

FUJITSU Server PRIMEQUEST 3000 Series Design Guide

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Preface



About this guide

Contents of This Guide

This manual describes the concepts of system design and notes for users of the PRIMEQUEST 3000 series.

- For details on the operation of the main unit and other information, refer to the manuals for the PRIMEQUEST 3000 series main unit.
- For details on the operating environment of the software, refer to the website of each software.
- For details on virtualization, refer to the document of each virtualization software.

Please use this guide with configurator and restrictions.

https://partners.ts.fujitsu.com/com/order-supply/configurators/primergy_config/Pages/PQ-current.aspx

Preface



Symbols in This Manual

The following table shows the meaning of the symbol used in this manual.

Symbol	Meaning
⇒	Indicates the page or document to refer to.

Abbreviations in This Manual

Name	Abbreviation		
PRIMEQUEST 3800B/3800B2	8 socket model		
PRIMEQUEST 3800E/3800E2	8 socket model	PRIMEQUEST 3000 series	
PRIMEQUEST 3400E	4 socket model		
Microsoft® Windows Server® 2016 Standard / Datacenter	Windows Server 2016	Windows	
Microsoft® Windows Server® 2019 Standard / Datacenter	Windows Server 2019	windows	
Red Hat® Enterprise Linux® 7 (for Intel64)	RHEL 7 (for Intel64) / RHEL 7	RHEL / Linux	
SUSE® Linux® Enterprise Server 12	SLES 12		
SUSE® Linux® Enterprise Server 15	SLES 15	SLES / LINUX	
Oracle® Linux 7	Oracle Linux	OL / Linux	
Oracle® VM Server for x86 Release 3	Oracle VM	OVM	
VMware vSphere® 6.5	VMware 6.5)/Muroro	
VMware vSphere® 6.7	VMware 6.7	viviware	

Preface



Name Abbreviati		Abbreviation	
PRIMEQUEST 3000 Series Operating Manual	Operating Manual		3800B/B2
PRIMEQUEST 3000 Series Hardware Installation Manual	Hardware Installation Manual		3x00E/E2
PRIMEQUEST 3000 Series General Description	General Description	Operating Manual	3x00E/E2
PRIMEQUEST 3000 Series Installation Manual	Installation Manual		3x00E/E2
PRIMEQUEST 3000 Series Administration Manual	Administration Manual		3x00E/E2
PRIMEQUEST 3000 Series Reference Manual (BIOS Setup Utility)	Reference Manual		3800B/B2
PRIMEQUEST 3000 Series Tool Reference	Tool Reference	Reference Manual	3x00E/E2

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1. PRIMEQUEST Overview

This chapter describes the overview of PRIMEQUEST. For details, refer to "Operating Manual".

Product (Type2)



Core servers that combine the reliability of a mainframe and the cost efficiency of an open server to support mission critical operations



Highly-reliable servers that are based on the latest Intel architecture

Specifications



Item		PRIMEQUEST 3000 series type2		
Ригроѕе		Enterprise	Business	
	Model name	3800E2	3800B2	
	Туре	Intel [®] Xeon [®] Pla	atinum Processor	
CPU	Number of cores (*1)	4/12/16/	24/26/28	
Maximum	SMP (sockets/cores) (*1)	8/224	8/224	
Maximum	number of partitions	4	1	
Мотопу	Supported DIMMs	8GB/16GB/32C	iB/64GB/128GB	
Memory	Maximum memory capacity (*1)	12TB (128GB DIMM x 96)	12TB (128GB DIMM x 96)	
Maximum	internal disk capacity	43.2TB (DU_SAS 1.8TB x 8, DU_M 1.8TB x 16)	14.4TB (DU 1.8TB x 8)	
Maximum number of PCI slots (*1)		16 (internal only) / up to 56 (Hot Plug is available when a PCI Box is equipped)	16 (4 slots are available of Hot Plug)	
Height		70	50	
Reliability,	Reliability, Availability, and Serviceability (RAS)			
Memory Mirror / Address Range Mirror		Supported		
Memory Sp	are	Supported		
Flexible I/O	/ Reserved SB	Supported	Not supported	
Extended P	Partitioning (including Extended Socket)	Supported (RHEL)	Not supported	
Dynamic Reconfiguration		TBD	Not supported	
RAID		Hardware RAID / Software RAID		
Redundancy		Memory, IOU, PSU, FAN, HDD, SSD, PCI Express card, MMB(*2), and power input system		
Hot plug		IOU (in a redundant configuration), PSU (in a redundant configuration), FAN, HDD (in a RAID configuration), SAS-SSD (in a RAID configuration), PCI Express card, and MMB (in a duplex configuration)		
Original dump function		sadump (RHEL)	Not supported	
Cluster	Intra-cabinet / Inter-cabinet	Supported	Not supported	
Remote operation		WOL, PXE, video redirection, and console redirection		

(*1) The maximum number of CPUs, the maximum number of cores, and the maximum memory capacity that can be configured in a system vary depending on the type and version of the OS. For details, refer to <u>"Appendix B OS Specifications</u>".

(*2) Except 3800B.

The maximum number of PCI slots depends on the type and the number of IO units.

For details, refer to "Chapter 1 Product Overview" in "Operating Manual".

Product (Type1)



Core servers that combine the reliability of a mainframe and the cost efficiency of an open server to support mission critical operations



Highly-reliable servers that are based on the latest Intel architecture

Specifications



ltem				
Purpose		Enterprise		Business
	Model name	3400E	3800E	3800B
CDU	Туре	Intel [®] Xeon [®] Platinum / Gold Processor	Intel [®] Xeon [®] Pla	itinum Processor
CPU	Number of cores (*1)		4/12/16/24/26/28	
Maximum S	SMP (sockets/cores) (*1)	4/112	8/224	8/224
Maximum	number of partitions	2	4	1
	Supported DIMMs		8GB/16GB/32GB/64GB/128GB	
Memory	Maximum memory capacity (*1)	12TB (128GB DIMM x 96) With Memory Scale-up Boards: 12TB	12TB (128GB DIMM x 96)	12TB (128GB DIMM x 96)
Maximum i	internal disk capacity	43.2TB (DU_SAS 1.8TB x 8, DU_M 1.8TB x 16)		14.4TB (DU 1.8TB x 8)
Maximum	number of PCI slots (*1)	16 (internal only) / up to 56 (Hot Plug is available when a PCI Box is equipped)		16 (4 slots are available of Hot Plug)
Height		70		50
Reliability, Availability, and Serviceability (RAS)				
Memory Mirror / Address Range Mirror			Supported	
Memory Sp	are		Supported	
Flexible I/O) / Reserved SB	Supported		Not supported
Extended P	Partitioning (including Extended Socket)	Supported (RHEL)		Not supported
Memory Sca	ale-up Board	Supported (RHEL)	Not supported	Not supported
Dynamic Re	econfiguration	Supported (RHEL 7, SLES 12)		Not supported
RAID		Hardware RAID / Software RAID		
Redundancy		Memory, IOU, PSU, FAN, HDD, SSD, PCI Express card, MMB(*2), and power input system		
Hot plug		IOU (in a redundant configuration), PSU (in a redundant configuration), FAN SAS-SSD (in a RAID configuration), PCI Express card, and MMB (in a		l, HDD (in a RAID configuration), a duplex configuration)
Original du	Imp function	sadump (RHEL)		Not supported
Cluster	Intra-cabinet / Inter-cabinet	Supported		Not supported
Remote operation		WOL, PXE, video redirection, and console redirection		

(*1) The maximum number of CPUs, the maximum number of cores, and the maximum memory capacity that can be configured in a system vary depending on the type and version of the OS. For details, refer to "Appendix B OS Specifications".

(*2) Except 3800B.

The maximum number of PCI slots depends on the type and the number of IO units.

For details, refer to "Chapter 1 Product Overview" in "Operating Manual".

Supported OS



⇒ For the latest information on the supported OSs, refer to the following URL: <u>http://sp.ts.fujitsu.com/dmsp/Publications/public/osrel-py.pdf</u>

Component Names





Front

Rear

(View without the front panel)

(*1) Memory Scale-up Boards (MSB) are only available for the 3400E.

Basic Configuration



- Layout and Internal Connection Configuration for the 3800B/B2 ⇒ <u>"Basic Configuration (3800B/B2)</u>"
- Layout and Internal Connection Configuration for the 3800E/E2 \Rightarrow "Basic Configuration (3800E/E2)"
- Layout and Internal Connection Configuration for the 3400E \Rightarrow "Basic Configuration (3400E)"

Basic Configuration (3800B/B2)



Internal Connection Configuration for 3800B/B2



UPI: Ultra Path Interconnect

Maximum number of ports and cards for network connection

Component	Maximum number of ports and cards
IOU onboard LAN ports	none
PCI Express slots on IOUs	16 cards (*1)

Basic components

Component	Max. installable number	Installed as standard
SB	4	1
IOU	2	1
PSU	4	2
DU_SAS	2	0
AC cable	4	No (must be ordered)

 \Rightarrow For details on the configuration, refer to "Operating Manual".

Basic Configuration (3800E/E2)



Internal Connection Configuration for 3800E/E2



Maximum number of ports and cards for network connection

Component	Maximum number of ports and cards
IOU onboard LAN ports	8 ports
PCI Express slots on IOUs	16 cards
PCI Express slots on PCI Boxes	48 cards

* The number of available PCI Box slots depends on which type of IO unit is selected.

Basic components

Component	Max. installable number	Installed as standard
SB	4	1
IOU	4	1
MMB	2	1
PSU	4	2
DU_SAS or DU_PCIEA <mark>(planned)</mark>	2	0
DU_M	4	0
AC cable	4	No (must be ordered)

 \Rightarrow For details on the configuration, refer to "Operating Manual".

Basic Configuration (3400E)



Internal Connection Configuration for 3400E



 \Rightarrow For details on the configuration, refer to "Operating Manual".

Maximum number of ports and cards for network connection

Component	Maximum number of ports and cards
IOU onboard LAN ports	8 ports
PCI Express slots on IOUs	16 cards (*1)
PCI Express slots on PCI Boxes	48 cards

* The number of available PCI Box slots depends on which type of IO unit is selected.

Basic components

Component	Max. installable number	Installed as standard
SB	2	1
MSB	3	0
IOU	4	1
MMB	2	1
PSU	4	2
DU_SAS or DU_PCIEA <mark>(planned)</mark>	2	0
DU_M	4	0
AC cable	6	No (must be ordered)

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Features (1)

Memory Mirror Function

 \Rightarrow For details, refer to "<u>System Board (SB)</u>".

Full Mirror Mode (which allows mirroring for all the memory that is installed in a chassis) and Address Range Mirror Mode are supported.

Memory Spare Function

This function ensures uninterrupted system operation by monitoring the memory to detect a problem at the earliest possible time. Data is copied if a problem is detected.

Active Processor Cores

This function specifies the number of CPU cores to run in a chassis.

* Consult your software vendors before using this function to reduce the number of software licenses.

RAID

 \Rightarrow For details, refer to "<u>Key Points for I/O Configuration Design</u>".

Software RAID and hardware RAID ensures the reliability and availability of the system.



Features (2)

FUĴĨTSU

Redundancy

By duplicating or multiplexing internal components, even if memory or other hardware fails, it is possible to prevent the system operation from being stopped.

Hot Plug

A component that is stopped due to a failure can be replaced without stopping the operation of the partition.

Cluster System

⇒ For details, refer to "Key Points for Cluster Configurations".

An inter-cabinet cluster is supported.

Boot Devices

The following boot types are supported:

- Internal SAS-HDD/SAS-SSD (with RAID card only)
- SAS-HDD/SAS-SSD installed in a JX40 S2 (with RAID card only)
- iSCSI-SAN boot
- FC-SAN boot
- FCoE boot
- M.2 Flash Device

Features (3)



- Wake On LAN (WOL) Function
 - This function enables the power of partitions to be controlled remotely.

Preboot eXecution Environment (PXE) Function

 This function enables operations such as installing and updating the OS to be managed from a server on the network.

Console Functions

Video Redirection Connection

This function remotely performs KVM operations from a console that is connected to a LAN. This allows a virtual media function (in which FD/CD/DVD drives on the console PC can be used as the drives for the PRIMEQUEST).

• Text Console Redirection (for Maintenance) This function directs the serial output from a partition to a terminal via a LAN.

USB Port Disable Function

- 3x00E/E2 : The front USB ports on the Home SB.
- 3800B/B2 : The front USB ports on the SB#0 only are available.
- They can be enabled or disabled in the BIOS menu.

Features (4)

Green Compliance and Power Saving

Power Saving Function

This function automatically adjusts the system operation so that the power consumption does not exceed the specified maximum value.

Energy-Saving Measures

- Power-efficient devices (LV-DIMM and SAS-SSD) are available.
- A highly-efficient power supply unit (80 PLUS platinum certified) is available.

Optimized Cooling

Cooling is optimized by finely controlling the FAN speed for each cooling group.

Reduction of Power Consumption

Power capping for PRIMEQUEST can automatically lower system performance so as to keep power consumption under pre-determined value.

Compliant with RoHS Directive (Revision in September 2010)

Features (5)

Hardware Partitioning (PPAR)

PPAR creates multiple separate blocks (partitions) in one cabinet and operates an independent system in each partition to allow flexible system operation.

- A different OS can be operated in each partition. Configuration example: 8 socket model
- An OS in one partition can be rebooted or shut down separately from other partitions.
- The partitions can be configured flexibly by using flexible I/O and Reserved SBs.
- For details, refer to "Key Points

for Hardware Partitioning Design".

- Multiple configurations can be operated in a single cabinet, and multiple servers that are operated separately from each other can be integrated in the cabinet.
- If a failure occurs in a partition, the hardware can protect other partitions from being affected by the failure.



Features (6)



Memory Scale-up Board

Memory Scale-up Boards are used for expanding the memory capacity of the partitions.

- Memory Scale-up Boards are only supported for the 3400E. A maximum of three boards can be installed in a cabinet.
- A maximum of 3TB can be installed in a single board.
- Degradation Function

If redundantly configured hardware fails, this function isolates the failed component and configures the system with the remaining hardware resources to continue system operation.

Flexible I/O

- Partitioning does not have any limitations on the placement of SBs and IOUs.
- Flexible I/O enables the Reserved SB function by using alternative SBs.
- Dynamic Reconfiguration (3400E and 3800E only)

Dynamic Reconfiguration links with RHEL to enable the addition or the removal of hardware resources such as CPUs, memory, and I/O in a partition without stopping the PPAR system.

Adding or removing SB units or IOU units with PCI Box LH modules is possible.

Features (7)



Reserved SB Function

I For details, refer to "<u>Key Points for Hardware Partitioning Design</u>".

This function automatically disconnects a failed SB, incorporates a spare SB that has been configured in advance, and starts PPAR to continue system operation.

Extended Partitioning

This function further divides the blocks that were divided by PPAR into smaller partitions.

Extended Socket

This function enables high-speed communications of up to 20Gbps between extended partitions that were configured in the same physical partition.

Original Dump Function

 \Rightarrow For details, refer to "<u>Key Points for I/O Configuration Design</u>".

This function collects system information when a problem occurs in the OS.



2. Basic Hardware Configuration

This chapter describes the basic configuration of each component. For details, refer to "Operating Manual".

Operator Panel (OPL 3800B/B2)



The panel for displaying the system status

System LED Control

A device (I2C LED Driver) installed to control the system LEDs that display the system status.

Intake Air Temperature Sensor

A sensor that is installed for monitoring the intake air temperatures of the main unit.

System FRU

A system FRU (I2C EEPROM) that is installed for storing information about the main unit.



OPUE (Operator Panel Unit of 3x00E/E2)



The panel for displaying the system status

- System LED Control
 - A device (I2C LED Driver) installed to control the system LEDs that display the system status.
- Intake Air Temperature Sensor
 - A sensor that is installed for monitoring the intake air temperatures of the main unit.
- System FRU
 - A system FRU (I2C EEPROM) that is installed for storing information about the main unit. 4

Four FBUs of EP420e RAID card

Four FBUs of RAID card

FBU Slot	RAID card
#0	IOUE#0 Slot #0
#1	IOUE#1 Slot #0
#2	IOUE#2 Slot #0
#3	IOUE#3 Slot #0



System Board (SB)

A board for installing CPUs and memories.

Features

- Up to four SBs can be installed in a cabinet.
- Necessary to mount SBs from slot#0 sequentially.
- At least two CPU must be installed on an SB.
- At least a set of memory modules (two modules) must be installed for each CPU on an SB.



External Ports

For a partition, the following ports are supported for the local KVM.

(The local KVM cannot be connected permanently. Use the video redirection function.)

- 3x00E/E2 : When multiple SBs are used to configure partitions, only the external ports of the Home SB are available.
- 3800B/B2 : When multiple SBs are used, only the external ports of the only SB#0 are available.
 - USB 3.0 x 4 (USB Type A)
 - VGA x 1 (D-sub 15pin)







BMM (System Board)



Sub-module of system Board

■ 3x00E/E2 :

- For changing Home SB, all system boards need BMM, but BMM in Home SB is only available.
- TPM and M.2 Flash device are not supported with Reserved SB and ASR&R.
- USB ports, VGA port, TPM and M.2 Flash device can work on only Home SB.
- eLCM must be ordered for each System Board and microSD must be mounted on each BMM of System Board.

■ 3800B/B2 :

• SB#0 only needs BMM. It is installed as standard.

• eLCM, TPM and M.2 Flash device can be mounted.



CPU (1)



Intel[®] Xeon[®] Scalable processors are used.

- Ultra Path Interconnect (UPI)
 - A high-speed system bus delivering up to 10.4GT/s (bandwidth 41.6GB/s)
 - The UPI connects a CPU and a chipset or connects CPUs to each other.
- CPU Installation Conditions
 - 3800B/E/B2 : Two CPUs must be installed on each SB.
 - 3400E/3800E2 : One or Two CPUs must be installed on each SB.
 - One or Two CPUs must be installed on each SB.
 - At least one set of memory modules (two DIMMs) must be installed for a CPU.
- Conditions for Installing Different CPUs

• 3x00E/E2 :

Different types of CPUs can not be installed in same PPAR. (The CPUs must be supported in the PRIMEQUEST model.)

• 3800B/B2 :

All CPUs must be same.

CPU (2) SKU (3800x2)



A UPI interface and memory controllers are integrated in these processors. It is possible to scale up the configuration by connecting CPUs via the UPI.

Product Name	Number of Cores	Freq. (GHz)	LLC (MB)	UPI (GT/s)	TDP (W)	Max. Memory per CPU (TB)	3800E2	3800B2
Intel® Xeon® Platinum 8280L Processor	28	2.7	38.50	10.4	205	4.5	Yes	Yes
Intel® Xeon® Platinum 8280M Processor	28	2.7	38.50	10.4	205	2.0	Yes	Yes
Intel® Xeon® Platinum 8280 Processor	28	2.7	38.50	10.4	205	1.0	Yes	Yes
Intel® Xeon® Platinum 8276L Processor	28	2.2	38.50	10.4	165	4.5	Yes	Yes
Intel® Xeon® Platinum 8276M Processor	28	2.2	38.50	10.4	165	2.0	Yes	Yes
Intel® Xeon® Platinum 8276 Processor	28	2.2	38.50	10.4	165	1.0	Yes	Yes
Intel® Xeon® Platinum 8270 Processor	26	2.7	35.75	10.4	205	1.0	Yes	Yes
Intel® Xeon® Platinum 8268 Processor	24	2.9	35.75	10.4	205	1.0	Yes	Yes
Intel® Xeon® Platinum 8260L Processor	24	2.4	35.75	10.4	165	4.5	Yes	Yes
Intel® Xeon® Platinum 8260M Processor	24	2.4	35.75	10.4	165	2.0	Yes	Yes
Intel® Xeon® Platinum 8260 Processor	24	2.4	35.75	10.4	165	1.0	Yes	Yes
Intel® Xeon® Platinum 8256 Processor	4	3.8	16.50	10.4	105	1.0	Yes	Yes
Intel® Xeon® Platinum 8253 Processor	16	2.2	22.00	10.4	125	1.0	Yes	Yes
Intel® Xeon® Gold 6262V Processor	24	1.9	33.00	10.4	135	1.0	planned	No
Intel® Xeon® Gold 6254 Processor	18	3.1	24.75	10.4	200	1.0	Yes	No
Intel® Xeon® Gold 6252 Processor	24	2.1	35.75	10.4	150	1.0	planned	No
Intel® Xeon® Gold 6248 Processor	20	2.5	27.50	10.4	150	1.0	Yes	No
Intel® Xeon® Gold 6246 Processor	12	3.3	24.75	10.4	165	1.0	planned	No
Intel® Xeon® Gold 6244 Processor	8	3.6	24.75	10.4	150	1.0	Yes	No
Intel® Xeon® Gold 6242 Processor	16	2.8	22.00	10.4	150	1.0	Yes	No
Intel® Xeon® Gold 6240L Processor	18	2.6	24.75	10.4	150	4.5	planned	No
Intel® Xeon® Gold 6240M Processor	18	2.6	24.75	10.4	150	2.0	planned	No
Intel® Xeon® Gold 6240 Processor	18	2.6	24.75	10.4	150	1.0	Yes	No
Intel® Xeon® Gold 6238L Processor	22	2.1	30.25	10.4	140	1.0	planned	No
Intel® Xeon® Gold 6238M Processor	22	2.1	30.25	10.4	140	4.5	planned	No
Intel® Xeon® Gold 6238 Processor	22	2.1	30.25	10.4	140	2.0	planned	No
Intel® Xeon® Gold 6234 Processor	8	3.4	24.75	10.4	130	1.0	planned	No
Intel® Xeon® Gold 6230 Processor	20	2.1	27.50	10.4	125	1.0	Yes	No
Intel® Xeon® Gold 6226 Processor	12	2.7	19.25	10.4	125	1.0	planned	No
Intel® Xeon® Gold 6222V Processor	20	1.8	27.50	10.4	115	1.0	planned	No

CPU (3) SKU (3x00B/E)



A UPI interface and memory controllers are integrated in these processors. It is possible to scale up the configuration by connecting CPUs via the UPI.

Product Name	Number of Cores	Freq. ()	LLC (MB)	UPI (GT/s)	TDP (W)	Max. Memory per CPU (GB)	3x00E	3800E	3400E
Intel® Xeon® Platinum 8180M Processor	28	2.5	38.5	10.4	205	1,500	Yes	Yes	Yes
Intel® Xeon® Platinum 8180 Processor	28	2.5	38.5	10.4	205	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8176M Processor	28	2.1	38.5	10.4	165	1,500	Yes	Yes	Yes
Intel® Xeon® Platinum 8176 Processor	28	2.1	38.5	10.4	165	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8170M Processor	26	2.1	35.8	10.4	165	1,500	Yes	Yes	Yes
Intel® Xeon® Platinum 8170 Processor	26	2.1	35.8	10.4	165	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8164 Processor	26	2.0	35.8	10.4	150	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8168 Processor	24	2.7	33.0	10.4	205	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8160M Processor	24	2.1	33.0	10.4	150	1,500	Yes	Yes	Yes
Intel® Xeon® Platinum 8160 Processor	24	2.1	33.0	10.4	150	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8153 Processor	16	2.0	22.0	10.4	125	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8158 Processor	12	3.0	24.8	10.4	150	768	Yes	Yes	Yes
Intel® Xeon® Platinum 8156 Processor	4	3.6	16.5	10.4	105	768	Yes	Yes	Yes

CPUs Supported by the PRIMEQUEST 3000 Series (1)

Note: For the latest information on the supported CPUs, contact your sales representative.

The CPUs that can be installed vary between models. The CPUs listed in table (1) and table (2) cannot be mixed. To use Memory Scale-up Boards, two CPUs must be installed in the system board of the connection destination.

CPU (4) SKU (3400E)



PPAR includes these SKUs can't use MSB.

CPUs Supported by the PRIMEQUEST 3000 Series (2)

Product Name	Number of Cores	Freq.	LLC (MB)	UPI (GT/s)	TDP (W)	Max. Memory per CPU (GB)	3800E 3800B	3400E
Intel® Xeon® Gold 6152 Processor	22	2.1	30.3	10.4	140	1,500	-	Yes
Intel® Xeon® Gold 6148 Processor	20	2.4	27.5	10.4	150	768	-	Yes
Intel® Xeon® Gold 6138 Processor	20	2.0	27.5	10.4	125	768	-	Yes
Intel® Xeon® Gold 6154 Processor	18	3.0	24.8	10.4	200	768	-	Yes
Intel® Xeon® Gold 6150 Processor	18	2.7	24.8	10.4	165	768	-	Yes
Intel® Xeon® Gold 6140M Processor	18	2.3	24.8	10.4	140	1,500	-	Yes
Intel® Xeon® Gold 6140 Processor	18	2.3	24.8	10.4	140	768	-	Yes
Intel® Xeon® Gold 6142M Processor	16	2.6	22.0	10.4	150	1,500	-	Yes
Intel® Xeon® Gold 6142 Processor	16	2.6	22.0	10.4	150	768	-	Yes
Intel® Xeon® Gold 6130 Processor	16	2.1	22.0	10.4	125	768	-	Yes
Intel® Xeon® Gold 6132 Processor	14	2.6	19.3	10.4	140	768	-	Yes
Intel® Xeon® Gold 6146 Processor	12	3.2	24.8	10.4	165	768	-	Yes
Intel® Xeon® Gold 6136 Processor	12	3.0	24.8	10.4	150	768	-	Yes
Intel® Xeon® Gold 6126 Processor	12	2.6	19.3	10.4	125	768	-	Yes
Intel® Xeon® Gold 6144 Processor	8	3.5	24.8	10.4	150	768	-	Yes
Intel® Xeon® Gold 6134M Processor	8	3.2	24.8	10.4	130	1,500	-	Yes
Intel® Xeon® Gold 6134 Processor	8	3.2	24.8	10.4	130	768	-	Yes
Intel® Xeon® Gold 6128 Processor	6	3.4	19.3	10.4	115	768	-	Yes

Note: For the latest information on the supported CPUs, contact your sales representative.

The CPUs that can be installed vary between models. The CPUs listed in table (1) and table (2) cannot be mixed. To use Memory Scale-up Boards, two CPUs must be installed in the system board of the connection destination.

Yes: Installable -: Not installable

CPU Installation Condition (1) (3x00E/E2)



Conditions for Installing Different CPUs (1/2)

Different types of CPUs can be installed in different PPAR blocks of a cabinet (*).



(*) The CPUs must be supported in the PRIMEQUEST model.

CPU Installation Condition (2) (3x00E/E2)

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Conditions for Installing Different CPUs (2/2)



CPU Selection Guide (1)



Intel® Xeon® Scalable Processor

- Intel® Xeon® Platinum Processor 82xx : 8 socket capable
- Intel® Xeon® Gold Processor 62xx : 4 socket capable (3800E2 only)

Memory Limits

- 82xxL/62xxL : Max. 4.5TB memory / CPU
- 82xxM/62xxM : Max. 2.0TB memory / CPU
- 82xx/62xx : Max. 1.0TB memory / CPU
 - TDP and performance are same.

SAP HANA

SAP/HANA certify 8280L, 8280M, 8280, 8276L, 8276M and 8276.

CPU Selection Guide (2)



- PPAR with Gold 62xx can be configured the combinations as follows.
 - SB#0 (SB#1 can be reserved SB.)
 - SB#1 (SB#0 can be reserved SB.)
 - SB#2 (SB#3 can be reserved SB.)
 - SB#3 (SB#2 can be reserved SB.)
 - SB#0 and SB#1 (No SB can be reserved SB.)
 - SB#2 and SB#3 (No SB can be reserved SB.)

CPU#1 on any home SB of 3800E2 have to be configured to connect IOU#2 or IOU#3.
CPU Selection Guide (3)



Intel® Xeon® Scalable Processor

- Intel® Xeon® Platinum Processor : 8 socket capable
- Intel® Xeon® Gold Processor : 4 socket capable (3400E only)

Memory Limits

- 81xxM : Max. 1.5TB memory / CPU
- 81xx : Max. 768GB memory / CPU
 - TDP and performance are same.
 - 12TB memory in a system needs 81xxM

SAP HANA

SAP/HANA certify 8180M, 8180, 8176M and 8176.

Memory (1)



Supported memory types are 8GB, 16GB, 32GB, 64GB, 128GB and 256GB DDR4 DIMM.

- Install a set of two identical DIMMs.
 - Install four DIMMs (two sets) to use the Memory Mirror function.
 (Refer to "<u>Memory</u>)".)
- For one CPU, six sets of memory modules can be installed in the memory slots on the SB.
- Installed memory operates only when the relevant CPU is operating.
- Installation Group

Install memory modules in pairs where the memory slot numbers third digit has a difference of 3.



PRIMEQUEST 3000 Series Design Guide

Memory (2)



Memory Installation Conditions

- For one CPU, 1 to 6 sets of memory modules can be installed.
- Memory must be added on a set basis. (Add memory on a two-set basis when the Memory Mirror function is used.) When only one set of memory module is installed, if one module fails, the SB is disconnected from the PPAR block. Therefore, it is recommended to install at least two sets of memory modules.
- RDIMM and LR DIMM cannot be populated together within a partition.
- 4 Rank DIMM cannot be populated with 1 and 2 Rank DIMM.
- When multiple DIMMs are used, the DIMM must be populated from farther side.
- Example in system: In iMC#0, farther side is '0A0'.
- When DIMMs with different rank number is populated together within a DDR channel, the DIMM with largest rank number must be populated first.
- When memory mirror is used, the same DIMMs must be populated in the DIMM slots which are the pare for memory mirror each other.
- When memory sparing is used, two and more rank numbers are required in each DDR channel.

\Rightarrow Please refer the configurator.

https://partners.ts.fujitsu.com/com/order-supply/configurators/primergy_config/Pages/PQ-current.aspx

Order	Droduct.nome	Memory	Lockstep	RAS		
Number	Product name	Operation Mode	Mode	Mirrored Region	Non-mirrored Region	
MC-0PMM5	Memory Mode Setting (Performance)	Normal	Disabled	none	SDDC+1	
MC-0PMM7	Momony Mode Setting (Mirror)	Full Mirror	Dischlad		none	
		Address Range Mirror	Disabled	SECDED	SECDED	
	Mamon Made Setting (Normal or Spare)	Normal	Enabled	none	ADDDC-MR	
IVIC-UPIVIIVIO	wemory wode second (Normal of Spare)	Sparing	Disabled	none	SDDC+1	

Memory (3) (3800B/B2)



Conditions of Installing Different Memory Modules

32GB memory (16GB single-rank (*1) DIMM x 2) and 64GB memory (32GB dual-rank (*1) DIMM x 2) can be installed.

Different types of memory modules other than the above combination cannot be installed together.



Memory (4) (3x00E/E2)



Conditions of Installing Different Memory Modules

32GB memory (16GB single-rank (*1) DIMM x 2) and 64GB memory (32GB dual-rank (*1) DIMM x 2) can be installed in the same partition.

Different types of memory modules other than the above combination cannot be installed together in the same partition.

Different types of memory modules can be installed in a different partition on a different SB.



Memory (5)



Memory Mirror

• Mirroring is performed between the memory pare in slots.

Memory Spare

- When multiple DIMM pairs are configured, a DIMM rank is used as a spare of other ranks.
- If the number of correctable errors that occur in a specific time period in a rank exceeds a threshold, the contents of the memory are copied to the rank that has been reserved as a spare and the DIMM rank in which the errors occurred is disconnected.
- * Memory Mirror and Memory Spare cannot be enabled at the same time.



* The available memory capacity is five-sixths of the total capacity of the installed memory.

DCPMM (3800x2)



Have to contact the following address before order or proposal. fj-pq-tech@dl.jp.fujitsu.com

• There are special notes and warnings to configure and operate with DCPMM.

- 3 types of DCPMM : 128GB, 256GB and 512GB.
- PRIMEQUEST supports DCPMM 2-2-2, 2-2-1 and 2-1-1.
 - 2CPUs must be installed on a SB.
 - 3800E2
 - The configurations of DCPMM and DDR4 DIMM on SBs in a partition must be same.
 - 3800B2
 - The configurations of DCPMM and DDR4 DIMM on SBs must be same.
 - When Memory mode, the ratio of DDR4 DIMM and DCPMM should be ranges of "1:4" from "1:16".
 - \Rightarrow Please refer "Configurator" for more information.

	CPU i (i= 0 and 1) **2CPUs must be installed on a SB.									
DCPMM	iMCm (m=0 and1)									
	CI	HO	CI	-11	CH2					
	slot 0	slot 1	slot 0	slot 1	slot 0	slot 1				
2-2-2	DDR4 DIMM	DCPMM	DDR4 DIMM	DCPMM	DDR4 DIMM	DCPMM				
2-2-1	DDR4 DIMM	DCPMM	DDR4 DIMM	DCPMM	DDR4 DIMM	none				
2-1-1	DDR4 DIMM	DCPMM	DDR4 DIMM	none	DDR4 DIMM	none				

SAP/HANA with DCPMM

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Example of DCPMM for SAP/HANA

- SAP does not support over 24TB.
- SAP/HANA supports DCPMM 2-2-2 as follows.
 - There are limitations for Dual power feed using 2200W PSU.

		1SB	2SB	3SB			_	_	
AEP+DDR4	SKU	B2	+8276x/828	30x	4SB	B2	E2	B2	E2
		E2	+8276x/828	30x		+8276x	+8276x	+8280x	+8280x
128GB AEP + 32GB DRAM	base	1.9TB	3.8TB	5.6TB	7.5TB				
128GB AEP + 64GB DRAM	М	2.3TB	4.5TB	6.8TB	9.0TB				
128GB AEP + 128GB DRAM	М	3.0TB	6.0TB	9.0TB	12.0TB	No	Limitation		n
256GB AEP + 64GB DRAM	М	3.8TB	7.5TB	11.3TB	15.0TB	Limitation			
256GB AEP + 128GB DRAM	L	4.5TB	9.0TB	13.5TB	18.0TB	(PSU 2+n)	(PSU 3+n)		ר)
128GB AEP + 256GB DRAM	L	4.5TB	9.0TB	13.5TB	18.0TB				
256GB AEP + 256GB DRAM	L	6.0TB	12.0TB	18.0TB	24.0TB				
512GB AEP + 128GB DRAM	L	7.5TB	15.0TB	22.5TB	30.0TB**	** 0 0 0 4			
512GB AEP + 256GB DRAM	L	9.0TB	18.0TB	27.0TB**	36.0TB**	SAP do	es not supp	Joir over	241 B.

Memory Scale-up Board (MSB)

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Memory installation boards only for the 3400E

Features

- Up to three Memory Scale-up Boards can be installed in a cabinet.
- At least four sets of memory modules (eight modules) must be installed in a Memory Scale-up Board.
 A maximum of 12 sets of memory modules (24 modules) can be installed in a Memory Scale-up Board.
- Memory Installation Conditions
 - Same as the system board
- Notes
 - To use Memory Scale-up Boards, two CPUs must be installed in the system board of the connection destination.
 - SBs can be specified as Reserved SBs even if the partitions also include Memory Scale-up Boards. Memory Scale-up Boards do not support spare switching similar to Reserved SBs.
 * Memory Scale-up Boards support the degradation function.
 - The supported OSs are RHEL only.
 Windows Server, SLES, Oracle Linux, Oracle VM and VMware are not supported.



1CPU/1SB/PPAR (only for 3400E and 3800E2)



PPAR based on one SB that mounts only one CPU.

Notes

- 3400E works with the firmware PA18071 or later.
- MSB cannot be used.
- IOU#2 and #3 do not work.

Also, DU_M#2, DU_M#3, PCI-BOX#2 and PCI-BOX#3 do not work.

Combinations in same chassis	SB#1 (1CPU)	SB#1 (2CPU)
SB#0 (1CPU)	Avalable	Not Avalable
SB#0 (2CPU)	Not Avalable	Avalable

- 1) SB#0, IOU#0 and CPU#0 on SB#0.
- 2) SB#1, IOU#1 and CPU#0 on SB#1.



Management Board (MMB) (1)



A system control board that is equipped with an independent dedicated processor except 3800B/B2

Features

 Redundant configuration can be achieved by installing two boards.



- Hot swap is possible only in a redundant configuration.
- The dedicated CPU operates as a dedicated host for system management.
- A Web server that is included in an MMB provides a graphical user interface.
- •An MMB can be operated from a Web browser (GUI) on a remote PC, and it is not necessary to prepare an operation management server separately.
- Hardware management and monitoring function
- Consolidated management and monitoring of the power supply, fan, and hardware of each partition
- Hardware setup (configuration change) function
- Power control in the cabinet, sensor monitoring, partition configuration settings, Memory Mirror mode settings, and reset process
- Collection and display of operation logs and error logs

Management Board (MMB) (2)

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• High-Level Security

- An original protocol is used to perform internal communication.
- Server management interfaces (Web Server and SNMP) are managed collectively.
- It is possible to add user definitions that allow operating only specific partitions. This function prevents wrong operations and malicious operations on partitions.



MMB (One board is included in the default configuration. Another MMB can be added for redundancy.)

Management Board (MMB) (3)



External Ports

•User port x 2

Used to connect to the management LAN for operation management of PRIMEQUEST.

Duplication is possible.

Port for maintenance x 1

Used by field engineers for maintenance.

• COM port for an MMB console

Used when user ports are not available.



Management LAN Unit (3800B/B2)



External Ports

Management LAN Port x1

Used to connect to the management LAN for operation management of PRIMEQUEST.

Shared LAN Port x 1

Used to connect to the management LAN and system LAN.



IO Unit of 3800B/B2 (IOUB)



A unit that is equipped with PCI Express slots.

- Features
 - An IOU connects components and external devices to an SB.
 - Up to two IOUBs can be installed in a cabinet.
 - Up to eight PCI cards with low profile bracket sizes can be installed.
 - Up to two PHP PCI Gen3 x16 lane cards, two PCI Gen3 x16 lane cards and four PCI Gen3 x8 lane cards can be installed.
 - External RAID card with FBU can mount Slot#0 only.
 - If only one SB in a cabinet, slot#0/1/2/3 of IOUB#0 and DU_SAS#0 can be used.
 - If only two SBs in a cabinet, all slots of IOUB#0 and DU_SAS#0/1 can be used.
 - •The configuration of only three SBs in a cabinet is can not be supported.

-						
SB	CPU	Bus	Connect to	Slot or Port		
		CPU-PCH Bus	BMM	Management / Shared LAN		
	<u> </u>	PCIe G3(x16)	DU_SAS#0	HDD#0, #1, #2, #3		
#0	#0	PCIe G3(x8)		Slot#0(x8), FBU capable		
#0		PCIe G3(x8)		Slot#1(x8)		
	#1	PCIe G3(x16)		Slot#2(x16, PHP)		
	#1	PCIe G3(x16)		Slot#3(x16, PHP)		
		PCIe G3(x16)	1006#0	Slot#4(x8)		
	#0	PCIe G3(x8)		Slot#5(x8)		
#1	#1	PCIe G3(x8)		Slot#6(x16)		
	44	PCIe G3(x16)		Slot#7(x16)		
	#1	PCIe G3(x16)	DU_SAS#1	HDD#0, #1, #2, #3		
	40	PCIe G3(x8)		Slot#0(x8), FBU capable		
<u></u> 2	#0	PCIe G3(x8)		Slot#1(x8)		
#2	#1	PCIe G3(x16)		Slot#2(x16, PHP)		
	#1	PCIe G3(x16)		Slot#3(x16, PHP)		
		PCIe G3(x16)	100B#1	Slot#4(x8)		
<u>مبر</u>	#0	PCIe G3(x8)		Slot#5(x8)		
#3		PCIe G3(x8)		Slot#6(x16)		
	#1	PCIe G3(x16)		Slot#7(x16)		



IO Unit of 3x00E/E2 (IOUE)

A unit that is equipped with PCI Express slots and 10GbE LAN ports.

Features

- An IOU connects components and external devices to an SB.
- Up to four IOUEs can be installed in a cabinet.
- To connect a PCI Box, install a PCI Box connection card in the specified PCI Express slot on the IOUE.
- There are two 10G BASE-T LAN ports same as X550-T2.
- Up to one PCI Gen3 x16 lane cards and three PCI Gen3 x8 lane cards can be installed.
- All slots are not hot plugged.
- External RAID card with FBU can mount Slot#0 only.





IO Unit (3800B) Example



IOU Configuration Examples

[Example with LAN Cards] Addition of LAN ports in a cluster configuration



[Example with FC Cards] Connection to an external storage device (ETERNUS)

ETERNUS

[Example with a SAS Array Controller Card] Connection to an external hard disk cabinet (JX40 S2)



[Example with a SAS Card] Connection to a backup cabinet (PRIMERGY SX05)



PRIMERGY SX05

IO Unit (3x00E) Example



IOU Configuration Examples

[Example with LAN Cards] Addition of LAN ports in a cluster configuration



[Example with FC Cards] Connection to an external storage device (ETERNUS)



[Example with a SAS Array Controller Card] Connection to an external hard disk cabinet (JX40 S2)



[Example with a SAS Card] Connection to a backup cabinet (PRIMERGY SX05)



PRIMERGY SX05

Disk Unit (DU_SAS)

A unit in which internal storage is installed

Features

- Up to two units can be installed in a cabinet.
- Up to four 2.5-inch internal hard disk drives (HDDs) or internal solid state drives (SAS-SSDs) can be installed in a unit.
 - In RAID configurations, hot replacements can be performed for internal HDDs and SAS-SSDs (excluding RAIDO and non-mirror configurations).
 - RAID0, RAID1, RAID1E, RAID5, RAID6, and RAID10 are supported.
 - A hot spare disk is supported.

For details on RAID configurations, refer to "<u>HDD Configuration</u>".

PRIMEQUEST 3000 Series Design Guide



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A unit in which internal storage is installed in 3x00E only.

Features

- Up to four units can be installed in a cabinet.
- Up to four 2.5-inch internal hard disk drives (HDDs) or internal solid state drives (SAS-SSDs) can be installed in a unit.
 - In RAID configurations, hot replacements can be performed for internal HDDs and SAS-SSDs (excluding RAIDO and non-mirror configurations).
 - RAID0, RAID1, RAID1E, RAID5, RAID6, and RAID10 are supported.
 - A hot spare disk is supported.
- One RAID card can be installed in a unit.

For details on RAID configurations, refer to "<u>HDD Configuration</u>".







Internal SSD (Limited Service Life Component)



Solid State Drives Installed in DU_SAS, IOUs or PCI Boxes

Limited Number of Write Operations

"Limited service life components" include the NAND flash memory which has a limited number of write operations

Depending on how SSDs are used, the NAND flash memory may reach the predetermined number of write operations before the product warranty period expires.

■Warranty period

The product warranty period ends when the warranty period expires or when the product reaches the guaranteed predetermined write value, whichever comes first.

Checking the status of the allowed write value, etc.

- The status can be checked with management software or with command line tools.
- Estimate the amount of writes when designing the system. In addition, check the status regularly after system implementation.
- If there is a possibility that the guaranteed predetermined write value is reached before the system reaches the end of its service life, spare parts and procedures for moving the data to the spare parts must be prepared.

DWPD (Drive Writes Per Day): The average number of overwrite operations that can be performed in one day with the amount of data equivalent to the entire drive

Flash Device Selection Guide

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Product	Order Number	DWPD	Location	Use case
SAS SSD 400GB	MC*5DG821	10	DU_SAS	Heavy load.
SAS SSD 800GB	MC*5DG921	10	DU_SAS	Heavy load.
SAS SSD 1.6TB	MC*5DGA21	10	DU_SAS	Heavy load.
SAS SSD 400GB	MC*5DH821	3	DU_SAS	General use.
SAS SSD 800GB	MC*5DH921	3	DU_SAS	General use.
SAS SSD 1.6TB	MC*5DHA21	3	DU_SAS	General use.
SAS SSD 3.2TB	MC*5DHB21	3	DU_SAS	General use.
SAS SSD 6.4TB	MC*5DKG21	3	DU_SAS	General use.
PCIeSSD AIC 1.6TB	MC*0JSDG1	3	IOU	High performance.
PCIeSSD AIC 3.2TB	MC*0JSDH1	3	IOU	High performance.
M.2 240GB noVM	MC*5FB751	5	BMM	SLES12SP4 only (SAP/HANA)
Dual micro SD 64GB	MC*5FA411	TBW=128TB	BMM	Boot device

DWPD (Drive Writes Per Day): The average number of overwrite operations that can be performed in one day with the amount of data equivalent to the entire drive

TBW (Total Bytes Written): Unit is TB.

Flash device for VMware

FUĴĨTSU

vSphere SSD and Flash Device Support (2145210)

 https://kb.vmware.com/selfservice/search.do?cmd=displayKC&docType=kc&docTypeID=DT_K B_1_1&externalId=2145210

				Host sw	ap cache	Datastore	VFlash	Boot D	Device	Coredump	Logging	Device
Interface		Cap.	TBW	<u>>- 365</u>	- 365 - 3650	>- 3650	>= 365	min.	>= 2	>= 0.1	64 TBW	128 TBW
Form Factor		(TB)	1511	7= 303 TRW	72 3030 TRW	72 3030 TBW	TBW	0.5 TBW	TBW	TBW	(dedicated)	(colocated)
				IDW	IBW		<= 4TB	>= 4GB		>= 4 GB	>= 4	IGB
SAS SSD	10	0.4	7,300	OK	OK	ОК	OK	OK	OK	OK	OK	OK
SAS SSD	10	0.8	14,600	OK	OK	ОК	OK	OK	OK	OK	OK	OK
SAS SSD	10	1.6	29,200	OK	OK	ОК	OK	OK	OK	OK	OK	OK
SAS SSD	3	0.8	4,380	OK	OK	ОК	OK	OK	OK	OK	OK	OK
SAS SSD	3	1.6	8,760	OK	OK	ОК	OK	OK	OK	OK	OK	OK
SAS SSD	3	3.2	17,520	OK	OK	ОК	OK	OK	OK	OK	OK	OK
PCIeSSD AIC	3	2	10,950	OK	OK	ОК	OK	OK	OK	OK	OK	OK
PCIeSSD AIC	3	4	21,900	OK	OK	OK	OK	OK	OK	OK	OK	OK
Dual micro SD	N/A	.064	128	NG	NG	NG	NG	OK	OK	NG	NG	NG

OK : No Problem

OK(1) : There is unused space.

NG : Don't use.

** PCIeSSD SFF(planned)

PCI Box (1) (3x00E)

An extended I/O cabinet that is equipped with 12 PCI Express slots, each having eight PCI Express Gen3 (8Gbps) lanes

Features

- Up to four PCI Boxes can be connected to a cabinet. (No PCI Box can be connected to 3800B.)
- The PCI Box connection card on an IOU is used to connect a PCI Box.
- PCI Hot Plug (PHP) for PCI Express cards is supported.
- A PCI Box can be divided into two partitions (PCI Box LH modules), each having six slots.
- PCI Boxes, power supply units and power cables for PCI Boxes need to be obtained separately.



For details on the power supply configuration for a PCI Box, refer to "<u>Power Supply Redundancy</u>".







PCI Box (2) (3x00E)



IOU combinations and the available number of PCI slots

Model	Number of IO units	Number of PCNCs	Number of PCI Boxes	Available number of slots
	4	8	4	56
3/00E	3	6	3	42
3800E	2	4	2	28
5000E	1	2	1	14

Note: PCI Box connection cards (PCNCs) must be installed in IOUs to connect PCI Boxes. One PCI Box connection cable is bundled with each PCNC. Six of the PCI Box slots can be used with one PCNC.

PCI Box (3) (3x00E)



PCI Box Connection Conditions

Different cabinets cannot be connected to a PCI Box (PCI Boxes cannot be shared by servers).



Connection to Different PCI Boxes



Connection from Different Cabinets to a PCI Box



* The connection configuration depends on the type of IO unit that is to be installed.

PCI Box (4) (3x00E)



A Configuration for Redundancy of PCI Boxes and PCI Box LH modules The effects of a failed PCI Box are taken into account.



Advantage

Even if one PCI Box fails, the failed PCI Box can be disconnected by a reboot and the system can be started using the other PCI Box. **Disadvantage**

Both partitions stop when a PCI Box fails.

A Configuration for Failure Isolation of PCI Boxes



The failure in partition#1 is isolated from partition#0.

Advantage

This configuration provides failure isolation. Even if the PCI Box for a partition fails, the other partition is not affected.

Disadvantage

The PCI Box for the relevant partition cannot be used until the PCI Box is repaired.

For details on redundancy of PCI Express cards and connection destinations, refer to "3.3.5 Network Configuration".

Power Supply Unit (PSU)



- A power supply unit (with FANs installed) that converts AC200V or AC100V to DC12V
 - \Rightarrow For details on connecting this unit, refer to "2.3 Power cable connection" in "Operating Manual".
 - Up to six PSUs can be installed in a cabinet.
 - \Rightarrow For details on the number of PSUs that must be installed, refer to "4.5.1 PSU Configuration" in "Operating" Manual".
 - The following three types of units are available (but cannot be installed together).
 - High-efficiency power supply unit (100/200V) 80 PLUS[®] Platinum certified

 - 3800B/3800E/3800B2/3800E2 does not support 100V.



Power Supply Configuration

		34()0E	3800	3800B/B2				
Input voltage	Redundancy	no MSB	with MSB	TDP =< 165W and P4600 = 0 and DCPMM = 0	Other configurations	no limitations			
	Non-redundant	2 (2 + 0)	3 (3 + 0)	2 (2 + 0)	3 (3 + 0)	2 (2 + 0)			
200V	Redundant	3 (2 + 1)	4 (3 + 1)	3 (2 + 1)	4 (3 + 1)	3 (2 + 1)			
	Dual power feed	4 (2 +2)	Not supported	4 (2 +2)	Not supported	4 (2 +2)			
	Non-redundant	3 (3 + 0)	Not supported						
100V	Redundant	4 (3 + 1)							
	Dual power feed	Not supported							

MMB and Disk Unit (3x00E)



A unit in which internal storage and MMB is installed in 3x00E only.

- Features
 - The unit is installed as standard.
 - Up to four DU_M can be installed in a unit.
 - Up to two MMB can be installed in a unit.



For details on DU_M, \Rightarrow refer to "<u>DU_M</u>".

Peripheral Configuration (1)



Console Unit

A PC is required to connect a console.

For details, refer to "<u>4.1 Key Points for Console Operation</u>".

Peripheral Configuration (2)



Rack

For details on racks that can be installed and the use of rack products, contact your sales representative.

* Racks must be secured to the floor as a countermeasure

How to Select Racks



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Peripheral Configuration (3)

■Rack Installation Requirements ⇒For details on rack installation conditions, refer to "Operating Manual" of 3800B.



	description of points
1	Front of rack
2	Rear of rack
А	Rack depth (comparison PRIMECENTER Rack 940/1000/1100 mm)
В	Rack width (comparison PRIMECENTER rack 700 mm)
C	Clearance for 19" installation level
C1	Front 19" installation level
C2	Rear 19" installation level
D	Cable routing area (cable area depth) and ventilation
Ε	Space for front panel and ventilation
F	Space for right and left support systems
Р	PRMEQUEST rack installation depth
a1	Front left support upright
a2	Front right support upright
b1	Rear left support upright
b2	Rear right support upright



Peripheral Configuration (4)

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Notes on Using Racks

- •When installing devices in a rack, install heavier devices on the bottom to lower the center of gravity and stabilize the rack.
- Attach a blank panel to the front of each unused space of the rack.





3. Hardware Configuration Design

This chapter describes the key points for designing hardware configurations.

Key Points for Hardware Design (3800Bn)



- PRIMEQUEST 3800Bn is more similar to PRIMERGY than 2800B3.
 - The management interface is iRMC Web UI same as PRIMERGY.
 - Almost all of the peripherals for PRIMEQUEST 3800Bn can be used for PRIMERGY.

Key Points for MMB Design (3x00En)



- When focusing on reliability, install two MMBs to create a redundant configuration
- Considerations Before Setting an MMB
 - IP address, host name, subnet mask, and gateway address
 - User accounts
 - Name of the PRIMEQUEST system (this is also used as the SNMP system name.)
 - Management VLAN (virtual IP addresses, etc.) environment

⇒ For details, refer to "Key Points for the MMB Settings" in "Linux (RHEL) Installation Guide" and "Connection and Setting of MMB" in "Reference Manual".
Key Points for Hardware Partitioning Design (3x00En)



Key Points for Configuring PPAR blocks

- Partitioning Design Rules
 - **For details, refer to** "<u>Partitioning Design Rules</u>".
 - Key points for partitioning design
 - Partition granularity and configuration conditions
 - The total numbers of system boards/Memory Scale-up Boards and CPUs per partition
- Functions That are Used for Partition Configuration
 - **For details**, refer to "<u>Functions That are Used for Partition Configuration</u>".
 - Home SB
 - Reserved SB function
 - Dynamic Reconfiguration function
- Switching Reserved SB Rules
 - For details, refer to "<u>Switching Reserved SB Rules</u>".
- Configuration Example
 - **I** For details, refer to "<u>Configuration Example</u>".
 - Guidelines for selecting a partition configuration
 - Configuration examples for each model

Partitioning Design Rules (1) (3x00En)



- One or more usable SBs and one or more usable IOUs are required in one partition.
- For essential operations, it is recommended to set them in a partition with the lowest partition number and also incorporate SBs with lower SB numbers in the partition.
- It is recommended that the SB with the lowest SB number is specified as the Home SB.
- When including DUs and PCI Boxes in a partition, include the IOU for connecting these components in the same partition.
- Note that the performance and the number of software licenses may vary if Reserved SB switching occurs or the system configuration is changed.

Component name	Minimum	Maximum	Configuration conditions
SB	1 board	/ boards in total	None
Memory Scale-up Board	0 boards		for 3400E only
IOU	1 unit	4 units	None
DU_SAS, DU_PCIEA(planned) and DU_M	0 units	The number of IOUs	Must be connected to an IOU
PCI Box LH (half of a PCI Box: LINKC x 1, PCI Express slot x 6)	0 units	The number of IOUs	Must be connected to an IOU

Partition Granularity and Configuration Conditions

* If an upper component is degraded, the lower components also cannot be used. (If an IOU is degraded, the DUs and PCI Boxes that are connected to the IOU are also degraded.)

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Partitioning Design Rules (2)



- The Total Numbers of System Boards/Memory Scale-up Boards and CPUs per Partition
 - When multiple SBs are used to configure a partition:
 - For the 3800B/3800E, two CPUs must be installed in each SB.
 - For the 3400E, the same number of CPUs must be installed between the SBs.
 - When 128GB DIMMs are used, a single partition can only be configured with one SB. A single partition cannot be configured with multiple SBs.
 - In a default configuration, an SB with two CPUs and an SB with one CPU in one partition (2SB-3CPU) cannot be installed.

Partition configuration (Number of SBs per partition)	Total number of CPUs	3800Bn	3400E	3400E with Memory Scale-up Board	3800En
	1	-	Yes	-	-
One SB	2	Yes	Yes	Yes (up to three Memory Scale-up Boards)	Yes
	2	-	Yes	-	-
T CD	3	-	-	-	-
TWO SBS	4	Yes	Yes	Yes (up to two Memory Scale-up Boards)	Yes
Three SBs	6	Yes	-	-	Yes
Four SBs	8	Yes	_		Yes



Home SB

The main SB among the SBs that are used to configure a PPAR block.

- Functions That Are Enabled on the Home SB
 - PCH (*1)

Onboard I/O is enabled, and USB ports and a VGA port can be used only on the Home SB.

Reference clock source

The clock source of the Home SB becomes the clock source in the partition.

- Selection of the Home SB
 - Specify the Home SB by using the MMB Web-UI.

If the Home SB is not specified directly, the first SB that is incorporated in the partition is specified as the Home SB.

* If the Home SB is removed from the partition or is degraded, the SB with the lowest number in the partition is specified as the Home SB.

(*1) PCH: An Intel C600 series with built-in controllers such as USB controllers, APIC, and RTC



Reserved SB Function

This function automatically disconnects a failed SB, incorporates a spare SB that has been implemented in advance, and restarts the PPAR block.

•The SB resources are not degraded, and the partition can be recovered quickly.

- •In a partition that has only one SB, even if the SB fails (or it is degraded), the partition can be recovered.
- During operation of a partition, an SB in the partition can be specified as a Reserved SB.
 An SB that is used in a partition of a test environment during normal operation can be incorporated in a partition of the production environment as a Reserved SB if a failure occurs.
- 3800B is not supported.





Wait Time for Reserved SB Switching

From 0 to 99 minutes can be set for the shutdown wait time when a Reserved SB that is used in another partition is switched by using the MMB Web-UI (the default setting is 10 minutes).

If the partition cannot be shut down after a specified time has passed, the Reserved SB is forced to be activated.

Saving the Partition Configuration Information

Before Reserved SB switching is performed, the partition configuration information for the entire cabinet is automatically saved to the MMB.

- The latest partition configuration information overwrites the existing information right before a Reserved SB replaces the failed SB (before the system reboots).
- The saved information can be viewed from the MMB Web-UI.

Memory Scale-up Board

Memory Scale-up Boards cannot be used as the source or the target of Reserved SB switching.

Functions That are Used for Partition Configuration - Reserved SB (3)

Reserved SB Setting Rules (1/4)

Consider the priority of partitions and do not specify SBs in different partitions with each other as Reserved SBs when multiple partitions are used or do not perform any loop settings for Reserved SBs.



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Reserved SB Setting Rules (2/4)



Reserved SB Setting Rules (3/4)

In some SB configurations, the amount of resources (the number of CPUs and/or the number of memory modules (memory capacity)) decreases or increases after switching. It is necessary to check the estimated performance and the estimated number of software licenses in advance.

* If a volume license or package product is used in a Windows OS or if the SB being used is not an SB that was purchased together with the enable kit, license authentication may be demanded after Reserved SB switching occurs.



A Reserved SB (CPU x 2) is set for the following partitions:

Partition#0 (CPU x 2) Partition#1 (CPU x 1)

When the Reserved SB is incorporated in partition#1, the number of CPUs increases. Two CPU licenses are required for partition#1.



Reserved SB Setting Rules (4/4)

- When using Reserved SBs, use NTP for time synchronization that is performed after switching.
- If devices are connected to the external (VGA and USB) ports on the Home SB and the Home SB is replaced, those devices must be connected to the newly replaced Home SB.

Switching Reserved SB Rules (1)



Switching Conditions

An SB that is incorporated in a partition is switched to a Reserved SB when one of the following events occurs (*1).

- SB degradation (Memory Scale-up Boards are not supported by the Reserved SB function.)
- CPU core degradation
- DIMM degradation (even if one DIMM fails)
- Detection of partial corruption in the memory of the mirroring pair (*2)
- Detection of UPI lane degradation (*2)
- Detection of PCI Express lane/speed degradation (between a CPU and an IOU) (*2)
- (*1) Actual Reserved SB switching occurs when the partition is started after a condition for Reserved SB switching is met.
- (*2) Because the partition operation continues, Reserved SB switching occurs when the partition is rebooted manually.

When the Home SB is Switched

When the Home SB is switched to a Reserved SB, the SB with the lowest SB number among SBs including Reserved SBs is changed to the Home SB.

* The same rule applies even if a degradation occurs.

⇒ For details on switching conditions, refer to "Reserved SB" in "Reference Manual".

Switching Reserved SB Rules (2)



When an SB Is Set as a Reserved SB for Multiple Partitions

If multiple SBs in different partitions fail simultaneously, the Reserved SB is used to replace the failed SB in the partition with the lowest partition number.



Switching Reserved SB Rules (3)



When Multiple Reserved SBs Are Set for a Partition

When there are Reserved SBs that do not belong to any partition, the Reserved SB with the highest SB number is used first.



Switching Reserved SB Rules (4)



- When Multiple Reserved SBs Are Set for Multiple Partitions The switching priority order is determined by the following conditions.
 - The partition with the lowest partition number is selected as the priority partition for which a Reserved SB is used.
 - The Reserved SB with the highest SB number is used first.



Switching Reserved SB Rules (5)



When Each Reserved SB Is Incorporated in a Partition

If One or More Partitions Are Powered Off

Among the powered-off Reserved SBs, the Reserved SB with the highest SB number is used first.

If All Partitions Are Powered On

The Reserved SB with the highest SB number is used first.

=> Then, the partition with this Reserved SB is stopped.



Functions That are Used for Partition Configuration - Dynamic Reconfiguration



Dynamic Reconfiguration Function

This function allows changing the hardware configuration of a partition while the OS is running, without a restart.

This function can be used in the following conditions.

Supported Models

3400E/3800E (not for 3800B, 3800B2 and 3800E2)

Supported OSs

RHEL 7.3 or later

Supported Functions

Hot addition:

Hot addition of SBs and IOUs with PCI Box LH modules is possible with supported OSs and models.

Hot removal:

Hot removal of SBs and IOUs with PCI Box LH modules is possible with supported OSs and models.

Dynamic Reconfiguration (Note)



Only 3400E/3800E (not for 3800B, 3800B2 and 3800E2)
 Combination of SBs that can hot add and remove

Configuration	Additional SB	
SB#0(home)	SB#0(home)+SB#1+SB#3	SB#2
SB#1(home)	SB#0+SB#1(home)+SB#2	SB#3
SB#2(home)	SB#1+SB#2(home)+SB#3	SB#0
SB#3(home)	SB#0+SB#2+SB#3(home)	SB#1
Configuration	of PPAR before hot remove	Removable SB
Configuration SB#0(home)+SB#2	of PPAR before hot remove SB#0(home)+SB#1+SB#2+SB#3	Removable SB SB#2
Configuration SB#0(home)+SB#2 SB#1(home)+SB#3	of PPAR before hot remove SB#0(home)+SB#1+SB#2+SB#3 SB#0+SB#1(home)+SB#2+SB#3	Removable SB SB#2 SB#3
Configuration of SB#0(home)+SB#2 SB#1(home)+SB#3 SB#0+SB#2(home)	of PPAR before hot remove SB#0(home)+SB#1+SB#2+SB#3 SB#0+SB#1(home)+SB#2+SB#3 SB#0+SB#1+SB#2(home)+SB#3	Removable SB SB#2 SB#3 SB#0

Please contact to fj-pq-tech@dl.jp.fujitsu.com, if you need additional combination.

Configuration Example - Guidelines

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Prerequisites

This section assumes that the following items are predetermined.

- The number of partitions
- The number of CPUs and the number of cores
- The lowest memory capacity

Guidelines for Model Selection

- When I/O scalability is highly important and the Dynamic Reconfiguration function is used, the 3800E/E2 is recommended.
- When higher CPU performance per partition is required, the 3800E/E2 is recommended.

Item	3800B/B2	3400E	3800E/E2
A guideline of the number of cores per partition	8 to 224 cores	4 to 112 cores	4 to 224 cores
A guideline of the memory capacity per partition without DCPMM	3800B : Maximum 12TB 3800B2 : Maximum 24TB	Maximum 6TB With Memory Scale-up Boards: Maximum 12TB	3800E : Maximum 12TB 3800E2 : Maximum 24TB
The number of partitions	1 partition	1 to 2 partitions	2 partitions or more
Work details	Aggregation of PC servers and higher reliability	Core system reconfiguration (ope and DB server/ERP infrastructure	en MF), UNIX server replacement,

Configuration Example - Pattern Overview



Examples of Determining Partition Configurations

- Focusing on Reducing the Downtime at a Failure (A, B, or C)
 - For a cluster configuration, a few seconds to a few minutes (a guideline for a two-node configuration)
 - When the Reserved SB function is used, switching time + OS startup time (approximately 10 minutes or longer)
- Focusing on Extensibility
 - Focusing on performance: Multiple CPUs (up to 8 CPUs), 192 cores (D)
 - Focusing on functions: The maximum number of connectable PCI-Express cards internally is 16, and 56 with PCI expansion boxes. (E)
- Server Integration
 - Physical Partitioning (PPAR): Reserved SB switching can also be used. (F)
 - Extended Partitioning (Ext.Par.): Division unit consists of one CPU core, 1GB of memory, and one I/O PCI card. (G)

Ригро	se	High availability			High performance, high functionality		Server integration	
		А	В	C	D	E	F	G
Configuration	example	Inter-cabinet cluster	Intra-cabinet cluster	Reserved SB switching	Multiple CPUs	Many PCI-Express cards	Physical partitioning (PPAR)	Extended partitioning (Ext.Par.)
Target m	odel	Two cabinets of the same model	3x00E/E2	3x00E/E2	3x00E/E2	3x00E/E2	3x00E/E2	3x00E/E2
Featur	es	Elimination of single points of failure	Minimization of single points of failure	Low management cost	Up to 8 CPUs, 224 cores	Up to 56 PCI cards	Up to 4 partitions	Up to 8 partitions
	CPUs	1 to 8	1 to 4	1 to 6	Max. 8	1 to 8	1 to 6	1 or more cores
In one partition	Memory	1.5TB (1 CPU) to 12TB (8 CPUs)	1.5TB (1 CPU) to 6TB (4 CPUs)	1.5TB (1 CPU) to 9TB (6 CPUs)	Max. 12TB	1.5TB (1 CPU) to 12TB (8 CPUs)	1.5TB (1 CPU) to 9TB (6 CPUs)	Min. 1GB/Ext.Par.

Configuration Example (A) - Inter-Cabinet Cluster



- Complete elimination of both single points of failure and shared components
- Cluster configuration between two cabinets with the same specifications, Memory Mirror configuration
- Clustering between Cabinet#0 and Cabinet#1: If a failure occurs, node switching occurs immediately and the system operation continues.
- Example: High-reliability database for a large number of users that is installed in multiple cabinets



Configuration Example (B) - Intra-Cabinet Cluster



Minimization of single points of failure

(The cabinet and the midplane are single points of failure. However, the possibility of failure is very small because no electronic parts are contained.)

- Cluster configuration between PPAR blocks with the same specifications in a cabinet, Memory Mirror configuration
- Clustering between PPAR#0 and PPAR#1: If a failure occurs, node switching occurs immediately and the system operation continues.
- Cluster configuration for small-sized installation (installation of one PRIMEQUEST)
- Example: High-reliability database for a user base that is small to medium sized, vSphereHA.

 PRIMEQUEST 3400E



Configuration Example (C) - Reserved SB Switching



- Redundant configuration that is based on a spare system board (Reserved SB)
- SB#3 is set as a Reserved SB for PPAR#0, PPAR#1, and PPAR#2.
- If a failure occurs on the SB of a PPAR block, the system continues its operation by disconnecting the failed SB, incorporating the spare SB, and then restarting the PPAR block.
- Configuration and management costs can be reduced.
 - No additional software is required because the availability is based on hardware.
 - Without additional hardware or special settings, configurations and operations can be achieved just by setting the firmware.
- Example: Small-to-medium-sized high availability system, FT server replacement (excluding nonstop systems)



Configuration Example (D) - High Performance Multiple CPUs



- High-performance configuration: Up to 8 CPUs and 192 cores per partition
- Behavior at a CPU failure
 - If a core failure occurs, then the system degrades the core, restarts the partition, and continues the operation.
 - If a failure other than a core failure occurs, then the system disconnects the SB that contains the failed part, restarts the partition with 6-CPU configuration, and continues the operation.

Example: In-memory high performance database, SAP HANA



Configuration Example (E) - High Functionality Multiple I/Os



- Up to 16 PCI-Express cards can be added in a cabinet.
- When more I/Os are required, by connecting PCI Boxes, up to 56 PCI-Express cards can be installed.
- Example: Communication HUB server, desktop virtualization server



4 PCI Boxes x 6 cards x 2 partitions = 48 cards

Configuration Example (F) - Physical Partitioning



- System boards and IO units in a cabinet are combined and divided into PPAR blocks.
- PPAR blocks are independent of each other. The hardware configuration and OS can be different between the PPAR blocks.
- Each PPAR block consists of at least one SB, at most four SBs (for 3800E) or two SBs (for 3400E), and at least one IOU.
- After the initial build, the configuration can be modified based on the operation condition.
 * When Dynamic Reconfiguration is not used, the PPAR block to be modified must be stopped.
- Example: Server integration, enhancement of the future scale-up range of a server



Configuration Example (G) - Extended Partitioning



- Each physical partition is divided into smaller partitions.
- Partitions are independent of each other. The hardware configuration and OS can be different between the partitions.
- The minimum division unit consists of one CPU core, 2GB of memory, and one I/O PCI card.
- After the initial build, the configuration can be modified based on the operation condition. Note: Memory Scale-up Boards can be used, however Dynamic Reconfiguration cannot be used.
- Example: Physical integration of small-sized servers



Key Points for I/O Configuration Design

Boot Type Selection

 \Rightarrow For details, refer to "<u>Boot Type Selection</u>".

- Guidelines for Selecting Internal Storage
 - ⇒ For details, refer to "<u>Guidelines for Selecting Internal Storage</u>".
- Obtaining RAID Cards and FBUs
 - ⇒ For details, refer to "<u>Obtaining RAID Cards and FBUs</u>".

HDD Configuration

 \Rightarrow For details, refer to "<u>HDD Configuration</u>".

Guidelines for Selecting a RAID Configuration for HDDs

- Software RAID
- Hardware RAID
- SAN boot
- Memory Dump Function
- Network Configuration
 - \Rightarrow For details, refer to "<u>Network Configuration</u>".
 - Network Types and Usage
 - Network Redundancy
- I/O Space Settings for PCI Devices
 - ⇒ For details, refer to "<u>Setting I/O Space for PCI Devices</u>".
 - I/O space assignment setting



Boot Type Selection

Boot type	Boot devices	Usage
Internal HDD or SAS-SSD (*1)	DU_SAS or DU_M	Boot an OS that is installed in an internal HDD.
External HDD cabinet	JX40 S2 with a SAS RAID card for connection	Boot an OS that is installed in an external HDD cabinet.
FC boot in an external file unit (SAN environment)	FC card	Boot an OS that is installed in an external disk array device.
FCoE boot in an external file unit (SAN environment)	CNA (except 3800E2 and 3800B2)	Boot an OS that is installed in an external disk array device.
iSCSI boot in an external file unit (SAN environment)	LAN card, and LAN port on an IOUE	Boot an OS that is installed in an external disk array device.
Preboot eXecution Environment (PXE)	LAN port on an IOUE	Boot via remote operation.
Boot from a M.2 Flash device	M.2 Flash device	Boot an OS that is installed in an M.2 Flash device.
Boot from a Micro SD	Dual Micro SD	Boot an OS that is installed in an Dual Micro SD
Boot from a virtual media	Device or file that is set as a virtual media	Boot from a device or file that is set as a virtual media.
Boot from a device connected to the front USB port on the Home SB	USB connected device (e.g. CD and DVD)	Boot from a USB connected device that is used temporarily for operations such as system configuration. (This operation is not available when the front bezel is removed.)

(*1) For details on the internal storage in the cabinet, refer to "Guidelines for Selecting Internal Storage".

- It is recommended to use a redundant HDD (hardware RAID or software RAID) as a boot HDD.
- When an internal disk is used as a boot device, RAID is configured at the same time as the OS installation using ServerView Installation Manager (SVIM).

Boot Type Selection (Key point)



Key points of PQ storage design:

- "SAN boot + multipath" is recommended for high reliability.
- PRIMECLUSTER GD is recommended when using PQ internal storage as OS boot device for RHEL.

		**			•••*	
	Software RAID			Hardware RAID		
Item	OS Standard function	PRIMECLUSTER GD	Internal (DU)	External disk cabinet (JX40)	Multipath	
Access Performance	Relatively low	Relatively low	good	good	good	
Card / Path Redundancy	Supported	Supported	Not Supported	Not Supported	Supported	
Device redundancy at boot time	Not fully Supported (depends on OS)	Supported	Supported	Supported	Supported	
		•			· · · · · · · · · · · · · · · · · · ·	

Guidelines for Selecting Storage (1)



Device type	Hot Plug	Path Redundancy	Reliability	Write Endurance	Cost	Device	Boot	RAID
SAS-HDD	Yes	with IOU x2	Low	none	Low	DU_SAS, DU_M	supported	HW RAID
SAS-SSD	Yes	and DU x2	High	10 or 3 DWPD	High	or ETERNUS JX	supported	or SW RAID
PCIeSSD AIC	No	with IOU x2	High	3 DWPD	High	IOUE	not supported	SW RAID only
SAN storage	Yes	supported	Highest	depend on storage	Highest	e.g. ETERNUS DX	supported	HW RAID or SW RAID
NAS	Yes	supported	High	depend on NAS	Higher	e.g. ETERNUS NR	supported	HW RAID or SW RAID
M.2 Flash device for VMware	No	none	Very Low	Enough	Low	BMM in SB	supported (boot only)	no RAID
M.2 Flash device	No	none	Very Low	Short	Very Low	BMM in SB	supported	no RAID
Dual M.2 Flash device	No	none	Very Low	Short	Very Low	PCI card in IOU	supported	Built-RAID
Dual MicroSD	No	none	Very Low	Very Short	Very Low	BMM in SB	supported (boot only)	Built-RAID

Guidelines for Selecting Storage (2)



3800B/B2 : RAID Cards or HDDs/SAS-SSDs in DUs

ltem	DU_SAS
PCI card	RAID card
Number of Storage Devices	4
Type of Storage Devices	SAS-HDD/SSD
OS Boot	Yes
Intel [®] VMD / vROC	No

■ DU_PCIEA is planned.

3400E, 3800E/E2 : RAID Cards or HDDs/SAS-SSDs in DUs

ltem	DU_SAS	DU_M
PCI card	RAID card	RAID card
Number of Storage Devices	4	4
Type of Storage Devices	SAS-HDD/SSD	SAS-HDD/SSD
OS Boot	Yes	Yes
Intel [®] VMD / vROC	No	No
Reserved SB	Yes	Yes

DU_PCIEA is planned.

Recommendations for RAID Cards and FBUs



RAID Cards in DUs

- FBUs (optional) can be connected to each RAID card
- RAID software licenses is available (EP420i and EP420e are optional). EP540i includes it as standard.

RAID Cards in IO Units (for JX40 S2 Connection)

- One FBU (optional) can be connect to the RAID card installed in Slot#0 of IOU only with an FBU installation kit.
- The RAID cards that does not connect FBU are recommended to use with the device like UPS.

HDD Configuration



Guidelines for Selecting a RAID Configuration for HDDs

Redundancy with "SAN boot + multipath driver" is recommended for reliability.

	Software RAID		Hardwa	re RAID	
Item	OS standard	PRIMECLUSTER GD	Inside of a DU (*1)	External hard disk cabinet (JX40 S2)	SAN boot + multipath driver
OS	(*2)	Supported with RHEL	Supported	Supported	Supported
High-speed access	Relatively slow	Relatively slow	Supported	Supported	Supported
Card duplication	Supported	Supported	Not supported	Not supported	Supported
Path duplication	Supported	Supported	Not supported	Not supported	Supported
RAID level	Depends on the software	1	1, 1E, 5, 6, 10	1, 1E, 5, 6, 10	Available at the RAID level of the storage device being used
Device duplication at boot time	Not supported	Supported	Supported	Supported	Supported

(*1) For details, refer to "<u>Guidelines for Selecting Internal Storage</u>".

(*2) For details on the supported OSs or virtualization software, refer to the related documents of the OS or virtualization software.

Notes (1/2)

• If an unpredictable power supply problem occurs, data in the cache (*) that is equipped in a hardware RAID or disk may be lost.

To avoid such a problem, make sure to consider installing a redundant power supply or dual power feed option as well as a CVCF or UPS.

(*) A hardware RAID uses the cache on the hardware when Write Back or Always Write Back is specified. A disk uses the cache on the hardware when the disk cache is enabled.

HDD Configuration (3x00E/E2)



Notes (2/2)

• When internal HDDs are used, the hardware RAID controller may fail to fully detect failures on a hard disk, and a system slowdown may occur.

[Additional Notes]

If intermittent media errors occur on a HDD, a slowdown may occur on rare occasions.

This problem may occur for example due to many scratches in a wide area on the HDD. The RAID controller tries to replace the media error area and salvage data using RAID parity. Therefore, if intermittent media errors occur over a long time, the salvage processing takes a longer time and the conventional media access processing is delayed.

If there are restrictions in operation, the following options are recommended.

- Use ETERNUS.
- Replace the HDD with a SAS-SSD.

HDD Configuration (RAID)

Software RAID

- RHEL standard RAID function
 - \Rightarrow For details, refer to "Linux (RHEL) Design Guide".
- Mirroring with PRIMECLUSTER GD is supported.
 - \Rightarrow For details on support information, refer to
 - "Linux (RHEL) Design Guide".
- Hardware RAID
 - Hard disk redundancy for disk units
 - •A RAID card is included by default in a DU to support RAID configurations.
 - •RAID0, RAID1, RAID1E, RAID5, RAID6, and RAID10 can be configured.
 - •Hot swapping internal HDDs is supported (excluding RAID0 and non-mirror configurations).
 - RAID management tool "ServerView RAID Manager" is supported. (This tool is bundled with the main server unit by default).
 - Hard disk redundancy on an external file unit
 - •A RAID configuration can be created in the file unit on an external storage device (such as ETERNUS).
 - \Rightarrow For details, refer to the manual for the file unit.
 - •RAID0, RAID1, RAID1E, RAID5, RAID6, RAID10, RAID50, and RAID60 can be configured.
 - Hot swapping internal HDDs is supported (excluding RAIDO and non-mirror configurations).
 - RAID management tool "ServerView RAID Manager" is supported. (This tool is bundled with the main server unit by default).

⇒ For details, refer to "SAS3 12 Gb/s MegaRAID® SAS Software User Guide" and "FUJITSU Software ServerView Suite ServerView RAID Manager User Guide".

SAN Boot

An OS is started from a boot disk that is set in an external storage.





Memory Dump Function for Windows



Memory Dump Function for Windows (OS Standard Function)

If a fatal system error occurs, data in the physical memory is output to a file.

Dump Types and Estimated Sizes

Dump type	Description	Dump file size		
Complete memory dump	Records all data that exists in the physical memory when the system stops.	Physical memory size + 300MB		
Kernel memory dump	Records the information only in the kernel memory space.	Depends on the memory space during system operation.		
Minimum memory dump	Records the minimum information that is useful for identifying the problem.	128KB or 256KB		
Automatic memory dump	 Records information that is equivalent to the conventional kernel memory dump. The following points are different from the kernel memory dump. The initial value of the paging file size is smaller than the kernel memory dump size. If part of the information in the kernel memory space cannot be recorded, the page file size is automatically extended the next startup. (If part of the information in the kernel memory space cannot be recorded, acquisition of memory dury information may fail.) 			

- Mechanism for Acquiring Dump Information
 - 1. If a system failure occurs, dump information is output to the paging file in the boot volume.
 - 2. After the OS is restarted, a tentative paging file is created, and the acquired dump information is moved to the specified save destination.


Memory Dump Function for RHEL (3800B/B2) Fujits

Memory Dump Function for RHEL

If a fatal system error occurs, data in the physical memory is output to a file.

Dump Types and Estimated Sizes



kdump (OS standard function)

Memory Dump Function for RHEL (3x00E)



Memory Dump Function for RHEL

If a fatal system error occurs, data in the physical memory is output to a file.

Dump Types and Estimated Sizes



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Network Configuration (3800B/B2)

Network Types

Connect with different types of networks for various intended purposes to achieve security and load balancing.

Operation LAN

The LAN that is used by the customer

Management LAN

The LAN for connecting to external servers such as the operation management server

Cluster LAN

(Cluster interconnect or private network)

- The LAN that allows mutual status monitoring between nodes in a cluster configuration
- Use a subnet that is different from the one for other LANs (such as the operation LAN).
- For details, refer to "Key Points for Cluster Configurations".



* Specify different subnets for the management LAN and cluster LAN.

Network Configuration (3x00E/E2)

Network Types

Connect with different types of networks for various intended purposes to achieve security and load balancing.

Operation LAN

The LAN that is used by the customer

Management LAN

The LAN for connecting each partition and MMB to external servers such as the operation management server

Cluster LAN

(Cluster interconnect or private network)

- The LAN that allows mutual status monitoring between nodes in a cluster configuration
- Use a subnet that is different from the one for other LANs (such as the operation LAN).
- For details, refer to "Key Points for Cluster Configurations".

Internal LAN

The LAN for connecting each partition to MMBs for internal communication

Maintenance LAN

The LAN that is used for maintenance

- For connecting a maintenance terminal (port for maintenance)
- * Specify different subnets for the management LAN, cluster LAN, internal LAN, and maintenance LAN.
- * When counting the number of LAN ports that are required for a partition, consider that two ports are used for the management LAN.

On the external switching hub device for connecting to the management LAN for MMBs, select [Disable] for the spanning tree protocol function.



Network Configuration

Redundancy of Internal Ports

Concepts of Reliable Configurations

When configuring PRIMEQUEST with multiple components, install internal ports on different components.

Example of IOUE

Separate IOUs from each other.





Separate IOUs from each other.



PRIMEQUEST 3000 Series Design Guide



Network Redundancy (3800B/B2)



Configuration That Focuses on Redundancy

Multiple channel ports on a PCI Express card are used effectively.



Network Redundancy (3x00E/E2)



Configuration That Focuses on Redundancy

Multiple channel ports on a PCI Express card are used effectively.



Configuration That Focuses on Hot Swap

Considering the range of impact during a PCI Express card failure, for connections with a PCI Express card (single card), only one port is used when using a multi-port card.



Network Redundancy with LOM



Network Configuration Redundancy with an Onboard LAN A network configuration can be duplicated by using an Onboard LAN.



* When an onboard LAN is used, before maintenance is performed on an IOU, all partitions that use the IOU must be stopped.

Redundant Configuration for the Management LAN

- The management LAN can be recovered when an error occurs by creating a redundant configuration of the user ports on the MMBs that are connected to the management LAN with tools such as the bonding driver, PRIMECLUSTER GLS, and Intel[®] PROSet.
- When MMBs are duplicated but user ports are not, the active MMB must be switched manually if an MMB fails.
- ⇒ For details, refer to "1.3.3 Redundant configuration of the management LAN" in "Reference Manual".

Network Redundancy (Infiniband)



InfiniBand Network Configuration Redundancy



Replacement of an Ethernet Environment with InfiniBand Cards

- InfiniBand cards with a wide bandwidth of 56Gbps can accommodate more networks than when a 10GbE environment is used.
- InfiniBand cards can be used for the paths to synchronize databases.

Setting I/O Space for PCI Devices

FUĴĨTSU

3800B/B2

To perform a boot in a legacy BIOS environment, it is necessary to assign the I/O space to the boot device.

- The size of the I/O space is 64KB for all models.
- A 4KB area of the I/O space can be assigned per device.
- 3800B can assign for up to 13 devices (that is, 16 devices in total including three device that is reserved for a PCH and Internal RAID cards). I/O Spaces of Slot #5, #6 and #7 in IOUB#1 can not be assigned.

■ 3x00E/E2

3x00E automatically allocates the IO space. Administrator need not operate to allocate it.

Setting of MMIO area of PCI devices



- Please use the Sub-NUMA Cluster(SNC) mode with "disabled" and use the uEFI mode (not Legacy mode).
 - It does not work with Legacy mode and SNC Enabled.
 - Using with uEFI mode and SNC Enable also
 - There is a limitation in the PCIe cards use for "uEFI mode and SNC Enable" or "Legacy mode and SNC Disable".

⇒ Refer "Tool Reference (UEFI)" about "Setting of Sub NUMA Clustering".

Key Points for Cluster Configurations (3800B/B2)



Cluster operation with cluster operation software is supported to increase system availability.



Cost for Installation and Operation

Key Points for Cluster Configurations (3x00E/E2)





Cost for Installation and Operation

Cluster Overview (3800B/B2)

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Cluster System Overview

• A dedicated LAN for inter-node communication is used to connect between nodes.

- Private network is used for Windows.
- Cluster interconnect is used for Linux.
- Inter-node communication is performed periodically to monitor problems.
- Windows

Clustering with Windows Server Failover Clustering (OS standard function) is recommended.

* A server for Active Directory (AD server) is required separately.

• RHEL

Clustering with PRIMECLUSTER is recommended.

Cluster Overview (3x00E/E2)

FUJITSU

Cluster System Overview

• A dedicated LAN for inter-node communication is used to connect between nodes.

- Private network is used for Windows.
- Cluster interconnect is used for Linux.
- Inter-node communication is performed periodically to monitor problems.
- There are two types of cluster systems: inter-cabinet cluster and intra-cabinet cluster.

 \Rightarrow For details, refer to "Inter-Cabinet Cluster" and "Intra-Cabinet Cluster".

• Windows

Clustering with Windows Server Failover Clustering (OS standard function) is recommended.

* A server for Active Directory (AD server) is required separately.

• RHEL

Clustering with PRIMECLUSTER is recommended.

Cluster Overview (3x00E/E2)



- Possible Combinations of PRIMEQUEST Cluster Configurations
 - Inter-Cabinet Cluster
 - Clustering between different models is not supported.
 - Each node consists of the same model in the same configuration (in the number of CPUs, CPU frequency, memory capacity, storage capacity, and number of storages).
 - Intra-Cabinet Cluster
 - All nodes have the same configuration (in the number of CPUs, CPU frequency, memory capacity, storage capacity, and number of storages).
 - If an IOU fails, the redundancy of the system is lost and components such as the midplane become single points of failure.

Key Points for Cluster Configurations (4/4)



Possible Combinations of PRIMEQUEST Cluster Configurations (2/2)

The following table shows whether OracleDB is supported as the cluster management DB software.

OS	Cluster software	Configuration	3800B/B2	3400E	3800E/E2
	PRIMECLUSTER	Intra-cabinet	No	Yes*	Yes
	(excluding RAC)	Inter-cabinet	Yes*	Yes*	Yes*
	PRIMECLUSTER (RAC)	Intra-cabinet/ inter-cabinet	No	No	No
KHEL	Oracle Clusterware	Intra-cabinet	No	No	No
	(SE2-RAC)	Inter-cabinet	No	No	No
	Oracle Clusterware (EE-RAC)	Intra-cabinet	Yes*	Yes*	Yes*
		Inter-cabinet	Yes*	Yes*	Yes*
	WSFC (excluding RAC)	Intra-cabinet	No	Yes*	Yes
		Inter-cabinet	Yes*	Yes*	Yes*
	WSFC (RAC)	Intra-cabinet/ inter-cabinet	No	No	No
Windows	Oracle Clusterware	Intra-cabinet	No	No	No
	(SE2-RAC)	Inter-cabinet	No	No	No
	Oracle Clusterware	Intra-cabinet	Yes*	Yes*	Yes*
	(EE-RAC)	Inter-cabinet	Yes*	Yes*	Yes*

RAC: Oracle Real Application Clusters WSFC: Windows Server Failover Clustering Yes*: Supported and recommended (IOU redundancy configuration is allowed) Yes: Supported and recommended No: Not supported

Note: When RAC is used, PRIMECLUSTER and WSFC cannot be used together with RAC. Use Oracle Clusterware.

Inter-Cabinet Cluster (3800B/B2)



A cluster configuration for communication between PRIMEQUEST nodes (cabinets)



Inter-Cabinet Cluster (3×00E/E2)



A cluster configuration for communication between PRIMEQUEST nodes (cabinets)



Management LAN

Intra-Cabinet Cluster (3x00E/E2)

- A cluster configuration for communication between nodes (partitions) that are created in a cabinet
- By configuring both active and standby systems in a cabinet, availability of the entire system including the software layer is ensured.



Key Points for Power Supply

Power Supply Redundancy

 \Rightarrow For details, refer to "<u>Power Supply Redundancy</u>". Examples of single power feed and dual power feed

UPS Redundancy

 \Rightarrow For details, refer to "<u>UPS Redundancy</u>".



Notes of PSU Configurations (3800B2/E2)



System Architect can't check completely.

- "3+1" means minimum three PSU must be mounted. (Two PSUs are mounted as standard.)
- Also, "3+1" means dual power feed cannot be used.

	Limit of Configuration					Advanced	PSU and	Redanduncy
Model	CPU TDP(W)	DDR4 (slots)	DCPMM (slots)	ΙΟυ	P4600 AIC/SFF	Thermal Design	200V	100V
	>=200	96	0	2	8	Not supported	2+1/2+2	Not supported
2000 02	=<165	96	0	2	8	Supported	2+1/2+2	Not supported
380082	>=200	48	48	2	8	Not supported	3+1	Not supported
	=<165	48	48	2	8	Supported	3+1	Not supported
	>=200	96	0	4	8	Not supported	3+1	Not supported
200052	=<165	96	0	4	8	Supported	3+1	Not supported
JOUUEZ	>=200	48	48	4	8	Not supported	3+1	Not supported
	=<165	48	48	4	8	Supported	3+1	Not supported
3800E2	>=200	96	0	2	2	Not supported	2+1/2+2	Not supported
Limited in SA*	=<165	96	0	2	2	Supported	2+1/2+2	Not supported
SA* : System Archtect								

Notes of PSU Configurations (3x00E/B)



System Architect can't check completely.

- "3+1" means minimum three PSU must be mounted. (Two PSUs are mounted as standard.)
- Also, "3+1" means dual power feed cannot be used.
- Please update the firmware PA18023 or later to use PSU 3+1.

	Limit of Configuration				Advanced	PSU and	Redanduncy
Model	CPU TDP(W)	DIMM (slots)	ΙΟυ	P4600 AIC/SFF	Thermal Design	200V	100V
2000	>=200	96	2	8	Not supported	2+1/2+2	Not supported
3000D	=<165	96	2	8	Supported	2+1/2+2	Not supported
3800E	>=200	96	4	8	Not supported	3+1	Not supported
	=<165	96	4	8	Supported	3+1	Not supported
3800E	>=200	96	2	2	Not supported	2+1/2+2	Not supported
Limited in SA*	=<165	96	2	2	Supported	2+1/2+2	Not supported
3400E +MSB	>=200	96	4	4	Not supported	2+1/2+2	Not supported
no check in SA*	=<165	96	4	4	Supported	2+1/2+2	Not supported
24005	>=200	48	4	4	Not supported	2+1/2+2	3+1
3400E	=<165	48	4	4	Supported	2+1/2+2	3+1
SA* : System Archtect							

Power Supply Redundancy (5U Chassis)

PSU 2+0 / 2+1 / 2+2



* When using a redundant configuration or dual power feed for the main unit, also use the same power supply configuration for the PCI Boxes.

⇒ For details on PSU configurations, refer to "Power Supply Unit (PSU)".

UPS Redundancy (5U Chassis)

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PSU 2+2 and UPS 1+1



PSU 3+0 / 3+1 (PA18023 or later)



 \Rightarrow For details on PSU configurations, refer to "<u>Power Supply Unit (PSU)</u>".

Redundancy (2U Chassis and PCI BOX)



Please connect PSU of 2U chassis and PCI BOX with same AC distribution panel or UPS with PSU of 5U chassis as the following table.

5U chassis PCI BOX 2U chassis	PSU#0	PSU#1	PSU#2	PSU#3
PSU#0	same	-	-	-
PSU#1	-	-	same	-

Guidelines for Selecting a 200V Power Distribution Box



AC 200V Power Distribution Box Brief Specifications

U number	Voltage	Input	Output		Outpul	t current
1U	200V	NEMA L6-30P	IEC320 C19	3	24A/BOX	16A per outlet
00	200V	NEMA L6-30P	IEC320 C19	3	24A/BOX	16A per outlet

Guidelines on the Number of AC 200V Power Distribution Boxes

Model	200V PSU 2+0	200V PSU 2+1	200V PSU 2+2	200V PSU 3+0	200V PSU 3+1
3400E/E2	1	1	2	-	-
3400E with Memory Scale-up Board	-	-	-	1	2
3800E/E2	1	1	2	2	2
3800B/B2	1	1	2	1	2

Guidelines for Selecting a Power Distribution Unit

FUJITSU

Maximum current

Model	PSU configuration	Chassis (5U)	per Cable(5U)	Chassis (2U)	per Cable(2U)	PCI BOX	PCI BOX Cable
24005	100V PSU 3+n	36 A	12 A	6.0 A	6.0 A	6.0 A	6.0 A
5400E	200V PSU 2+n	20 A	10 A	3.0 A	3.0 A	3.0 A	3.0 A
3400E with Memory Scale-up Board	200V PSU 3+n	24 A	8 A	3.0 A	3.0 A	3.0 A	3.0 A
3800E/E2	200V PSU 2+n	24 A	12 A	6.0 A	6.0 A	6.0 A	6.0 A
	200V PSU 3+n	24 A	8 A	3.0 A	3.0 A	3.0 A	3.0 A
3800B/B2	200V PSU 2+n	24 A	12 A				
	200V PSU 2+n	24 A	8 A	-	-	-	-



4. Operation Management Design

This chapter describes the key points for designing operation management. For details, refer to Manuals.

Key Points for Console Operation(1)(3800B/B2) Fujirsu

Functions of Consoles

Connection type	Console type	Intended purposes	Connection target	Remarks
Remote	Video redirection	Control and management of the OS in a partition (using images)	Management LAN	 It is difficult to acquire operation logs or automate operations (log acquisition can be performed by using an application with a log acquisition function). A PC in which JRE is installed must be connected to the management LAN. If the resolution on the server is 800 x 600, part of the screen may not be displayed or trails of the mouse pointer may appear.
	Text console	Maintenance	Management LAN	

Key Points for Console Operation(2) (3800B/B2)Fujirsu

Console Connection Configuration



Key Points for Server Operation Management (1) (3800B/B2) Fuir



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Key Points for Server Operation Management (2) (3800B/B2) Fujitsu

Operation Management of the Entire System with Systemwalker Centric Manager

Operation management including work management, network management, and storage management

- Failure statuses can be checked easily through an integrated monitoring screen.
- ServerView Suite functions can be used through web call linkage.
- Duplicated operation management server

If a problem occurs on the primary management server, monitoring can be continued by switching to the secondary management server.

• Operations on the monitoring screen are restricted to prevent unintended operations and unauthorized access.



💗 For details, refer to "Appendix J Systemwalker Centric Manager Linkage" in "Reference Manual".

Key Points for Console Operation (3x00E/E2)



Functions of Consoles

Connection type	Console type	Intended purposes	Connection target	Remarks
Remote	Video redirection	Control and management of the OS in a partition (using images)	Management LAN	 It is difficult to acquire operation logs or automate operations (log acquisition can be performed by using an application with a log acquisition function). A PC in which JRE is installed must be connected to the management LAN. If the resolution on the server is 800 x 600, part of the screen may not be displayed or trails of the mouse pointer may appear.
	Text console	Maintenance	Management LAN	

Action That Is Required When Reserved SB Switching Occurs If switching by the Reserved SB function occurs, the console connection must be changed.

Key Points for Console Operation (2/2)



Console Connection Configuration



Server Management (1/2)





Hardware management of a PRIMEQUEST server through the MMB Web-UI (agentless management)

- 💊 Hardware status monitoring
- Hardware setting
- Power supply operation (turning on/off) etc. on a partition basis

Hardware management of multiple PRIMEQUEST and PRIMERGY servers through ServerView Suite

 $\underline{http://www.fujitsu.com/global/products/computing/servers/mission-critical/primequest/technology/server-view.html}{}$

- Consolidated management and operability of multiple PRIMEQUEST servers in an integrated screen
- Functions for supporting the entire system life cycle that are provided to the managed servers
- Power supply operation and reboot operation for a partition that can be performed from a GUI

Integrated management of different models through ServerView Resource Orchestrator V3 (optional)

http://www.fujitsu.com/global/products/software/infrastructure-software/resource-management/serverview-resource-orchestrator/

- A single screen for displaying server information in which different operations and monitoring between platforms are integrated
- Server operations (start, stop, and reboot operations) through the screen (Automation with a CLI is also possible.)
- Functions for supporting the entire virtual environment operation (Integrated management of physical servers and virtual servers, simplified and visualized operation of virtual servers, and simplified maintenance)

PRIMEQUEST 3000 Series Design Guide
Key Points for Server Operation Management (2/2) Fujits

Operation Management of the Entire System with Systemwalker Centric Manager

Operation management including work management, network management, and storage management

- Failure statuses can be checked easily through an integrated monitoring screen.
- ServerView Suite functions can be used through web call linkage.
- Duplicated operation management server

If a problem occurs on the primary management server, monitoring can be continued by switching to the secondary management server.

• Operations on the monitoring screen are restricted to prevent unintended operations and unauthorized access.



Operation management server

For details, refer to "Appendix J Systemwalker Centric Manager Linkage" in "Reference Manual".



Backup and Restoration of Configuration Information

For details, refer to "Backing Up and Restoring Configuration Information" in "Reference Manual".

- Backup Mechanism
 - Configuration information is stored in the System FRU (I2C EEPROM) on the OPL.
 - (This processing is performed regularly or when MMB firmware is updated.)
 - The same information is stored also in the flash memory of the MMB.
 - •When duplicated MMBs are used, the same information is always stored in both MMBs.
- Backup Contents
 - Firmware setting information
 - Device identification information

Key Points for Backing Up and Restoring solutions



Backup and Restoration of System Disks

OS Standard Commands and Tools

Command or tool name	0.		
command of toor name	Windows	Linux	
Windows Server Backup	Yes	-	Yes: Available
dump and restore commands	-	Yes	-: Not available

Optional Products

Tool name	OS		Options that can be added	
Toor fiame	Windows (*1)	Linux (*2)	options that can be added	
ServerView Resource Orchestrator V3	Yes	Yes	-	
SystemcastWizard Professional	Yes	Yes	-	
PRIMECLUSTER GD Snapshot	-	Yes	-	
ETERNUS SF AdvancedCopy Manager	Yes (*3)	Yes (*3)	-	
NetVault Backup 11 (*4)	-	Yes	NetVault Backup 11 BMR Single Offline Only Client	
NetVault Backup 11 for Windows (*4)	Yes	-	NetVault Backup 11 for Windows BMR Single Offline Only Client NetVault Backup 11 for Windows BMR Single Client for Windows	
Arcserve Backup for Windows	Yes	-	Arcserve Backup for Windows Disaster Recovery Option	

(*1) For details on support information for Windows Server 2012, visit our web site: <u>http://www.fujitsu.com/global/products/computing/servers/mission-critical/primequest/software/</u>.

Yes: Available, -: Not available

(*2) For details on support information for Oracle Linux support, contact your sales representative.

(*3) Only for a SAN boot configuration with an ETERNUS disk storage system

(*4) For supported configurations, contact your sales representative.

* Floppy disk drives cannot be connected to the PRIMEQUEST 3000 series. Select a method that does not require direct connection of a floppy disk drive.

* The software support information is as of June 2016. For the latest software information, contact your sales representative.

Key Points for NTP Operation

- The NTP should be used when the Reserved SB function is used or when a partition is configured with two or more SBs
- Time Setting Targets
 - \Rightarrow For details on settings, refer to "Reference Manual".
 - MMB
 - The MMB works as an NTP client that is connected to external NTP servers to synchronize time.
 - Each partition

Each partition works as an NTP client that is connected to external NTP servers.



- * To ensure the stability of the NTP operation, specify multiple NTP servers from each NTP client.
- * Select NTP servers that have a high-precision clock in the Internet or intranet.



5. OS/Support

This chapter describes information on the OS.

Arrangement Information

- FUjitsu
- For details on the types of OSs and support, contact your sales representative.
- For details on OS specifications, refer to "<u>Appendix B OS</u> <u>Specifications</u>" and the website of each vendor.



Appendices

Appendix A Bundled Software (1)



Software Bundled with Hardware

The "ServerView Suite" DVD is bundled with the main unit by default.

 \Rightarrow For details, refer to "Bundled software" in "Operating Manual".

Tool	Windows	RHEL	SLES	Oracle Linux	Oracle VM	VMware
DSNAP	Yes	-	-	-	-	-
Software Support Guide	Yes	-	-	-	-	-
ServerView Operations Manager	Yes	Yes	Yes	-	-	-
ServerView Agentless Service	Yes	Yes	Yes	Yes	-	-
ServerView Agent	Yes	Yes	Yes	Yes	Yes	-
ServerView RAID Manager	Yes	Yes	Yes	Yes	Yes	-
ServerView CIM Provider	-	-	-	-	-	Yes
SVmco	-	Yes	-	-	-	-
HBA blockage function	-	Yes	-	-	-	-
Dynamic Reconfiguration utility	-	Yes	Yes (*1)	-	-	-

(*1) SLES 12 SP1

Yes: Supported, -: Not supported

Appendix A Bundled Software (2)

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Drivers

Windows

Drivers are provided with ServerView Suite.

For the latest versions, contact your sales representative.

Related Software

Server Management Software

⇒ For details, refer to "Server management software" in "Operating Manual".

Appendix B OS Specifications (1)



The following OS specification information is applied to the PRIMEQUEST 3000 series. For details on the specifications including maximum values on each OS, refer to the information that is provided by each vendor.

Windows Server 2019: Comparison of Specifications

OS type		Datacenter / Standard	
Maximum number of sockets		8	
CPU	Maximum number of cores	256	
	Maximum number of logical CPUs	512	
Memory	Maximum memory capacity 12TB		
D:-1. /*1)	Number of partitions in a disk	MBR format (Primary + Extended): 3+124, 4+0 GPT format: 128+0	
DISK (* 1)	Maximum LUN capacity	MBR format: 2TB GPT format: 256TB (Upper limit in the file system)	
Maximum number of PCI slots		All slots can be used.	
	PCI Hot Plug	PCI Box is supported for 3c00E. IOUB is supported for 3800B.	
Firmware	UEFI support	Supported	

(*1) The upper limits of the file system size and the file size in each file system are as follows:

FAT Maximum size: 2TB, maximum file size: 2TB

NTFS Maximum size: 16TB (4KB cluster)/256TB (64KB cluster) (implementation restrictions, the logical maximum value is 16EB)

Maximum file size: 16TB (implementation restrictions, the logical maximum value is 2^64-1 clusters)

ReFS, which is the latest file system for Windows Server 2012, can be used for data areas, but ReFS is not recommended because its use has not been proven well.

Appendix B OS Specifications (1)



The following OS specification information is applied to the PRIMEQUEST 3000 series. For details on the specifications including maximum values on each OS, refer to the information that is provided by each vendor.

Windows Server 2016: Comparison of Specifications

OS type		Datacenter / Standard	
Maximum number of sockets		8	
CPU	Maximum number of cores	256	
	Maximum number of logical CPUs	512	
Memory	Maximum memory capacity 3TB (planned 12TB)		
D:-1/ /*1)	Number of partitions in a disk	MBR format (Primary + Extended): 3+124, 4+0 GPT format: 128+0	
DISK (* 1 <i>)</i>	Maximum LUN capacity	MBR format: 2TB GPT format: 256TB (Upper limit in the file system)	
DCI	Maximum number of PCI slots	All slots can be used.	
FCI	PCI Hot Plug	PCI Box is supported for 3c00E. IOUB is supported for 3800B.	
Firmware	UEFI support	Supported	

(*1) The upper limits of the file system size and the file size in each file system are as follows:

FAT Maximum size: 2TB, maximum file size: 2TB

NTFS Maximum size: 16TB (4KB cluster)/256TB (64KB cluster) (implementation restrictions, the logical maximum value is 16EB)

Maximum file size: 16TB (implementation restrictions, the logical maximum value is 2^64-1 clusters)

ReFS, which is the latest file system for Windows Server 2012, can be used for data areas, but ReFS is not recommended because its use has not been proven well.

Appendix B OS Specifications (2)



The following OS specification information is applied to the PRIMEQUEST 3000 series. For details on the specifications including maximum values on each OS, refer to the information that is provided by each vendor.

Windows Server 2012: Comparison of Specifications

OS type		Windows 2012 R2 Datacenter / R2 Standard	
Maximum number of sockets		8	
СРИ	Maximum number of cores	192	
	Maximum number of logical CPUs	384 (when Hyper-V is enabled) 320 (when Hyper-V is disabled)	
Memory	Maximum memory capacity	3TB (planned 4TB)	
Number of partitions in a disk		MBR format (Primary + Extended): 3+124, 4+0 GPT format: 128+0	
DISK (* 1)	Maximum LUN capacity	MBR format: 2TB GPT format: 256TB (Upper limit in the file system)	
Maximum number of PCI slots		All slots can be used.	
ru	PCI Hot Plug	PCI Box is supported. No IOU is supported. (Specification of the main unit)	
Firmware	UEFI support	Supported	

(*1) The upper limits of the file system size and the file size in each file system are as follows:

FAT Maximum size: 2TB, maximum file size: 2TB

NTFS Maximum size: 16TB (4KB cluster)/256TB (64KB cluster) (implementation restrictions, the logical maximum value is 16EB)

Maximum file size: 16TB (implementation restrictions, the logical maximum value is 2^64-1 clusters)

ReFS, which is the latest file system for Windows Server 2012, can be used for data areas, but ReFS is not recommended because its use has not been proven well.

Appendix B OS Specifications (3)



RHEL: Comparison of Specifications

OS type		RHEL 7 (for Intel64)
	Maximum number of sockets	8 (4 system boards)
CPU	Maximum number of cores	224
	Maximum number of logical CPUs	448
Memory	Maximum memory capacity	24TB
	Number of partitions in a disk	MBR format (Primary + Extended): 4+0, 3+1 (up to 11 logical partitions in the extended partition) GPT format: 15
	Maximum LUN capacity	The XFS file system MBR format: 2TB GPT format: 7,500TB (The maximum file system size x 15 partitions equivalent)
Disk	Maximum number of volumes No limit * Tested up to 10,000 by Red Hat	
	Maximum number of LUNs (default value/maximum value) (*1)	SCSI common layer: 512/4,294,967,296 Fusion-MPT SAS (mptsas driver): 16,896/16,896 Fusion-MPT SCSI (mptspi driver): 256/256 Emulex Fibre Channel (lpfc driver): 256/65,536 MegaRAID SAS (megaraid_sas driver): 8/8
	Maximum number of PCI slots	All slots can be used.
	PCI Hot Plug	PCI Box is supported. No IOU is supported. (Specification of the main unit)
PCI	MSI support (OS/driver) (Common between x86 and Intel64)	Kernel: MSI and MSI-X are supported. / FusionMPT: MSI is supported, but MSI-X is not supported. INTx is used by default. LPFC: MSI and MSI-X are supported. INTx is used by default. / e1000e: MSI and MSI-X are supported. MSI is used by default. igb: MSI and MSI-X are supported. MSI-X is used by default. / ixgbe: MSI and MSI-X are supported. MSI-X is used by default. * To specify an option other than the default for a driver, use the option parameter of the driver.
Firmware	UEFI support	Supported

(*1) - In actual operation, the values are restricted by the maximum number of volumes.

- The number of LUNs for each of the lower-level drivers (mptsas, mptspi, lpfc, and megaraid_sas) cannot exceed the value that is set for the SCSI common layer.

- To specify a non-default value, use the option parameter of each driver.

Appendix B OS Specifications (4)



SLES: Comparison of Specifications

For details, refer to the following URLs:

SLES 12: https://www.suse.com/releasenotes/x86_64/SUSE-SLES/12/#TechInfo

OS type		SLES 12 / 15		
CPU	Maximum number of logical CPUs	8,192		
Memory	Maximum memory capacity	24TB		
Maximum file system size		1EB (ext4)		
DISK	Maximum file size	1EB (ext4)		
Maximum number of PCI slots		All slots can be used.		
PCI Hot Plug		PCI Box is supported. No IOU is supported. (Specification of the main unit)		
Firmware	UEFI support	Supported		

Appendix B OS Specifications (5)



Oracle Linux (planned) : Comparison of Specifications For details, refer to the following URL:

http://docs.oracle.com/cd/E52668_01/E67200/html/section-xv3-gvd-kn.html

OS type		Oracle Linux 7	
CPU	Maximum number of logical CPUs	2,048	
Метогу	Maximum memory capacity	12TB	
	Maximum LUN capacity	50TB	
		bfrts: 50TB	
	Maximum file system size	ext4: 50TB	
Disk		XFS: 500TB	
	Maximum file size	bfrts: 50TB	
		ext4: 50TB	
		XFS: 16TB	
DCI	Maximum number of PCI slots	All slots can be used.	
ru	PCI Hot Plug	Not supported	
Firmware	UEFI support	Supported	

Appendix B OS Specifications (6)



Oracle VM (planned) : Comparison of Specifications

The configuration maximums vary depending on actual environment. For details, refer to "Configuration Limits for Release 3.4" in the following URL. <u>http://docs.oracle.com/cd/E64076_01/E64077/html/vmrns-limits.html</u>

OS type		Oracle VM 3
	Maximum number of logical CPUs	288
СРИ	Number of vCPUs per virtual machine	PVM: 128 HVM: 128
Memory	Maximum memory capacity	1TB (12)
Disk Maximum number of LUNs		1000
(in OCFS2)	Maximum volume capacity	64TB
Virtual NICs		PVM: 31 HVM: 8
	Maximum number of physical NIC ports	For details, refer to "Network Maximums" in "Chapter 6 Configuration Limits for Release 3.4".
Firmware	UEFI support	Not supported

Appendix B OS Specifications (7)



VMware vSphere 6.5: Comparison of Specifications

The configuration maximums vary depending on actual environment.

For details, refer to "Configuration Maximums" in the following URL:

https://www.vmware.com/pdf/vsphere6/r65/vsphere-65-configuration-maximums.pdf

Edition of vSphere 6		Essentials Essentials Plus Standard Enterprise Enterprise Plus			Enterprise Plus				
Maximum number of logical CPUs		576							
CFU	Number of vCPUs per virtual machine		128Way						
Memory	Maximum memory capacity	12TB							
Dick (in VMES)	Maximum number of LUNs	512							
Disk (in VMFS)	Maximum volume capacity	64TB							
DCI	Maximum number of FC-HBAs	8							
ru	Maximum number of physical NIC ports	For details, refer to "Networking Maximums" in "Configuration Maximums".							
Firmware	UEFI support			Supported					

Note: The number of LAN ports for the partition must include a port (1Gbps/1 port) for communication between the partition and the MMBs. In addition, make sure to include the number of onboard LAN ports (2 ports per IOU).

Appendix B OS Specifications (8)



VMware vSphere 6.7: Comparison of Specifications

The configuration maximums vary depending on actual environment.

For details, refer to "Configuration Maximums" in the following URL:

https://www.vmware.com/pdf/vsphere6/r67/vsphere-67-configuration-maximums.pdf

Edition of vSphere 6		Essentials Essentials Plus Standard Enterprise Enterprise Plus			Enterprise Plus				
Maximum number of logical CPUs		576							
CFU	Number of vCPUs per virtual machine		128Way						
Memory	Maximum memory capacity	16TB							
Dick (in VMES)	Maximum number of LUNs	512							
כ וויז אוש אוש	Maximum volume capacity	64TB							
DCI	Maximum number of FC-HBAs	8							
ru	Maximum number of physical NIC ports	For details, refer to "Networking Maximums" in "Configuration Maximums".							
Firmware	UEFI support			Supported					

Note: The number of LAN ports for the partition must include a port (1Gbps/1 port) for communication between the partition and the MMBs. In addition, make sure to include the number of onboard LAN ports (2 ports per IOU).

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