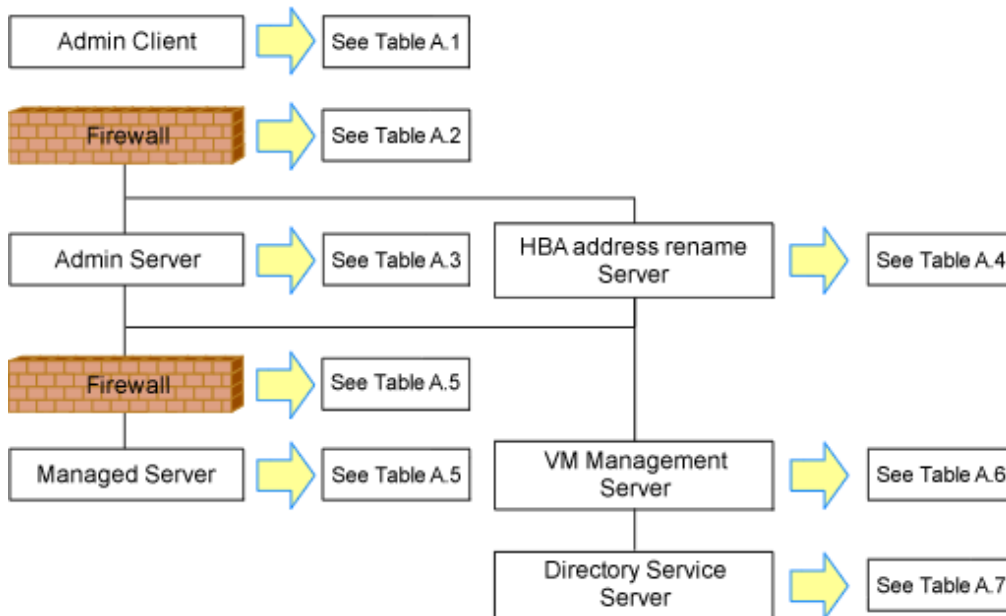
This SNMP community name is used by the admin server to collect power consumption data from a power monitoring target (via the SNMP protocol).

# Appendix A Port List

This appendix explains the ports used by Resource Orchestrator.

The following figure shows the connection configuration of Resource Orchestrator components.

Figure A.1 Connection Configuration



Resource Orchestrator ports should be configured during the system configuration of each related server.

For details on setup, refer to the following:

- Changing Admin Server Port Numbers
  - "8.2 Changing Port Numbers" in the "User's Guide VE"
- Changing Managed Server Port Numbers
  - "9.1.6 Changing Port Numbers" in the "User's Guide VE"
- Changing Port Numbers for Communication Between the HBA address rename Setup Service and the Admin Server
  - "9.2.2 Changing the Port Number Used to Communicate with the Admin Server" in the "User's Guide VE"

If any of those ports is already used by another service, allocate a different port number.

The following tables show the port numbers used by Resource Orchestrator. Communications should be allowed for each of these ports for Resource Orchestrator to operate properly.

Table A.1 Admin client

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
ROR console	Admin client	-	Variable value	Not possible	Admin server	rcxweb	23461	Possible	tcp
ServerView Operations Manager (*)						http	3169	Not possible	
						https	3170	Not possible	

\* Note: Required for PRIMERGY servers.

Table A.2 Firewall

Function Overview	Direction	Source		Destination		Protocol
		Servers	Port	Servers	Port	
ROR console	One-way	Admin client	Variable value	Admin server	23461	tcp
ServerView Operations Manager (*)					3169	
					3170	

\* Note: Required for PRIMERGY servers.

Table A.3 Admin server

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
ROR console	Admin client	-	Variable value	Not possible	Admin server	rcxweb	23461	Possible	tcp
ServerView Operations Manager (*1)						http	3169	Not possible	
						https	3170	Possible	
Internal control	Admin server	-	Variable value	-	Admin server (*2)	- (*3)	3172	Not possible	tcp
						nfdomain	[Windows Manager] 23457 [Linux Manager] 23455	Possible	tcp
						rcxmgr	23460	Possible	tcp
						rcxtask	23462	Possible	tcp
						rcxmongrel1	23463	Possible	tcp
						rcxmongrel2	23464	Possible	tcp
						rcxdb	23465	Possible	tcp
Monitoring and controlling resources	Admin server	-	Variable value	-	Managed server (Physical OS)	nfagent	23458	Possible	tcp



Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
	-		Variab le value	-	Server management unit (management blade)	snmp	161	Not possible	udp
	-		Variab le value	-	Server management unit (Remote Management Controller)	ipmi	623	Not possible	udp
	-		Variab le value	-		telnet	23	Not possible	tcp
	-		Variab le value	-	Server management unit (Remote Management Controller (XSCF))	snmp	161	Not possible	udp
	-		Variab le value	-		ssh	22	Not possible	tcp
	-		Variab le value	-	L2 switches	telnet	23	Not possible	tcp
	-		Variab le value	-		ping	-	-	ICMP
	-		Variab le value	-		snmp	161	Not possible	tcp,udp
	-		Variab le value	-	Firewall	telnet	23	Not possible	tcp
	-		Variab le value	-		ping	-	-	ICMP
	-		Variab le value	-		snmp	161	Not possible	tcp,udp
	-		Variab le value	-	Server load balancer	telnet	23	Not possible	tcp
	-		Variab le value	-		ping	-	-	ICMP
	-		Variab le value	-		snmp	161	Not possible	tcp,udp
	-		Variab le value	-	Ethernet Fabric switches	ssh	22	Not possible	tcp

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
		-	Variable value	-	(Converged Fabric)	ping	-	-	ICMP
		-	Variable value	-		snmp	161	Not possible	tcp,udp
		-	Variable value	-	Ethernet Fabric switches (VCS)	ping	-	-	ICMP
		-	Variable value	-		netconf	830	Not possible	tcp
		-	Variable value	-	Management host	ping	-	-	ICMP
		-	Variable value	-		snmp	161	Not possible	tcp,udp
	Server management unit (management blade)	-	Variable value	-	Admin server	snmptrap	162	Not possible	udp
	Server management unit (Remote Management Controller)								
	Server management unit (Remote Management Controller (XSCF))								
	L2 switches	-	Variable value	-	Admin server	snmptrap	162	Not possible	tcp,udp
	Firewall								
	Server load balancer								
Ethernet Fabric switches									
Management host									

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
ServerView Agents (*1)	Admin server	-	Variable value	-	Managed servers	snmp	161	Not possible	tcp udp
	Managed servers	-	Variable value	-	Admin server	snmptrap	162	Not possible	udp
Backup, restore, cloning	Admin server	-	4972	Not possible	Managed servers	-	4973	Not possible	udp
	Managed servers	-	4973	Not possible	Admin server	-	4972	Not possible	udp
		bootpc	68	Not possible		bootps	67	Not possible	udp
		-	Variable value	-		pxe	4011	Not possible	udp
		-	Variable value	-		tftp	69	Not possible	udp
	Admin server	-	Variable value	-	Admin server	-	4971	Not possible	tcp
Backup, cloning (collection)	Managed servers	-	Variable value	-	Admin server	-	14974 - 14989 (*4) 4974 - 4989 (*5)	Possible	udp
Restore cloning (deployment)	Managed servers	-	Variable value	-	Admin server	-	14974 - 14989 (*4) 4974 - 4989 (*5)	Possible	tcp udp
Monitoring server power status	Admin server	-	-	-	Managed servers	-	-	-	ICMP (*6)
VMware ESX/ ESXi, vCenter Server (*7)	Admin server	-	Variable value	-	Managed server, vCenter Server	-	443	Not possible	tcp
System Center Virtual	Admin server	-	Variable value	-	System Center Virtual	-	80	Not possible	tcp

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
Machine Manager					Machine Manager	WinRM	443 5985		
Directory services provided with ServerView Operations Manager	Admin server	-	Variable value	-	Directory services provided with ServerView Operations Manager	ldaps	1474	Possible	tcp
		-	Variable value	-		ldap	1473	Not possible	tcp
Active Directory	Admin server	-	Variable value	-	Active Directory	ldaps	636	Possible	tcp
Discover LAN switches	Admin server	-	-	-	LAN switch	-	-	-	ICMP
LAN switch control	Admin server	-	Variable value	-	LAN switch	-	22,23	Not possible	ssh, telnet
Open the web management window	Admin server	-	Variable value	-	L2 switches	http	80	Possible	tcp
		-	Variable value	-		https	443	Possible	tcp
		-	Variable value	-	Firewall	http	80	Possible	tcp
		-	Variable value	-		https	443	Possible	tcp
		-	Variable value	-	Server load balancer	http	80	Possible	tcp
		-	Variable value	-		https	443	Possible	tcp
		-	Variable value	-	Management host	http	80	Possible	tcp
		-	Variable value	-		https	443	Possible	tcp

\*1: Required for PRIMERGY servers.

\*2: For the port used by the ESC manager when coordinating with ETERNUS SF Storage Cruiser, refer to the "ETERNUS SF Storage Cruiser Operation Guide".

\*3: ServerView Remote Connector Service. This is necessary when using VIOM coordination or when running VMware ESXi on managed servers.

\*4: Required when the OS of the admin server is Windows.

\*5: Required when the OS of the admin server is Linux.

\*6: ICMP ECHO\_REQUEST datagram.

\*7: Required when running VMware ESX/ESXi on managed servers.

Table A.4 HBA address rename Setup Service Server

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
HBA address rename setup service	HBA address rename setup service server	-	Variable value	Not possible	Admin server	rcxweb	23461	Possible	tcp
		bootps	67	Not possible	Managed servers	bootpc	68	Not possible	udp
		pxe	4011	Not possible					
		tftp	69	Not possible					

Table A.5 Managed Server or Firewall

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
Monitoring and controlling resources	Admin server	-	Variable value	-	Managed server (Physical OS)	nfagent rcvat (*1)	23458	Possible	tcp
					Managed server (VMware)	https	443	Not possible	tcp
					Managed server (Xen, KVM, Solaris zones)	ssh	22	Not possible	tcp
					Managed server (Hyper-V)	RPC	135	Not possible	tcp
						NETBIOS Name Service	137	Not possible	tcp udp
						NETBIOS Datagram Service	138	Not possible	udp
						NETBIOS Session Service	139	Not possible	tcp

Function Overview	Source				Destination				Protocol	
	Servers	Service	Port	Modification	Servers	Service	Port	Modification		
						SMB	445	Not possible	tcp,udp	
					L2 switches	telnet	23	Not possible	tcp	
						ping	-	-	ICMP	
						snmp	161	Not possible	tcp,udp	
					Firewall	telnet	23	Not possible	tcp	
						ping	-	-	ICMP	
						snmp	161	Not possible	tcp,udp	
					Server load balancer	telnet	23	Not possible	tcp	
						ping	-	-	ICMP	
						snmp	161	Not possible	tcp,udp	
					Ethernet Fabric switches (C-Fabric)	ssh	22	Not possible	tcp	
						ping	-	-	ICMP	
						snmp	161	Not possible	tcp,udp	
					Ethernet Fabric switches (VCS)	ping	-	-	ICMP	
						netconf	830	Not possible	tcp	
					Management host	ping	-	-	ICMP	
						snmp	161	Not possible	tcp,udp	
		L2 switches	-	Variable value	-	Admin server	snmptrap	162	Not possible	tcp,udp
		Firewall								
		Server load balancer								

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
	Ethernet Fabric switches								
	Management host								
ServerView Agents (*2)	Admin server	-	Variable value	-	Managed servers	snmp	161	Not possible	tcp udp
	Managed servers	-	Variable value	-	Admin server	snmptrap	162	Not possible	udp
Backup, restore, cloning	Admin server	-	4972	Not possible	Managed servers	-	4973	Not possible	udp
	Managed servers	-	4973	Not possible	Admin server	-	4972	Not possible	udp
		-	Variable value	-		tftp	69	Not possible	udp
HBA address rename setup service	Managed servers	bootpc	68	Not possible	HBA address rename setup service server	bootps	67	Not possible	udp
						pxe	4011	Not possible	udp
		-	Variable value	-		tftp	69	Not possible	udp
VMware ESX/ ESXi (*3)	Admin server	-	Variable value	-	Managed servers	-	443	Not possible	tcp
Open the web management window	Admin server	-	Variable value	-	L2 switches	http	80	Possible	tcp
						https	443	Possible	tcp
					Firewall	http	80	Possible	tcp
						https	443	Possible	tcp
					Server load balancer	http	80	Possible	tcp
						https	443	Possible	tcp

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
					Management host	http	80	Possible	tcp
						https	443	Possible	tcp

\*1: Required for SPARC M10/M12 and SPARC Enterprise servers.

\*2: Required for PRIMERGY servers.

\*3: Required when running VMware ESX/ESXi on managed servers.

Table A.6 VM Management Server

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
vCenter Server	Admin server	-	Variable value	-	vCenter Server	-	443	Not possible	tcp
System Center Virtual Machine Manager	Admin server	-	Variable value	-	System Center Virtual Machine Manager	-	80	Not possible	tcp
					WinRM	443 5985			

Table A.7 Directory Service Server

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
Directory services provided with ServerView Operations Manager	Admin server	-	Variable value	-	Directory services provided with ServerView Operations Manager	ldaps	1474	Possible	tcp
Active Directory	Admin server	-	Variable value	-	Active Directory	ldaps	636	Possible	tcp

Table A.8 ISM Server

Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
Internal control	Admin server	-	Variable value	-	ISM Server	-	25566	Possible	tcp



Table A.9 DHCP Server

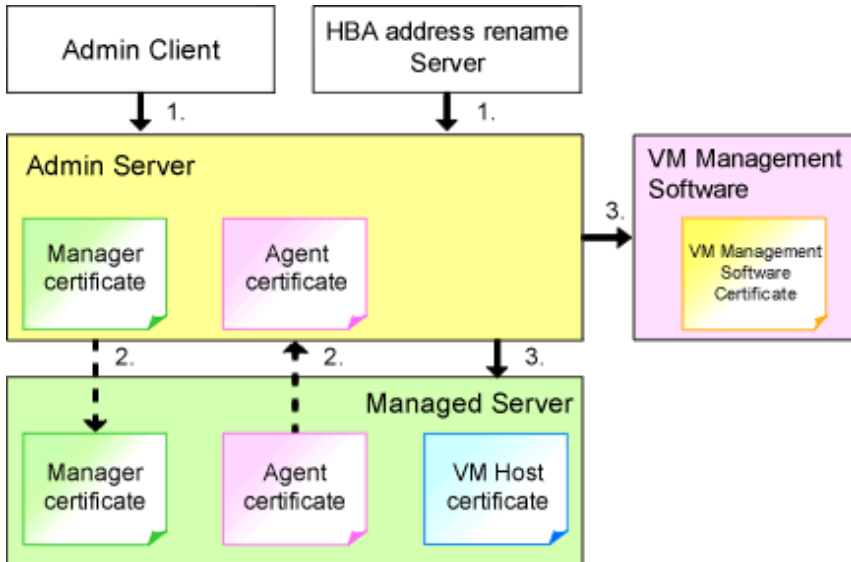
Function Overview	Source				Destination				Protocol
	Servers	Service	Port	Modification	Servers	Service	Port	Modification	
DHCP service	Admin server	-	Variable value	Not possible	DHCP Server	nfagent	23458	Possible	tcp
						tftp	69	Not possible	udp
						bootps	67	Not possible	udp

# Appendix B HTTPS Communications

This appendix explains the HTTPS communication protocol used by Resource Orchestrator and its security features.

Resource Orchestrator uses HTTPS communication for the three cases shown in the figure below. Certificates are used for mutual authentication and for encrypting communication data.

Figure B.1 HTTPS Communication



1. Between the Admin Client and the Admin Server, or Between the HBA address rename Server and the Admin Server

The admin client and HBA address rename server automatically obtain a certificate from the admin server at each connection. This certificate is used to encrypt the communicated data.

2. Between the Admin Server and Managed Servers (Communication with Agents)

Certificates are created on both the admin server and managed servers when Resource Orchestrator (manager or agent) is first installed. Certificates of other communication targets are stored at different timings, as described below (refer to "Certificate Creation Timing"). Those certificates are used for HTTPS communication based on mutual authentication.

When re-installing the manager, its agent certificates (stored on the admin server) are renewed. Because the renewed certificates differ from those stored on the agent side (on managed servers), agents are not able to communicate with the admin server. To avoid such communication issues, it is recommended to backup agent certificates (on the admin server) before uninstalling the manager, and restore them after re-installation. When re-installing the manager, back up the certificates referring to "11.1 Manager Uninstallation" in the "Setup Guide VE". When restoring the certificates, refer to "2.1 Manager Installation" in the "Setup Guide VE".

3. Between the Admin Server and Managed Servers (Communication with VM Hosts), or Between the Admin Server and VM Management Software [VMware]

The admin server obtains and stores certificates for each connection with a managed server (VM host) or VM management software. Those certificates are used to encrypt communications.

## Certificate Creation Timing

Between the Admin Client and the Admin Server, or Between the HBA address rename Server and the Admin Server

Certificates are automatically obtained each time HTTPS connections are established. They are not stored on the admin server.

Between the Admin Server and Managed Servers (Communication with Agents)

The certificates used for HTTPS communication are automatically exchanged and stored on the manager and agents on the following occasions:

- When registering a managed server

- Right after re-installing and starting an agent

Between the Admin Server and Managed Servers (Communication with VM Hosts), or Between the Admin Server and VM Management Software [VMware]

Certificates are automatically obtained each time HTTPS connections are established. They are not stored on the admin server.

## Types of Certificates

Resource Orchestrator uses the following certificates.

Between the Admin Client and the Admin Server, or Between the HBA address rename Server and the Admin Server

The public keys included in the certificates are created using X.509-based RSA encryption. These keys are 2048 bits long.

Between the Admin Server and Managed Servers (Communication with Agents)

The public keys included in the certificates are created using X.509-based RSA encryption. These keys are 2048 bits long.

Between the Admin Server and Managed Servers (Communication with VM Hosts), or Between the Admin Server and VM Management Software [VMware]

The public keys included in the certificates are created using X.509-based RSA encryption. The key length depends on the specifications of the VM host or the VM management software.

## Adding the Admin Server's Certificate to Client Browsers

Resource Orchestrator automatically generates a unique, self-signed certificate for each admin server during manager installation. This certificate is used for HTTPS communication with admin clients.

Use of self-signed certificates is generally safe within an internal network protected by firewalls, where there is no risk of spoofing attacks and communication partners can be trusted. However, Web browsers, which are designed for less-secure networks (internet), will see self-signed certificates as a security threat, and will display the following warnings.

- Warning dialog when establishing a connection

When opening a browser and connecting to the admin server for the first time, a warning dialog regarding the security certificate received from the admin server is displayed.

- Address bar and Phishing Filter warning in Internet Explorer

The background color of the address bar will become red and the words "Certificate Error" will be displayed on its right side of the address bar of the login screen, the ROR console, and BladeViewer.

Furthermore, the Phishing Filter may show a warning on the status bar.

When using Internet Explorer, the above warnings can be disabled by creating a certificate for the admin server's IP address or host name (FQDN) that is specified in the address bar's URL, and installing it to the browser.

On the admin server, a certificate for host name (FQDN) is automatically created during installation of the manager.

When using other servers as admin clients, use the following procedure to install the admin server's certificate on each client.

Therefore, the certificate creation step in the following procedure can be skipped when using the admin server as an admin client. In that case, use host name (FQDN) in the URL and proceed to step 2.

1. Create a Certificate
  - a. Open the command prompt on the admin server.
  - b. Execute the following command to move to the installation folder.

[Windows Manager]

```
>cd "Installation_folder\SVROR\Manager\sys\apache\conf" <RETURN>
```

[Linux Manager]

```
# cd /etc/opt/FJSVrcvnr/sys/apache/conf <RETURN>
```

- c. After backing up the current certificate, execute the certificate creation command bundled with Resource Orchestrator (openssl.exe).

When using the `-days` option, choose a value (number of days) large enough to include the entire period for which you plan to use Resource Orchestrator. However, the certificate's expiration date (defined by adding the specified number of days to the current date) should not go further than the 2038/1/19 date.

## Example

When the Manager is installed in the "C:\Fujitsu\ROR" folder, and generating a certificate valid for 15 years (or 5479 days, using the `-days 5479` option)

[Windows Manager]

```
>cd "C:\Fujitsu\ROR\SVROR\Manager\sys\apache\conf" <RETURN>
>..\..\bin\rxadm mgrctl stop <RETURN>
>copy ssl.crt\server.crt ssl.crt\server.crt.org <RETURN>
>copy ssl.key\server.key ssl.key\server.key.org <RETURN>
>..\bin\openssl.exe req -new -x509 -nodes -sha256 -newkey rsa:2048 -out ssl.crt\server.crt -keyout ssl.key
\server.key -days 5479 -config openssl.cnf <RETURN>
Loading 'screen' into random state - done
Generating a 2048 bit RSA private key
.....++++++
.....++++++
writing new private key to 'ssl.key\server.key'
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) []: <RETURN>
State or Province Name (full name) []: <RETURN>
Locality Name (eg, city ) []: <RETURN>
Organization Name (eg, company) []: <RETURN>
Organizational Unit Name (eg, section) []: <RETURN>
Common Name (eg, server FQDN or YOUR name) [localhost]: IP_address or hostname(*) <RETURN>
Email Address []: <RETURN>
>..\..\bin\rxadm mgrctl start <RETURN>
```

[Linux Manager]

```
# cd /etc/opt/FJSVrcvmr/sys/apache/conf <RETURN>
# /opt/FJSVrcvmr/bin/rxadm mgrctl stop <RETURN>
# cp ssl.crt/server.crt ssl.crt/server.crt.org <RETURN>
# cp ssl.key/server.key ssl.key/server.key.org <RETURN>
# /opt/FJSVrcvmr/sys/apache/bin/openssl req -new -x509 -nodes -sha256 -newkey rsa:2048 -out ssl.crt/
server.crt -keyout ssl.key/server.key -days 5479 -config /opt/FJSVrcvmr/sys/apache/ssl/openssl.cnf
<RETURN>
Generating a 2048 bit RSA private key
.....++++++
.....++++++
writing new private key to 'ssl.key/server.key'
-----
You are about to be asked to enter information that will be incorporated
into your certificate request.
```

```

What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.
-----
Country Name (2 letter code) []: <RETURN>
State or Province Name (full name) []: <RETURN>
Locality Name (eg, city ) []: <RETURN>
Organization Name (eg, company) []: <RETURN>
Organizational Unit Name (eg, section) []: <RETURN>
Common Name (eg, server FQDN or YOUR name) [localhost]: IP_address or hostname (*) <RETURN>
Email Address []: <RETURN>

# /opt/FJSVrcvnr/bin/rcxadm mgrctl start <RETURN>

```

\* Note: Enter the IP address to be entered in the Web browser or the host name (FQDN).

### Example

```

IP address: 192.168.1.1
Host name: myhost.company.com

```

## 2. Add the Certificate to the Web Browser

### Internet Explorer

Open the Resource Orchestrator login screen, referring to "Chapter 3 Login to the ROR Console" in the "Setup Guide VE". When opening the ROR console, enter the same IP address or host name (FQDN) as that used to generate the certificate in the previous step. Once the login screen is displayed, perform the following operations.

- a. Open the [Certificate] dialog.
 

Open the "Certificate is invalid dialog" by clicking the "Certificate Error" displayed in the address bar in Internet Explorer. This will open an "Untrusted Certificate" or "Certificate Expired" message.  
Click the "View certificates" link displayed at the bottom of this dialog.
- b. Confirm that the "Issued to" and "Issued by" displayed in the [Certificate] dialog are both set to the IP address or host name (FQDN) used to generate the certificate.
- c. In the [Certificate] dialog, click [Install Certificate].
 

The [Certificate Import Wizard] dialog is displayed.
- d. Click [Next>].
- e. Select "Place all certificates in the following store".
- f. Click [Browse].
 

The [Select Certificate Store] dialog is displayed.
- g. Select "Trusted Root Certification Authorities".
- h. Click [OK].
- i. Click [Next>].
- j. Check that "Trusted Root Certification Authorities" is selected.
- k. Click [Finish].
  - l. Restart the Web browser.

If multiple admin clients are used, perform this operation on each admin client.

## Firefox

Open the Resource Orchestrator login screen, referring to "Chapter 1 Login and Logout" in the "User's Guide VE".

If the [This Connection is Untrusted] window is displayed, perform the following procedure:

- a. Select <I Understand the Risks> and click the <Add Exception> button.  
The [Add Security Exception] window is displayed.
- b. In the [Add Security Exception] window, click the <View> button.  
The [Certificate Viewer] is displayed.
- c. In the [Certificate Viewer], ensure that the certificate and the issuer have an IP address or hostname (FQDN) specified.
- d. In the [Add Security Exception] window, click the <Confirm Security Exception> button.

After logging in and clicking a tab, the [**This Connection is Untrusted**] window may be displayed.

If this occurs, perform the following procedure:

- a. In the [Options] window, click the <Advanced>, and then the <Encryption> tab.
- b. Click the <View Certificates> button.  
The [Certificate Manager] window is displayed.
- c. Select the <Servers> tab, and then click the <Add Exception> button.  
The [Add Security Exception] window is displayed.
- d. In the [Add Security Exception] window, enter the URL displayed in the [This Connection is Untrusted] window, and then click <Get Certificate>.
- e. Click the <View> button to display the [Certificate Viewer].
- f. In the Certificate Viewer, ensure that the certificate and the issuer have an IP address or hostname (FQDN) specified.
- g. In the [Add Security Exception] window, click the <Confirm Security Exception> button.
- h. Click the <OK> button.

### Note

- Enter the IP address or host name (FQDN) used to generate the certificate in the Web browser's URL bar. If the entered URL differs from that of the certificate, a certificate warning is displayed.

### Example

A certificate warning is displayed when the following conditions are met.

- The entered URL uses an IP address while the certificate was created using a host name (FQDN)
  - The admin server is set with multiple IP addresses, and the entered URL uses an IP address different from that used to generate the certificate
- When using Firefox on Windows OS, the certificate needs to be installed to the OS via Internet Explorer.

# Appendix C Hardware Configuration

This appendix explains how to configure hardware.

## C.1 Connections between Server Network Interfaces and LAN Switch Ports

Configuring VLAN settings on internal LAN switch ports requires an understanding of the network connections between LAN switches and physical servers (between LAN switch ports and the network interfaces mounted in each server).

This section shows which network interfaces (on PRIMERGY BX600 server blades) are connected to which LAN switch blade ports. For servers other than PRIMERGY BX servers, refer to the server manual for details on the connections between server blades and LAN switch blades.

The connections between server blades and LAN switch blades are shown in the following table.

Table C.1 Connections between Server Blades and LAN Switch Blades (PG-SW107)

NIC index	NIC placement (on a server blade)	Connected port number (on a LAN switch blade)
Index 1	Onboard LAN1	NET1 port "3N-2"
Index 2	Onboard LAN2	NET2 port "3N-2"
Index 3	Onboard LAN3	NET1 port "3N-1"
Index 4	Onboard LAN4	NET2 port "3N-1"
Index 5	Onboard LAN5	NET1 port "3N"
Index 6	Onboard LAN6	NET2 port "3N"
Index 7	LAN expansion card LAN1	NET3 port "N"
Index 8	LAN expansion card LAN2	NET4 port "N"

N: Slot number of the connected server blade

PG-SW104/105/106 is mounted in NET3 and NET4.

For details, refer to the chassis hardware manual.

Table C.2 Connections between Server Blades and LAN Switch Blades (PG-SW104/105/106)

NIC index	NIC placement (on a server blade)	Connected port number (on a LAN switch blade)
Index 1	Onboard LAN1	NET1 port "N"
Index 2	Onboard LAN2	NET2 port "N"
Index 3	LAN expansion card LAN1	NET3 port "N"
Index 4	LAN expansion card LAN2	NET4 port "N"
Index 5	-	-
Index 6	-	-
Index 7	-	-
Index 8	-	-

-: None

N: Slot number of the connected server blade



VLAN settings cannot be configured on the following devices.

- PRIMERGY BX600 Ethernet Blade Panel 1Gb 10/6 (IBP 10/6) and 30/12 (IBP 30/12)
- A LAN switch directly connected to a PRIMERGY BX 600 LAN pass-thru blade
- A LAN switch directly connected to servers other than PRIMERGY BX servers

LAN switch blade product names may differ between countries.

This section refers to the product names used in Japan.

The following table shows product references often used in other countries.

Reference	Product Name
PG-SW104	PRIMERGY BX600 Switch Blade (1Gbps) PRIMERGY BX600 Ethernet Switch 1GB 10/6(SB9)
PG-SW105	PRIMERGY BX600 Switch Blade (10Gbps) PRIMERGY BX600 Ethernet Switch 1GB 10/6+2(SB9)
PG-SW106	Cisco Catalyst Blade Switch 3040 PRIMERGY BX600 Ethernet Switch 1GB 10/6(Cisco CBS 3040)
PG-SW107	PRIMERGY BX600 Switch Blade (1Gbps) PRIMERGY BX600 Ethernet Switch 1GB 30/12(SB9F)

## C.2 WWN Allocation Order during HBA address rename Configuration

This section explains the order in which WWNs are allocated during configuration of HBA address rename.

With HBA address rename, as WWNs are allocated to the I/O addresses of HBAs in descending order, the order may not match the port order listed in the HBA.

When specifying the locations for WWN allocation, check the I/O addresses of HBAs.

The I/O addresses of HBAs can be confirmed using tools provided by HBA vendors or FC-HBA BIOS.

- For blade servers



For a blade server with an HBA with 2 ports, allocation is performed as follows:

```

WWN value provided by "I/O Virtualization Option": 20:00:00:17:42:51:00:00
WWNN value for ports 1 and 2 of the HBA           : 20:00:00:17:42:51:00:00
WWPN value for HBA port 1                         : 9:00:00 PM:17:42:51:00:00
WWPN value for HBA port 2                         : 10:00:00 PM:17:42:51:00:00

```

- For rack mount or tower servers

For the PCI slots of rack mount or tower servers, WWNs are allocated in the following order:

```

PRIMERGY RX200 S4   slot2 -> slot1 -> slot3
PRIMERGY RX200 S5 or later slot1 -> slot2 -> slot3
PRIMERGY RX300 S4   slot5 -> slot6 -> slot1 -> slot7 -> slot4 -> slot2 -> slot3
PRIMERGY RX300 S5 or later slot2 -> slot3 -> slot4 -> slot5 -> slot6 -> slot7 -> slot1
PRIMERGY RX600 S4   slot6 -> slot3 -> slot4 -> slot1 -> slot2 -> slot7 -> slot5
PRIMERGY RX600 S5   slot7 -> slot6 -> (slot5 -> slot8 -> slot9 -> slot10) -> slot4 -> slot3 -> slot2
-> slot1
PRIMERGY RX600 S6   slot7 -> slot6 -> (slot5 -> slot8 -> slot9 -> slot10) -> slot4 -> slot3 -> slot2
-> slot1

```



```

PRIMERGY RX2520 M1 slot4 -> slot5 -> slot6 -> slot2 -> slot3 -> slot1
PRIMERGY RX4770 M1 slot9 -> slot8 -> slot10 -> slot5 -> slot6 -> slot7 -> slot4 -> slot3 -> slot2
-> slot1
PRIMERGY TX300 S4 slot5 -> slot6 -> slot1 -> slot7 -> slot4 -> slot2 -> slot3
PRIMERGY TX300 S5 (slot7) -> slot6 -> slot5 -> slot4 -> slot3 -> slot2 -> (slot1)
PRIMERGY TX300 S6 slot5 -> slot6 -> slot1 -> slot7 -> slot4 -> slot2 -> slot3

```

In a single PCI slot, allocate WWNs in the following order:

```
port 2 -> port 1
```



## Example

When one port HBAs are mounted in slot 2 and slot 3 of an RX600 S4, WWNs are allocated in the following order:

```
slot 3 -> slot 2
```

```

WWN value provided by "I/O Virtualization Option": 20:00:00:17:42:51:00:00
WWNN value for slots 2 and 3 of the HBA           : 20:00:00:17:42:51:00:00
WWPN value for HBA slot 2                         : 22:00:00:17:42:51:00:00
WWPN value for HBA slot 3                         : 21:00:00:17:42:51:00:00

```

When two port HBAs are mounted in slot 2 of an RX600 S4, WWNs are allocated in the following order:

```
slot 2 (port 2) -> slot 2 (port 1)
```

```

WWN value provided by "I/O Virtualization Option": 20:00:00:17:42:51:00:00
WWNN value for ports 1 and 2 of the HBA           : 20:00:00:17:42:51:00:00
WWPN value for HBA port 1                         : 10:00:00 PM:17:42:51:00:00
WWPN value for HBA port 2                         : 9:00:00 PM:17:42:51:00:00

```

# Appendix D Ethernet Fabric Devices

This appendix explains the method for managing Ethernet fabric devices in Resource Orchestrator.

## D.1 Fujitsu PRIMERGY Converged Fabric Switch Blade (10 Gbps 18/8+2) and Fujitsu Converged Fabric Switch

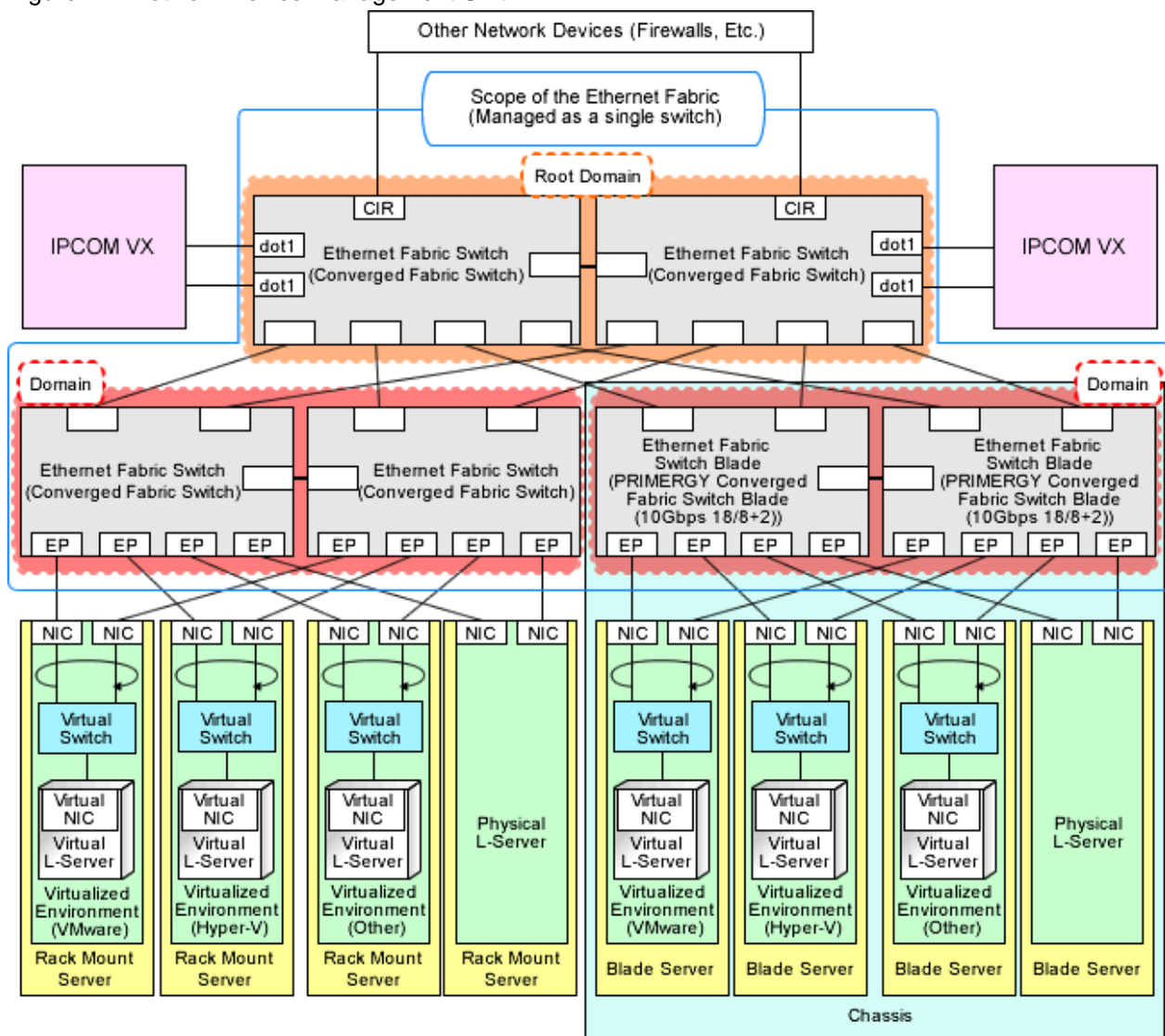
This section explains the method for managing Ethernet fabric configured using "Fujitsu PRIMERGY Converged Fabric Switch Blade (10 Gbps 18/8+2)" and "Fujitsu CFX 2000 Series".

### D.1.1 Management Unit

The configuration example of the Ethernet fabric configured using "Fujitsu PRIMERGY Converged Fabric Switch Blade (10 Gbps 18/8+2)" and "Fujitsu CFX 2000 Series" is shown in "Figure D.1 Network Device Management Unit".

Resource Orchestrator manages all devices comprising an Ethernet fabric as a single network device.

Figure D.1 Network Device Management Unit



CIR: Clean Interface with Redundancy  
 EP: End Point  
 dot1: IEEE802.1ad Frame Communication Port

## D.2 Extreme VCS Fabric

This section explains Ethernet fabrics (VCS) configured for ExtremeSwitching VDX series.

### D.2.1 Management Unit

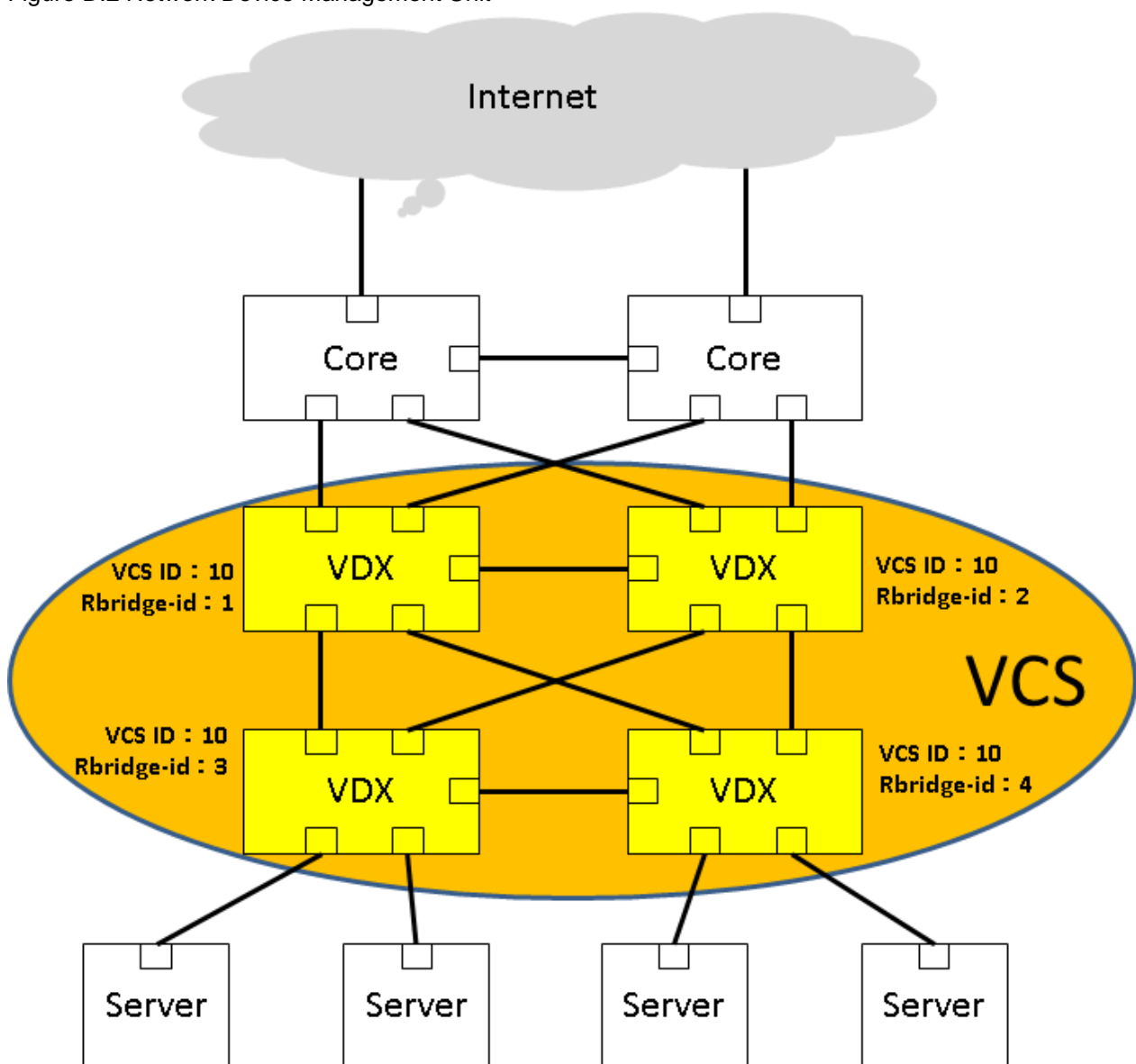
A configuration example of Ethernet fabrics (VCS) configured for ExtremeSwitching VDX series is shown in "Figure D.2 Network Device Management Unit".

Resource Orchestrator manages all devices comprising an Ethernet fabric (VCS) as a single network device.



Display of the Virtual Fabric is not supported.

Figure D.2 Network Device Management Unit



# Appendix E IPCOM VX Series Devices

This appendix explains the method for managing IPCOM VX series devices in Resource Orchestrator.

## E.1 IPCOM VX Series

This section explains how to manage IPCOM VX series devices configured for linking with Ethernet fabrics.

### E.1.1 Management Unit

A configuration example of IPCOM VX series configured for linking with Ethernet fabrics is shown in "[Figure E.1 Network Device \(IPCOM VX Series\) Management Unit](#)".

Resource Orchestrator manages IPCOM VX series devices as a single management host network device. Each IPCOM VA in an IPCOM VX series device is managed as a network device (firewall or server load balancer).

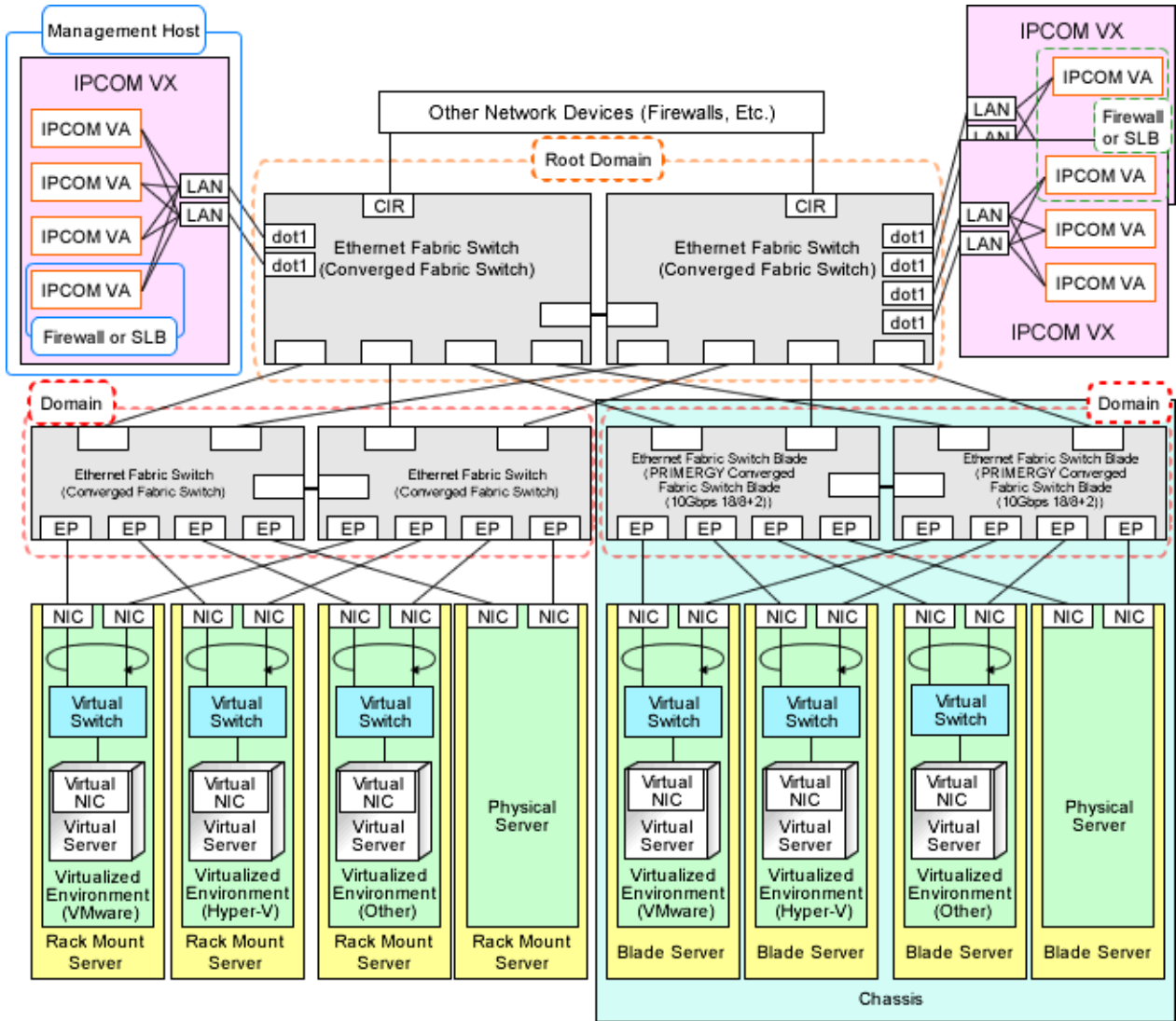
For the port name of the Ethernet fabric to specify for the link information of the network configuration information necessary for registration as a network device, specify an IEEE802.1ad frame communication port with the type EP (End Point) and CIR (Clean Interface with Redundancy). The port type can be either EP or CIR.

For details on how to confirm the port name to specify, refer to "[7.7.3 Creating Network Configuration Information \(XML Definition\)](#)".

For the admin IP address to specify when stating the network device information in the network configuration information, specify the admin IP address configured for the IPCOM VX series device or IPCOM VA.

The following configuration diagram is based on the assumption that the VFAB is set to network mode.

Figure E.1 Network Device (IPCOM VX Series) Management Unit



CIR: Clean Interface with Redundancy  
 EP: End Point  
 dot1: IEEE802.1ad Frame Communication Port  
 SLB: Server Load Balancer