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Building High Availability System on Fujitsu SPARC M12 and Fujitsu M10/ SPARC M10 Servers (Maintenance procedure)

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Fujitsu LIMITED

■ Preface

- This document describes the high availability system maintenance procedure with Physical Partition Dynamic Reconfiguration (PPAR DR) supported by Fujitsu SPARC M12 and Fujitsu M10 servers. See also, Building High Availability System on Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Servers (system configuration).
- The result of each commands described in this document may be different in each platform and software version.
- This document describes the procedure with Fujitsu M12 and Fujitsu M10 Systems, Oracle VM Server for SPARC 3.2 or later and Oracle Solaris11.2.
- For further details about PPAR DR, see following manuals.
  http://www.fujitsu.com/global/products/computing/servers/unix/sparc/downloads/manuals/
  - Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 System Operation and Administration Guide.
  - Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide.
  - Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 XSCF Reference Manual.

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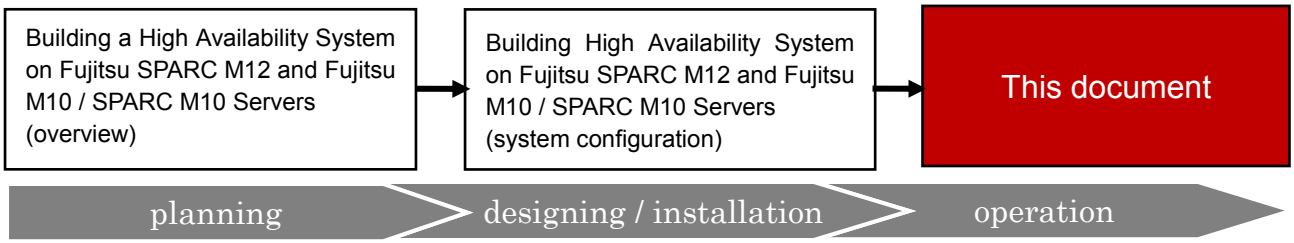
■Points of concern

- In this document, it is described as an example using Fujitsu SPARC M12-2S.

■Orientation of this document



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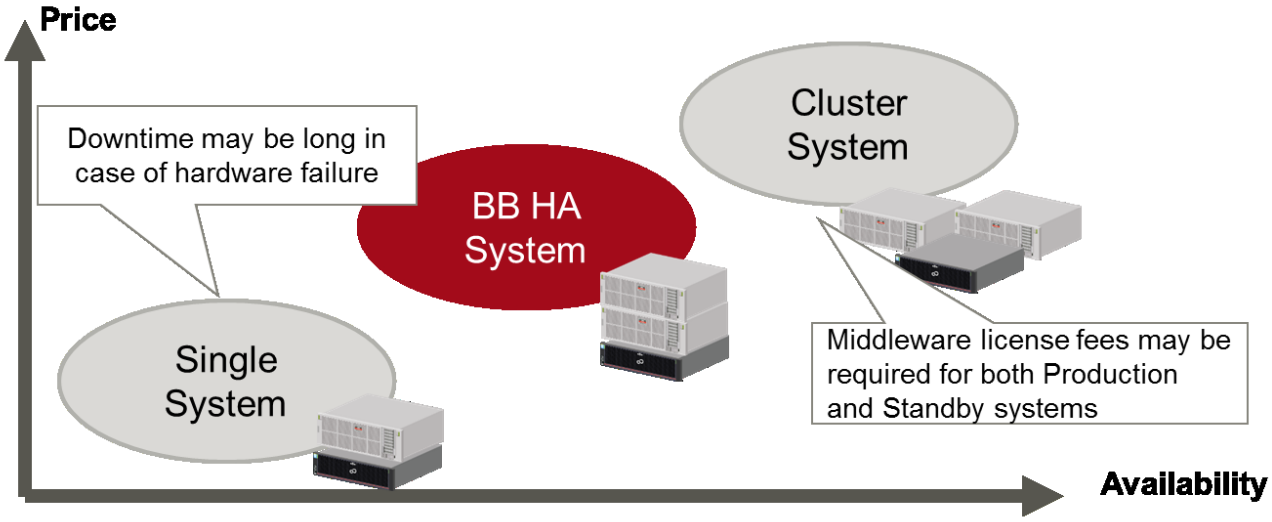
1. Preface

1.1 Overview of the BB HA

Building Block High Availability (BB HA) system is the highly available system consisting of Fujitsu SPARC M12 and Fujitsu M10-4S/SPARC M10-4S Servers. This system has following features and provides higher availability with lower cost.

- Self-recovery from Hardware failure and restart your business. Live Repair of failed parts.
  => Increase Availability
- Reduce Middleware license fee for standby system
  => Reduce Cost

Figure.1 The orientation of BB HA



1.2 Overview of PPAR DR

Physical Partition Dynamic Reconfiguration (PPAR DR) is the Fujitsu SPARC M12-2S and Fujitsu M10-4S/SPARC M10-4S Servers feature which realizes to expand or shrink a system board without stopping the physical partition.

This is the key feature to configure the BB HA system and it is very important to understand how PPAR DR functions, especially with regard to logical domain configurations.

This section describes key configuration considerations for building PPAR DR tolerant systems. For simplicity, this document focuses on an example 2BB configuration, although many of the considerations apply to large configurations.

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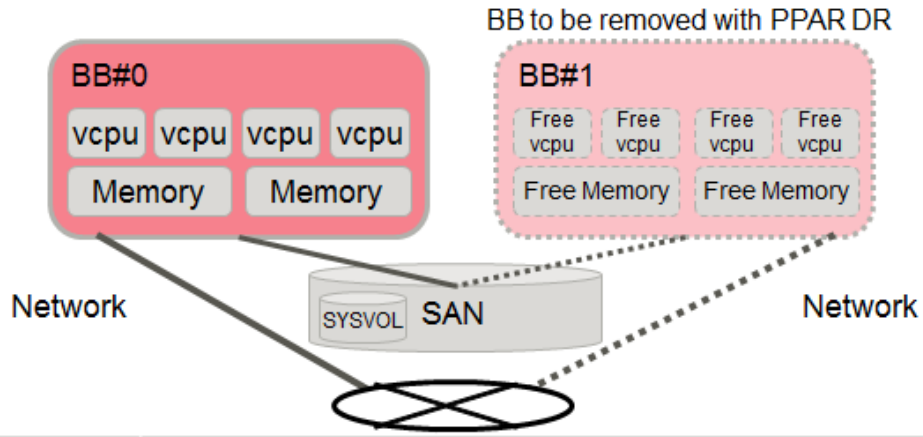
1.2.1 Configuration and Resource Planning for PPAR DR Board Delete

As you might expect, PPAR DR delete is significantly more complicated than PPAR DR add since delete removes resources from a running system. During a deleteboard PPAR DR operation in a 2BB system, the PPAR effectively loses half of its hardware resources. If logical domains are configured to use all hardware resources, half of the resources must be released before executing PPAR DR. The logical domains must be configured and prepared such that they can tolerate this reduction of resources.

Figure.2 Overview of a deleteboard capable configuration example



Resource Type	General Requirements
vcpus	Half of the vcpus must be unassigned from all domains before executing PPAR DR
Memory	Half of the Memory must be unassigned from all domains before executing PPAR DR
IO	IO must be redundant across BBs

Assigned vcpu and Memory on the BB to be removed are moved to the remaining board by OVM automatically. The remaining board must have enough free space to accept the resources being moved from the board being PPAR DR deleted, as shown below.

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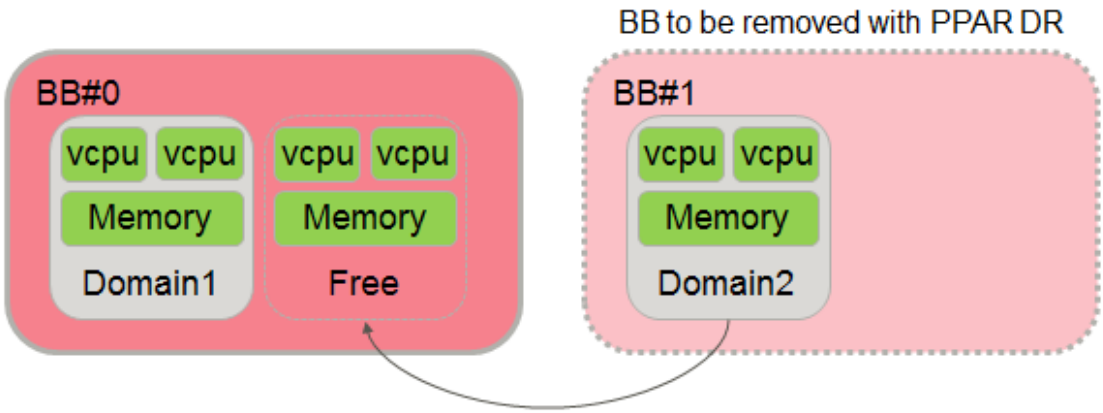
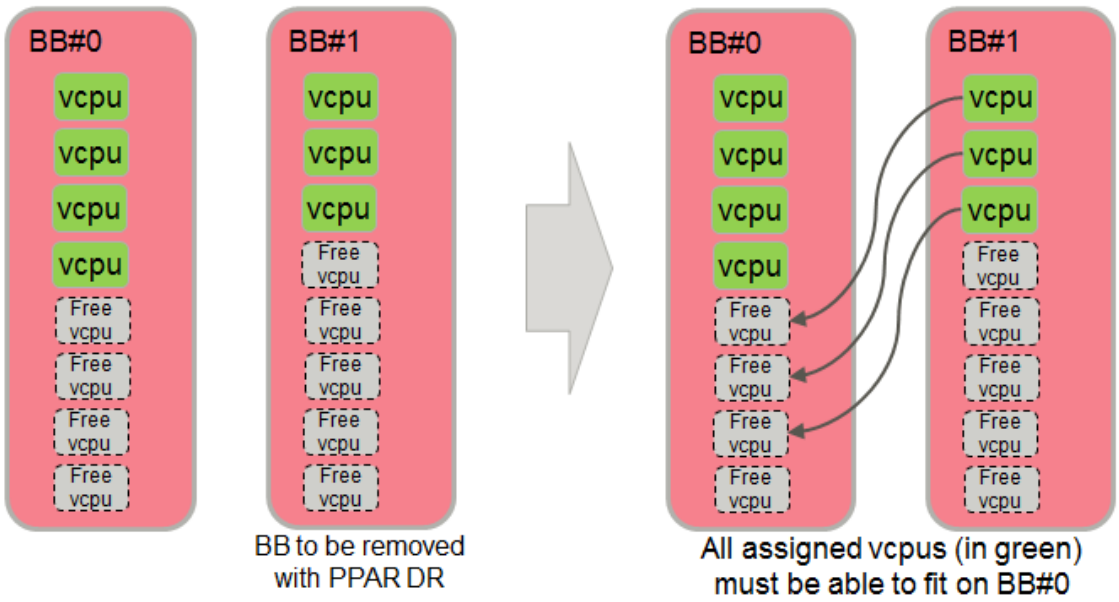
Figure.3 Resource remap during PPAR DR deleteboard



1.2.2 vcpu Remapping Concept

During a PPAR DR delete operation, assigned vcpus are remapped to free vcpus automatically by OVM. When configuring a PPAR DR tolerant logical domain configuration, at least half of the activated vcpus in the entire system must be kept free to allow for this remapping to occur. Beyond that, no additional core activations are required for the remapping of vcpus, as the total number of activated vcpus remains constant throughout the PPAR DR operation.

Figure.4 Overview of vcpu Remapping



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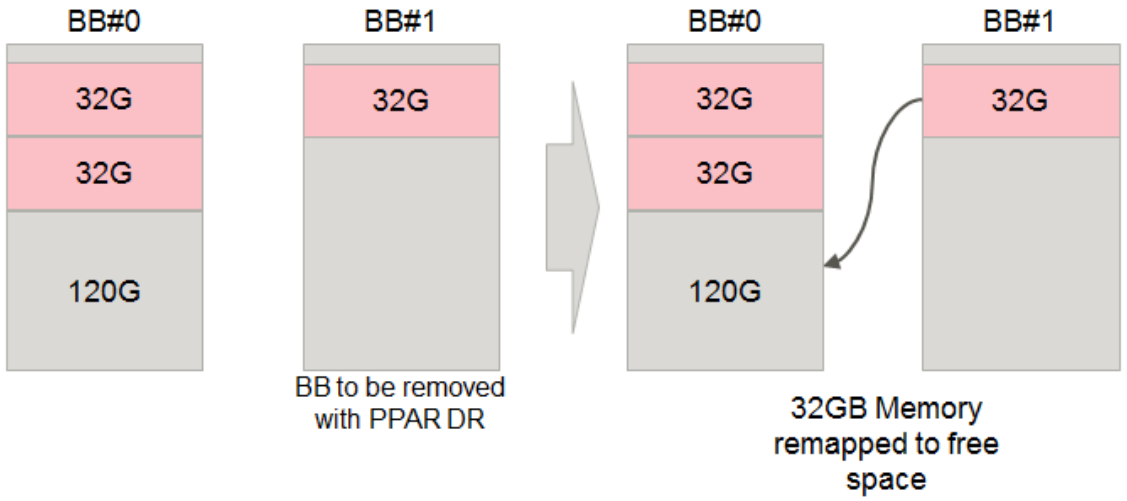
1.2.3 Memory Remapping Concept

During a PPAR DR delete operation, assigned memory is remapped to free memory automatically by OVM. When configuring a PPAR DR tolerant logical domain configuration, at least half of the memory in the entire system must be kept free to allow for this remapping to occur.

Figure.5 Memory Remapping (Successful Case)



When memory is remapped during a PPAR DR deleteboard operation, the free memory must not only be of a total size large enough to accommodate the moving logical domain(s); the free memory that is used for the logical domain(s) being moved must also be contiguous. The free memory must be in contiguous blocks large enough for each of the memory blocks being remapped.

In the figure above, the 32G memory block in BB#1 can be remapped into BB#0 because BB#0 has a contiguous block of 120GB. In the below unsuccessful case, although BB#0 has a total of 32GB of free memory, the contiguous block of 32GB on BB#1 cannot be remapped to the two 16GB blocks in BB#0.

*Enable splitting of memory blocks in Oracle VM Server for SPARC 3.4 or later.

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Figure.6 Memory Remapping (Unsuccessful Case)

1.3 Requisite of BB HA

To enable the BB HA, the following condition must be satisfied.

- Software versions are required for Fujitsu SPARC M12.
  - XSCF : XCP3021 or later
  - Control domain : Oracle Solaris11.3 SRU11.3.17.5.0 or later
  - Root domain : Oracle Solaris11.3 SRU11.3.17.5.0 or later
  - I/O domain : Oracle Solaris11.3 SRU11.3.17.5.0 or later
  - Guest domain : Oracle Solaris 10 1/13 or later or Oracle Solaris11.3 SRU11.3.17.5.0 or later

  Software versions are required for High Consolidation Type B of Fujitsu SPARC M12.
  - XSCF : XCP3021 or later
  - Control domain : Oracle Solaris11.3 SRU11.3.23.5.0 or later
  - Root domain : Oracle Solaris11.3 SRU11.3.17.5.0 or later
  - I/O domain : Oracle Solaris11.3 SRU11.3.17.5.0 or later
  - Guest domain : Oracle Solaris11.3 SRU11.3.17.5.0 or later

  Software versions are required for Fujitsu M10.*
  - XSCF : XCP2240 or later
  - Control domain : Oracle Solaris11.2 SRU11.2.8.4.0 or later
  - Root domain : Oracle Solaris11.2 SRU11.2.8.4.0 or later
  - I/O domain : Oracle Solaris11.2 SRU11.2.8.4.0 or later
  - Guest domain : Oracle Solaris 10 1/13 or later or Oracle Solaris 11.1 SRU1.4 or later

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Recommended software versions are following for Fujitsu M10.*

- XSCF : XCP2271 or later
- Control domain : Oracle Solaris11.3 (includes OVM 3.3) or later
- Root domain : Oracle Solaris11.3 or later
- I/O domain : Oracle Solaris11.3 or later
- Guest domain : Oracle Solaris 10 1/13 or any version of Oracle Solaris 11.1 or later

  * High Consolidation Type B is not qualified at this time, but should work; if this configuration is of interest, contact M12_force@us.fujitsu.com.

- Reserve a half of CPU/Memory resources of the physical partition to keep the resource of each domains after a system board is removed due to some faults.

- For PPAR DR deleteboard operations, the following DIMM configuration requisites must be satisfied.

  a. Each BB must have the same physical memory configuration, which means the same capacity DIMMs must be installed in the same position across all BBs.

Table.1 Sample DIMM Configurations

	BB#0	BB#1
Non-supported with PPAR DR (memory config does not match between BBs)	CPU#0 Group A 8GB DIMM x8 Group B 16GB DIMM x8	CPU#0 Group A 8GB DIMM x8
Supported	CPU#0 Group A 8GB DIMM x8 CPU#1 Group A 16GB DIMM x8	CPU#0 Group A 8GB DIMM x8 CPU#1 Group A 16GB DIMM x8

  b. Each memory group (16 DIMM slots associated to a CPU socket) must satisfy the following capacity limitation:

     CPU#0 Group A ≤ CPU#0 Group B ≤ CPU#1 Group A ≤ ... ≤ CPU#3 Group B

The following table shows supported and non-supported DIMM configuration examples for the above two rules.

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Table.2 Sample DIMM Configurations

	BB#0	BB#1
Non-supported with PPAR DR (CPU#1 Group A DIMMs smaller than CPU#0 Group B DIMMs)	CPU#0 Group A 8GB DIMM x8 Group B 16GB DIMM x8 CPU#1 Group A 8GB DIMM x8	CPU#0 Group A 8GB DIMM x8 Group B 16GB DIMM x8 CPU#1 Group A 8GB DIMM x8
Supported	CPU#0 Group A 8GB DIMM x8 Group B 16GB DIMM x8 CPU#1 Group A 32GB DIMM x8 Group B 32GB DIMM x8	CPU#0 Group A 8GB DIMM x8 Group B 16GB DIMM x8 CPU#1 Group A 32GB DIMM x8 Group B 32GB DIMM x8

- Create a redundant configuration by connecting I/O devices under the root complex of each system board to the system volume I/O devices and the network of each domains.

1.4 Know issues of operating BB HA system

The following lists known issues related to operate the BB HA system.

Before operating your BB HA system, please confirm if any of the conditions shown below are present. If they are, follow the guidance shown below to obtain the fix or workaround.

1.4.1 ldmd may dump core while PPAR DR is done with DBA (Dynamic Bus Assignment)

Bug ID: 21306352

Bug Description: Board DR causes ldmd abort after ldmad changes in S11.2 SRU9

Condition: PPAR DR may fail if used to delete a system board in an environment containing a root domain (not a control domain) running Oracle Solaris 11.2 SRU9.5.0 or later. Only when Root Domain(s) is/are configured. This issue does not occur in Primary-only Domain configurations.

PPAR DR Operation Condition: deleteboard only

Symptom: During deleteboard, a race condition between the OS suspend and IO configuration change may lead to an ldmd core dump.

Error Message:

```
XSCF> deleteboard -y -c disconnect -m unbind=resource 01-0
PSB#01-0 will be unconfigured from PPAR immediately. Continue?[y|n] :y
Start unconfigure preparation of PSB. [1200sec]
  0.end
Unconfigure preparation of PSB has completed.
```

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Start unconfiguring PSB from PPAR. [7200sec]

0..... 30..... 60..... 90.....-

end

Timeout detected during communicate with Logical Domains Manager.

Fix: Apply Solaris 11.3 or later (which includes Oracle VM Server for SPARC 3.3 or later)

Workaround: Remove all PCIe buses from the BB to be deleted before issuing the PPAR DR deleteboard command.

1.4.2 System panic may occur during PPAR DR with Solaris 10 patches 150400-01 to 150400-06 or Solaris 11 SRU9.5.1 or later

Bug ID: 17510986

Bug Description: Panic at cu_pg_reconfig+0x88 on Athena system at suspend/resume test.

Condition: If the guest domain is Oracle Solaris 11.1 SRU9.5.1 or later is installed, or if the guest domain is Oracle Solaris 10 and 150400-01 or newer is installed, system panic may occur when executing PPAR DR

PPAR DR Operation Condition: deleteboard only

Symptom: During deleteboard, suspend/resume causes Solaris to panic. (Note: the deleteboard command succeeds even if Solaris panic occurs.)

Error Message:

panic[cpu28]/thread=2a100511c60: BAD TRAP: type=31 rp=2a100510db0 addr=8 mmu_fsr=0 occurred in module "unix" due to a NULL pointer dereference

sched: trap type = 0x31

addr=0x8

pid=0, pc=0x1065fd4, sp=0x2a100510651, tstate=0x4480001602, context=0x1

g1-g7: 10349838, 0, 10349800, 0, 2, 10, 2a100511c60

000002a100510b00 unix:die+7c (31, 2a100510db0, 8, 0, 0, 10c4400)

%l0-3: 0000000000000031 0000000001000000 0000000000002000 00000000010c4800

%l4-7: 00000000010c4800 0000000000000001 0000000000000005 000002a100510bc0

000002a100510be0 unix:trap+a90 (2a100510db0, d075a008, 1fff, 0, 1c00, 0)

%l0-3: 0000000000000000 0000000000000031 00000000c1680000 0000000000000000

%l4-7: 0000000000000001 0000000000000005 0000000000000000 0000000000000001

000002a100510d00 unix:ktl0+64 (c4003cbb4900, 2a100510f0c, c4003cbb4900, 3, 8, c4003cbc9ad8)

%l0-3: 0000030000036000 00000000000000e0 0000004480001602 000000000101e688

%l4-7: 00000000010090f8 000000001069d358 000000000000000b 000002a100510db0

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000002a100510e50 unix:cu_pg_reconfig+54 (3, c4003a10bbe0, 700, 2a100510f0c, 100da400, 0)
%l0-3: 0000000000000003 00000000100da548 0000c4003a10bba0 0000040017bdac90
%l4-7: 0000040017bdac80 0000000000000003 0000000000000000 0000000000000018
000002a100510f10 unix:update_cpu_mappings+408 (1b, 800, 1f, 100da400, f8, c4003d358000)
%l0-3: 00000000100da548 0000c4003cc01580 0000000000000800 0000030000040300
%l4-7: 0000000000000800 00000000100da4c8 0000000000000800 0000030000040300
000002a100510fd0 unix:suspend_start_common+3c4 (100d9c00, 7bee19ec, 0, 1069ffc0, 0, 1069fc00)
%l0-3: 00000000100d9c00 0000000000000001 00000000100d9c00 000000001069ffc0
%l4-7: 000000001069fc00 000000000000000b 0000000010484000 0000000000000001
000002a1005110d0 platsvc:ps_suspend_sequence+148 (c4003edf7d10, 2a100511c60, c4003d566d80, c4003e7a45c8, 106e88c0, 100)
%l0-3: 0000000000000000 0000000000000000 0000000000000000 0000000000000000
%l4-7: 0000000000000000 0000000000000000 0000000000000000 0000000000000001
000002a1005111a0 platsvc:ps_suspend_thread_func+4c (0, 106e88d0, 106e8840, 0, 0, 106e8800)
%l0-3: 0000000010010000 000000000000000c 000000000000000c 000002a1004fdc60
%l4-7: 0000005f90229bff 0000000000000001 0000000010641408 0000c4003edf7d10

syncing file systems... done

Fix: Apply Solaris 10 patch 150400-07 or later, or apply Solaris 11.1 SRU14.5.0 or later.

Workaround: None.

1.4.3 XSCF may mishandle sequence number in DS (Domain Service) packet and PPAR DR fails.

Bug ID: RTIF2-150729-001

Bug Description: PPAR DR may fail after deleteboard command is executed.

Condition: XCP2260 or earlier

PPAR DR Operation Condition: addboard and deleteboard

Symptom: During deleteboard, XSCF may mishandle the sequence number in the DS packet. After that, PPAR DR fails due to an information mismatch between XSCF and ldmd until the PPAR is powered off and powered on from the XSCF.

Error Message:

XSCF> addboard -v -y -c configure -p 0 00-0

PSB#00-0 will be configured into PPAR-ID 0. Continue?[y|n] :y

Start connecting PSB to PPAR. [3600sec]

(Omitted)

No physical CPU ID 0

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end

PSB#00-0 could not be configured into PPAR-ID 0

due to operating system or Logical Domains Manager error.

Fix: Install XCP 2271 or later

Workaround: None

1.4.4 Use of the flashupdate command on an active PPAR causes addboard to fail.

Bug ID: RTIF2-150521-001

Bug Description: flashupdate command on an active PPAR causes addboard to fail.

Condition: Any XCP version.

PPAR DR Operation Condition: addboard only

Symptom: The flashupdate command fails to update CMU firmware in the Building Block correctly, causing the Hypervisor to abort when PPAR DR addboard operations are executed. The Hypervisor abort causes all domains in the PPAR to go down and then restart.

Error Message:

Output during PPAR DR process:

Warning: /BB#x/CMUL:SCF:POST/OBP/HV data write error

Notice: /UNSPECIFIED:HYPERVISOR: DR failed

Fix: None

Workaround: When any one of the following operations is planned to be executed, please first perform the procedure documented below in order to avoid known issue RTIF2-150521-001.

- A parts replacement in a Building Block (BB) in an active PPAR that requires the use of PPAR DR deleteboard and addboard operations.
- A BB addition to an active PPAR using PPAR DR addboard.
- An XCP firmware update of a powered on PPAR. (Online firmware update)

(1) Confirm by the following procedure whether the CMU firmware back-up copy has been lost.

1) Confirm the current CMU firmware version using the XSCF version command.

2) Confirm whether the CMU firmware back-up copy exists.

If the current CMU firmware version does not exist in the CMU BACKUP field, it means that the CMU firmware back-up copy has been lost. In the following example, the CMU firmware back-up of BB#00 has been lost.

In this case, perform step (3) to recover before proceeding with the operations mentioned above.

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Example 1

```
XSCF> version -c xcp -v
BB#00-XSCF#0 (Master)
XCP0 (Reserve): 2271
CMU                 : 02.26.0000
      POST          : 3.9.0
      OpenBoot PROM : 4.36.1+2.11.0
      Hypervisor    : 1.4.2
XSCF                : 02.27.0001
XCP1 (Current): 2271
CMU                 : 02.26.0000 (firmware version of CMU running on BB#00)
      POST          : 3.9.0
      OpenBoot PROM : 4.36.1+2.11.0
      Hypervisor    : 1.4.2
XSCF                : 02.27.0001
BB#01-XSCF#0 (Standby)
XCP0 (Reserve): 2271
CMU                 : 02.26.0000
      POST          : 3.9.0
      OpenBoot PROM : 4.36.1+2.11.0
      Hypervisor    : 1.4.2
XSCF                : 02.27.0001
XCP1 (Current): 2271
CMU                 : 02.26.0000 (firmware version of CMU running on BB#01)
      POST          : 3.9.0
      OpenBoot PROM : 4.36.1+2.11.0
      Hypervisor    : 1.4.2
XSCF                : 02.27.0001
CMU BACKUP
#0: 02.27.0001
#1: .. (firmware backup of running CMU does not exist)
XSCF>
```

If CMU firmware is updated online to XCP2271 from XCP2260, 02.27.0001 and 02.26.0000 are supposed to be displayed in CMU BACKUP #0 and #1 respectively.

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(2) If the CMU firmware back-up has not been lost, perform the following procedure.

1) Switch the master XSCF using the switchscf command.

Confirm whether the XSCF you are logged into is the Master XSCF.

```
XSCF> showbbstatus
BB#00 (Master)
```

If "Master" is displayed, perform the following command:

```
XSCF> switchscf -t Standby
```

Otherwise, perform the following command:

```
XSCF> switchscf -t Master
```

2) Log in to the Master XSCF and wait until the XSCF enters the ready state.

Confirm the XSCF is in the ready state using the showhardconf command. The XSCF is in the ready state when the "Standby" chassis enters the "Normal" state, as shown in the example below.

Example 2.1

```
XSCF> showhardconf
SPARC M10-4S;
    + Serial:2081230006; Operator_Panel_Switch:Service;
    + System_Power:On; System_Phase:Cabinet Power On;
    Partition#0 PPAR_Status:Running;
    BB#00 Status:Normal; Role:Standby; Ver:2271h; Serial:2081230006;
     (Omitted)
    BB#01 Status:Normal; Role:Master; Ver:2271h; Serial:2014020903;
    (Omitted)
```

3) Restart all XSCFs in all chassis.

Log in to the Master XSCF and execute the rebootxscf command.

```
XSCF> rebootxscf -ay
The XSCF will be reset. Continue? [y|n] :y
(Omitted)
```

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4) Wait for all XSCFs to complete their reboot.

Confirm all XSCFs have completed their reboot by using the showhardconf command.

Reboot is complete when all chassis are displayed as "Normal" state.

Example 2.2

```
XSCF> showhardconf
SPARC M10-4S;
    + Serial:2081230006; Operator_Panel_Switch:Service;
    + System_Power:On; System_Phase:Cabinet Power On;
    Partition#0 PPAR_Status:Running;
    BB#00 Status:Normal; Role:Standby; Ver:2271h; Serial:2081230006;
    (Omitted)
    BB#01 Status:Normal; Role:Master; Ver:2271h; Serial:2014020903;
    (Omitted)
```

Perform the above workaround if CMU firmware backup exists. After performing this procedure, the CMU firmware backup is not lost even after performing future online firmware updates.

(3) If the CMU firmware back-up has been lost, perform the following procedure.

1) Perform an online firmware update using the XCP version which contains the lost CMU firmware version.

In this example, the version of the lost CMU backup file is 02.26.0000 and the XCP firmware version is XCP2260.

Example 3.1

```
XSCF> getflashimage -l
  Existing versions:
  Version                 Size          Date
  BBXCP2260.tar.gz    102946759     Tue Dec 01 04:11:22 UTC 2015
  BBXCP2271.tar.gz    103068103     Thu Oct 22 14:01:39 PDT 2015
```

If the necessary firmware version is not available, download the necessary version from MOS and import the XCP image file into XSCF with the “getflashimage” command.

```
XSCF> flashupdate -c update -m xcp -s 2260
(Omitted)
```

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Confirm the firmware update has completed by checking for "XCP update has been completed" in the XSCF event log.

Example 3.2

```
XSCF> showlogs event
Date                              Message
    (Omitted)
Dec 02 05:29:04 UTC 2015    XCP update has been completed (XCP version=2260:last version=2271)   * this message is to confirmed
```

After the above message has been displayed, the switching of Master XSCF is performed automatically. Wait until the Standby XSCF enters the ready state, then confirm that the status of the Standby chassis has changed to "Normal". Confirm that the Version has changed to the XCP version which contains the lost CMU firmware version.

Example 3.3

```
XSCF> showhardconf
SPARC M10-4S;
      + Serial:2081230006; Operator_Panel_Switch:Service;
      + System_Power:On; System_Phase:Cabinet Power On;
      Partition#0 PPAR_Status:Running;
      BB#00 Status:Normal; Role:Master; Ver:2260h; Serial:2081230006;
       (Omitted)
      BB#01 Status:Normal; Role:Standby; Ver:2260h; Serial:2014020903;
       (Omitted)
```

Confirm that the firmware backup of the running CMU has been restored

Use the “version” command to check that the firmware version of the running CMU (02.26.0000) is displayed after CMU BACKUP.

Example 3.4

```
XSCF> version -c xcp -v
BB#00-XSCF#0 (Master)
XCP0 (Reserve): 2271
CMU          : 02.26.0000
    POST                  : 3.9.0
```

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OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
XCP1 (Current):2271
CMU : **02.26.0000 (firmware version of CMU running on BB#00)**
POST : 3.9.0
OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
BB#01-XSCF#0 (Standby)
XCP0 (Reserve): 2271
CMU : 02.26.0000
POST : 3.9.0
OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
XCP1 (Current): 2271
CMU : **02.26.0000 (firmware version of CMU running on BB#01)**
POST : 3.9.0
OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
CMU BACKUP
#0: 02.27.0001
#1: **02.26.0000 (firmware version backup of running CMU)**

2) Switch the Master XSCF using the switchscf command.
By performing the following procedure, loss of CMU firmware backup after online update can be prevented (this procedure is the same as the procedure described in step (2)).

```
XSCF> switchscf -t Standby
```

3) Log in to the Master XSCF and wait until the Standby XSCF enters the ready state.
Confirm using the showhardconf command. The Standby XSCF is in the ready state when “Normal” is displayed for the Standby chassis.

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Example 3.5

```
XSCF> showhardconf
SPARC M10-4S;
    + Serial:2081230006; Operator_Panel_Switch:Service;
    + System_Power:On; System_Phase:Cabinet Power On;
    Partition#0 PPAR_Status:Running;
    BB#00 Status:Normal; Role:Standby; Ver:2260h; Serial:2081230006;
     (Omitted)
    BB#01 Status:Normal; Role:Master; Ver:2260h; Serial:2014020903;
     (Omitted)
```

4) Restart all XSCFs in all chassis.

Log in to the Master XSCF and execute the rebootxscf command.

```
XSCF> rebootxscf -ay
  The XSCF will be reset. Continue? [y|n] :y
   (Omitted)
```

5) Wait for all XSCFs to complete their reboot.

Confirm all XSCFs have completed their reboot by using the showhardconf command. Reboot is complete when all chassis are displayed as "Normal" state.

Example 3.6

```
XSCF> showhardconf
SPARC M10-4S;
    + Serial:2081230006; Operator_Panel_Switch:Service;
    + System_Power:On; System_Phase:Cabinet Power On;
    Partition#0 PPAR_Status:Running;
    BB#00 Status:Normal; Role:Standby; Ver:2260h; Serial:2081230006;
     (Omitted)
    BB#01 Status:Normal; Role:Master; Ver:2260h; Serial:2014020903;
     (Omitted)
```

6) Perform an online firmware update using the original XCP version.

```
XSCF> flashupdate -c update -m xcp -s 2271
```

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Confirm the firmware update has completed by checking for "XCP update has been completed" in the event log.

Example 3.7

```
XSCF> showlogs event
Date                          Message
 (Omitted)
Dec 02 05:29:04 UTC 2015      XCP update has been completed (XCP version=2271:last
version=2260) *this message is to be confirmed
```

After the above message has been displayed, the switching of Master XSCF is performed automatically. Wait until the Standby XSCF enters the ready state, then confirm that the status of the Standby chassis has changed to "Normal". Confirm that the Version has changed to the original XCP version.

Example 3.8

```
XSCF> showhardconf
SPARC M10-4S;
      + Serial:2081230006; Operator_Panel_Switch:Service;
      + System_Power:On; System_Phase:Cabinet Power On;
      Partition#0 PPAR_Status:Running;
      BB#00 Status:Normal; Role:Standby; Ver:2271h; Serial:2081230006;
       (Omitted)
      BB#01 Status:Normal; Role:Master; Ver:2271h; Serial:2014020903;
       (Omitted)
```

7) Confirm that the current CMU firmware version now exists in the CMU BACKUP field in the XSCF version command output.

Example 3.9

```
XSCF> version -c xcp -v
BB#00-XSCF#0 (Master)
XCP0 (Reserve): 2271
CMU          : 02.26.0000
   POST              : 3.9.0
```

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OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
XCP1 (Current):2271
CMU : **02.26.0000 (firmware version of CMU running on BB#00)**
POST : 3.9.0
OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
BB#01-XSCF#0 (Standby)
XCP0 (Reserve): 2271
CMU : 02.26.0000
POST : 3.9.0
OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
XCP1 (Current): 2271
CMU : **02.26.0000 (firmware version of CMU running on BB#01)**
POST : 3.9.0
OpenBoot PROM : 4.36.1+2.11.0
Hypervisor : 1.4.2
XSCF : 02.27.0001
CMU BACKUP
#0: 02.27.0001
#1: **02.26.0000 (firmware version backup of running CMU)**
XSCF>

Above is the workaround procedure when CMU firmware backup does not exist.
After this workaround procedure has been completed, PPAR DR can be executed.
Moreover, after performing this procedure, the CMU firmware backup is not lost even after performing further online firmware updates.

1.4.5 vcpu removal after PPAR DR may cause panic .

Bug ID: 22368677

Bug Description: ldm rm-vcpu after Board DR may cause panic on Fujitsu M10

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Condition: The domain from which one or more vcpus are removed is running any version of Oracle Solaris 11. This issue does not occur on guest domains running Solaris 10.

PPAR DR Operation Condition: deleteboard followed by vcpu addition and vcpu removal, or deleteboard followed by vcpu add then remove performed automatically by Dynamic Resource Management (DRM).

Symptom: After a deleteboard operation, if vcpu addition and then vcpu removal are executed, the target domain may panic. The panic may occur when the vcpu addition and vcpu removal operations match the following operations:

[vcpu addition]

*One or more of these:

- ldm add-vcpu/add-core is executed to add vcpu(s)

  or

- ldm set-vcpu/set-core is executed to add vcpu(s)

  or

- ldm grow-socket is executed to add vcpu(s)

  or

- Dynamic Resource Management (DRM) is in the enabled state and DRM adds vcpu(s) to a domain due to a workload change

- The Dynamic Resource Management (DRM) configuration is changed from enabled to disabled

[vcpu removal]

*And then one or more of these:

- ldm remove-vcpu/remove-core is executed to remove vcpu(s)

  or

- ldm set-vcpu/set-core is executed to remove vcpu(s)

  or

- ldm shrink-socket is executed to remove vcpu(s)

  or

- Dynamic Resource Management (DRM) is in the enabled state and DRM removes vcpu(s) from a domain due to a workload change

- The Dynamic Resource Management (DRM) configuration is changed from enabled to disabled

Error Message:

panic[cpu0]/thread=2a1003bdc60: BAD TRAP: type=31 rp=2a1003bccf0 addr=c mmu_fsr=0 occurred in module "unix" due to a NULL pointer dereference

sched: trap type = 0x31

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addr=0xc

pid=0, pc=0x106b730, sp=0x2a1003bc591, tstate=0x9980001606, context=0x0

g1-g7: 1044d1c, ffec, 1ffd8, 100dc400, 2, 0, 2a1003bdc60

000002a1003bca40 unix:die+7c (31, 2a1003bccf0, c, 0, 0, 10c0c00)

%l0-3: 0000000000000031 0000000001000000 0000000000002000 00000000010c1010

%l4-7: 00000000010c1000 0000000000000000 0000000000000005 000002a1003bcb00

000002a1003bcb20 unix:trap+a3c (2a1003bccf0, ea26200c, 1fff, 0, 1c00, 0)

%l0-3: 0000000000000000 0000000000000031 00000000c1680000 0000000000000001

%l4-7: 0000000000000030 0000000000000005 0000000000000000 0000000000000001

000002a1003bcc40 unix:ktl0+64 (30000008000, 2a1003bce48, 30000008000, 3, 8, c40016880830)

%l0-3: 0000000010010000 0000000000000000 0000009980001606 000000000101e360

%l4-7: 00000000010090f8 0000000000000370 0000000000000000 000002a1003bccf0

000002a1003bcd90 unix:cpu_init_seqchipid+a0 (0, 1, 28, 10484000, 10390800, 5)

%l0-3: 0000000000000000 000000000000000b 000000000000002f 0000c400147d2cd8

%l4-7: 000002a1003bce4c 0000000000000002 0000c40016a49b10 000002a1003bce48

000002a1003bce50 dr_cpu:dr_cpu_unconfigure+13c (800, 2a1003bcfd4, 30000008000, 10483ff8, 5, 0)

%l0-3: 0000000000000002 0000000000000000 0000000000000000 0000000000000004

%l4-7: 0000000000000002 0000000000000002 0000000000000055 0000000000000002

(Omitted)

Fix: Apply Solaris 11.3 SRU14.6 or later.

Workaround: If Dynamic Resource Management is not used on the domain(s), after the deleteboard operation and the vcpu addition (but before vcpu removal), add the following statement in /etc/system on each domain and reboot the domain(s). After the below setting has been made and the domain(s) have been rebooted, subsequent deleteboard operations and vcpu allocation changes will not lead to this panic issue.

```
set lgrp_topo_levels=1
```

If Dynamic Resource Management is used on the domain(s), disable DRM before executing the deleteboard operation, or add the above statement in /etc/system on the domain(s) and reboot the domain(s) before DRM automatically manipulates vcpu allocation. DRM can be enabled and in use throughout PPAR DR operations only after the above setting is made and the domain(s) have been rebooted.

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1.5 System configuration described in this document

This chapter explains the construction procedure of BB HA by three types in each paragraph as follows. Please refer to 'Building a High Availability System on Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Servers (Overview)' for the feature of each composition. This document doesn't describe how to create the following three configurations. See the "Building High Availability System on Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Servers (System configuration)".

1.5.1 Configuration of control domain only (traditional type)

The Oracle Solaris zone is configured on the control domain in this configuration procedure as shown in Figure.7. Business application are run on the non-global zone.

Figure.7 A schematic diagram of a system configuration that satisfies the requisite of Traditional Type.

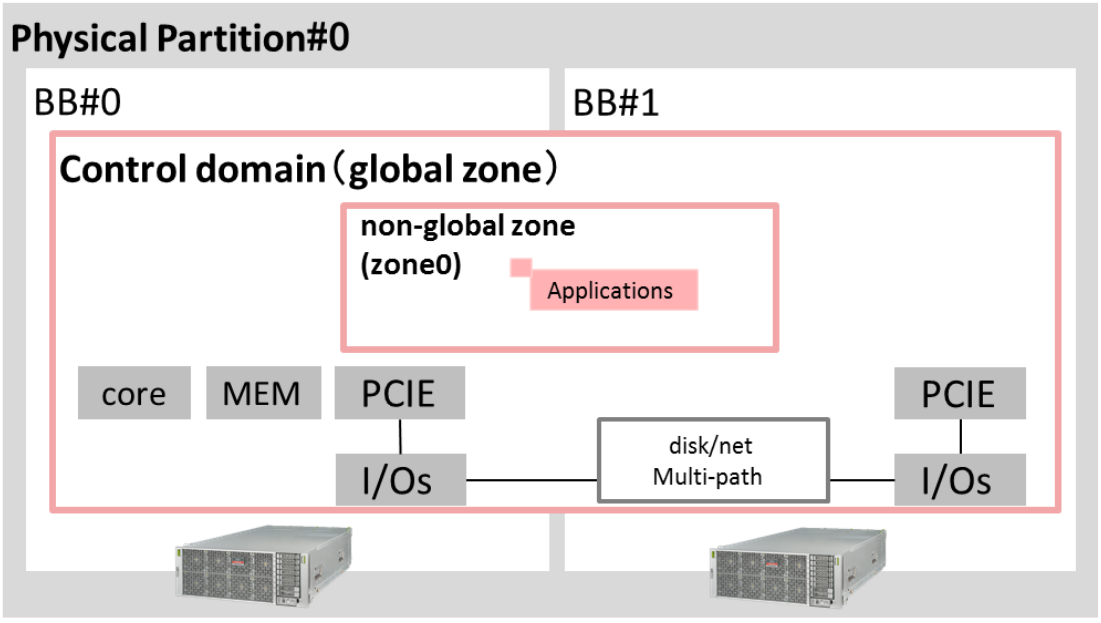

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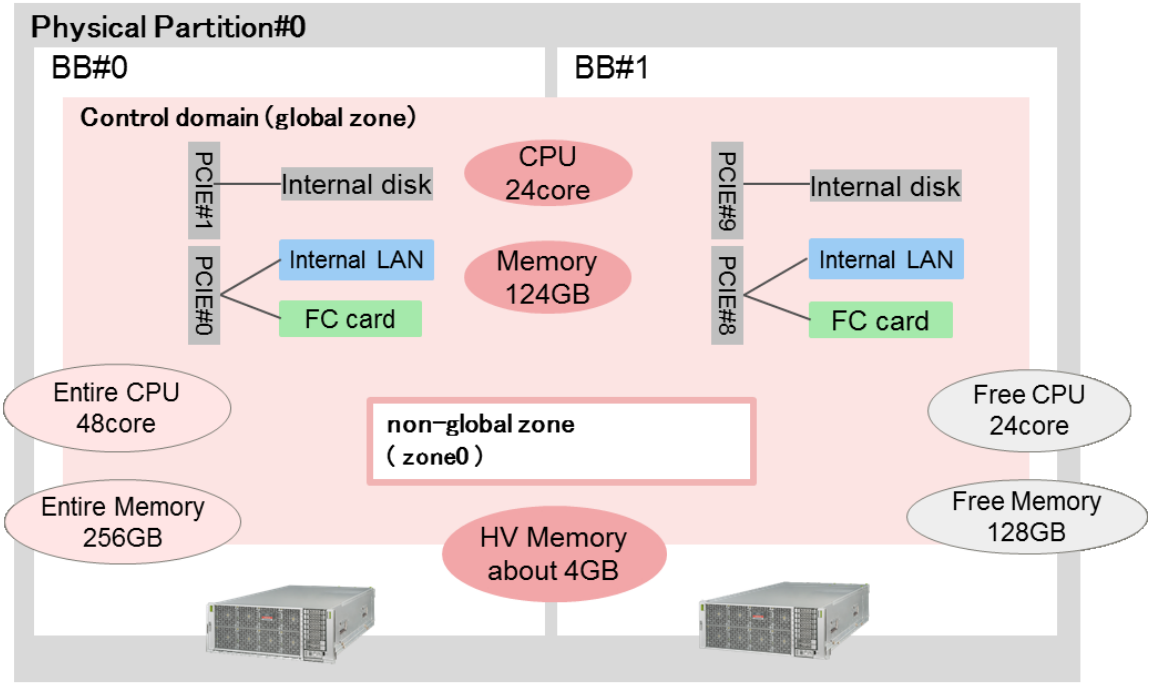
Figure.8 shows the CPU core, memory, physical I/O resources to assign to control domain (global zone).

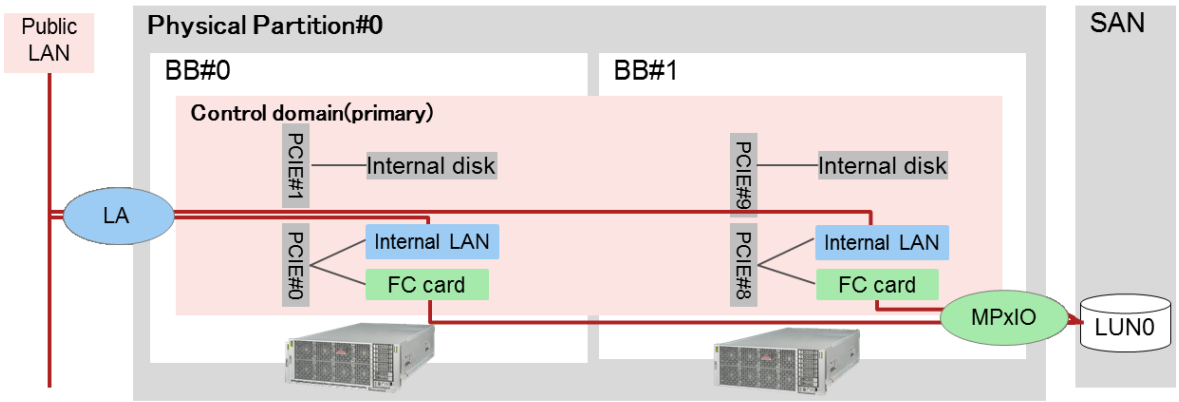
Figure.8 CPU core, memory, physical I/O resource to control domain global zone)



Described in the requisite of BB HA, a half of CPU core and Memory should be reserved.

Figure.9 shows the I/O configuration and the redundant configuration used by the control domain (global zone).

Figure.9 I/O configuration of control domain (global zone)



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Described in the requisite of BB HA, control domain should be configured the redundant configuration by assigning I/O devices in each BB's disk volume and network interface.
In this example, each domain is configured the Link Aggregation (LA) with the network interfaces in each BB. Also, control domain's disk volume is the LUN on the Storage Area Network (SAN) and the LUNs are multipathing by FibreChannel card in each BB.

The following table summarizes the control domain's resources.

Table.3 Resource assignment of control domain (global zone) in traditional type

domain name	**CPU core**	**memory**	**Physical I/O(BB#0 side)**	**Physical I/O(BB#1 side)**
control domain (global zone)	24	124GB	PCIE1(Internal disk and Free SLOT x1) PCIE0(Internal LAN and FC card) PCIE2(Free SLOT x1) PCIE3(Free SLOT x1) PCIE4(Internal LAN and Free SLOT x1) PCIE5(Internal disk and Free SLOT x1) PCIE6(Free SLOT x1) PCIE7(Free SLOT x1)	PCIE9(Internal disk and Free SLOT x1) PCIE8(Internal LAN and FC card) PCIE10(Free SLOT x1) PCIE11(Free SLOT x1) PCIE12(Internal LAN and Free SLOT x1) PCIE13(Internal disk and Free SLOT x1) PCIE14(Free SLOT x1) PCIE15(Free SLOT x1)
free resources	24	128GB	-	-

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1.5.2 Configuration of control domain and multiple root domains (consolidation type)

The control domain and two root domains are configured in this configuration procedure as shown in Figure.10. Business application are run on the root domains.

Figure.10 A schematic diagram of a system configuration that satisfies the requisite of consolidation Type

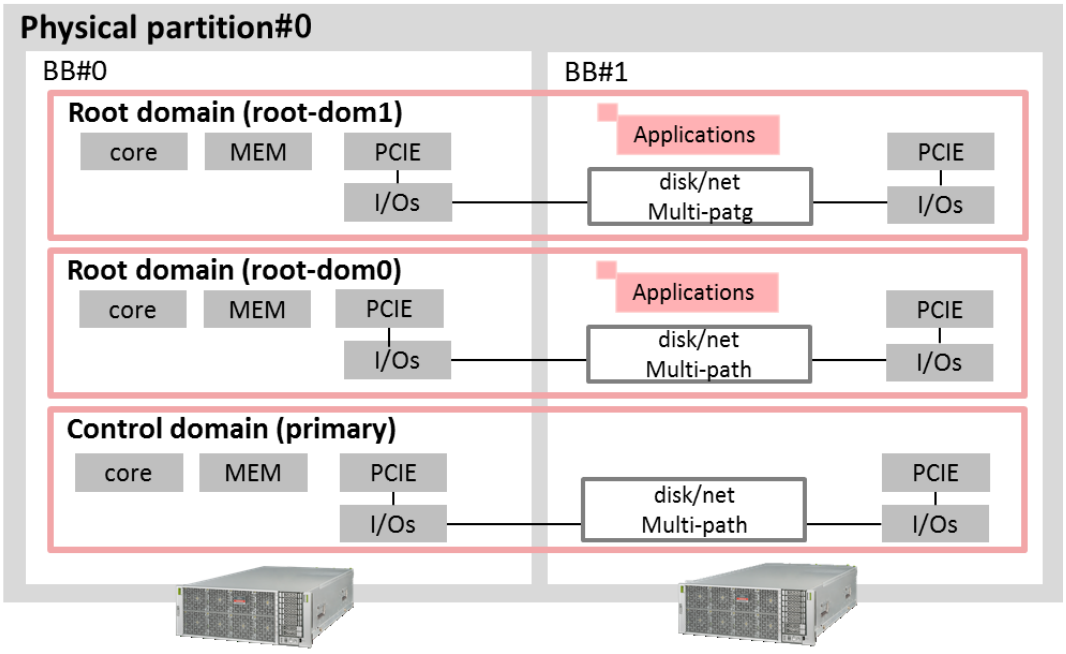

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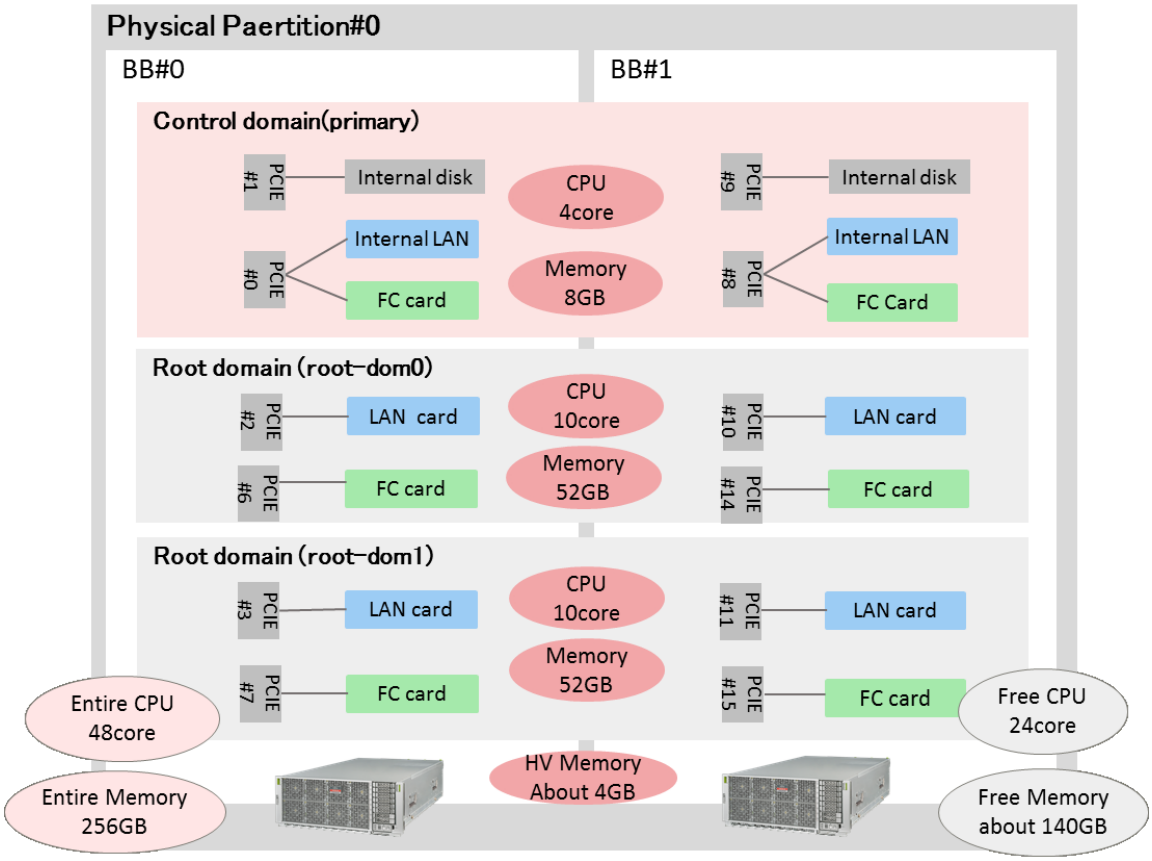
Figure.11 shows the CPU core, memory physical I/O resources to assign to each domain.

Figure.11 CPU core, memory, physical I/O resource assignment to each domain



Described in the requisite of BB HA, a half of CPU core and Memory should be reserved.
The 2BB configuration allocates 2.5GB + 1.5GB memory to Hypervisor and to keep the requisite, the maximum size of memory to allocate the logical domains is 124GB. In this example, 112GB of memory is allocated to the logical domains and rest of them (about 140GB) is reserved.
Also, a half of CPU core (24 cores) is reserved to keep the requisite.

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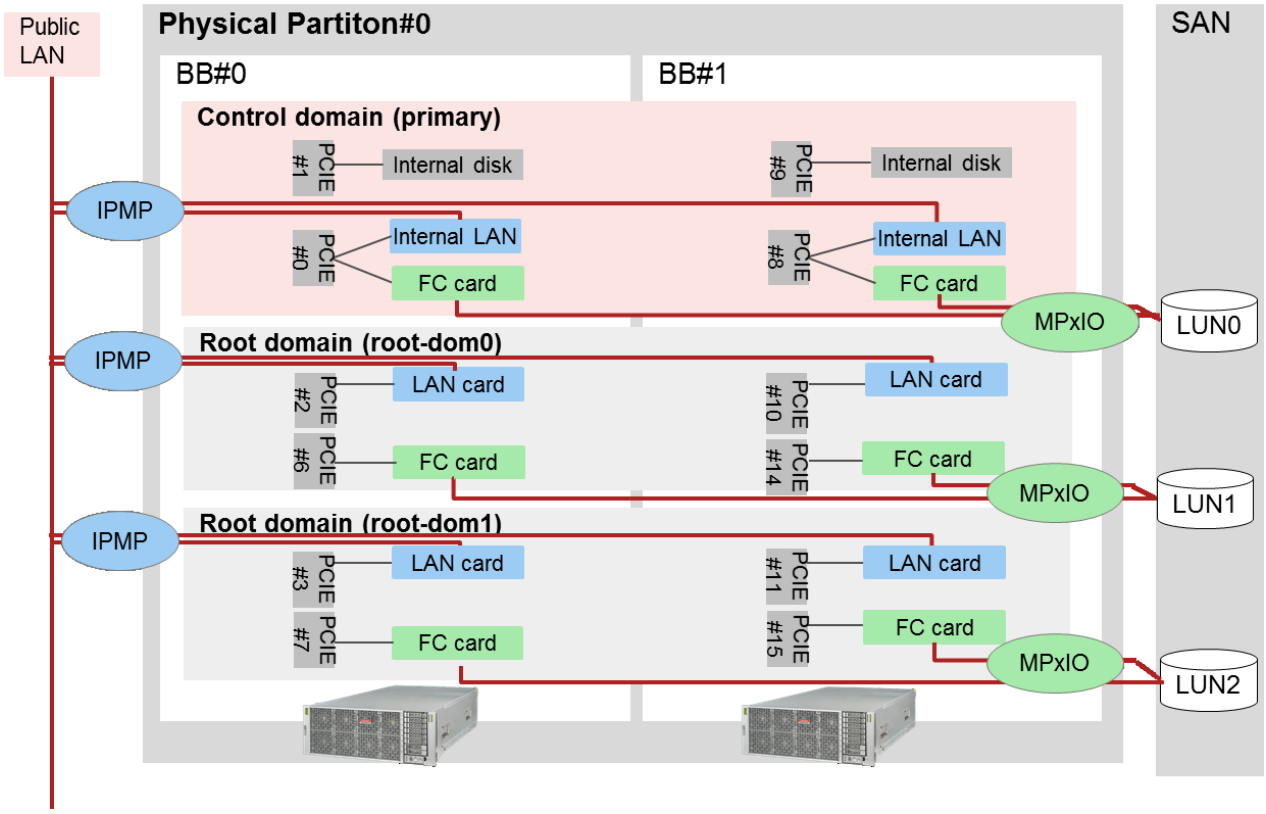
Figure.12 shows the I/O configuration and multi-path configuration in each domain.

Figure.12 I/O configuration of each domain.



Described in the requisite of BB HA, each domain should be configured the redundant configuration by assigning I/O devices in each BB's disk volume and network interface.

In this example, each domain is configured the IP Network Multipathing (IPMP) with the network interfaces in each BB. Also, each domain's disk volume is the LUN on the Storage Area Network (SAN) and the LUNs are multipathing by FibreChannel card in each BB.

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The following table summarizes the each domain's resources.

Table.4 Resource assignment in each domain.

domain name	CPU core	memory	Physical I/O(BB#0 side)	Physical I/O(BB#1 side)
primary	4	8GB	PCIE1(Internal disk and Free SLOT x1) PCIE0(Internal LAN and FC card)	PCIE9(Internal disk and Free SLOT x1) PCIE8(Internal LAN and FC card)
root-dom0	10	52GB	PCIE2(LAN card) PCIE6(FC card)	PCIE10(LAN card) PCIE14(FC card)
root-dom1	10	52GB	PCIE3(LAN card) PCIE7(FC card)	PCIE11(LAN card) PCIE15(FC card)
free resources	24	140GB	PCIE4(Internal LAN and Free SLOT x1) PCIE5(Internal disk and Free SLOT x1)	PCIE12(Internal LAN and Free SLOT x1) PCIE13(Internal disk and Free SLOT x1)

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1.5.3 Configuration of control domain and multiple guest domains (high consolidation type A)

The control domain and three guest domains are configured in this configuration procedure as shown in Figure.13 Business application are run on the guest domains.

Figure.13 A schematic diagram of a system configuration that satisfies the requisite of high consolidation Type A.

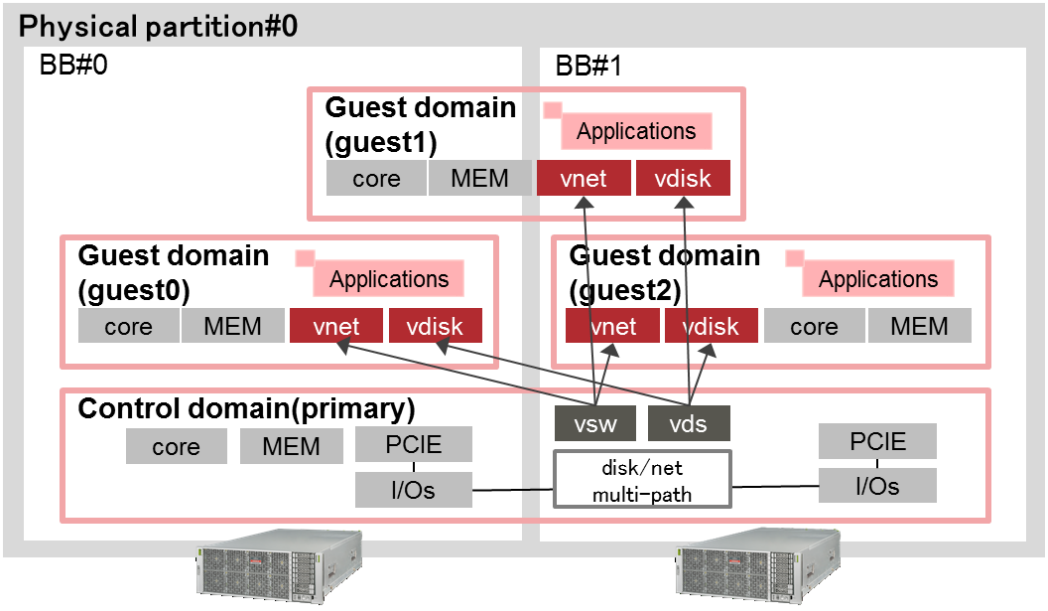

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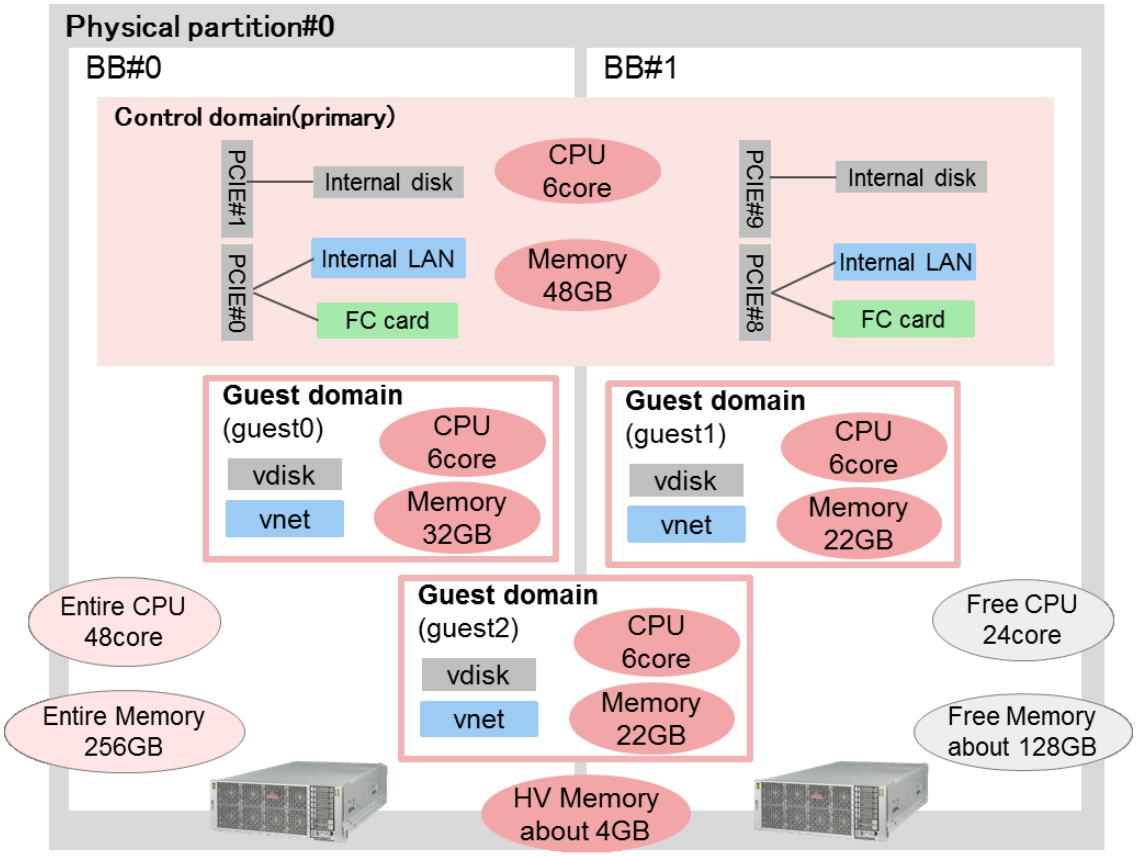
Figure.14 shows the CPU core, memory physical I/O resources to assign to each domain.

Figure.14 CPU core, memory, physical I/O resource assignment to each domain



Described in the requisite of BB HA, a half of CPU core and Memory should be reserved.
The 2BB configuration allocates 2.5GB + 1.5GB memory to Hypervisor and to keep the requisite, the maximum size of memory to allocate the logical domains is 124GB. In this example, 124GB of memory is allocated to the logical domains and rest of them (about 128GB) is reserved.
Also, a half of CPU core (24 cores) is reserved to keep the requisite.

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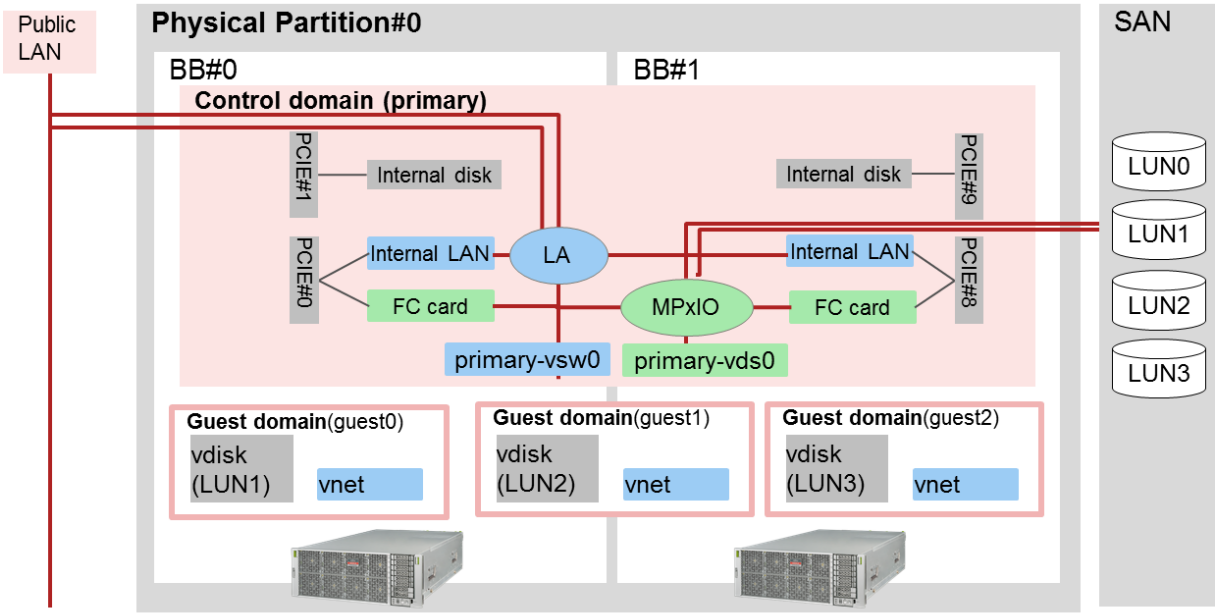
Figure.15 shows the I/O configuration and multi-path configuration in each domain.

Figure.15 I/O configuration of each domain



Described in the requisite of BB HA, each domain should be configured the redundant configuration by assigning I/O devices in each BB's disk volume and network interface.

In this example, each domain is configured the Link Aggregation(LA) with the network interfaces in each BB. Also, each domain's disk volume is the LUN on the Storage Area Network (SAN) and the LUNs are multipathing by FibreChannel card in each BB.

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The following table summarizes the each domain's resources.

Table.5 Resource assignment of each domain in high consolidation type.

Domain name	CPU core	memory	Physical I/O(BB#0 side)	Physical I/O(BB#1 side)
primary	6	48GB	PCIE1(Internal disk and Free SLOT x1) PCIE0(Internal LAN and FC card)	PCIE9(Internal disk and Free SLOT x1) PCIE8(Internal LAN and FC card)
guest0	6	32GB	-	-
guest1	6	22GB	-	-
guest2	6	22GB	-	-
(free resource)	24	128GB	PCIE2(Free SLOT x1) PCIE3(Free SLOT x1) PCIE4(Internal LAN and Free SLOT x1) PCIE5(Internal disk and Free SLOT x1) PCIE6(Free SLOT x1) PCIE7(Free SLOT x1)	PCIE10(Free SLOT x1) PCIE11(Free SLOT x1) PCIE12(Internal LAN and Free SLOT x1) PCIE13(Internal disk and Free SLOT x1) PCIE14(Free SLOT x1) PCIE15(Free SLOT x1)

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1.5.4 Configuration of control domain and multiple guest domains (high consolidation type B)

Two root domains and multiple guest domains are configured in this configuration procedure as shown in Figure.16 Business application are run on the guest domains.

Figure.16 A schematic diagram of a system configuration that satisfies the requisite of high consolidation Type.

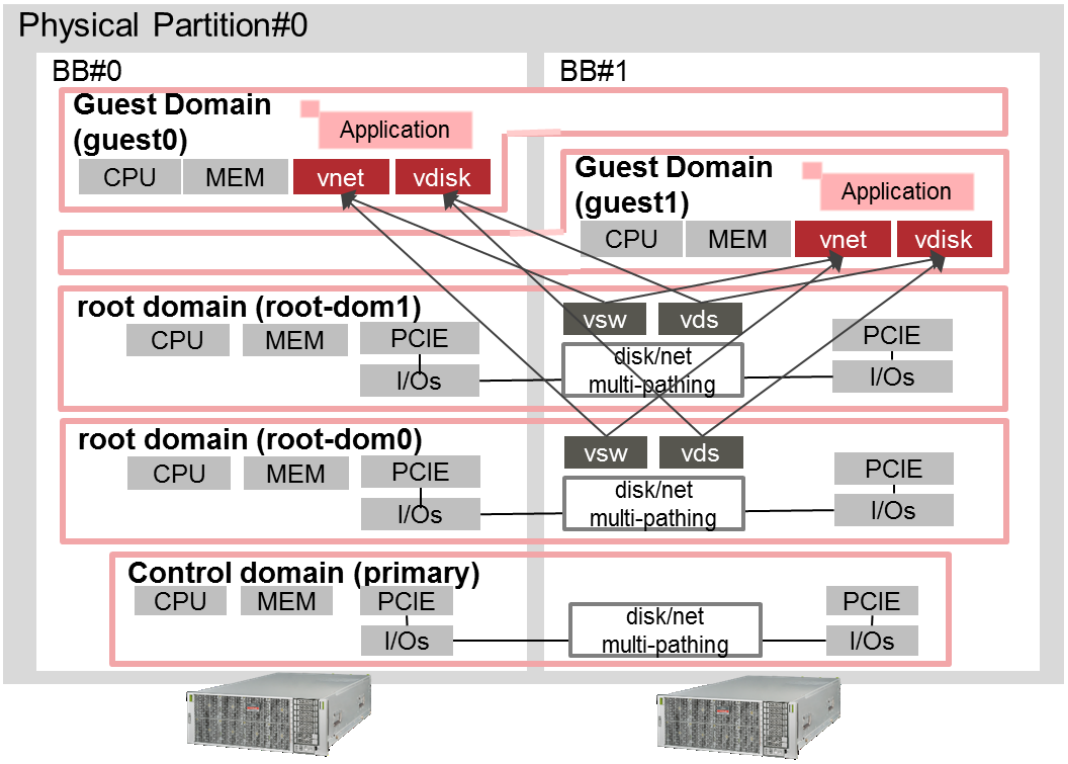

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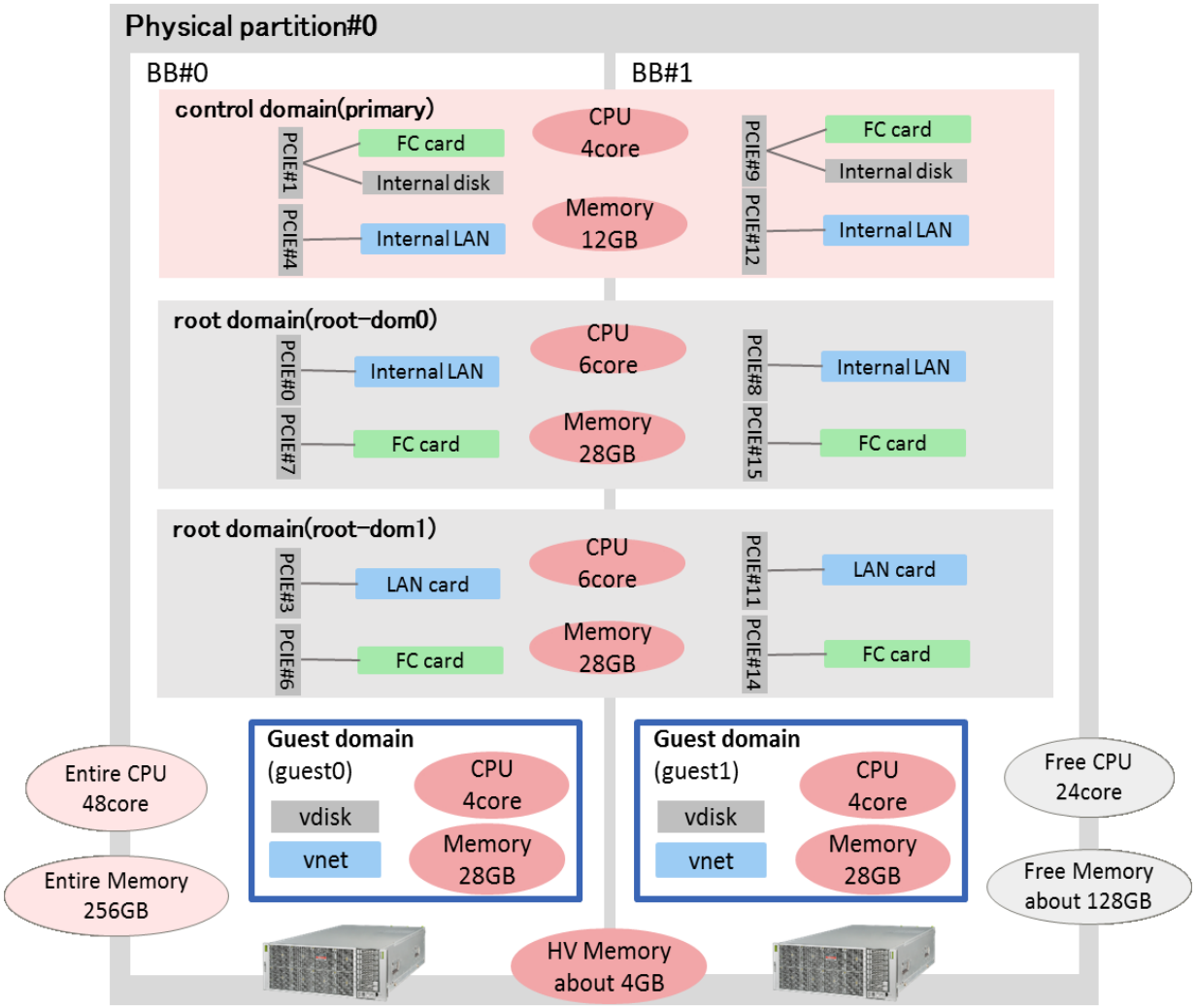
Figure.17 shows the CPU core, memory physical I/O resources to assign to each domain.

Figure.17 CPU core, memory, physical I/O resource assignment to each domain



Described in the requisite of BB HA, a half of CPU core and Memory should be reserved.
The 2BB configuration allocates 2.5GB + 1.5GB memory to Hypervisor and to keep the requisite, the maximum size of memory to allocate the logical domains is 124GB. In this example, 124GB of memory is allocated to the logical domains and rest of them (about 128GB) is reserved.
Also, a half of CPU core (24 cores) is reserved to keep the requisite.

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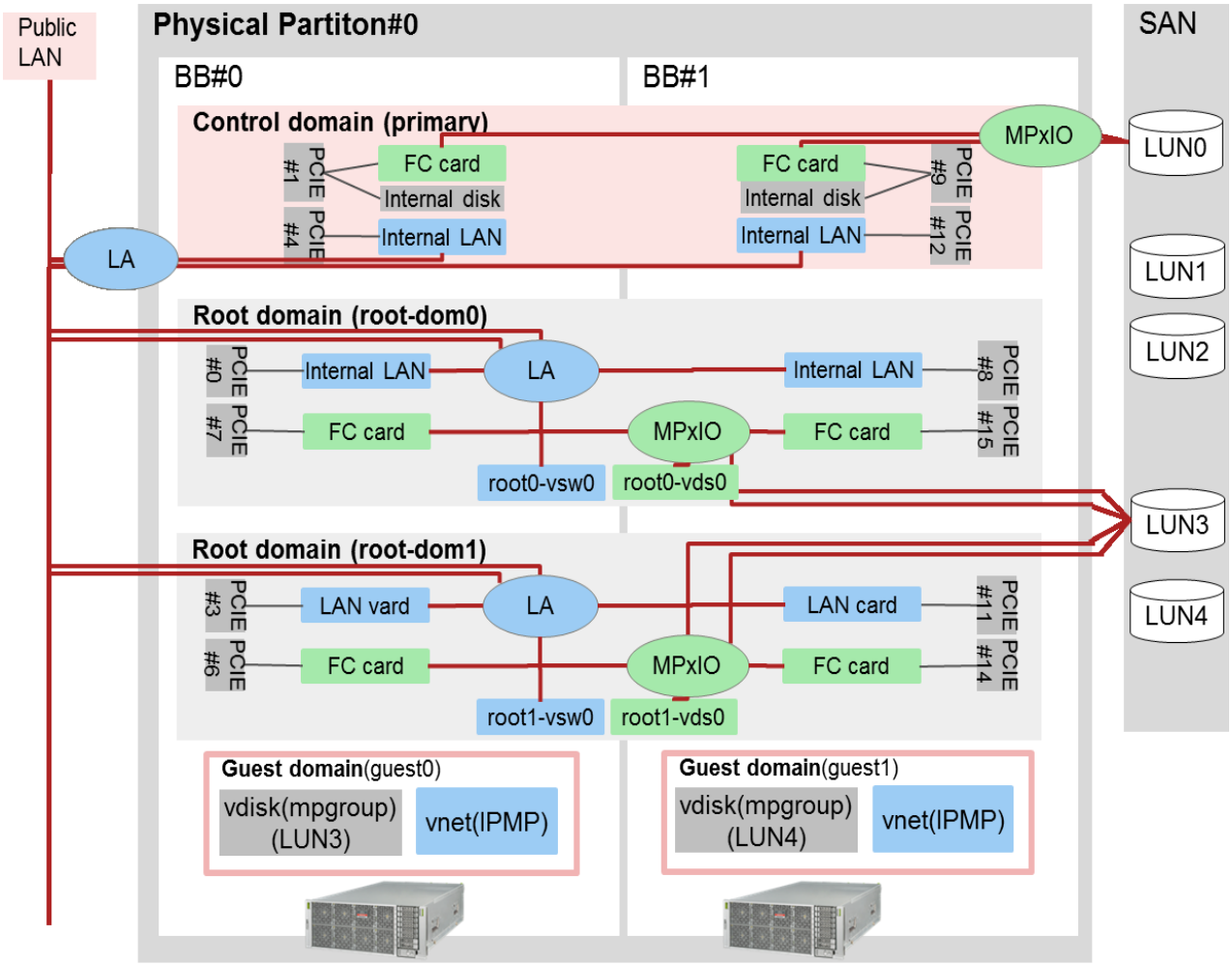
Figure.18 shows the I/O configuration and multi-path configuration in each domain.

Figure.18 I/O configuration of each domain



Described in the requisite of BB HA, each domain should be configured the redundant configuration by assigning I/O devices in each BB's disk volume and network interface.

In this example, each domain is configured the Link Aggregation(LA) with the network interfaces in each BB. Also, each domain's disk volume is the LUN on the Storage Area Network (SAN) and the LUNs are multipathing by FibreChannel card in each BB.

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The following table summarizes the each domain's resources.

Table.6 Resource assignment of each domain in high consolidation type.

Domain name	CPU core	memory	Physical I/O(BB#0 side)	Physical I/O(BB#1 side)
primary	4	12GB	PCIE1(Internal disk and FC card) PCIE4(Internal LAN and Free SLOT x1)	PCIE9(Internal disk and FC card) PCIE12(Internal LAN and Free SLOT x1)
root-dom0	6	28GB	PCIE0(Internal LAN and Free SLOT x1) PCIE7(FC card)	PCIE8(Internal LAN and Free SLOT x1) PCIE15(FC card)
root-dom1	6	28GB	PCIE3(LAN card) PCIE6(FC card)	PCIE11(LAN card) PCIE14(FC card)
guest0	4	28GB	-	-
guest1	4	28GB	-	-
(free resource)	24	128GB	PCIE2(Free SLOT x1) PCIE5(Internal disk and Free SLOT x1)	PCIE10(Free SLOT x1) PCIE13(Internal disk and Free SLOT x1)

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1.6 The flow of system maintenance after the hardware error.

This chapter explains the flow of the maintenance procedure of three types of BB HA in the following paragraphs.

1.6.1 The flow of maintenance of traditional type

This section describes an example of the procedure for actively replacing system board 01-0 using Physical Partition Dynamic Reconfiguration (PPAR DR). This procedure assumes that the failure of PCIe Bus (Root complex) on BB#1(PCIE8) described in figure.19 is occurred and the physical partition is reset. Then, recovery mode repairs the domain configuration automatically and after that, replace BB#1 with PPAR DR.

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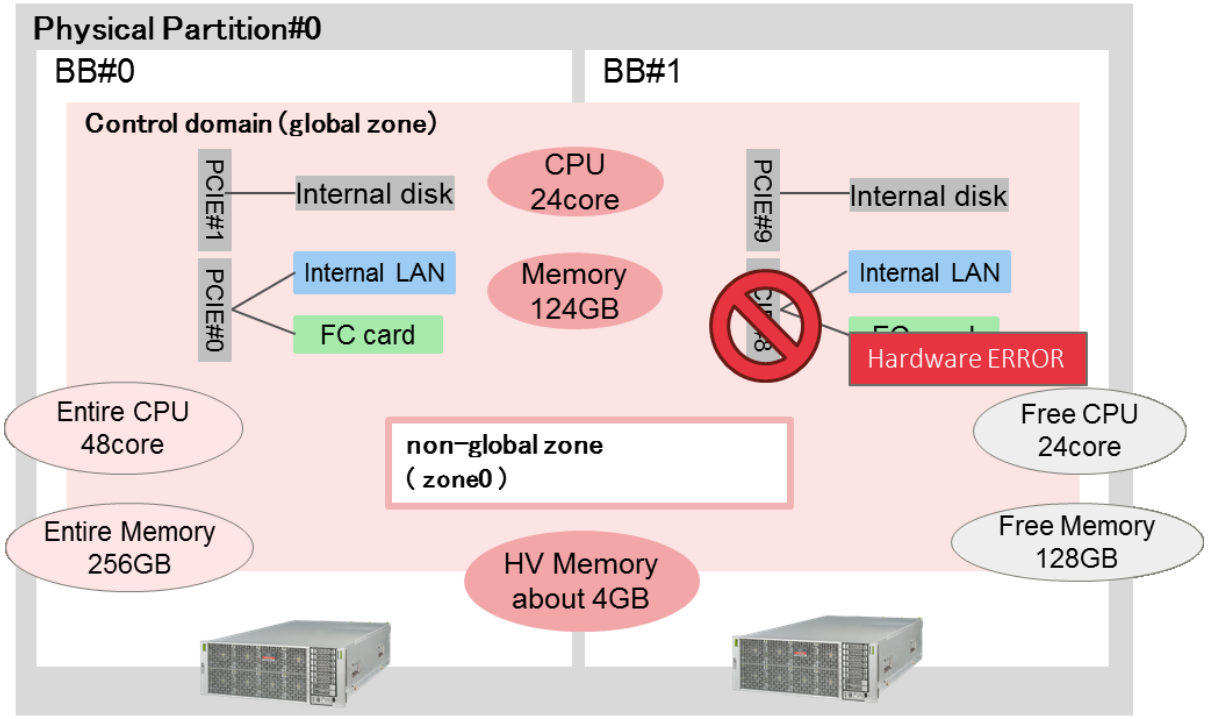
Figure.19 PCIe Bus Hardware error in the traditional type



After the failure of PCIe Bus, the system boots up with factory-default configuration and the failed PCIe Bus is degraded. If the recovery mode of Oracle VM Server for SPARC (OVM) is enabled, OVM recovers the logical domain configuration automatically. In the recovery sequence, the failed PCIe Bus(PCIE8) is removed from primary.

The recovery sequence is finished, execute PPAR DR and replace the BB#1 which owns failed resource.

Figure.20 shows the flow of this maintenance procedure.

Note - If the XSCF in the system board to be actively replaced is defective, you cannot perform active replacement using PPAR DR.

You must stop the physical partition to which the system board to be actively replaced belongs and then perform maintenance with the input power to the Fujitsu SPARC M12-2S and Fujitsu M10-4S to be replaced turned off.

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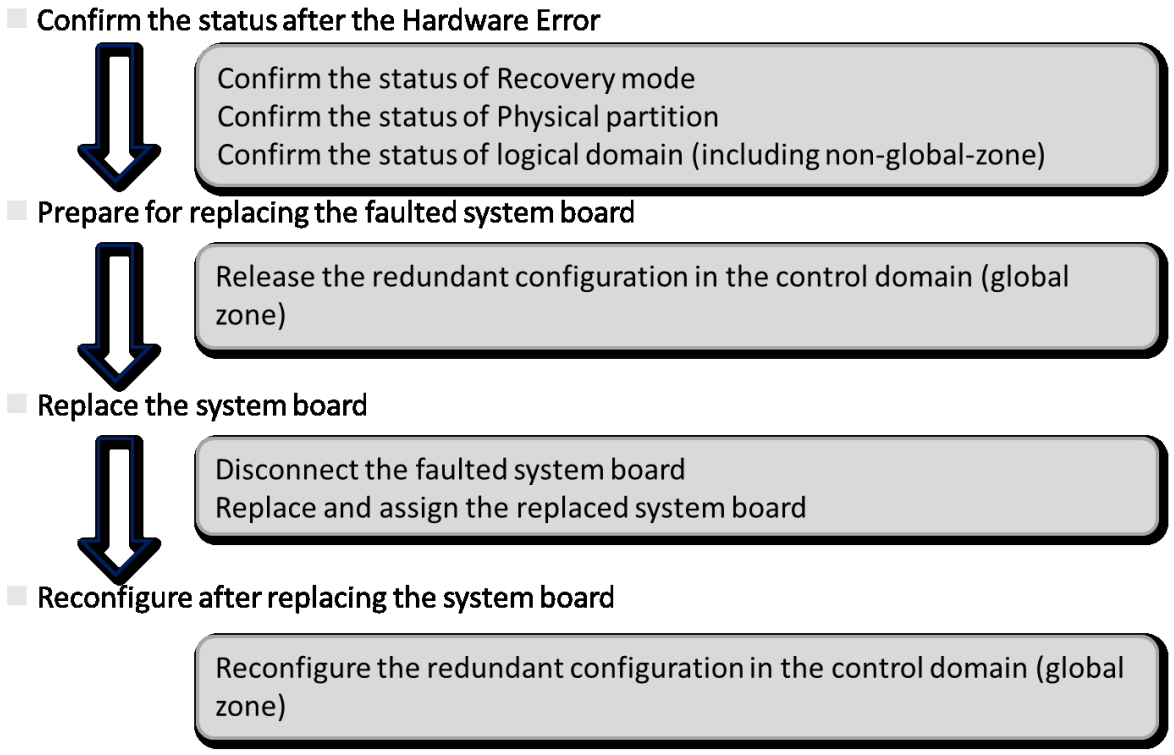
Figure.20 The flow of maintenance procedure of traditional type



1.6.2 The flow of maintenance of consolidation type

This section describes an example of the procedure for actively replacing system board 01-0 using Physical Partition Dynamic Reconfiguration (PPAR DR). This procedure assumes that the failure of PCIe Bus (Root complex) on BB#1(PCIE11) described in figure.21 is occurred and the physical partition is reset. Then, recovery mode repairs the domain configuration automatically and after that, replace BB#1 with PPAR DR.

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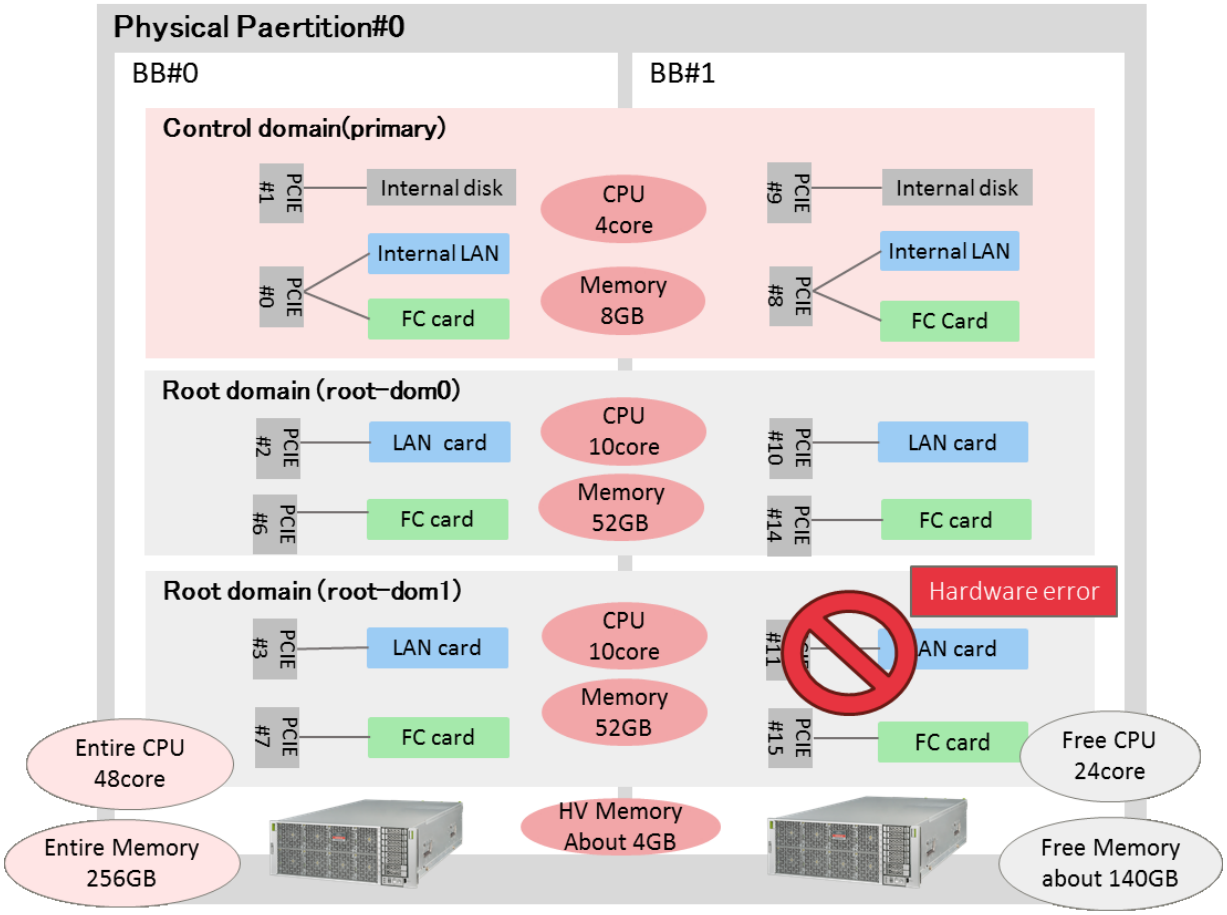
Figure.21 PCIe Bus Hardware error in the consolidation type



With this procedure, Dynamic PCIe Bus Assignment (supported by XCP 2240 or later with Oracle VM Server for SPARC 3.2 or later and the root domain with Oracle Solaris 11.2 SRU11.2.8.4.0 or later) must be supported in the environment.

After the failure of PCIe Bus, the system boots up with factory-default configuration and the failed PCIe Bus is degraded. If the recovery mode of Oracle VM Server for SPARC (OVM) is enabled, OVM recovers the logical domain configuration automatically. In the recovery sequence, the failed PCIe Bus(PCIE11) is removed from root-dom1.

The recovery sequence is finished, execute PPAR DR and replace the BB#1 which owns failed resource.

Figure.22 shows the flow of this maintenance procedure.

Note - If the XSCF in the system board to be actively replaced is defective, you cannot perform active replacement using PPAR DR.

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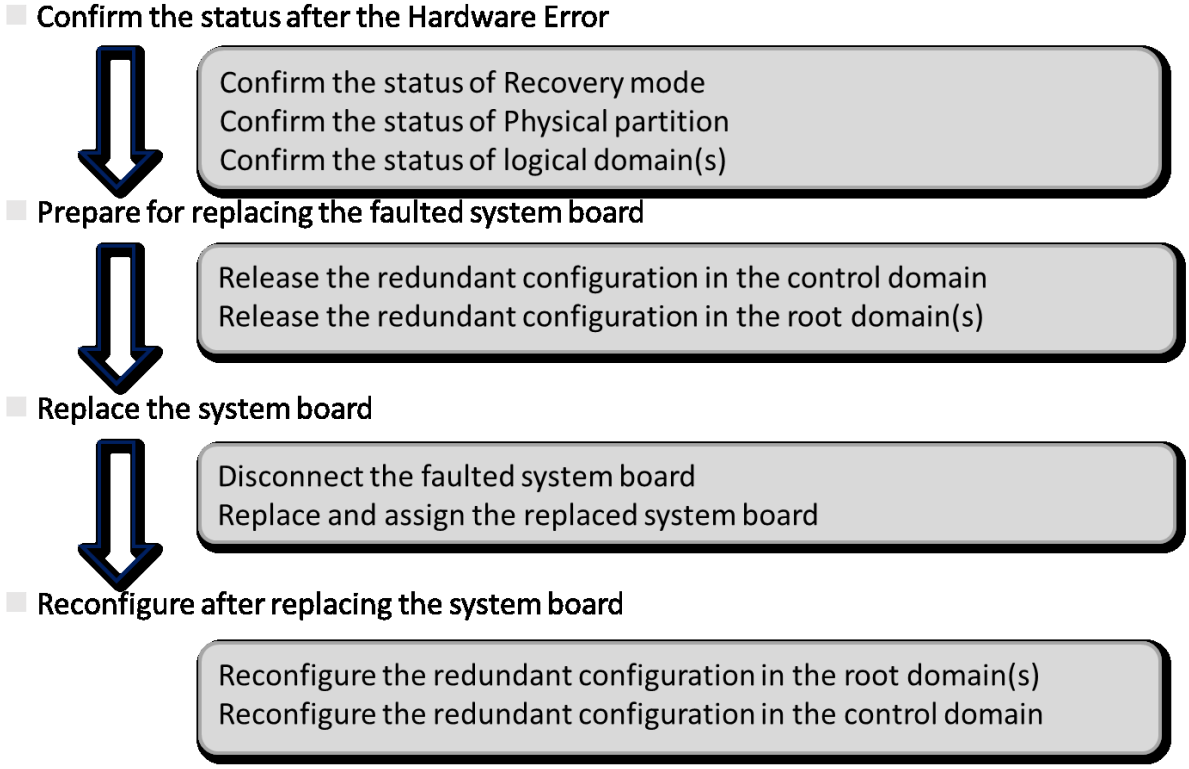
You must stop the physical partition to which the system board to be actively replaced belongs and then perform maintenance with the input power to the Fujitsu SPARC M12-2S and Fujitsu M10-4S to be replaced turned off.

Figure.22 The flow of maintenance procedure of consolidation type



If you applied another configuration (from the example) to the BB HA system, see also “Appendix.A. PPAR DR deleteboard bestpractice” and confirm your configuration satisfies the conditions.

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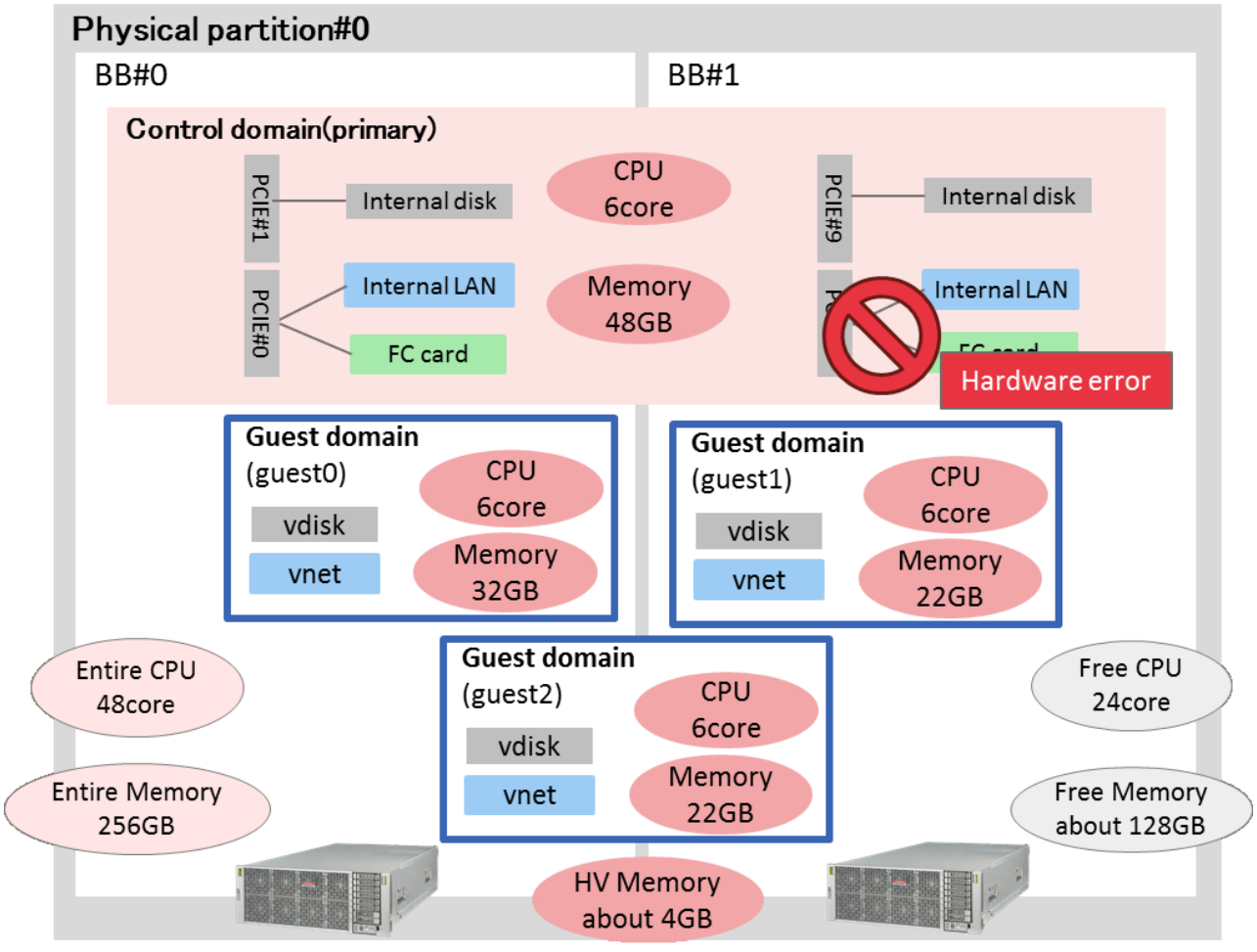
1.6.3 The flow of maintenance of high consolidation type A

This section describes an example of the procedure for actively replacing system board 01-0 using Physical Partition Dynamic Reconfiguration (PPAR DR). This procedure assumes that the failure of PCIe Bus (Root complex) on BB#1(PCIE8) described in figure.23 is occurred and the physical partition is reset. Then, recovery mode repairs the domain configuration automatically and after that, replace BB#1 with PPAR DR.

Figure.23 PCIe Bus Hardware error in the high consolidation type



After the failure of PCIe Bus, the system boots up with factory-default configuration and the failed PCIe Bus is degraded. If the recovery mode of Oracle VM Server for SPARC (OVM) is enabled, OVM recovers the logical domain configuration automatically. In the recovery sequence, the failed PCIe Bus(PCIE8) is removed from primary.

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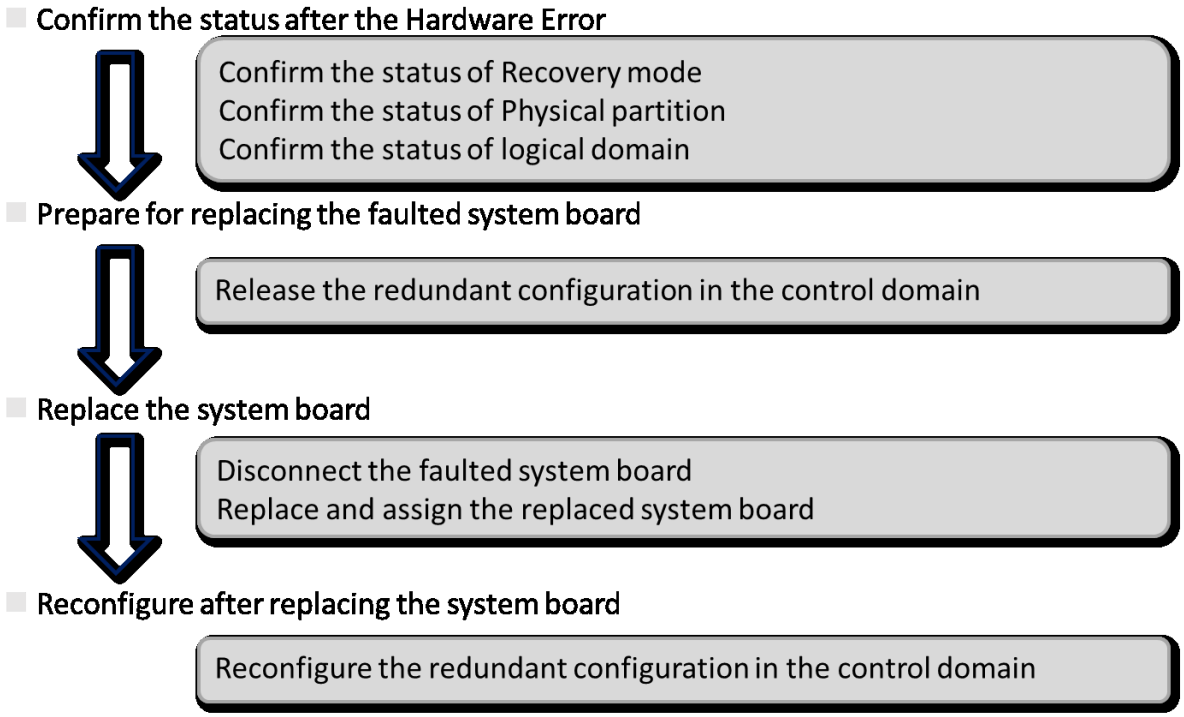
The recovery sequence is finished, execute PPAR DR and replace the BB#1 which owns failed resource.

Figure.24 shows the flow of this maintenance procedure.

Note - If the XSCF in the system board to be actively replaced is defective, you cannot perform active replacement using PPAR DR.

You must stop the physical partition to which the system board to be actively replaced belongs and then perform maintenance with the input power to the Fujitsu SPARC M12-2S and Fujitsu M10-4S to be replaced turned off.

Figure.24 The flow of maintenance procedure of high consolidation type



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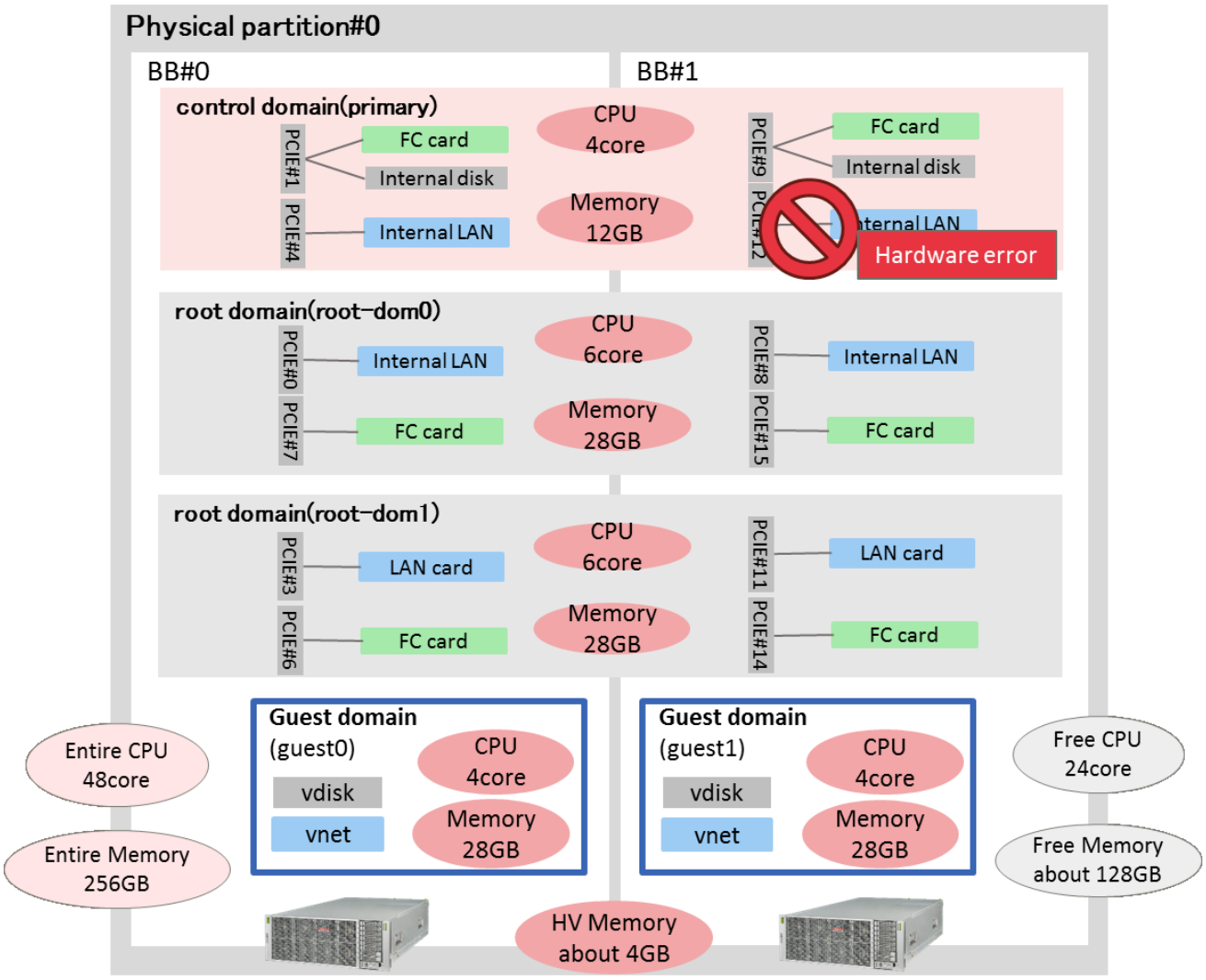
1.6.4 The flow of maintenance of high consolidation type B

This section describes an example of the procedure for actively replacing system board 01-0 using Physical Partition Dynamic Reconfiguration (PPAR DR). This procedure assumes that the failure of PCIe Bus (Root complex) on BB#1(PCIE12) described in figure.25 is occurred and the physical partition is reset. Then, recovery mode repairs the domain configuration automatically and after that, replace BB#1 with PPAR DR.

Figure.25 PCIe Bus Hardware error in the high consolidation type



After the failure of PCIe Bus, the system boots up with factory-default configuration and the failed PCIe Bus is degraded. If the recovery mode of Oracle VM Server for SPARC (OVM) is enabled, OVM recovers the logical domain configuration automatically. In the recovery sequence, the failed PCIe Bus(PCIE12) is removed from primary.

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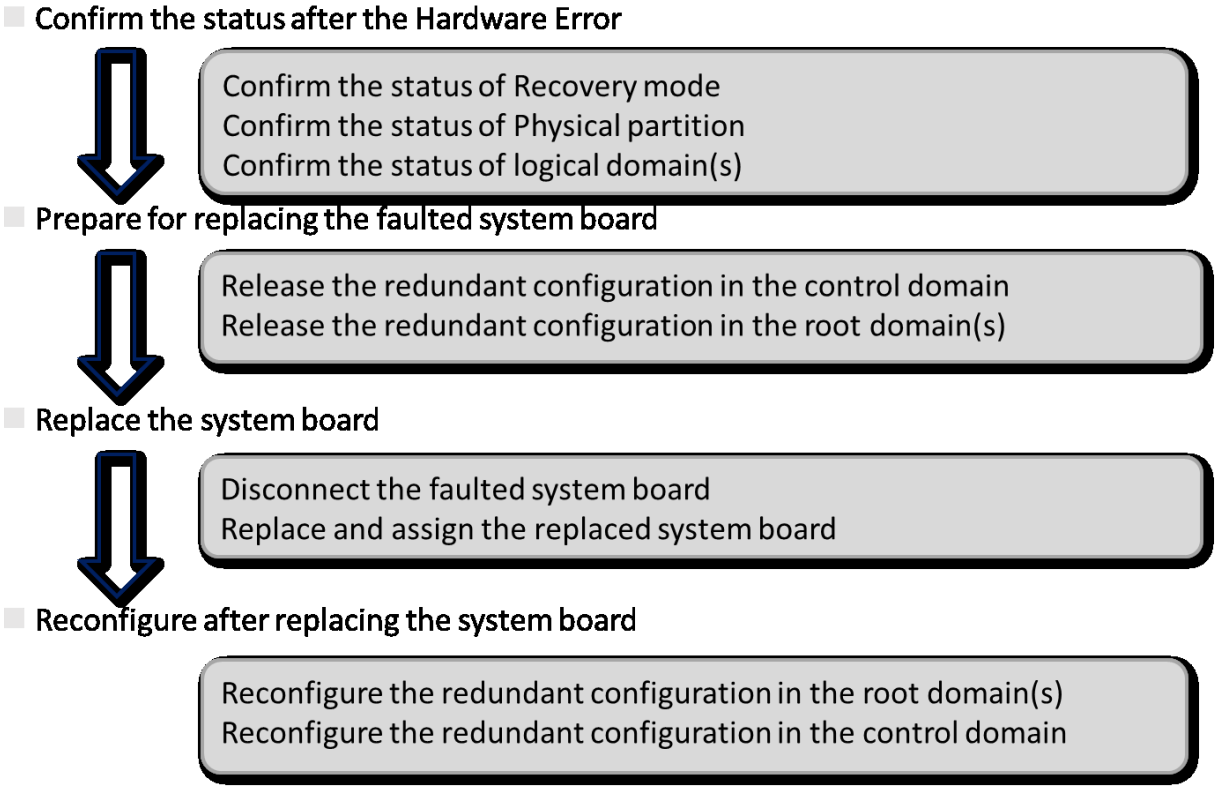
The recovery sequence is finished, execute PPAR DR and replace the BB#1 which owns failed resource.
Figure.26 shows the flow of this maintenance procedure.

Note - If the XSCF in the system board to be actively replaced is defective, you cannot perform active replacement using PPAR DR.
You must stop the physical partition to which the system board to be actively replaced belongs and then perform maintenance with the input power to the Fujitsu SPARC M12-2S and Fujitsu M10-4S to be replaced turned off.

Figure.26 The flow of maintenance procedure of high consolidation type



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2. Confirm the status after the hardware error

2.1 Connect to the console of the control domain

Execute the console command to connect to the console of the control domain and log in to it.

```
XSCF> console -p 0
```

2.2 Check the status of recovery mode

Execute the ldm command to check the status of recovery mode.

The following example indicates that ldmd daemon is in the sequence of recovery mode. If so, wait a few minutes and execute ldm command again to check the status.

Note - In the recovery mode sequence, the control domain is rebooted automatically. Do not run the business application(s) until the recovery mode is finished.

```
primary# ldm list-domain
------------------------------------------------------------------------
Notice: the LDoms Manager is running in Recovery Mode because not all
resources required for the selected configuration were available when
the system was powered on.
------------------------------------------------------------------------

NAME        STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary     Active     -n-cv-  UART    32     8G      16%   4m

root-dom0   Inactive   ------          80    52G

root-dom1   Inactive   ------          80    52G
```

Execute the ldm command and the following message is displayed, the recovery mode sequence was finished. The message is displayed in each time of executing the ldm command until the ldm add-spconfig command is executed. Each subsequent examples of ldm command omits the message.

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```
primary# ldm list-domain
------------------------------------------------------------------------
Notice: the system is running a degraded configuration because not all
resources required for the selected configuration were available when
the system was powered on.
------------------------------------------------------------------------
NAME          STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary       active     -n-cv-  UART    32      8G     16%   8m
root-dom0     active     -n----  5000    80     52G     10%   4m
root-dom1     active     -n----  5001    80     52G     10%   4m
```

2.3 Log in to the master XSCF

Execute the showbbstatus command to check that the XSCF to which you have logged in is the master XSCF. If you have logged in to a standby XSCF, log out and then log in to the master XSCF again.

```
XSCF> showbbstatus
BB#00 (Master)
```

2.4 Check the status of physical partition

Execute the showhardconf command to check [Status] of the XSCF in the system board 01-0 to be replaced is "Normal". In following example, the system board 01-0 is regarded as "BB#01".
Also, failed PCIe Bus(PCIE11) is regarded as the failed of BB#01 CMUL CPU#0.

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```
XSCF> showhardconf
SPARC M12-2S;
+ Serial:PZ51620007; Operator_Panel_Switch:Service;
 + System_Power:On; System_Phase:Cabinet Power On;
 Partition#0 PPAR_Status:Running;
 BB#00 Status:Normal; Role:Master; Ver:300ch; Serial:PZ51620007;
          + FRU-Part-Number:CA20369-B17X 003AB/9999999 ;
          + Power_Supply_System: ;
          + Memory_Size:256 GB;
      CMUL Status:Normal; Ver:0101h; Serial:PP1236052K ;
               + FRU-Part-Number:CA07361-D941 C4          /7060911;
               + Memory_Size:128 GB; Type: F ;
               :
BB#01 Status:Normal; Role:Standby; Ver:0101h;Serial: 7867000297;
               :
           *CMUL Status:Degraded; Ver:1101h; Serial:PP123003R8   ;
               + FRU-Part-Number:CA07855-D201 A1     /9999999                    ;
               + Memory_Size:128 GB; Type: F
                *CPU#0 Status:Degraded; Ver:4241h; Serial:00500165;
                              + Freq:4.250 GHz; Type:0x30;
                              + Core:12; Strand:8;
              :
```

2.5 Switch the master XSCF if needed

Execute the showbbstatus command to confirm that the XSCF in the system board to be replaced is not the master XSCF.

The following example shows that the XSCF in the system board 00-0(BB#00) is the master XSCF.

```
XSCF> showbbstatus
BB#00 (Master)
```

If the XSCF in the system board to be replaced is the master XSCF, execute the switchscf command to switch the master XSCF.

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```
XSCF> switchscf -t Standby
The XSCF unit switch between the Master and Standby states.
Continue? [y|n] :
```

Note - Confirm that the XSCF has been switched and restarted before you release the system board.

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3. Prepare for replacing the failed system board

The following sections explain the procedures necessary settings for system board replacement of BB HA with four types.

3.1 Case of traditional type

3.1.1 Connect to the console of the control domain

Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

3.1.2 Check the logical domain (including the non-global zone) operation status

a. Execute the ldm list-domain command to check the operation status of the logical domain.
To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in FLAGS.
The displayed characters and their meanings are as follows:

"n": Oracle Solaris is operating
"t": OpenBoot PROM status
"-": In another state (including [STATE] other than "active")
If there is a non-global zone, check the operation status with the zoneadm list command.
If [STATUS] is "running", Oracle Solaris is running.

```
primary# ldm list-domain
NAME             STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary          active     -n-c--  UART    192   124G     4.0%  21m
primary# zoneadm list -iv
  ID NAME             STATUS     PATH                    BRAND    IP
   0 global           running    /                       solaris  shared
   1 zone0            running    /zones/zone0            solaris  excl
```

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b. Execute the ldm list-devices command with the -a option specified to check the resource usage status.

In the following example, the -a option is specified to display all resources bound to the logical domain and all resources that are not bound.

In this procedure, execute the command and confirm there are enough free resources (CPU cores and Memory) in the system.

The CPU cores are not assigned to any domain if “%FREE” is “100” in the “CORE” section and the memory is not assigned if “BOUND” is empty in the “MEMORY” section.

In this configuration, confirm there are free 24 CPU cores and about free 128GB memory in the system for the requisite of BB HA.

```
primary# ldm list-devices -a
CORE
    ID      %FREE   CPUSET
    0       0       (0, 1, 2, 3, 4, 5, 6, 7)
    4       0       (8, 9, 10, 11, 12, 13, 14, 15)
    8       0       (16, 17, 18, 19, 20, 21, 22, 23)
(Omitted)
128     100     (1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031)
129     100     (1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039)
(Omitted)
205     100     (1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647)
206     100     (1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655)
(Omitted)
MEMORY
    PA                  SIZE        BOUND
    0x740000000000      64G
    0x760000800000      1272M       _sys_
    0x760050000000      64256M
    0x7c0000000000      62G         primary
    0x7c0f80000000      2G
    0x7e0000800000      1272M       _sys_
    0x7e0050000000      512M        _sys_
    0x7e0070000000      256M        _sys_
    0x7e0080000000      62G         primary
    (Omitted)
```

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c. Save the configuration information to XSCF.

Execute the ldm add-spconfig command on the control domain to save the configuration information.

The following example checks the configuration information that has already been saved and saves it again with the same name.

Execute the ldm list-spconfig command on the control domain to check the current configuration information.

```
primary# ldm list-spconfig
factory-default
ldm-set1 [next poweron]
```

Execute the ldm remove-spconfig command and delete the configuration information you want to overwrite.

```
primary # ldm remove-spconfig ldm-set1
```

Execute the ldm add-spconfig command and save the configuration information again.

```
primary # ldm add-spconfig ldm-set1
```

Execute the ldm list-spconfig command and confirm that the saved configuration information is [current].

```
primary# ldm list-spconfig
factory-default
ldm-set1 [current]
```

3.1.3 Release the redundant configuration in the control domain

Release the redundant configuration of the system volume and I/O devices in the control domain.

To enable the release of system board 01-0, this step describes how to release the I/O devices of the system board to be replaced and which are used in the control domain. See the documentation for the software for that redundant configuration for details on how to cancel the configuration. The release of FibreChannel port multipath is not needed.

In the following example, a physical network device (net4) is canceled from the LinkAggregation (LA) configuration. For details on the command, see the manual for Oracle Solaris.

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Execute the dladm show-phys command to check the mapping between the physical network interface (ixgbe4) and the network interface name (net4).

```
primary# dladm show-phys
LINK         MEDIA       STATE      SPEED  DUPLEX    DEVICE
net0         Ethernet    up         1000   full      ixgbe0
      :
net4         Ethernet    up         1000   full      ixgbe4
primary# dladm show-phys -L
LINK         DEVICE      LOC
net0         ixgbe0      /BB0/CMUL
      :
net4         ixgbe4      /BB1/CMUL
```

Execute the dladm show-aggr, dladm show-link command and check the configuration information of the network interface constituting the LA (aggr 0 in this example).

```
primary# dladm show-aggr
LINK                MODE   POLICY     ADDRPOLICY      LACPACTIVITY     LACPTIMER
aggr0               dlmp        --         --                --              --
primary# dladm show-link
LINK                CLASS     MTU    STATE    OVER
net0                phys      1500   up       --
net4                phys      1500   up       --
:
aggr0               aggr      1500   up       net0 net4
```

Execute the dladm remove-aggr command to detach net4 from the group of LA and execute the dladm show-link command to confirm that it has been detached.

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```
primary# dladm remove-aggr -l net4 aggr0
primary# dladm show-link
LINK            CLASS     MTU    STATE    OVER
net0            phys      1500   up       --
net4            phys      1500   unknown  --
:
aggr0           aggr      1500   up       net0
```

3.2 Case of consolidation type

3.2.1 Connect to the console of the control domain

Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

3.2.2 Check the operation status and resource usage status of the logical domain.

a. Execute the ldm list-domain command to check the operation status of the logical domain.
To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in FLAGS.
The displayed characters and their meanings are as follows:

"n": Oracle Solaris is operating
"t": OpenBoot PROM status
"-": In another state (including [STATE] other than "active")

The following example shows that the control domain, two root domains are operating.

```
primary# ldm list-domain
NAME              STATE      FLAGS     CONS    VCPU  MEMORY   UTIL   UPTIME
primary           active     -n-cv-    UART    32    8G       4.0%   21m
root-dom0         active     -n----    5000    80    52G      3.1%   17m
root-dom1         active     -n----    5001    80    52G      3.1%   17m
```

b. Execute the ldm list-devices command with the -a option specified to check the resource usage status.
In the following example, the -a option is specified to display all resources bound to the logical domain and all resources that are not bound.

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In this procedure, execute the command and confirm there are enough free resources (CPU cores and Memory) in the system.

The CPU cores are not assigned to any domain if “%FREE” is “100” in the “CORE” section and the memory is not assigned if “BOUND” is empty in the “MEMORY” section.

In this configuration, confirm there are free 24 CPU cores and about free 140GB memory in the system for the requisite of BB HA.

```
primary# ldm list-devices -a
CORE
    ID        %FREE   CPUSET
    0         0       (0, 1, 2, 3, 4, 5, 6, 7)
    1         0       (8, 9, 10, 11, 12, 13, 14, 15)
    2         0       (16, 17, 18, 19, 20, 21, 22, 23)
    4         100     (32, 33, 34, 35, 36, 37, 38, 39)
    5         100     (40, 41, 42, 43, 44, 45, 46, 47)
(Omitted)
205         0       (1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647)
206         0       (1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655)
(Omitted)
MEMORY
    PA                  SIZE        BOUND
    (Omitted)
    0x7c0000000000      32G
    0x7e0000800000      1272M       _sys_
    0x7e0050000000      512M        _sys_
    0x7e0070000000      256M        _sys_
    0x7e0080000000      8G          primary
    0x7e0280000000      22G
    (Omitted)
```

3.2.3 Release the redundant configuration in the control domain

Release the redundant configuration of the system volume and I/O devices in the control domain.

To enable the release of system board 01-0, this step describes how to release the I/O devices of the system board to be replaced and which are used in the control domain. See the documentation for the software for that redundant configuration for details on how to cancel the configuration. The release of FibreChannel port multipath is not needed.

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In the following example, a physical network device (net4) is canceled from the IPMP configuration. For details on the command, see the manual for Oracle Solaris.

Execute the dladm show-phys command to check the mapping between the physical network interface (ixgbe4) and the network interface name (net4).

```
primary# dladm show-phys
LINK         MEDIA        STATE      SPEED  DUPLEX    DEVICE
net0         Ethernet     up         1000   full      ixgbe0
     :
net4         Ethernet     up         1000   full      ixgbe4
primary# dladm show-phys -L
LINK         DEVICE       LOC
net0         ixgbe0       /BB0/CMUL
     :
net4         ixgbe4       /BB1/CMUL
```

Execute the ipmpstat -i command to check the configuration information for the network interfaces configuring IPMP.

```
primary# ipmpstat -i
INTERFACE  ACTIVE  GROUP  FLAGS   LINK  PROBE     STATE
net0       yes     ipmp0  --mbM-- up    disabled  ok
net4       no      ipmp0  is----- up    disabled  ok
```

Execute the if_mpadm -d command to release net4 from the IPMP group, and then execute the ipmpstat -i command to confirm that it has been released.
The following example confirms that STATE is offline.

```
primary# if_mpadm -d net4
primary# ipmpstat -i
INTERFACE  ACTIVE  GROUP  FLAGS   LINK  PROBE     STATE
net0       yes     ipmp0  --mbM-- up    disabled  ok
net4       no      ipmp0  -s---d- up    disabled  offline
```

Execute the ipadm delete-ip command and delete net4.

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```
primary# ipadm delete-ip net4
```

3.2.4 Release the redundant configuration in the root domain

Release the redundant configuration of the system volume and I/O devices in the root domain.

To enable the release of system board 01-0, this step describes how to release the I/O devices of the system board to be replaced and which are used in the root domain. With the similar procedure of the control domain, a physical network device is canceled from the IPMP configuration. See the documentation for the software for that redundant configuration for details on how to cancel the configuration. root-dom1 doesn't need to release the IPMP configuration since one side physical network device is degraded. The release of FibreChannel port multipath is not needed.

3.3 Case of high consolidation type A

3.3.1 Connect to the console of the control domain

Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

3.3.2 Check the operation status and resource usage status of the logical domain.

a. Execute the ldm list-domain command to check the operation status of the logical domain.
   To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in FLAGS.
   The displayed characters and their meanings are as follows:

   "n": Oracle Solaris is operating
   "t": OpenBoot PROM status
   "-": In another state (including [STATE] other than "active")

   The following example shows that the control domain, three guest domains are operating.

```
primary# ldm list-domain
NAME      STATE    FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary   active   -n-cv-  UART    48    48G      4.0%  21m
guest0    active   -n----  5000    48    32G      3.1%  17m
guest1    active   -n----  5001    48    22G      3.1%  17m
guest2    active   -n----  5002    48    22G      3.1%  17m
```

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b. Execute the ldm list-devices command with the -a option specified to check the resource usage status.

In the following example, the -a option is specified to display all resources bound to the logical domain and all resources that are not bound.

In this procedure, execute the command and confirm there are enough free resources (CPU cores and Memory) in the system.

The CPU cores are not assigned to any domain if “%FREE” is “100” in the “CORE” section and the memory is not assigned if “BOUND” is empty in the “MEMORY” section.

In this configuration, confirm there are free 24 CPU cores and about free 128GB memory in the system for the requisite of BB HA.

```
primary# ldm list-devices -a
CORE
    ID        %FREE    CPUSET
    0         0        (0, 1, 2, 3, 4, 5, 6, 7)
    1         0        (8, 9, 10, 11, 12, 13, 14, 15)
    2         0        (16, 17, 18, 19, 20, 21, 22, 23)
 (Omitted)
 128       100      (1024, 1025, 1026, 1027, 1028, 1029, 1030, 1031)
 129       100      (1032, 1033, 1034, 1035, 1036, 1037, 1038, 1039)
 (Omitted)
 205       100      (1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647)
 206       100      (1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655)
 (Omitted)
 MEMORY
    PA                  SIZE          BOUND
    0x740000000000      64G
    0x760000800000      1272M         _sys_
    0x760050000000      64256M
    0x7c0000000000      22G           guest2
    0x7c0580000000      32G           guest0
    0x7c0d80000000      1536M         guest1
 (Omitted)
    0x7e0080000000      48G           primary
    0x7e0c80000000      12G           guest1
    0x7e0f80000000      2G
 (Omitted)
```

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3.3.3 Release the redundant configuration in the control domain

Release the redundant configuration of the system volume and I/O devices in the control domain.

To enable the release of system board 01-0, this step describes how to release the I/O devices of the system board to be replaced and which are used in the control domain. See the documentation for the software for that redundant configuration for details on how to cancel the configuration. The release of FibreChannel port multipath is not needed.

In the following example, a physical network device (net4) is canceled from the LA configuration. For details on the command, see the manual for Oracle Solaris.

Execute the dladm show-phys command to check the mapping between the physical network interface (ixgbe4) and the network interface name (net4).

```
primary# dladm show-phys
LINK              MEDIA                STATE      SPEED  DUPLEX    DEVICE
net0              Ethernet             up         1000   full      ixgbe0
:
net4              Ethernet             up         1000   full      ixgbe4
primary# dladm show-phys -L
LINK              DEVICE       LOC
net0              ixgbe0       /BB0/CMUL
:
net4              ixgbe4       /BB1/CMUL
```

Execute the dladm show-aggr, dladm show-link command and check the configuration information of the network interface constituting the LA (aggr0 in this example).

```
primary# dladm show-aggr
LINK              MODE   POLICY     ADDRPOLICY      LACPACTIVITY     LACPTIMER
aggr0             dlmp          --         --                   --            --
primary# dladm show-link
LINK              CLASS     MTU    STATE    OVER
net0              phys      1500   up       --
net4              phys      1500   up       --
:
aggr0             aggr      1500   up       net0 net4
```

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Execute the dladm remove-aggr command to detach net4 from the group of LA and execute the dladm show-link command to confirm that it has been detached.

```
primary# dladm remove-aggr -l net4 aggr0
primary# dladm show-link
LINK            CLASS     MTU    STATE    OVER
net0            phys      1500   up       --
net4            phys      1500   unknown  --
:
aggr0           aggr      1500   up       net0
```

3.4 Case of high consolidation type B

3.4.1 Connect to the console of the control domain

Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

3.4.2 Check the operation status and resource usage status of the logical domain.

a. Execute the ldm list-domain command to check the operation status of the logical domain.
To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in FLAGS.
The displayed characters and their meanings are as follows:

"n": Oracle Solaris is operating
"t": OpenBoot PROM status
"-": In another state (including [STATE] other than "active")

The following example shows that the control domain, two root domains, two guest domains are operating.

```
primary# ldm list-domain
NAME              STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  NORM  UPTIME
primary           active     -n-cv-  UART    32    12G      0.1%  0.0%  4m
guest0            active     -n----  5002    32    28G      0.0%  0.0%  4m
guest1            active     -n----  5003    32    28G      0.0%  0.0%  4m
root-dom0         active     -n--v-  5000    48    28G      0.0%  0.0%  4m
root-dom1         active     -n--v-  5001    48    28G      0.0%  0.0%  4m
```

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b. Execute the ldm list-devices command with the -a option specified to check the resource usage status.

In the following example, the -a option is specified to display all resources bound to the logical domain and all resources that are not bound.

In this procedure, execute the command and confirm there are enough free resources (CPU cores and Memory) in the system.

The CPU cores are not assigned to any domain if “%FREE” is “100” in the “CORE” section and the memory is not assigned if “BOUND” is empty in the “MEMORY” section.

In this configuration, confirm there are free 24 CPU cores and about free 128GB memory in the system for the requisite of BB HA.

```
primary# ldm list-devices -a
CORE
    ID        %FREE    CPUSET
        0         0    (0, 1, 2, 3, 4, 5, 6, 7)
        1         0    (8, 9, 10, 11, 12, 13, 14, 15)
        2         0    (16, 17, 18, 19, 20, 21, 22, 23)
(Omitted)
      141       100    (1128, 1129, 1130, 1131, 1132, 1133, 1134, 1135)
      142       100    (1136, 1137, 1138, 1139, 1140, 1141, 1142, 1143)
(Omitted)
      205       100    (1640, 1641, 1642, 1643, 1644, 1645, 1646, 1647)
      206       100    (1648, 1649, 1650, 1651, 1652, 1653, 1654, 1655)
(Omitted)
MEMORY
    PA                    SIZE          BOUND
        0x720000000000    28G           guest1
        0x720700000000    228G
        0x760000000000    1536M         root-dom1
        0x760060800000    1528M         _sys_
        0x7600c0000000    27136M        root-dom1
        0x760760000000    28G           guest0
(Omitted)
        0x7e0130000000    9984M         primary
        0x7e03a0000000    28G           root-dom0
        0x7e0aa0000000    218624M
(Omitted)
```

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3.4.3 Release the redundant configuration in the control domain

Release the redundant configuration of the system volume and I/O devices in the control domain.

To enable the release of system board 01-0, this step describes how to release the I/O devices of the system board to be replaced and which are used in the control domain. See the documentation for the software for that redundant configuration for details on how to cancel the configuration. The release of FibreChannel port multipath is not needed.

In the following example, a physical network device (net6) is canceled from the LA configuration. For details on the command, see the manual for Oracle Solaris.

Execute the dladm show-phys command to check the mapping between the physical network interface (ixgbe6) and the network interface name (net6).

```
primary# dladm show-phys
LINK              MEDIA          STATE      SPEED  DUPLEX    DEVICE
net6              Ethernet       up         1000   full      ixgbe6
:
net2              Ethernet       up         1000   full      ixgbe2
primary# dladm show-phys -L
LINK              DEVICE       LOC
net2              ixgbe2       /BB0/CMUU
:
net6              ixgbe6       /BB1/CMUU
```

Execute the dladm show-aggr, dladm show-link command and check the configuration information of the network interface constituting the LA (aggr0 in this example).

```
primary# dladm show-aggr
LINK              MODE   POLICY     ADDRPOLICY      LACPACTIVITY    LACPTIMER
aggr0             dlmp   --         --              --              --
primary# dladm show-link
LINK              CLASS     MTU    STATE    OVER
Net2              phys      1500   up       --
Net6              phys      1500   up       --
:
aggr0             aggr      1500   up       net2 net6
```

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Execute the dladm remove-aggr command to detach net6 from the group of LA and execute the dladm show-link command to confirm that it has been detached.

```
primary# dladm remove-aggr -l net6 aggr0
primary# dladm show-link
LINK                CLASS     MTU    STATE    OVER
Net2                phys      1500   up       --
Net6                phys      1500   unknown  --
:
aggr0               aggr      1500   up       net2
```

3.4.4 Release the redundant configuration in the root domain

Release the redundant configuration of the system volume and I/O devices in the root domain.

To enable the release of system board 01-0, this step describes how to release the I/O devices of the system board to be replaced and which are used in the root domain. With the similar procedure of the control domain, a physical network device is canceled from the LA configuration. See the documentation for the software for that redundant configuration for details on how to cancel the configuration. root-dom1 doesn't need to release the LA configuration since one side physical network device is degraded. The release of FibreChannel port multipath is not needed.

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4. Replace the system board

4.1 Check the status of the system board to be replaced

Return to the XSCF shell, and then check the status of the system board 01-0 to be replaced.

Execute the showboards command to check the system board state.

Confirm that the system board 01-0 to be replaced is in the "Assigned" state and that the [Pwr], [Conn], and [Conf] columns all show "y". It means the system board is configured in the physical partition.

```
XSCF> showboards -p 0
PSB    PPAR-ID(LSB)    Assignment    Pwr    Conn    Conf    Test      Fault
----   ------------    ----------    ----   ----    ----    -------   --------
00-0   00(00)          Assigned      y      y       y       Passed    Normal
01-0   00(01)          Assigned      y      y       y       Passed    Degraded
```

4.2 Release the system board from the physical partition

Release the system board 01-0 from the physical partition.

a. Execute the deleteboard -c disconnect -m unbind=resource command to release the system board from the physical partition.

```
XSCF> deleteboard -c disconnect -m unbind=resource 01-0
PSB#01-0 will be unconfigured from PPAR immediately. Continue? [y|n] :y
All domains are temporarily suspended, proceed?[y|n] :y
Start unconfigure preparation of PSB. [1200sec]
0end
Unconfigure preparation of PSB has completed.
Start unconfiguring PSB from PPAR. [7200sec]
0..... 30..... 60....end
Unconfigured PSB from PPAR.
PSB power off sequence started. [1200sec]
0..... 30..... 60..... 90.....120.....150.....end
Operation has completed.
```

b. Execute the showresult command to check the end status of the deleteboard command that was just executed.

An end value of 0 indicates the normal termination of the deleteboard command.

If the end value is other than 0 or if an error message is displayed upon executing the deleteboard command, it indicates abnormal termination of the deleteboard command. By

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referring to "C.1.2 deleteboard" in the Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide, based on the error message, identify the error and then take corrective action.

```
XSCF> showresult
0
```

c. Execute the showboards command to check the system board status.
Confirm that the system board 01-0 to be replaced is in the "Assigned" state and that the [Pwr], [Conn], and [Conf] columns all show "n." It means the system board is powered off.

```
XSCF> showboards -p 0
PSB PPAR-ID(LSB) Assignment    Pwr  Conn  Conf  Test    Fault
---- ----------  ----------    ---- ----  ----  --------  -------
00-0 00(00)      Assigned      y    y     y     Passed    Normal
01-0 00(01)      Assigned      n    n     n     Passed    Degraded
```

4.3 Replace the system board

Execute the replacefru command to replace the system board 01-0.

```
XSCF> replacefru
```

Note - For details on the replacement of system boards by using the replacefru command, see "9.6 Releasing FRUs From the System" and "10.4 Incorporating an FRU Into the System" in the Fujitsu SPARC M12-2/M12-2S Service Manual or “5.8 Releasing a SPARC M10-4/M10-4S FRU from the System with the replacefru Command” and “6.2 Incorporating a SPARC M10-4/M10-4S FRU into the System with the replacefru Command” in the Fujitsu M10-4/Fujitsu M10-4S/SPARC M10-4/SPARC M10-4S Service Manual.

4.4 Incorporate the system board into the physical partition.

Incorporate the system board 01-0 which has been replaced into the physical partition.

a. Execute the showboards command to check the system board status.
Confirm that the system board 01-0 which has been replaced is in the Assigned state and that the [Pwr], [Conn], and [Conf] columns all show "n." It means the replaced system board is powered off.

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```
XSCF> showboards -p 0
PSBPPAR-ID(LSB) Assignment      Pwr   Conn  Conf  Test    Fault
---- ----------- -----------    ----  ----  ----  -------  --------
00-0 00(00)     Assigned        y     y     y     Passed   Normal
01-0 00(01)     Assigned        n     n     n     Passed   Normal
```

b. Execute the addboard -c configure command to incorporate the system board into the physical partition.

To recover the original logical domain configuration, execute the addboard -c configure command with the -m bind=resource option specified.

```
XSCF> addboard -c configure -m bind=resource -p 0 01-0
PSB#01-0 will be configured into PPAR-ID 0. Continue?[y|n] :y
Start connecting PSB to PPAR. [3600sec]
0..... 30..... 60..... 90.....120.....150.....180.....210.....240.....
270.....300.....330.....360.....390.....420.....450.....480.....510.....
540.....570.....600.....630.....660.....690.....720.....750.....780.....
810.....840.....870.....900.....930.....960.....end
Connected PSB to PPAR.
Start configuring PSB to Logical Domains (LDoms) Manager. [1800sec]
0.....end
Configured PSB to Logical Domains (LDoms) Manager.
Operation has completed.
```

Note - If an error message appears during execution of the addboard command, see "C.1.1 addboard," in the Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide and then identify the error and take corrective action.

c. Execute the showresult command to check the end status of the addboard command that was just executed.

An end value of 0 indicates the normal termination of the addboard command.

If the end value is other than 0 or if an error message is displayed upon executing the addboard command, it indicates abnormal termination of the addboard command. By referring to "C.1.1 addboard" in the Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide, based on the error message, identify the error and then take corrective action.

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```
XSCF> showresult
0
```

d. Execute the showboards command to check the system board status.
Confirm that both of the [Conn] and [Conf] columns show "y" after the system board 01-0 has been successfully incorporated.

```
XSCF> showboards -p 0
PSBPPAR-ID(LSB)  AssignmentPwr  Conn  Conf  Test    Fault
---- ----------  ----------- ----  ----  ----  -------  --------
00-0 00(00)      Assigned  y   y     y     Passed  Normal
01-0 00(01)      Assigned  y   y     y     Passed  Normal
```

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5. Reconfigure after replacing the system board

The following sections explain the procedures necessary settings after replacing the system board of BB HA with three types.

5.1 Case of traditional type

5.1.1 Check the logical domain operation status.

a. Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

b. Execute the ldm list-domain command to confirm that the logical domain operation status has not changed after the addition of the system board.
To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in [FLAGS].
The displayed characters and their meanings are as follows:
"n": Oracle Solaris is operating
"t": OpenBoot PROM status
"-": In another state (including [STATE] other than "active")

If there is a non-global zone, check the operation status with the zoneadm list command.
If [STATUS] is "running", Oracle Solaris is running.

```
primary# ldm list-domain
NAME             STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary          active     -n-c--  UART    192   124G     4.0%  9m
primary# zoneadm list -iv
  ID NAME             STATUS     PATH                    BRAND    IP
   0 global           running    /                       solaris  shared
   1 zone0            running    /zones/zone0            solaris  excl
```

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5.1.2 Check the status of I/O devices in each logical domain

Execute the ldm list-io command to check each I/O devices in the incorporated system board are assigned to each domain.

The following example in case of Fujitsu SPARC M12 and Oracle VM Server for SPARC 3.5 shows that the control domain has PCIe endpoint devices which name includes "/BB1/" and PCIe Buses (PCIE8) which own such PCIe endpoint devices.

Note - If the PCIe Bus owned by the control domain is degraded, or the restart of the control domain is executed before replacing the system board, the degraded PCIe Bus may not be assigned to the domain after replacing system board. If so, execute the ldm add-io command to assign the PCIe Bus to the domain manually.

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```
primary# ldm list-io
NAME                              TYPE   BUS      DOMAIN     STATUS
----                              ----   ---      ------     ------
/BB0/CMUL/CMP0/TDM0               BUS    PCIE0    primary    IOV
/BB0/CMUL/CMP0/TDM1               BUS    PCIE1    primary    IOV
/BB0/CMUL/CMP0/TDM2               BUS    PCIE2    primary    IOV
/BB0/CMUL/CMP0/TDM3               BUS    PCIE3    primary    IOV
/BB0/CMUU/CMP0/TDM0               BUS    PCIE4    primary    IOV
/BB0/CMUU/CMP0/TDM1               BUS    PCIE5    primary    IOV
/BB0/CMUU/CMP0/TDM2               BUS    PCIE6    primary    IOV
/BB0/CMUU/CMP0/TDM3               BUS    PCIE7    primary    IOV
/BB1/CMUL/CMP0/TDM0               BUS    PCIE8
....
/BB1/PCI2                         PCIE   PCIE8               UNK
/BB1/PCI0                         PCIE   PCIE9    primary    EMP
primary# ldm add-io PCIE8 primary
primary# ldm list-io
NAME                              TYPE   BUS      DOMAIN     STATUS
----                              ----   ---      ------     ------
/BB0/CMUL/CMP0/TDM0               BUS    PCIE0    primary    IOV
/BB0/CMUL/CMP0/TDM1               BUS    PCIE1    primary    IOV
/BB0/CMUL/CMP0/TDM2               BUS    PCIE2    primary    IOV
/BB0/CMUL/CMP0/TDM3               BUS    PCIE3    primary    IOV
/BB0/CMUU/CMP0/TDM0               BUS    PCIE4    primary    IOV
/BB0/CMUU/CMP0/TDM1               BUS    PCIE5    primary    IOV
/BB0/CMUU/CMP0/TDM2               BUS    PCIE6    primary    IOV
/BB0/CMUU/CMP0/TDM3               BUS    PCIE7    primary    IOV
/BB1/CMUL/CMP0/TDM0               BUS    PCIE8    primary    IOV
....
/BB1/PCI2                         PCIE   PCIE8    primary    OCC
```

5.1.3 Re-establish a redundant configuration of the Control domain

Re-establish a redundant configuration for the physical I/O devices of the control domain.

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Log in to the control domain and re-establish a redundant configuration which has been released.
For details on the procedures for redundant configurations, see the documentation for the software for the respective redundant configurations. The re-establish of FibreChannel port multipath is not needed.

The following describes an example of a procedure for re-configuring network interface (net4), into a redundant configuration, using LA. For details on the LA related command, see the manual for Oracle Solaris.
Execute the dladm show-aggr, dladm show-link command and check the configuration information of the current network interface constituting LA (aggr0 in this example).

```
primary# dladm show-aggr
LINK                MODE   POLICY     ADDRPOLICY      LACPACTIVITY     LACPTIMER
aggr0               dlmp            --         --                   --               --
primary# dladm show-link
LINK                CLASS      MTU      STATE      OVER
net0                phys       1500       up         --
net4                phys       1500       unknown    --
aggr0               aggr       1500       up         net0
```

Execute the dladm add-aggr command, add net4 to the group of LA, execute the dladm show-link command, and confirm that it was added.

```
primary# dladm add-aggr -l net4 aggr0
primary# dladm show-link
 LINK                CLASS      MTU      STATE      OVER
 net0                phys       1500       up         --
 net4                phys       1500       up         --
 aggr0               aggr       1500       up         net0 net4
```

Note - If the system board is unintentionally disconnected (When [Status] of BB#01 is [Degraded] in “Chapter 2.4 Check the status of physical partition”), before rebooting the OS, please delete the already created LA and recreate the LA.

a. Execute the console command, connect to the console of the control domain, and log in.

```
XSCF> console -p 0
```

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b. Execute the ipadm , dladm command, delete the created LA (in this example, aggr0) and recreate it. If you are using the corresponding LA in the non-global zone, you need to remove the network setting of the non-global zone or stop the non-global zone before deleting the LA. After completing the re-creation of the LA, please restore the state of the non-global zone (network setting, starting state).

```
primary# ipadm delete-ip aggr0
primary# dladm delete-aggr aggr0
primary# dladm create-aggr -m dlmp -l net0 -l net4 aggr0
primary# ipadm create-ip aggr0
primary# ipadm create-addr -T static -a local=192.168.1.101/24 aggr0/v4
```

5.1.4 Save the configured logical domain configuration information to the XSCF.

Execute the ldm add-spconfig command to save the configured information.

The following example checks the saved configuration information and then saves the current configuration with the name “ldm-set2”.

Execute the ldm list-spconfig command to check the current configuration information.

```
primary# ldm list-spconfig
factory-default
ldm-set1 [next poweron]
```

Execute the ldm add-spconfig command to save the configuration information to XSCF.

```
primary # ldm add-spconfig ldm-set2
```

Execute the ldm list-spconfig command to check that the saved configuration information has become [current].

```
primary# ldm list-spconfig
factory-default
ldm-set1
ldm-set2 [current]
```

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5.2 Case of consolidation type

5.2.1 Check the logical domain operation status.

a. Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

b. Execute the ldm list-domain command to confirm that the logical domain operation status has not changed after the addition of the system board.
To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in [FLAGS].
The displayed characters and their meanings are as follows:
"n": Oracle Solaris is operating
"t": OpenBoot PROM status
"-": In another state (including [STATE] other than "active")

```
primary# ldm list-domain
NAME          STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary       active     -n-cv-  UART    32    8G       64%   54m
root-dom0     active     -n----  5000    80    52G      42%   54m
root-dom1     active     -n----  5001    80    52G      11%   54m
```

5.2.2 Check the status of I/O devices in each logical domain

Execute the ldm list-io command to check each I/O devices in the incorporated system board are assigned to each domain.
The following example in case of Fujitsu SPARC M12 and Oracle VM Server for SPARC 3.5 shows that the control domain and the root domains have PCIe endpoint devices which name includes "/BB1/" and PCIe Buses (PCIE8, PCIE9, PCIE10, PCIE11, PCIE14 and PCIE15) which own such PCIe endpoint devices.
Note - If the PCIe Bus owned by the control domain is degraded, or the restart of the control domain is executed before replacing the system board, the degraded PCIe Bus may not be assigned to the domain after replacing system board. If so, execute the ldm add-io command to assign the PCIe Bus to the domain manually.

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```
primary# ldm list-io
NAME                    TYPE  BUS     DOMAIN      STATUS
----                    ----  ---     ------      ------
/BB0/CMUL/CMP0/TDM0     BUS   PCIE0   primary     IOV
/BB0/CMUL/CMP0/TDM1     BUS   PCIE1   primary     IOV
/BB0/CMUL/CMP0/TDM2     BUS   PCIE2   root-dom0   IOV
/BB0/CMUL/CMP0/TDM3     BUS   PCIE3
/BB0/CMUU/CMP0/TDM0     BUS   PCIE4
/BB0/CMUU/CMP0/TDM1     BUS   PCIE5   root-dom1   IOV
/BB0/CMUU/CMP0/TDM2     BUS   PCIE6
/BB0/CMUU/CMP0/TDM3     BUS   PCIE7
/BB1/CMUL/CMP0/TDM0     BUS   PCIE8   primary     IOV
/BB1/CMUL/CMP0/TDM1     BUS   PCIE9   primary     IOV
/BB1/CMUL/CMP0/TDM2     BUS   PCIE10  root-dom0   IOV
/BB1/CMUL/CMP0/TDM3     BUS   PCIE11  root-dom1   IOV
/BB1/CMUU/CMP0/TDM0     BUS   PCIE12
/BB1/CMUU/CMP0/TDM1     BUS   PCIE13
/BB1/CMUU/CMP0/TDM2     BUS   PCIE14  root-dom0   IOV
/BB1/CMUU/CMP0/TDM3     BUS   PCIE15  root-dom1   IOV
....
/BB1/CMUL/NET0          PCIE  PCIE8   primary     OCC
/BB1/PCI2               PCIE  PCIE8   primary     OCC
/BB1/CMUL/SASHBA        PCIE  PCIE9   primary     OCC
/BB1/PCI0               PCIE  PCIE9   primary     EMP
/BB1/PCI7               PCIE  PCIE10  root-dom0   OCC
/BB1/PCI5               PCIE  PCIE11  root-dom1   OCC
....
/BB1/PCI3               PCIE  PCIE14  root-dom0   OCC
/BB1/PCI1               PCIE  PCIE15  root-dom1   OCC
....
```

5.2.3 Re-establish a redundant configuration of the root domain

Re-establish a redundant configuration for the physical I/O devices of the root domain.

Log in to the root domain and re-establish a redundant configuration which has been released.

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For details on the procedures for redundant configurations, see the documentation for the software for the respective redundant configurations. The re-establish of FibreChannel port multipath is not needed.

The following describes an example of a procedure for re-configuring network interface (net4), into a redundant configuration, using IPMP. For details on the IPMP related command, see the manual for Oracle Solaris.

Log in to the root domain (root-dom0).

```
primary# ldm list-domain
NAME              STATE    FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary           active   -n-cv-  UART    32     8G      64%   54m
root-dom0         active   -n--v-  5000    80     52G     42%   54m
root-dom1         active   -n--v-  5001    80     52G     11%   54m


primary# telnet localhost 5000
    ....
root-dom0#
```

Execute the dladm show-phys command to check the status of the network interface (net4).

```
root-dom0# dladm show-phys
LINK              MEDIA                STATE      SPEED  DUPLEX    DEVICE
net0              Ethernet             up         1000   full      ixgbe0
net4              Ethernet             up         1000   full      ixgbe4
```

Execute the ipadm create-ip command, ipadm set-ifprop command and ipadm add-ipmp command and register net4 as a standby device of ipmp0.

```
root-dom0# ipadm create-ip net4
root-dom0# ipadm set-ifprop -p standby=on -m ip net4
root-dom0# ipadm add-ipmp -i net4 ipmp0
```

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Execute ipmpstat -i command to check the IPMP status and confirm its [STATE] is "ok"

```
root-dom0# ipmpstat -i
INTERFACE   ACTIVE  GROUP   FLAGS   LINK    PROBE   STATE
net0        yes     ipmp0   --mbM-- up      disabled ok
net4        no      ipmp0    is-----  up     disabled ok
```

root-dom1 which was degraded its network device needs the reconfiguration of IPMP. Execute ipadm command to remove the failed network device and re-assign the replaced network device to the IPMP configuration.

```
root-dom1# ipmpstat -i
INTERFACE   ACTIVE  GROUP   FLAGS   LINK    PROBE STATE
net0        yes     ipmp0   --mbM-- up      disabled ok
root-dom1# ipadm delete-ip net4
root-dom1# ipadm create-ip net4
root-dom1# ipadm add-ipmp -i net4 ipmp0
root-dom1# ipadm set-ifprop -p standby=on -m ip net4
root-dom1# ipmpstat -i
INTERFACE   ACTIVE  GROUP   FLAGS   LINK    PROBE   STATE
net0        yes     ipmp0   --mbM-- up      disabled ok
net4        no      ipmp0    is-----  up     disabled ok
```

5.2.4 Re-establish a redundant configuration of the control domain

Re-establish a redundant configuration for the physical I/O devices of control domain. For details on the procedures for restore the redundant configurations, see the documentation for the software for the respective redundant configurations and Oracle Solaris. With the similar procedure of the root domain, a physical network device is assigned to the IPMP configuration. The re-establish of FibreChannel port multipath is not needed.

5.2.5 Save the configured local domain configuration information to the XSCF.

Execute the ldm add-spconfig command to save the configured information.

The following example checks the saved configuration information and then saves the current configuration with the name “ldm-set2”.

Execute the ldm list-spconfig command to check the current configuration information.

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```
primary# ldm list-spconfig
factory-default
ldm-set1 [next poweron]
```

Execute the ldm add-spconfig command to save the configuration information to XSCF.

```
primary # ldm add-spconfig ldm-set2
```

Execute the ldm list-spconfig command to check that the saved configuration information has become [current].

```
primary# ldm list-spconfig
factory-default
ldm-set1
ldm-set2 [current]
```

5.3 Case of high consolidation type A

5.3.1 Check the logical domain operation status.

a. Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

b. Execute the ldm list-domain command to confirm that the logical domain operation status has not changed after the addition of the system board.
To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in [FLAGS].
The displayed characters and their meanings are as follows:
"n": Oracle Solaris is operating
"t": OpenBoot PROM status
"-": In another state (including [STATE] other than "active")

```
primary# ldm list-domain
NAME            STATE      FLAGS   CONS    VCPU  MEMORY   UTIL  UPTIME
primary         active     -n-cv-  UART    48    48G      64%   54m
guest0          active     -n----  5000    48    32G      42%   54m
```

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guest1	active	-n----	5001	48	22G	11%	54m
guest2	active	-n----	5002	48	22G	11%	54m

5.3.2 Check the status of I/O devices in each logical domain

Execute the ldm list-io command to check each I/O devices in the incorporated system board are assigned to each domain.

The following example in case of Fujitsu SPARC M12 and Oracle VM Server for SPARC 3.5 shows that the control domain has PCIe endpoint devices which name includes "/BB1/" and PCIe Buses (PCIE8) which own such PCIe endpoint devices.

Note - If the PCIe Bus owned by the control domain is degraded, or the restart of the control domain is executed before replacing the system board, the degraded PCIe Bus may not be assigned to the domain after replacing system board. If so, execute the ldm add-io command to assign the PCIe Bus to the domain manually.

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```
primary# ldm list-io
NAME                          TYPE   BUS      DOMAIN    STATUS
----                          ----   ---      ------    ------
/BB0/CMUL/CMP0/TDM0           BUS    PCIE0    primary   IOV
/BB0/CMUL/CMP0/TDM1           BUS    PCIE1    primary   IOV
/BB0/CMUL/CMP0/TDM2           BUS    PCIE2    primary   IOV
/BB0/CMUL/CMP0/TDM3           BUS    PCIE3    primary   IOV
/BB0/CMUU/CMP0/TDM0           BUS    PCIE4    primary   IOV
/BB0/CMUU/CMP0/TDM1           BUS    PCIE5    primary   IOV
/BB0/CMUU/CMP0/TDM2           BUS    PCIE6    primary   IOV
/BB0/CMUU/CMP0/TDM3           BUS    PCIE7    primary   IOV
/BB1/CMUL/CMP0/TDM0           BUS    PCIE8
....
/BB1/PCI2                     PCIE   PCIE8             UNK
/BB1/PCI3                     PCIE   PCIE10   primary   EMP
primary# ldm add-io PCIE8 primary
primary# ldm list-io
NAME                          TYPE   BUS      DOMAIN    STATUS
----                          ----   ---      ------    ------
/BB0/CMUL/CMP0/TDM0           BUS    PCIE0    primary   IOV
/BB0/CMUL/CMP0/TDM1           BUS    PCIE1    primary   IOV
/BB0/CMUL/CMP0/TDM2           BUS    PCIE2    primary   IOV
/BB0/CMUL/CMP0/TDM3           BUS    PCIE3    primary   IOV
/BB0/CMUU/CMP0/TDM0           BUS    PCIE4    primary   IOV
/BB0/CMUU/CMP0/TDM1           BUS    PCIE5    primary   IOV
/BB0/CMUU/CMP0/TDM2           BUS    PCIE6    primary   IOV
/BB0/CMUU/CMP0/TDM3           BUS    PCIE7    primary   IOV
/BB1/CMUL/CMP0/TDM0           BUS    PCIE8    primary   IOV
....
/BB1/PCI2                     PCIE   PCIE8    primary   OCC
```

5.3.3 Re-establish a redundant configuration of the Control domain

Re-establish a redundant configuration for the physical I/O devices of the control domain.

Log in to the control domain and re-establish a redundant configuration which has been released.

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For details on the procedures for redundant configurations, see the documentation for the software for the respective redundant configurations. The re-establish of FibreChannel port multipath is not needed.

The following describes an example of a procedure for re-configuring network interface (net4), into a redundant configuration, using LA. For details on the LA related command, see the manual for Oracle Solaris.
Execute the dladm show-aggr, dladm show-link command and check the configuration information of the current network interface constituting LA (aggr0 in this example).

```
primary# dladm show-aggr
LINK                MODE   POLICY     ADDRPOLICY      LACPACTIVITY     LACPTIMER
aggr0               dlmp            --         --                   --               --
primary# dladm show-link
LINK                CLASS       MTU      STATE      OVER
net0                phys        1500       up         --
net4                phys        1500       unknown    --
aggr0               aggr        1500       up         net0
```

Execute the dladm add-aggr command, add net4 to the group of LA, execute the dladm show-link command, and confirm that it was added.

```
primary# dladm add-aggr -l net4 aggr0
primary# dladm show-link
 LINK                CLASS       MTU      STATE      OVER
 net0                phys        1500       up         --
 net4                phys        1500       up         --
 aggr0               aggr        1500       up         net0 net4
```

Note- If the system board is unintentionally disconnected (When [Status] of BB#01 is [Degraded] in “Chapter 2.4 Check the status of physical partition”), before rebooting the OS, please delete the already created LA and recreate the LA.

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a. Execute the console command, connect to the console of the control domain, and log in.

```
XSCF> console -p 0
```

b. Execute the ipadm, dladm command, delete the created LA (in this example, aggr0) and recreate it. If you are using the corresponding LA in the guest domain, you need to remove the network setting of the guest domain or stop the guest domain before deleting the LA.
After completing the re-creation of the LA, please restore the state of the guest domain (network setting, starting state).

```
primary# ipadm delete-ip aggr0
primary# dladm delete-aggr aggr0
primary# dladm create-aggr -m dlmp -l net0 -l net4 aggr0
primary# ipadm create-ip aggr0
primary# ipadm create-addr -T static -a local=192.168.1.101/24 aggr0/v4
```

5.3.4 Save the configured logical domain configuration information to the XSCF.

Execute the ldm add-spconfig command to save the configured information.

The following example checks the saved configuration information and then saves the current configuration with the name “ldm-set2”.

Execute the ldm list-spconfig command to check the current configuration information.

```
primary# ldm list-spconfig
factory-default
ldm-set1 [next poweron]
```

Execute the ldm add-spconfig command to save the configuration information to XSCF.

```
primary # ldm add-spconfig ldm-set2
```

Execute the ldm list-spconfig command to check that the saved configuration information has become [current].

```
primary# ldm list-spconfig
factory-default
ldm-set1
ldm-set2 [current]
```

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5.4 Case of high consolidation type B

5.4.1 Check the logical domain operation status.

a. Execute the console command to connect to the console of the control domain and then log in to it.

```
XSCF> console -p 0
```

b. Execute the ldm list-domain command to confirm that the logical domain operation status has not changed after the addition of the system board.
To check the logical domain operation status, confirm that [STATE] indicates "active" and check the second character from the left of the string in [FLAGS].
The displayed characters and their meanings are as follows:
"n": Oracle Solaris is operating
"t": OpenBoot PROM status
"-": In another state (including [STATE] other than "active")

```
primary# ldm list-domain
NAME        STATE    FLAGS   CONS    VCPU  MEMORY   UTIL  NORM  UPTIME
primary     active   -n-cv-  UART    32    12G      0.1%  0.0%  1h 1m
guest0      active   -n----  5002    32    28G      0.0%  0.0%  56m
guest1      active   -n----  5003    32    28G      0.0%  0.0%  56m
root-dom0   active   -n--v-  5000    48    28G      0.0%  0.0%  56m
root-dom1   active   -n--v-  5001    48    28G      0.0%  0.0%  56m
```

5.4.2 Check the status of I/O devices in each logical domain

Execute the ldm list-io command to check each I/O devices in the incorporated system board are assigned to each domain.

The following example in case of Fujitsu SPARC M12 and Oracle VM Server for SPARC 3.5 shows that the control domain and the root domains have PCIe endpoint devices which name includes "/BB1/" and PCIe Buses (PCIE8, PCIE9, PCIE11, PCIE12, PCIE14 and PCIE15) which own such PCIe endpoint devices.

Note - If the PCIe Bus owned by the control domain is degraded, or the restart of the control domain is executed before replacing the system board, the degraded PCIe Bus may not be assigned to the domain after replacing system board. If so, execute the ldm add-io command to assign the PCIe Bus to the domain manually.

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```
primary# ldm list-io
NAME                          TYPE   BUS      DOMAIN      STATUS
----                          ----   ---      ------      ------
/BB0/CMUL/CMP0/TDM0           BUS    PCIE0    root-dom0 IOV
/BB0/CMUL/CMP0/TDM1           BUS    PCIE1    primary     IOV
/BB0/CMUL/CMP0/TDM2           BUS    PCIE2
/BB0/CMUL/CMP0/TDM3           BUS    PCIE3    root-dom1 IOV
/BB0/CMUU/CMP0/TDM0           BUS    PCIE4    primary     IOV
/BB0/CMUU/CMP0/TDM1           BUS    PCIE5
/BB0/CMUU/CMP0/TDM2           BUS    PCIE6    root-dom1 IOV
/BB0/CMUU/CMP0/TDM3           BUS    PCIE7    root-dom0 IOV
/BB1/CMUL/CMP0/TDM0           BUS    PCIE8    root-dom0 IOV
/BB1/CMUL/CMP0/TDM1           BUS    PCIE9    primary     IOV
/BB1/CMUL/CMP0/TDM2           BUS    PCIE10
/BB1/CMUL/CMP0/TDM3           BUS    PCIE11   root-dom1 IOV
/BB1/CMUU/CMP0/TDM0           BUS    PCIE12   primary     IOV
/BB1/CMUU/CMP0/TDM1           BUS    PCIE13
/BB1/CMUU/CMP0/TDM2           BUS    PCIE14   root-dom1 IOV
/BB1/CMUU/CMP0/TDM3           BUS    PCIE15   root-dom0 IOV
/BB0/CMUL/NET0                PCIE   PCIE0    root-dom0 OCC
/BB0/PCI2                     PCIE   PCIE0    root-dom0 EMP
/BB0/CMUL/SASHBA0             PCIE   PCIE1    primary     OCC
/BB0/PCI0                     PCIE   PCIE1    primary     OCC
....
/BB0/PCI5                     PCIE   PCIE3    root-dom1 OCC
/BB0/PCI9                     PCIE   PCIE3    root-dom1 EMP
/BB0/CMUL/NET2                PCIE   PCIE4    primary     OCC
/BB0/PCI6                     PCIE   PCIE4    primary     EMP
....
/BB0/PCI3                     PCIE   PCIE6    root-dom1 OCC
/BB0/PCI8                     PCIE   PCIE6    root-dom1 EMP
/BB0/PCI1                     PCIE   PCIE7    root-dom0 OCC
/BB1/CMUL/NET0                PCIE   PCIE8    root-dom0 OCC
/BB1/PCI2                     PCIE   PCIE8    root-dom0 EMP
```

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```
/BB1/CMUL/SASHBA0                    PCIE    PCIE9     primary     OCC
/BB1/PCI0                            PCIE    PCIE9     primary     OCC
....
/BB1/PCI5                            PCIE    PCIE11    root-dom1   OCC
/BB1/PCI9                            PCIE    PCIE11    root-dom1   EMP
/BB1/CMUL/NET2                       PCIE    PCIE12    primary     OCC
/BB1/PCI6                            PCIE    PCIE12    primary     EMP
....
/BB1/PCI3                            PCIE    PCIE14    root-dom1   OCC
/BB1/PCI8                            PCIE    PCIE14    root-dom1   EMP
/BB1/PCI1                            PCIE    PCIE15    root-dom0   OCC
....
```

5.4.3 Re-establish a redundant configuration of the root domain

Re-establish a redundant configuration for the physical I/O devices of the root domain.

Log in to the root domain and re-establish a redundant configuration which has been released.

For details on the procedures for redundant configurations, see the documentation for the software for the respective redundant configurations. The re-establish of FibreChannel port multipath is not needed.

The following describes an example of a procedure for re-configuring network interface (net4), into a redundant configuration, using LA. For details on the LA related command, see the manual for Oracle Solaris.

Log in to the root domain (root-dom0).

```
primary# telnet localhost 5000
   ....
root-dom0#
```

Execute the dladm show-aggr, dladm show-link command and check the configuration information of the current network interface constituting LA (aggr0 in this example).

```
root-dom0 dladm show-aggr
LINK                MODE   POLICY     ADDRPOLICY      LACPACTIVITY     LACPTIMER
aggr0               dlmp             --         --                    --                    --
```

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```
root-dom0 dladm show-link
LINK            CLASS     MTU    STATE    OVER
net0            phys      1500   up       --
net4            phys      1500   unknown  --
aggr0           aggr      1500   up       net0
```

Execute the dladm add-aggr command, add net4 to the group of LA, execute the dladm show-link command, and confirm that it was added.

```
root-dom0# dladm add-aggr -l net4 aggr0
root-dom0# dladm show-link
LINK            CLASS     MTU    STATE    OVER
net0            phys      1500   up       --
net4            phys      1500   up       --
aggr0           aggr      1500   up       net0 net4
```

Note - If the system board is unintentionally disconnected (When [Status] of BB#01 is [Degraded] in “Chapter 2.4 Check the status of physical partition”), before rebooting the OS, please delete the already created LA and recreate the LA.

Execute the ipadm, dladm command, delete the created LA (in this example, aggr0) and recreate it. If you are using the corresponding LA in the guest domain, you need to remove the network setting of the guest domain or stop the guest domain before deleting the LA.
After completing the re-creation of the LA, please restore the state of the guest domain (network setting, starting state).

```
root-dom1# ipadm delete-ip aggr0
root-dom1# dladm delete-aggr aggr0
root-dom1# dladm create-aggr -m dlmp -l net0 -l net4 aggr0
root-dom1# ipadm create-ip aggr0
root-dom1# ipadm create-addr -T static -a local=192.168.1.101/24 aggr0/v4
```

5.4.4 Re-establish a redundant configuration of the control domain

Re-establish a redundant configuration for the physical I/O devices of control domain. For details on the procedures for restore the redundant configurations, see the documentation for the software for

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the respective redundant configurations and Oracle Solaris. With the similar procedure of the root domain, a physical network device is assigned to the LA configuration. The re-establish of FibreChannel port multipath is not needed.

5.4.5 Save the configured local domain configuration information to the XSCF.

Execute the ldm add-spconfig command to save the configured information.

The following example checks the saved configuration information and then saves the current configuration with the name “ldm-set2”.

Execute the ldm list-spconfig command to check the current configuration information.

```
primary# ldm list-spconfig
factory-default
ldm-set1 [next poweron]
```

Execute the ldm add-spconfig command to save the configuration information to XSCF.

```
primary # ldm add-spconfig ldm-set2
```

Execute the ldm list-spconfig command to check that the saved configuration information has become [current].

```
primary# ldm list-spconfig
factory-default
ldm-set1
ldm-set2 [current]
```

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Appendix.A. PPAR DR deleteboard Best Practice

A.1 Best practice operation and confirmation for PPAR DR deleteboard

Before deleting a BB with the above configuration, the following conditions should be satisfied.

OVM remaps the resources on the BB to be deleted to the free resources on the remaining BB automatically. There is no need to remove all CPU/memory resources on the BB to be deleted.

- All logical domains must be either in a Solaris booted state or a shutdown state. PPAR DR deleteboard cannot be executed if any logical domain is at the OpenBoot PROM prompt (ok prompt)
- The quantity of vcpus on the BB to be deleted can fit into remaining free vcpus available in the system.
- The quantity of memory on the BB to be deleted can fit into the remaining free memory available in the system.
- There are enough free contiguous memory regions for remapping memory.
- All physical I/O resources on the BB to be deleted are free
- I/O devices are multipathed among the BBs.
- Add the following statement to /etc/system on each domain, and reboot the domain(s) before executing the deleteboard operation:

  For SRU11.2.10.5.0 or later, it is not necessary to set this parameter.

```
set lgrp_topo_levels=1
```

<How to confirm the CPU condition>

The following example shows CPU usage on a 2BB system (with 384 vcpus).

If the user wants to delete BB#1 (192 vcpus), 192 free vcpus are needed in the system.

In this example, 240 vcpus are used by domains, and there are not enough free vcpus. PPAR DR deleteboard will fail.

To resolve this condition, stop and unbind the development domain “ldom_dev”.

```
primary# ldm list-domain
NAME        STATE    FLAGS   CONS    VCPU  MEMORY   UTIL   NORM   UPTIME
primary     active   -n-cv-  UART    16    62G      0.0%   0.0%   13d 18h 19m
ldom1       active   -n----  5001    32    64G      0.0%   0.0%   2d 17h 9m
ldom2       active   -n----  5002    32    64G      0.0%   0.0%   2d 17h 14m
ldom3       active   -n----  5003    32    64G      0.0%   0.0%   2d 17h 20m
ldom_dev    active   -n----  5004    32    64G      0.0%   0.0%   2d 17h 24m
```

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<How to confirm the memory condition>

The following example shows the memory usage on a 2BB system (with 512GB memory).

```
primary# ldm list-socket
SOCKET
    TENANT          VCPUS   CORES   SOCKET_ID   GROUP
    primary         48      6       0           /BB0
    ldom1           48      6       0           /BB0
    ldom2           48      6       2           /BB0
    ldom3           48      6       2           /BB0
    ldom_dev        48      6       6           /BB1

    FREE            VCPUS   CORES   SOCKET_ID   GROUP
                    48      6       4           /BB1
                    48      6       4           /BB1
                    48      6       6           /BB1
MEMORY
    PA              SIZE            SOCKET_ID   BOUND
    0x700000000000  64G             6           ldom_dev
    0x720000000000  64G             6
    0x740000000000  128G            4
    0x780000000000  64G             2           ldom1
    0x7a0000000000  64G             2           ldom2
    0x7c0000000000  64G             0           ldom3
    0x7e0080000000  62G             0           primary
primary# ldm list-devices -a memory
MEMORY
    PA              SIZE            BOUND
    0x700000000000  64G             ldom_dev
    0x720000000000  64G
    0x740000000000  64G
    0x760000800000  1272M           _sys_
    0x760050000000  64256M
    0x780000000000  64G             ldom1
    0x7a0000000000  64G             ldom2
    0x7c0000000000  64G             ldom3
    0x7e0000800000  1272M           _sys_
    0x7e0050000000  512M            _sys_
    0x7e0070000000  256M            _sys_
    0x7e0080000000  62G             primary
```

Production domains (ldom1 to ldom3 in this configuration) use BB#0 memory. Stop and unbind the development domain “ldom_dev” to free up memory on BB#1.

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<How to confirm the I/O condition>

The following example shows the I/O usage on a 2BB system for Fujitsu SPARC M12 and Oracle VM Server for SPARC 3.5.

To delete BB#1 (PCIE8 to PCIE15), all PCIE buses on the BB to be deleted must be free. In this example, primary owns all PCIE buses on BB#1 (PCIE8 to PCIE15), and the PPAR DR deleteboard fails.

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```
primary# ldm list-io
NAME                    TYPE    BUS     DOMAIN  STATUS
----                    ----    ---     ------  ------
/BB0/CMUL/CMP0/TDM0     BUS     PCIE0   primary IOV
/BB0/CMUL/CMP0/TDM1     BUS     PCIE1   primary IOV
/BB0/CMUL/CMP0/TDM2     BUS     PCIE2   primary IOV
/BB0/CMUL/CMP0/TDM3     BUS     PCIE3   primary IOV
/BB0/CMUU/CMP0/TDM0     BUS     PCIE4   primary IOV
/BB0/CMUU/CMP0/TDM1     BUS     PCIE5   primary IOV
/BB0/CMUU/CMP0/TDM2     BUS     PCIE6   primary IOV
/BB0/CMUU/CMP0/TDM3     BUS     PCIE7   primary IOV
/BB1/CMUL/CMP0/TDM0     BUS     PCIE8   primary IOV
/BB1/CMUL/CMP0/TDM1     BUS     PCIE9   primary IOV
/BB1/CMUL/CMP0/TDM2     BUS     PCIE10  primary IOV
/BB1/CMUL/CMP0/TDM3     BUS     PCIE11  primary IOV
/BB1/CMUU/CMP0/TDM0     BUS     PCIE12  primary IOV
/BB1/CMUU/CMP0/TDM1     BUS     PCIE13  primary IOV
/BB1/CMUU/CMP0/TDM2     BUS     PCIE14  primary IOV
/BB1/CMUU/CMP0/TDM3     BUS     PCIE15  primary IOV
/BB0/CMUL/NET0          PCIE    PCIE0   primary OCC
/BB0/PCI2               PCIE    PCIE0   primary EMP
/BB0/CMUL/SASHBA0       PCIE    PCIE1   primary OCC
/BB0/PCI0               PCIE    PCIE1   primary OCC
/BB0/PCI7               PCIE    PCIE2   primary OCC
(Omitted)
/BB1/CMUL/NET0          PCIE    PCIE8   primary OCC
(Omitted)
primary# ldm remove-io PCIE8 primary
(Omitted)
primary# ldm remove-io PCIE15 primary
```

To resolve the condition, remove the PCIE buses (PCIE8 to PCIE15) from the primary by ldm remove-io command. Confirm the PCIE buses and related PCIE endpoint are not in use and can be free. If they are in use, ldm remove-io command returns error and they are not removed. If so, check the error message and release the device(s).

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After the above conditions are satisfied, perform the deleteboard command from the XSCF.
Before executing PPAR DR, execute the showhardconf XSCF command and confirm all BBs in the system are in the “Normal” state. If some BBs are not “Normal”, the BB’s XSCF may be rebooting. Please wait 10 minutes and then execute the showhardconf XSCF command again. If the state is still not “Normal”, execute the showlogs command, check for the cause of the error, and then remove the error.

Execute the showboards XSCF command and confirm the deleted BB (01-0 in this case) is in the "Assigned" state and that the [Pwr], [Conn], and [Conf] columns all show "y".

[Note] If [Pwr], [Conn], and [Conf] are not all in the “y” status, the BB might not be deleted successfully. Confirm the state and set the correct state by referring to "3.1.3 Checking the system board status" in the "Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide".

```
XSCF> showboards -p 0
PSB     PPAR-ID(LSB)    Assignment      Pwr     Conn    Conf    Test    Fault
----    ------------    ----------      ----    ----    ----    -------    --------
00-0    00(00)          Assigned        y       y       y       Passed  Normal
01-0    00(01)          Assigned        y       y       y       Passed  Normal
```

Then, execute the deleteboard command to unconfigure the BB to be deleted from the PPAR. After that, execute the showresult command to check the return code status of the deleteboard command.

[Note] If the return code value is anything other than 0, or if an error message is displayed upon executing the deleteboard command, this indicates an abnormal termination of the deleteboard command has occurred.
Refer to "C.1.2 deleteboard" in the “Fujitsu SPARC M12 and Fujitsu M10/SPARC M10 Domain Configuration Guide.” Based on the error message, identify the error and then take corrective action.

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```
XSCF> deleteboard -v -c disconnect -m unbind=none 01-0
PSB#01-0 will be unconfigured from PPAR immediately. Continue?[y|n] :y
Start unconfigure preparation of PSB. [1200sec]
   0end
Unconfigure preparation of PSB has completed.
Start unconfiguring PSB from PPAR. [7200sec]
   0....end
Unconfigured PSB from PPAR.
PSB power off sequence started. [1200sec]
   0..... 30..... 60end
Operation has completed.

XSCF> showresult
0
```

After deleteboard, execute the showboards command to confirm the deleted BB (01-0 in this case) is in the "Assigned" state and that the [Pwr], [Conn], and [Conf] columns all show "n".

[Note] If [Pwr], [Conn], and [Conf] are not all in the “n” state, something has gone wrong in the deleteboard sequence. Please contact your support organization.

```
XSCF> showboards -p 0
PSB     PPAR-ID(LSB)    Assignment      Pwr     Conn    Conf    Test    Fault
----    ------------    ----------      ----    ----    ----    -------  --------
00-0    00(00)          Assigned        y       y       y       Passed  Normal
01-0    00(01)          Assigned        n       n       n       Passed  Normal
```

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A.2 PPAR DR Troubleshooting

The PPAR DR deleteboard operation may fail for a number of different reasons. This section provides guidance to resolve PPAR DR failures.

A.2.1. Remap Memory Using the FJ Socket Command

As described in the PPAR DR overview section, deleteboard may fail due to a lack of contiguous free memory regions available for remapping memory. The following example shows BB#1 uses 64GB memory, and BB#0 has 64GB free memory, but there are no 64GB contiguous memory regions. Thus, memory remap of ldom4 (SOCKET_ID 6: 64GB) fails and the BB deleteboard fails.

```
primary# ldm list-socket
  (Omitted)
MEMORY
    PA                SIZE      SOCKET_ID   BOUND
    0x700000000000    64G       6           ldom4
    0x720000000000    64G       6
    0x740000000000    128G      4
    0x780000000000    32G       2           ldom1
    0x780800000000    32G       2
    0x7a0000000000    32G       2           ldom2
    0x7a0800000000    32G       2
    0x7c0000000000    64G       0           ldom3
    0x7e0080000000    62G       0           primary
```

To resolve the condition, use the FJ socket command to manipulate the memory assigned to domain ldom4. When domain ldom4 is in an active state, BB#1 memory may not be fully removed with the operation since the OS is using the region permanently. For example, trying to remove 32GB may result in only 16GB being removed since the remaining memory is used by the OS permanently. But repeating the FJ socket command may split the large memory region into smaller regions and satisfy contiguous free memory requirements.

[Note] The following operations grow the memory at first. In some cases, the domain's memory increases (greater than 64G in this example) since the added memory cannot be removed. If you want not to increase the domain's memory, shrink the memory at first.

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Example of remap memory of ldom4(SOCKET_ID 6:64GB)

1) The memory of 32GB is added to BB#0(SOCKET_ID 2).
2) The memory of 32GB is reduced from BB#1(SOCKET_ID 6).
3) The memory of 32GB is added to BB#0(SOCKET_ID 2).
4) The memory of 32GB is reduced from BB#1(SOCKET_ID 6).
   -> It partial succeeded (only 26GB memory was actually reduced).
5) To retain the size of ldom4's memory, remove an additional 6GB from BB#0 (SOCKET_ID 2).

By executing a combination of these commands, the memory region is split and then can be remapped.

```
primary# ldm grow-socket memory=32G socket_id=2 ldom4                1)
primary# ldm shrink-socket memory=32G socket_id=6 ldom4               2)
primary# ldm grow-socket memory=32G socket_id=2 ldom4                3)
primary# ldm shrink-socket memory=32G socket_id=6 ldom4               4)
Only 26G of memory could be removed from the ldom4 domain
because the rest of the memory is in use.
primary# ldm shrink-socket memory=6G socket_id=2 ldom4                5)
primary# ldm list-socket
  (Omitted)
MEMORY
    PA                SIZE        SOCKET_ID    BOUND
    0x700000000000    58G         6
    0x700e80000000    6G          6            ldom4
    0x720000000000    64G         6
    0x740000000000    128G        4
    0x780000000000    32G         2            ldom1
    0x780800000000    32G         2            ldom4
    0x7a0000000000    32G         2            ldom2
    0x7a0800000000    6G          2
    0x7a0980000000    26G         2            ldom4
    0x7c0000000000    64G         0            ldom3
    0x7e0080000000    62G         0            primary
```

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Revision history

Revision date	Rev	Change
2016.11	1.0	Newly added.
2017.4	2.0	Add the Fujitsu SPARC M12-2S Server Add configuration pattern
2017.9	3.0	Add the High Consolidation Type B
2018.12	4.0	Support Oracle Solaris 11.4

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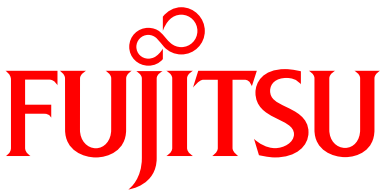

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