PRIMECLUSTER Wizard for NAS (PRIMEQUEST) 4.3

Configuration and Administration Guide

Linux

Preface

Purpose

The purpose of the document is to outline functions of PRIMECLUSTER Wizard for NAS. Further, it describes the procedures from installation to operation management.

Readers

The document is intended for system engineers and system administrators to design, configure, and manage a PRIMECLUSTER system. The reader should have expertise in PRIMECLUSTER and PRIMECLUSTER Wizard for NAS.

Outline

The document consists of the following 6 chapters and 2 appendixes:

- Chapter 1 Feature

- Chapter 2 Environment Configuration

- Chapter 3 Operation

- Chapter 4 Command

- Chapter 5 Notice

- Chapter 6 Message

- Appendix A How to configure GLS

- Appendix B Turning of the control facility for the NAS-Cluster

Notational convention

The document conforms to the following notational conventions:

🅿 Point
....
Contains important information about the subject at hand.
....

📖 Information
....
Describes information a user can refer to.
....

📚 See
....
Provides the names of manuals to be referenced.
....

📒 Note
....
Describes points where a user should take notice.
....

📝 Example
....
Describes settings using an example.
....

Trademarks

Red Hat is a registered trademark of Red Hat, Inc. in the U.S. and other countries.

Linux is a registered trademark of Linus Torvalds.

PRIMECLUSTER is a trademark of Fujitsu Limited.

NetApp is a trademark or registered trademark of Network Appliance Inc. in the United States and other countries.

All other trademarks or registered trademarks mentioned here in are the property of their respective owners.

The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

Date of publication and edition

Date of publication and edition	Manual code
February 2013, First edition	J2UL-1697-01ENZ0(00)/J2UL-1697-01ENZ2(00)

Copyright

Contents

Chapter 1 Feature

1.1 Feature outline

PRIMECLUSTER Wizard for NAS is a software product that facilitates cluster operation management for NAS operating on a PRIMECLUSTER system.

This is required for scalable operation and standby operation (cold standby) with the NetApp Filer.

Hereinafter, NetApp Filer (ETERNUS NR1000F series) is referred to as NAS.

This software provides the following features:

Feature	Description
Environment Setup	Environment setup tool to enable clustering of NAS on PRIMECLUSTER
Start and Stop Control	Control export on NAS
Releases the file lock	Releases the file lock on NAS
Monitoring the NAS-Cluster	In the NAS-Cluster in which the controller is made double with two NAS devices, the failover of the NAS-Cluster is done even when data cannot be accessed by the network failure between the cluster node and the NAS devices.(optional)
Setup and Operation Commands	Commands used for setup and operations

Environment Setup

To enable clustering of NAS, it is required that NAS is registered on userApplication (cluster application) as a "resource". PRIMECLUSTER Wizard for NAS provides an interface to do it. For details, refer to "Chapter 2 Environment Configuration".

Start and stop control

Along with the userApplication state transition, PRIMECLUSTER Wizard for NAS automatically control the export/unexport of the NAS volume. In standby operation, PRIMECLUSTER Wizard for NAS also release the file lock of the operating node in which a Netapp resource failure occurs during Online processing.

File locks release

Release the file lock when the userApplication switch and the node goes down.

In standby operation, the NFS file lock on the NAS device is released when userApplication is started.

In scalable operation, the NFS file lock on the NAS device is released, if PRIMECLUSTER Wizard for NAS detects the userApplication failure and the node down on another node.

Monitoring the NAS-Cluster (Control facility for the NAS-Cluster)

In the NAS-Cluster in which the controller is made double with two NAS devices, the failover of the NAS-Cluster is done even when data cannot be accessed by the network failure between the cluster node and the NAS devices and service can be continued. When the controller in the NAS device breaks down, the NAS-Cluster does the failover. But, when the network failure is done between the cluster node and the NAS device, the NAS-Cluster does not failover.

Setup and Operation Commands

PRIMECLUSTER Wizard for NAS provides auxiliary commands to discontinue or restart monitoring resource. For details, refer to "Chapter 4 Command".

See

If you need a recovery of the NAS-Cluster after its failover, refer to "3.4 Recovery sequence after control facility of the NAS-Cluster".

1.2 Operating environment

Scalable operation
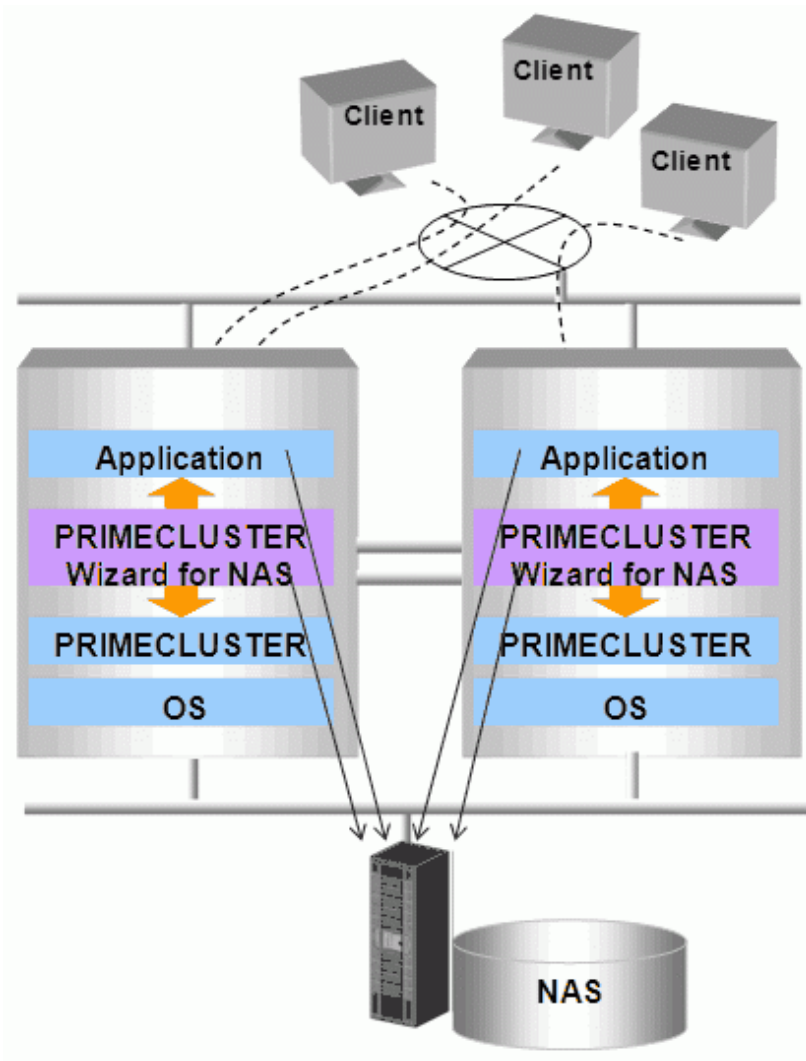
In scalable operation, NAS is operated on all nodes. Then, the file lock is shared on all the nodes.

Standby operation
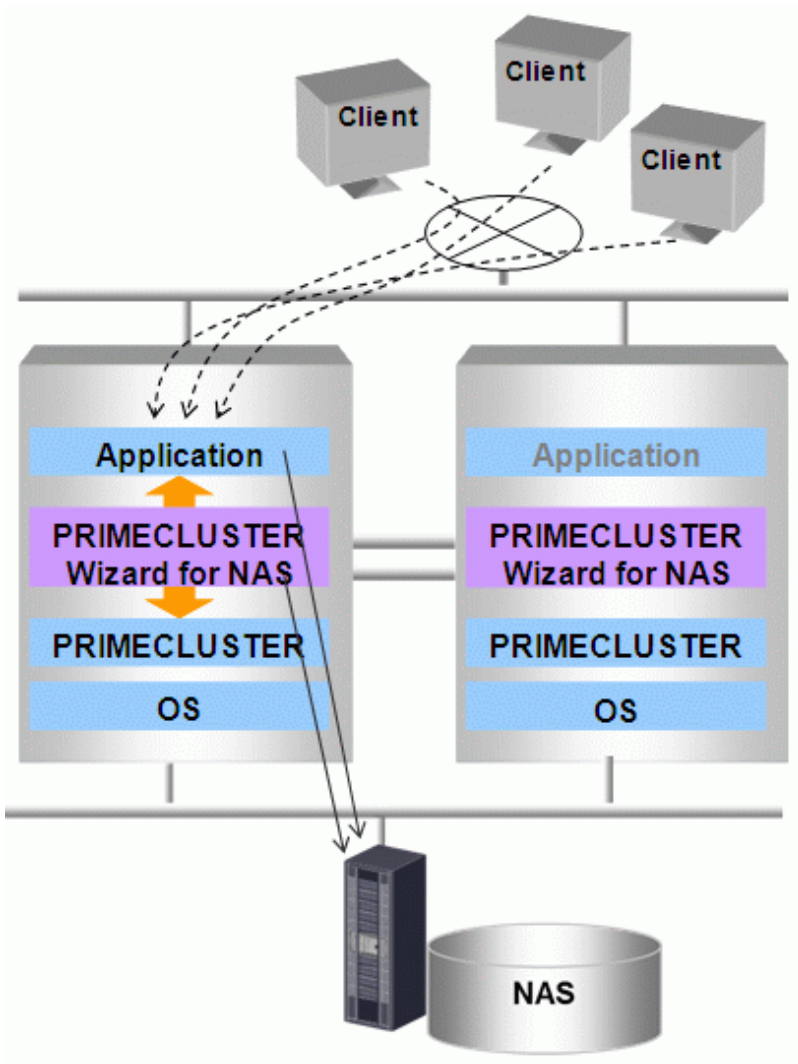
In standby operation, a cluster system consists of an operating node and standby nodes. Only on an operating node, NAS is active. On standby nodes, NAS is inactive. In the event of a failure, NAS is activated after userApplication is switched to one of the standby nodes, and the file lock of the operating node is released.

Chapter 2 Environment Configuration

2.1 Configuration procedure

This section describes a general procedure of configuring an environment on a PRIMECLUSTER system.

Scalable/Standby operation

No.	Outline	
	Any one of nodes in a cluster system	Other nodes in a cluster system
1	Install and configure PRIMECLUSTER	Install and configure PRIMECLUSTER
2	Install PRIMECLUSTER Wizard for NAS	Install PRIMECLUSTER Wizard for NAS
3	Configure NAS	--
4	Create the userApplication, Netapp resource	--
5	Install user applications onto NAS	Install user applications onto NAS
6	Create resources of user applications	--

Further details of each step are described below.

2.2 PRIMECLUSTER installation and configuration

Set up hardware

Set up hardware required for PRIMECLUSTER.

Install software

Install PRIMECLUSTER first, referring to "PRIMECLUSTER Software Release Guide".

Scalable operation requires the following editions:

- PRIMECLUSTER Enterprise Edition

Standby operation requires the following editions:

- PRIMECLUSTER Enterprise Edition

- PRIMECLUSTER HA Server

Set up cluster system

Configure a cluster system including network systems according to the PRIMECLUSTER manual.

2.3 PRIMECLUSTER Wizard for NAS installation

Install PRIMECLUSTER Wizard for NAS, referring to "Software Release Guide PRIMECLUSTER Wizard for NAS".

2.4 NAS configuration

This section explains how to configure NAS.

Initial configuration

Perform initial configuration including network systems and RAID according to the NAS manual.

Volume creation

Create a volume or a qtree according to the NAS manual. The volume name or the qtree name is required when the environment of the PRIMECLUSTER Wizard for NAS is configured.

Host setup

If you use a DNS server on NAS, you need to perform IP address to host name mapping. If you do not use a DNS server, register a host name and an associate IP using the following steps:

1. Mount the "/vol/vol0" volume on the management server for NAS.

2. Register a host name and an associate IP of a cluster node in the "/etc/hosts" file of NAS.

You also need to register an NAS host name and an associate IP in DNS or in the "/etc/hosts" file of the cluster node.

Note

- Confirm it can access the NAS device after the setting is completed. Confirm it is possible to access it by the ping command for the NAS device with the IPv4 address. Confirm it is possible to access it by the ping6 command for the NAS device with the IPv6 address.

- You must specify the same host name as that of the cluster node in the DNS or "/etc/hosts" file of NAS. If the name is different, the file lock might not be properly controlled.

rsh setup

Set up rsh that is used to control NAS using the following steps:

1. Log on to NAS using telnet.

2. Execute the following command, so rsh can be used from the node:

```
options rsh.access host=host name1, host name2, ..
```

3. Mount the "/vol/vol0" volume on the NAS management server.
   Register a host name of the cluster node in the "/etc/hosts.equiv" file of NAS.

Note

After setup, it is recommended to check if rsh on cluster nodes is available for NAS.

```
# rsh nas1 date
Tue Jun 6 10:50:24 JST 2006
```

exportfs setup

Set up exportfs using the following steps.

1. Mount the "/vol/vol0" volume on the NAS management server.

2. Register a volume name or a qtree name of NAS and names of cluster nodes that access to the volume on the "/etc/exports" file of NAS.

2.5 userApplication and Netapp resource

2.5.1 /etc/fstab.pcl setup

Set up a NAS volume or a qtree.

1. Make the directory of the mount point. However, do not make a directory or a file under the directory of the mount point. The mount control with PRIMECLUSTER cannot be done when there is a directory or a file under the directory of the mount point.

2. Set the mount point to /etc/fstab.pcl.

```
#RMS#<NAS host name: NAS volume name or qtree name> <mount point> nfs <option>
```

- For standby operation using NAS device with IPv4 address, the following option is recommended:

```
rw,hard,bg,nointr,rsize=32768,wsize=32768,tcp,nfsvers=3
```

- For scalable operation using NAS device with IPv4 address, the following option is recommended:

```
rw,hard,bg,nointr,rsize=32768,wsize=32768,tcp,noac,nfsvers=3
```

- For standby operation using NAS device with IPv6 address, the following option is recommended:

```
rw,hard,bg,nointr,rsize=32768,wsize=32768,proto=tcp6,nfsvers=3
```

- For scalable operation using NAS device with IPv6 address, the following option is recommended:

```
rw,hard,bg,nointr,rsize=32768,wsize=32768,proto=tcp6,noac,nfsvers=3
```

📝 Example
. . . .

Standby operation using NAS device with IPv4 address case:

#RMS#netapp:/vol/vol1 /NAS nfs rw,hard,bg,nointr,rsize=32768,wsize=32768,tcp,nfsvers=3 0 0

Standby operation using NAS device with IPv6 address case:

#RMS#netapp:/vol/vol1 /NAS nfs rw,hard,bg,nointr,rsize=32768,wsize=32768,proto=tcp6,nfsvers=3 0 0

. . . .

2.5.2 userApplication creation

Create userApplication and Netapp resources using the CUI hvw command (RMS Wizard).

🗂 See
. . . .
Refer to "PRIMECLUSTER Installation and Administration Guide" for details of making userApplication.
. . . .

Scalable operation

userApplication is configured as shown in the illustration.
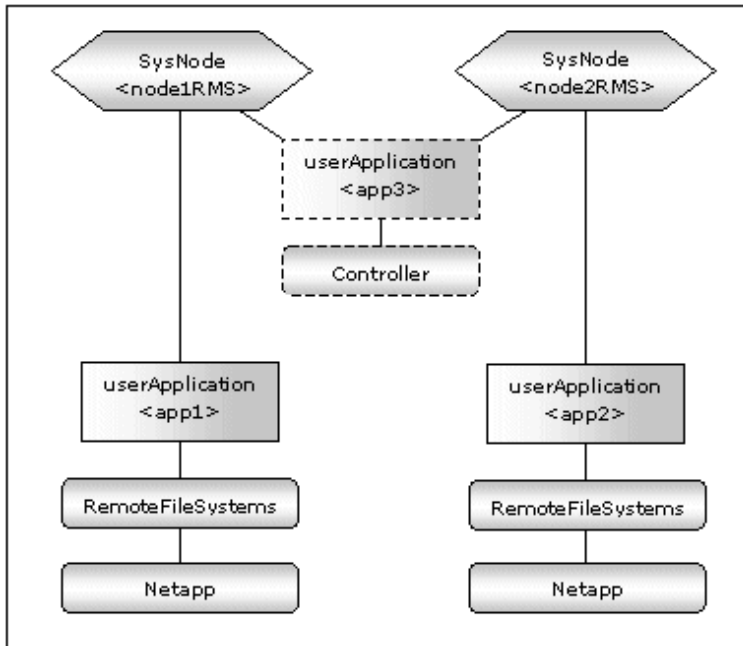
Standby operation

userApplication is configured as shown in the illustration.
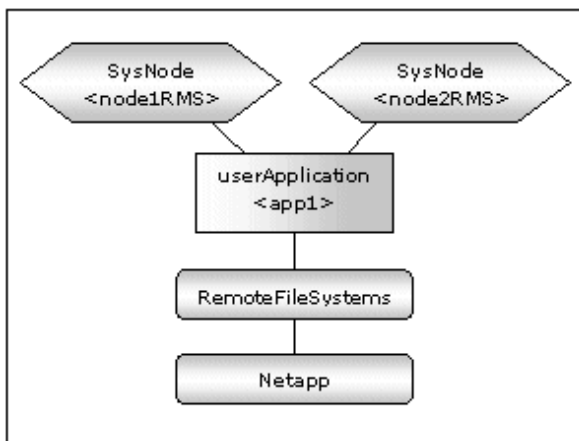
RMS Wizard Start

Start the RMS Wizard by executing the following command on any one of nodes in a cluster system:

```
hvw -n <Configuration Name>
```

You can specify any configuration name for the hvw command.

userApplication creation

1. When the RMS Wizard is started, the following menu is displayed. Select Application-Create to create userApplication.

```
node1: Main configuration menu, current configuration: nas_config
No RMS active in the cluster
 1) HELP                         10) Configuration-Remove
 2) QUIT                         11) Configuration-Freeze
 3) Application-Create           12) Configuration-Thaw
 4) Application-Edit             13) Configuration-Edit-Global-Settings
 5) Application-Remove           14) Configuration-Consistency-Report
 6) Application-Clone            15) Configuration-ScriptExecution
 7) Configuration-Generate       16) RMS-CreateMachine
 8) Configuration-Activate       17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 3
```

2. When the selection menu of the turnkey wizard is displayed, select NETAPP.

```
Creation: Application type selection menu:
 1) HELP               6) GENERIC           11) STANDBY
 2) QUIT               7) NETAPP            12) WIZSTANDBY
 3) RETURN             8) NETWORKER
 4) OPTIONS            9) ORACLE
 5) DEMO              10) SCALABLE
Application Type: 7
```

3. Select Machines+Basics.

```
Settings of turnkey wizard "NETAPP"
 1) HELP                   4) REMOVE+EXIT           7) Machines+Basics(-)
 2) NO-SAVE+EXIT           5) ApplicationName=APP1
 3) SAVE+EXIT              6) BeingControlled=no
Choose the setting to process: 7
```

4. Machines+Basics wizard is displayed.

```
Machines+Basics (app1:consistent)
 1) HELP                    10) (PostOnlineScript=)    19) (OnlinePriority=)
 2) -                       11) (PreOfflineScript=)    20) (StandbyTransitions=)
 3) SAVE+EXIT               12) (OfflineDoneScript=)   21) (LicenseToKill=no)
 4) REMOVE+EXIT             13) (FaultScript=)         22) (AutoBreak=yes)
 5) AdditionalMachine       14) (AutoStartUp=no)       23) (HaltFlag=no)
 6) AdditionalConsole       15) (AutoSwitchOver=No)    24) (PartialCluster=0)
 7) Machines[0]=node1RMS    16) (PreserveState=no)     25) (ScriptTimeout=)
 8) (PreCheckScript=)       17) (PersistentFault=0)
 9) (PreOnlineScript=)      18) (ShutdownPriority=)
Choose the setting to process:
```

5. Configure userApplication according to environments.

📖 Information
....

The recommended values are as follows:

- Scalable operation

Attributes	Values

AutoSwitchOver	No
PersistentFault	1

- Standby operation

Attributes	Values
AdditionalMachine	Add a standby node. (required)
AutoSwitchOver	HostFailure|ResourceFailure|ShutDown
PersistentFault	1
HaltFlag	yes

6. When configuration is completed, save it pressing SAVE+EXIT.

2.5.3 Netapp resource creation

1. When you return to the NETAPP turnkey wizard, select Netapp.

```
Settings of turnkey wizard "NETAPP"
 1) HELP                            13) Crm:BasicApplication(-)
 2) -                              14) Oracle(-)
 3) SAVE+EXIT                        15) Crm:SystemState3(-)
 4) -                              16) Crm:SystemState2(-)
 5) ApplicationName=APP1             17) LocalFileSystems(-)
 6) Machines+Basics(app1)            18) RemoteFileSystems(-)
 7) CommandLines(-)                  19) IpAddresses(-)
 8) Controllers(-)                   20) RawDisks(-)
 9) Nwcl(-)                          21) LVM-VolumeManagement(-)
10) Nwst(-)                          22) Netapp(-)
11) Nwsv(-)                          23) Gds:Global-Disk-Services(-)
12) Crm:Application(-)               24) Gls:Global-Link-Services(-)
Choose the setting to process: 22
```

2. When the Netapp wizard is displayed, select AdditionalNetAppFiler.

```
Netapp (Netapp_APP1:not yet consistent)
 1) HELP                            7) (PostOnlineScript=)
 2) -                              8) (PreOfflineScript=)
 3) SAVE+EXIT                        9) (PostOfflineScript=)
 4) REMOVE+EXIT                     10) (FaultScript=)
 5) AdditionalNetAppFiler           11) NetappClusterFlag=no
 6) (PreOnlineScript=)
Choose the setting to process: 5
```

3. When the following menu is displayed, select FREECHOICE and enter a host name for NAS.

```
1) HELP
2) RETURN
3) FREECHOICE
Set an additional NetApp Filer: 3
        >> netapp1
```

4. When the following menu is displayed, select AdditionalExportpoint.

```
1) HELP              4) AdditionalExportpoint  7) ScriptTimeout=300
2) NO-SAVE+RETURN    5) UnLockFlag=always
3) -                 6) UnExportFlag=no
Choose the setting to process: 4
```

5. When the following menu is displayed, select FREECHOICE and enter a volume to be exported.

```
1) HELP
2) RETURN
3) FREECHOICE
Set an additional export point: 3
        >> /vol/vol1
```

6. The following menu is displayed. If you have any further volumes to be exported, select AdditionalExportpoint to add.

```
1) HELP                        6) ExportFlag=no
2) NO-SAVE+RETURN              7) UnExportFlag=no
3) SAVE+RETURN                 8) ScriptTimeout=300
4) AdditionalExportpoint       9) Exportpoint[0]=/vol/vol1
5) UnLockFlag=always
Choose the setting to process:
```

The following operations are available from the above menu:

Attributes	Description
UnLockFlag	Select whether or not Unlock processing should be executed on NAS. Selecting "always" constantly enables Unlock processing in the event of a Netapp resource failure and a node with the Netapp resource is down. Selecting "nodedown" enables Unlock processing only when the node with the Netapp resource is down. Default: always (always, nodedown)
ExportFlag	Select whether or not Export processing is executed during Online processing. Selecting "yes" enables Export processing during Online processing with "anon=0" option. Selecting "no" disables Export processing during Online processing. It is necessary to export volumes as described in "exportfs setup" of "2.4 NAS configuration". Default: no (yes, no)
UnExportFlag	Select whether or not Unexport processing should be executed during Offline processing in standby operation. Selecting "yes" enables Unexport processing during Offline processing. Selecting "no" disables Unexport processing during Offline processing. In scalable operation, Unexport processing is disabled regardless this option. UnExportFlag is valid when ExportFlag is set to "yes". Default: no (yes, no)
ScriptTimeout	Specify timeout period (sec) for launching of Online/Offline processing. Normally, you do not need to change the default value. Default: 300 (10-31536000)

7. If addition is complete, select SAVE+RETURN.

You return to the Netapp Wizard. If you want to add any further NAS units, select AdditionalNetAppFiler.

8. It is set for script files in Netapp resource also start and stop. If it is not necessary, go to next step.

```
Netapp (Netapp_APP1:consistent)
  1) HELP                              7) (PreOnlineScript=)
  2) -                                 8) (PostOnlineScript=)
  3) SAVE+EXIT                         9) (PreOfflineScript=)
  4) REMOVE+EXIT                      10) (PostOfflineScript=)
  5) AdditionalNetAppFiler            11) (FaultScript=)
  6) NetAppFiler[0]=netapp1           12) NetappClusterFlag=no
Choose the setting to process:
```

Attributes	Description
PreOnlineScript	Executed before Online processing.
PostOnlineScript	Executed after Online processing.
PreOfflineScript	Executed before Offline processing.
PostOfflineScript	Executed after Offline processing.
FaultScript	Executed when a fault occurs.

See

For further details, see the "PRIMECLUSTER Reliant Monitor Services (RMS) with Wizard Tools (Solaris, Linux) Configuration and Administration Guide".

9. Next, it is set for PRIMECLUSTER to control the NAS cluster if necessary. In the cluster composition of the NAS device, if network failure between the cluster node and the NAS device is detected PRIMECLUSTER Wizard for NAS can execute failover (cf takeover) of the NAS-Cluster.

Selects NetappClusterFlag=no for monitoring the NAS-Cluster.

```
Netapp (Netapp_APP1:consistent)
  1) HELP                              7) (PreOnlineScript=)
  2) -                                 8) (PostOnlineScript=)
  3) SAVE+EXIT                         9) (PreOfflineScript=)
  4) REMOVE+EXIT                      10) (PostOfflineScript=)
  5) AdditionalNetAppFiler            11) (FaultScript=)
  6) NetAppFiler[0]=netapp1           12) NetappClusterFlag=no
Choose the setting to process: 12
```

Attributes	Description
NetappClusterFlag	It is set for control facility of the NAS-Cluster. Default: no (yes, no)

Note

Default is no. NetappClusterFlag select no if control facility of the NAS-Cluster is not necessary, when you use a clustered NAS.

10. If you use NAS-Cluster, select yes.

```
Setting menu : NetappClusterFlag for Netapp
  1) HELP
  2) RETURN
  3) yes
  4) no
NetappCluster flag for Netapp: 3
```

11. Set parameters.

```
Netapp (Netapp_APP1:not yet consistent)
1) HELP                           10) (PostOfflineScript=)
2) -                              11) (FaultScript=)
3) SAVE+EXIT                      12) NetappClusterFlag=yes
4) REMOVE+EXIT                    13) NetappClusterDeviceName=
5) AdditionalNetAppFiler          14) NetappClusterPingCount=10
6) NetAppFiler[0]=netapp1         15) NetappClusterPingTimeout=5
7) (PreOnlineScript=)             16) NetappClusterPingInterval=5
8) (PostOnlineScript=)            17) NetappClusterPingIPType=IPv4
9) (PreOfflineScript=)
Choose the setting to process:
```

Attributes	Description
NetappClusterDeviceName	The NAS device name (host name) is specified. Delimit by ":" and specify two NAS device names. example: netapp1:netapp2
NetappClusterPingCount	The execution frequency of the ping / ping6 command is specified. Default: 10 (1 - 60)
NetappClusterPingTimeout	The time-out time (sec) for launching of the ping / ping6 command is specified. Default: 5 (1 - 300)
NetappClusterPingInterval	The execution interval (sec) of the ping / ping6 command is specified. Default: 5 (1 - 300)
NetappClusterPingIPType	The type of IPaddress of the ping / ping6 command to NAS device is specified. Default: IPv4 (IPv4, IPv6)

🛅 Note

- These attributes is set for each userApplication.

- The NAS device is monitored by the ping / ping6 command. When IPv4 is specified by NetappClusterPingIPType, the ping command is used. When IPv6 is specified by NetappClusterPingIPType, the ping6 command is used. Verify that the access to the NAS device is possible by the type of IPaddress of NetappClusterPingIPType. For details, refer to "2.4 NAS configuration"

- It is recommended that the value of NetappClusterPingCount, NetappClusterPingTimeout, and NetappClusterPingInterval is default.

- Do not mix the NAS device name of IPv4 and NAS device name of IPv6 in NetappClusterDeviceName.

🛅 See

Refer to "Appendix B Turning of the control facility for the NAS-Cluster" for the parameter of the ping / ping6 command.

12. When the setting is completed, SAVE+EXIT is selected.

```
Netapp (Netapp_APP1:consistent)
 1) HELP
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) AdditionalNetAppFiler
 6) NetAppFiler[0]=netapp1
 7) (PreOnlineScript=)
 8) (PostOnlineScript=)
 9) (PreOfflineScript=)
10) (PostOfflineScript=)
11) (FaultScript=)
12) NetappClusterFlag=yes
13) NetappClusterDeviceName=netapp1:netapp2
14) NetappClusterPingCount=10
15) NetappClusterPingTimeout=5
16) NetappClusterPingInterval=5
17) NetappClusterPingIPType=IPv4
Choose the setting to process: 3
```

2.5.4 RemoteFileSystems resource creation

1. Select RemoteFileSystems from the NETAPP turnkey wizard to mount the NAS volume.

```
Settings of turnkey wizard "NETAPP"
 1) HELP                        13) Crm:BasicApplication(-)
 2) -                           14) Oracle(-)
 3) SAVE+EXIT                    15) Crm:SystemState3(-)
 4) -                           16) Crm:SystemState2(-)
 5) ApplicationName=APP1        17) LocalFileSystems(-)
 6) Machines+Basics(app1)       18) RemoteFileSystems(-)
 7) CommandLines(-)             19) IpAddresses(-)
 8) Controllers(-)              20) RawDisks(-)
 9) Nwcl(-)                     21) LVM-VolumeManagement(-)
10) Nwst(-)                     22) Netapp(Netapp_APP1)
11) Nwsv(-)                     23) Gds:Global-Disk-Services(-)
12) Crm:Application(-)          24) Gls:Global-Link-Services(-)
Choose the setting to process: 18
```

2. When the RemoteFileSystems wizard is displayed, select AdditionalMountPoint.

```
File systems (Rfs_APP1:not yet consistent)
1) HELP                  4) REMOVE+EXIT          7) (Timeout=180)
2) -                     5) AdditionalMountPoint
3) SAVE+EXIT             6) (Filter=)
Choose the setting to process: 5
```

3. When the following menu is displayed, select the mount point listed in /etc/fstab.pcl, or select FREECHOISE and enter the mount point.

```
1) HELP
2) RETURN
3) FREECHOICE
4) ALL
5) /mnt/NAS
Choose a mount point: 5
```

When the mount point is specified, a setup menu is displayed.
Note that this menu is exclusive to AUTORECOVER.

Attributes	Description
AUTORECOVER	AUTORECOVER allows you to select whether or not the mount should automatically be recovered. If AUTORECOVER is enabled, the mount is automatically remounted when it is released.

AUTORECOVER is enabled if it is displayed at "Currently set".

```
Set flags for mount point: /mnt/NAS Currently set: REMOTE,AUTORECOVER (RA)
1) HELP                4) DEFAULT              7) SERVERCONTROLLED(C)
2) -                   5) SYNC(Y)              8) MONITORONLY(M)
3) SAVE+RETURN         6) NOT:AUTORECOVER(A)   9) KEEPONLINE(K)
Choose one of the flags:
```

4. When settings are complete, select SAVE+RETURN.

5. You return to the RemoteFileSystems wizard. Change Timeout and ServerTimeout to 300s respectively. If you want to add any further mount points, select AdditionalMountPoint. If creation is complete, press SAVE+EXIT.

```
File systems (Rfs_APP1:consistent)
 1) HELP                       6) MountPoints[0]=RA:/mnt/NAS
 2) -                          7) (RootDirectory=)
 3) SAVE+EXIT                  8) (ServerTimeout=300)
 4) REMOVE+EXIT                9) (Filter=)
 5) AdditionalMountPoint      10) (Timeout=300)
Choose the setting to process: 3
```

2.5.5 Addition of other resources

1. When the RemoteFileSystems resource settings are done, you return to the NETAPP turnkey wizard. Create userApplication resources if necessary.

```
Settings of turnkey wizard "NETAPP"
 1) HELP                          13) Crm:BasicApplication(-)
 2) -                             14) Oracle(-)
 3) SAVE+EXIT                     15) Crm:SystemState3(-)
 4) -                             16) Crm:SystemState2(-)
 5) ApplicationName=APP1          17) LocalFileSystems(-)
 6) Machines+Basics(app1)         18) RemoteFileSystems(Rfs_APP1)
 7) CommandLines(-)               19) IpAddresses(-)
 8) Controllers(-)                20) RawDisks(-)
 9) Nwcl(-)                       21) LVM-VolumeManagement(-)
10) Nwst(-)                       22) Netapp(Netapp_APP1)
11) Nwsv(-)                       23) Gds:Global-Disk-Services(-)
12) Crm:Application(-)            24) Gls:Global-Link-Services(-)
Choose the setting to process: 3
```

When it is complete, select SAVE+EXIT

📕 See
. . . .
If you create userApplication resources using GLS, refer to "Appendix A How to configure GLS".
. . . .

📙 Note
. . . .
Do not configure the PRIMECLUSTER Wizard for Oracle here. Configure it at "2.6 User application installation onto NAS".
. . . .

2.5.6 userApplication resource creation (scalable)

In scalable operation, it is possible to set up Scalable Cluster Application(app3) if necessary.

1. Create userApplication for each node according to 2.5.2 - 2.5.5.

2. Create userApplication (app3), and register userApplications created on step 1 to app3.

📕 See
. . . .
To set up Scalable Cluster Application is optional.
For details, refer to "6.6.2.2 Creating Scalable Cluster Applications" in "PRIMECLUSTER Installation and Administration Guide".
. . . .

2.5.7　Enabling resources

1. When userApplication creation is done, select Configuration-Generate to set up the environment definition file.

```
node1: Main configuration menu, current configuration: nas_config
No RMS active in the cluster
 1) HELP                           10) Configuration-Remove
 2) QUIT                           11) Configuration-Freeze
 3) Application-Create             12) Configuration-Thaw
 4) Application-Edit               13) Configuration-Edit-Global-Settings
 5) Application-Remove             14) Configuration-Consistency-Report
 6) Application-Clone              15) Configuration-ScriptExecution
 7) Configuration-Generate         16) RMS-CreateMachine
 8) Configuration-Activate         17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 7
```

2. Then, select Configuration-Activate to enable the environment definition file in each cluster node.

```
node1: Main configuration menu, current configuration: nas_config
No RMS active in the cluster
 1) HELP                           10) Configuration-Remove
 2) QUIT                           11) Configuration-Freeze
 3) Application-Create             12) Configuration-Thaw
 4) Application-Edit               13) Configuration-Edit-Global-Settings
 5) Application-Remove             14) Configuration-Consistency-Report
 6) Application-Clone              15) Configuration-ScriptExecution
 7) Configuration-Generate         16) RMS-CreateMachine
 8) Configuration-Activate         17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 8
```

3. Select QUIT and exit the RMS Wizard.

```
node1: Main configuration menu, current configuration: nas_config
No RMS active in the cluster
 1) HELP                           10) Configuration-Remove
 2) QUIT                           11) Configuration-Freeze
 3) Application-Create             12) Configuration-Thaw
 4) Application-Edit               13) Configuration-Edit-Global-Settings
 5) Application-Remove             14) Configuration-Consistency-Report
 6) Application-Clone              15) Configuration-ScriptExecution
 7) Configuration-Generate         16) RMS-CreateMachine
 8) Configuration-Activate         17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 2
```

2.5.8　userApplication operation check

Start up userApplication and see if it is normally running on all nodes.

- NAS

　Check if a volume is mounted on an operating node. You also need to check if the file can be read and written.

For further detailed information on how to verify that NAS is mounted and accessed from the node, refer to "Chapter 5 Notice".

If it is not normally running, take corrective action referring to "3.1 Corrective action during failover".

2.6 User application installation onto NAS

This section describes how to install and configure user applications on PRIMECLUSTER.

- Application data allocation

  Create application data on NAS using any one of nodes. NAS should be mounted and accessed from the node. You also need to set up as the application data can be accessed from other nodes.

 See

For further details about application creation, refer to a manual for each application. If you use PRIMECLUSTER Wizard for Oracle, refer to the "PRIMECLUSTER Wizard for Oracle Installation and Administration Guide".

2.7 Creation/configuration of application resources

Register the resources for user applications that are created at "2.6 User application installation onto NAS" in userApplication that is created at "2.5 userApplication and Netapp resource".

The following example shows how to configure the application resources.

 P **Point**

When you use PRIMECLUSTER Wizard for Oracle, create Oracle resources referring to the "PRIMECLUSTER Wizard for Oracle Installation and Administration Guide". Then, you can skip from "2.7.1 Creation of Online/Offline script" to "2.7.2 Configure userApplication".

2.7.1 Creation of Online/Offline script

Create Online/Offline scripts to control user application startup and stop. The Online script is used to start a user application, and the Offline script is script is used to stop a user application or clear the FAULT state.

 Note

Points of concern on creating the scripts are as follows.

- Online script

  A cluster system executes the Online script with root user.

- Offline script

  A cluster system executes the Offline script with root user.

Offline script should terminate normally if it is executed when the target application is not running. If not, fault clear of userApplication fails.

 See

For Online/Offline scripts, see "6.6 Setting Up Online/Offline Scripts" of "PRIMECLUSTER Installation and Administration Guide"

2.7.2 Configure userApplication

Start RMS Wizard

Start the RMS Wizard and configure userApplication.

The configuration name that is specified for the hvw command should be the same as that is specified at "2.5.2 userApplication creation".

Edit userApplication

1. The RMS Wizard is displayed. Select Application-Edit

```
node1: Main configuration menu, current configuration: nas_config
No RMS active in the cluster
 1) HELP                          10) Configuration-Remove
 2) QUIT                          11) Configuration-Freeze
 3) Application-Create            12) Configuration-Thaw
 4) Application-Edit              13) Configuration-Edit-Global-Settings
 5) Application-Remove            14) Configuration-Consistency-Report
 6) Application-Clone             15) Configuration-ScriptExecution
 7) Configuration-Generate        16) RMS-CreateMachine
 8) Configuration-Activate        17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 4
```

2. Select userApplication (displayed in capital letters) from a list of userApplication.

```
Edit: Application selection menu:
1) HELP                          6) Netapp_APP1
2) QUIT                          7) Rfs_APP1
3) RETURN                        8) app1
4) OPTIONS
5) APP1
Application Name: 5
```

3. Select CommandLines in the NETAPP turnkey wizard.

```
Settings of turnkey wizard "NETAPP"
 1) HELP                          13) Crm:BasicApplication(-)
 2) READONLY                      14) Oracle(-)
 3) SAVE+EXIT                     15) Crm:SystemState3(-)
 4) -                             16) Crm:SystemState2(-)
 5) ApplicationName=APP1          17) LocalFileSystems(-)
 6) Machines+Basics(app1)         18) RemoteFileSystems(Rfs_APP1)
 7) CommandLines(-)               19) IpAddresses(-)
 8) Controllers(-)                20) RawDisks(-)
 9) Nwcl(-)                       21) LVM-VolumeManagement(-)
10) Nwst(-)                       22) Netapp(Netapp_APP1)
11) Nwsv(-)                       23) Gds:Global-Disk-Services(-)
12) Crm:Application(-)            24) Gls:Global-Link-Services(-)
Choose the setting to process: 7
```

4. Select AdditionalStartCommand in the CommandLines wizard. Then, select FREECHOICE and specify the Online script that is created at "2.7.1 Creation of Online/Offline script".

```
CommandLines (Cmd_APP1:not yet consistent)
1) HELP                              4) REMOVE+EXIT
2) -                                 5) AdditionalStartCommand
3) SAVE+EXIT                         6) (ReturnCodes)
Choose the setting to process: 5
```

```
1) HELP
2) RETURN
3) FREECHOICE
Set a start command: 3
        >> /nas/start.sh
```

5. You return to the CommandLines wizard. Select StopCommands[0]. Then, select FREECHOICE and specify the Offline script that is created at "2.7.1 Creation of Online/Offline script".

```
CommandLines (Cmd_APP1:consistent)
 1) HELP                              7) StopCommands[0]=none
 2) -                                 8) CheckCommands[0]=none
 3) SAVE+EXIT                         9) CheckCommandTimeouts[0]=none
 4) REMOVE+EXIT                      10) Flags[0]=DT300
 5) AdditionalStartCommand          11) (ReturnCodes)
 6) StartCommands[0]='/nas/start.sh'
Choose the setting to process: 7
```

```
1) HELP
2) RETURN
3) FREECHOICE
Set a stop command: 3
        >> /nas/stop.sh
```

6. You return to the Commandlines wizard. If you have more user applications you want to use, add it using AdditionalStartCommand. When it is completed, select SAVE+EXIT.

```
CommandLines (Cmd_APP1:consistent)
 1) HELP                              7) StopCommands[0]='/nas/stop.sh'
 2) -                                 8) CheckCommands[0]=none
 3) SAVE+EXIT                         9) CheckCommandTimeouts[0]=none
 4) REMOVE+EXIT                      10) Flags[0]=DT300
 5) AdditionalStartCommand          11) (ReturnCodes)
 6) StartCommands[0]='/nas/start.sh'
Choose the setting to process: 3
```

7. You return to the NETAPP turnkey wizard. Create or edit other userApplication resources if necessary. When it is completed, select SAVE+EXIT.

```
Settings of turnkey wizard "NETAPP"
 1) HELP                              13) Crm:BasicApplication(-)
 2) -                                 14) Oracle(-)
 3) SAVE+EXIT                         15) Crm:SystemState3(-)
 4) -                                 16) Crm:SystemState2(-)
 5) ApplicationName=APP1              17) LocalFileSystems(-)
 6) Machines+Basics(app1)            18) RemoteFileSystems(Rfs_APP1)
 7) CommandLines(Cmd_APP1)           19) IpAddresses(-)
 8) Controllers(-)                    20) RawDisks(-)
 9) Nwcl(-)                           21) LVM-VolumeManagement(-)
10) Nwst(-)                           22) Netapp(Netapp_APP1)
11) Nwsv(-)                           23) Gds:Global-Disk-Services(-)
12) Crm:Application(-)                24) Gls:Global-Link-Services(-)
Choose the setting to process: 3
```

8. You return to a list of userApplication. If you want to configure other userApplication, select that userApplication. If it is completed, select RETURN.

```
Edit: Application selection menu (restricted):
1) HELP
2) QUIT
3) RETURN
4) OPTIONS
5) APP1
Application Name: 3
```

9. You return to the RMS Wizard. Select Configuration-Generate, and then Configuration-Activate, and enables the configuration. When it is done, select QUIT.

```
node1: Main configuration menu, current configuration: nas_config
No RMS active in the cluster
 1) HELP                              10) Configuration-Remove
 2) QUIT                              11) Configuration-Freeze
 3) Application-Create                12) Configuration-Thaw
 4) Application-Edit                  13) Configuration-Edit-Global-Settings
 5) Application-Remove                14) Configuration-Consistency-Report
 6) Application-Clone                 15) Configuration-ScriptExecution
 7) Configuration-Generate            16) RMS-CreateMachine
 8) Configuration-Activate            17) RMS-RemoveMachine
 9) Configuration-Copy
Choose an action: 2
```
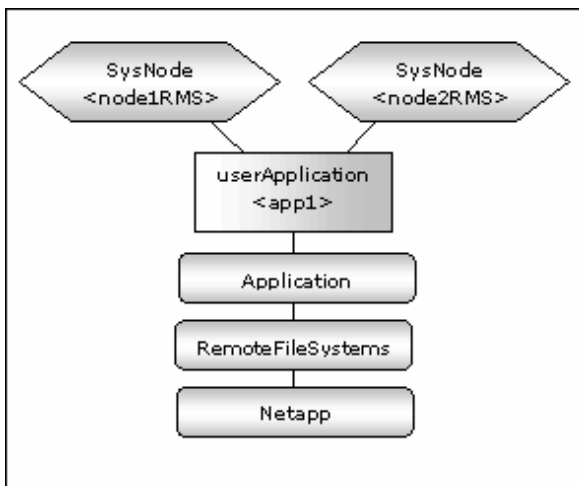
Scalable operation

userApplication is configured as follows:
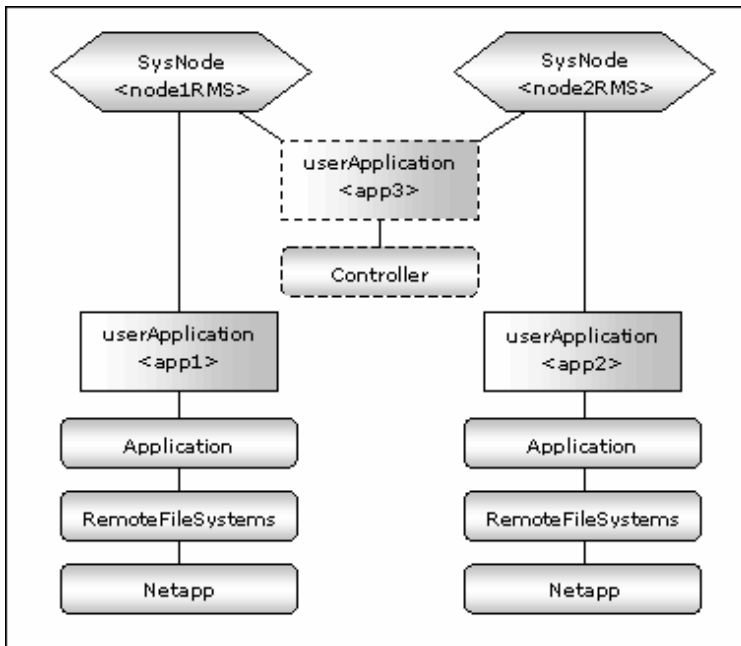
Standby operation

userApplication is configured as follows:

2.7.3 userApplication check

Check if userApplication is normally running on all nodes as follows:

- NAS

  The NAS volume is mounted on an operating node, and it can be read and written.

- Logical IP address

  A client can be connected to an operating node using a logical IP address (only when a logical IP address is used).

- A user application is normally started and stopped.

℗ Point
. . . .
For further detailed information on how to verify that NAS is mounted and accessed from the node, refer to "Chapter 5 Notice".

If userApplication is not normally running, take corrective action referring to "3.1 Corrective action during failover".

Chapter 3 Operation

3.1 Corrective action during failover

When the RemoteFileSystems detects an error in network systems or in an NAS device, or the GLS resource detects an error in networks, failover occurs. If other Wizard products are used, the wizard products might detect a failure, and failover occurs. Confirm the following and take corrective action.

userApplication log

When an error is detected in a user application in a PRIMECLUSTER system, check the application log and take corrective action.

PRIMECLUSTER Wizard for NAS log

In the PRIMECLUSTER Wizard for NAS, operations and error messages are output to the following log file. For the error messages, see "Chapter 6 Messages".

```
/var/opt/reliant/log/FJSVclnas_<resource name>_<NAS hostname>.log
```

The format of the log file is as follows:

```
date/command name/category/ID/text
2003/07/25 15:18:40 FJSVclnas [Info] [0201] Online(Standby)
2003/07/25 15:18:40 FJSVclnas [Info] [0205] Unlock node1's locks on NFS server(filer)
2003/07/25 15:18:40 FJSVclnas [Error] [0114] Cannot connect to NFS server(filer) with rsh
```

- Date

  Output in the "YYYY/MM/DD HH:MM:SS" format.

- Category

  Indicates a log category such as information, error, etc.

- ID

  Indicates a message No.

- Text

  indicates a message text.

📕 Note

....

- The size of the log file is not restricted. RMS controls the log file.

- The log file will be required for troubleshooting. Do not delete or edit the file.

....

RemoteFileSystems log

When an error is detected in networks or in NAS, the RemoteFileSystems resource enters FAULT. Check the RemoteFileSystems log (/var/opt/reliant/log/hvdet_nfs*) and take corrective action.

GLS log

If you use GLS to connect cluster nodes and NAS, and this leads to error in a network system, the GLS resource enters FAULT. Check the GLS log and take corrective action.

3.2 NAS device Maintenance

During the maintenance of the NAS device, it is recommended that the cluster service is stopped. This section describes the maintenance procedure of the NAS device while RMS is running.

The NAS device maintenance procedure while RMS is running.

The maintenance procedure is as follows:

1. Start userApplication

   Start userApplication that includes the Netapp resource if it has stopped.

2. Put userApplication into maintenance mode and stop monitoring

   Put userApplication into maintenance mode. If you use the function to control NAS-Cluster with PRIMECLUSTER or in scalable operation, stop monitoring the Netapp resources by executing the "hvnasdisable" command.

3. Confirmation of maintenance mode and stop of monitoring

   Confirm that changing into maintenance mode and stop of monitoring have been successfully done.
   (Refer to note of "4.1 hvnasdisable - Discontinue monitoring resource".)

4. Stop the applications that depend on the NAS volume

   If there are applications that depend on the NAS volume, stop them manually.

5. Do maintenance on NAS device

   Change the NAS device settings.

6. Start NAS device

   After the maintenance is completed, start NAS device.
   Before going on to the next step, verify that the access to the NAS device is possible, refer to "2.4 NAS configuration".

7. Start the applications that depend on the NAS volume

   If the applications that depend on the NAS volume are stopped, start them manually.

8. Restart resource monitoring and stop maintenance mode

   If you use the function to control NAS-Cluster with PRIMECLUSTER or in scalable operation, restart monitoring the Netapp resources again using "hvnasenable" command. Next, stop maintenance mode of userApplication.

9. Confirmation of restart of monitoring and maintenance mode

   Confirm that restart of monitoring and changing out of maintenance mode has been successfully done.
   (Refer to note of "4.2 hvnasenable - Restart monitoring resource".)

 Note
....

 - Do neither unmount nor mount of the RemoteFileSystems resource manually after "put userApplication into maintenance mode and stop monitoring"
....

3.3 Collect troubleshooting information

The following information is helpful to investigate problems.

PRIMECLUSTER

 See
. . . . - 25 - . . . .
See "PRIMECLUSTER Installation and Administration Guide".
. . . .

PRIMECLUSTER Wizard for NAS

- Definition file

  /usr/opt/reliant/etc/hvgdconfig
  /usr/opt/reliant/build/<Configuration name>.usfiles/*

- Log file

  /var/opt/reliant/log/*

 Information
. . . .
You can collect troubleshooting information on the PRIMECLUSTER Wizard for NAS as well as PRIMECLUSTER using the "pclsnap" command. pclsnap is a system information tool, and it comes with the FJSVpclsnap Expansion Support Package.
. . . .

3.4 Recovery sequence after control facility of the NAS-Cluster

The following information is recovery sequence after control facility of the NAS-Cluster.

Recovery sequence

1. Recover the NAS devices failure.

2. Execute "cf giveback" command on NAS devices.

3. Execute "cf status" command on NAS devices, and then make sure NAS-Cluster is normal.

4. Execute "/opt/FJSVclnas/sbin/hvnasenable -a" command for Netapp resource, and then make sure the Netapp resource status changes from Warning to Online.

 See
. . . .
- cf giveback

  The command of cf giveback referring to manual of the NAS device.

- cf status

  The command of cf status referring to manual of the NAS device.

- hvnasenable

  For hvnasenable command detail, see "4.2 hvnasenable - Restart monitoring resource".
. . . .

Chapter 4 Command

4.1 hvnasdisable - Discontinue monitoring resource

User

Super user

Format

/opt/FJSVclnas/sbin/hvnasdisable *userApplication Resource*

/opt/FJSVclnas/sbin/hvnasdisable -a [*userApplication*]

Function

hvnasdisable discontinues monitoring Netapp resources specified on a local node where this command is executed.

This function is used to stop NAS devices for maintenance. If the command is executed while userApplication is running, the function is disabled to monitor the Netapp resources immediately, and the resource state enters the Warning state. Even though the NAS device is stopped, the resources remain Warning.

If hvnasdisable is executed while userApplication is stopped, it is necessary to confirm if the resource state is Warning, and then stop the NAS device for maintenance.

Parameter

userApplication Resource

Specify userApplication including Netapp resources that will be discontinued monitoring.

Specify the Netapp resource that will be discontinued monitoring.

Specify them on the local node.

-a [*userApplication*]

The option discontinues monitoring all Netapp resources that belong to userApplication that is running on a local node and is specified for *userApplication*.

If *userApplication* is omitted, the option will discontinue monitoring all the Netapp resources on the local node.

Exit status

0 : Normal termination
1 : Abnormal termination
2 : Abnormal termination (discontinuance of resource monitoring with the -a option fails)

Note

- If there are applications that depend on the NAS volume, stop them manually or stop monitoring them before executing this command.

- Do not execute this command while switchover or failover is in progress.

- In standby operation and not using control facility for the NAS-Cluster, Netapp resource does not goes into Warning state.

- In using control facility for the NAS-Cluster, execute the hvnasdisable command to all Netapp resource.

4.2 hvnasenable - Restart monitoring resource

User

Super user

Format

/opt/FJSVclnas/sbin/hvnasenable *userApplication Resource*

/opt/FJSVclnas/sbin/hvnasenable -a [*userApplication*]

Function

It restarts monitoring Netapp resources, which discontinue to be monitored, on a local node. hvnasenable is available while userApplication is running. Executing the command enables monitoring the resources immediately. Be aware that the command must be executed on an active NAS device. Also, confirm that the resource state is changed from Warning to Online.

Parameter

userApplication Resource

Specify userApplication including Netapp resources that will be restarted monitoring.

Specify the Netapp resource that will be restarted monitoring.

Specify them on the local node.

-a [*userApplication*]

The option restarts monitoring all Netapp resources that belong to userApplication that is running on a local node and is specified for *userApplication*.

If *userApplication* is omitted, the option will restart monitoring all the Netapp resources on the local node.

Exit status

0 : Normal termination
1 : Abnormal termination
2 : Abnormal termination (restarting of resource monitoring with the -a option fails)

Note

Do not execute this command while switchover or failover is in progress.

Chapter 5 Notice

When using the PRIMECLUSTER Wizard for NAS, take notice of the following:

- If you use Netapp resources in combination with other Wizard products like Wizard for Oracle, select NETAPP in the menu of the turnkey wizard in "2.5.2 userApplication creation".

📖 Information
....

If you use Netapp resources in combination with other Wizard products, select NETAPP in the following screen.

```
Creation: Application type selection menu:
 1) HELP                6) GENERIC             11) STANDBY
 2) QUIT                7) NETAPP              12) WIZSTANDBY
 3) RETURN              8) NETWORKER
 4) OPTIONS             9) ORACLE
 5) DEMO               10) SCALABLE
Application Type: 7
```

....

- ExportFlag (included in 4.3A10 or later) described in "2.5.2 userApplication creation" determines whether or not Export processing for NAS volumes is executed during Online processing. Up to the previous version, Export processing was always executed during Online processing.

- If you set UnLockFlag to "always" in scalable operation, Unlock processing is executed during split brain. Then, NFS re-locking is executed, and the lock is set again, so this does not disrupt ongoing operations. But the NFS relocking might slow down operations.

- If you specify IP instead of an NAS host name in /etc/fstab.pcl, the NFS lock control might fail. You must specify a host name. The host name should be the same as the one that is registered in NAS.

- When you register a host name of a cluster node in the NAS hosts file, the host name should be the same as the one that is registered in that cluster node. If it is different, the lock control might fail.

- When you use a clustered NAS, you need to specify an export volume or qtree in the "/etc/exports" file, so takeover/giveback will be properly performed.

- When you use a clustered NAS, NAS does not temporarily respond during takeover/giveback. To prevent failover, you need to set both the ServerTimeout and Timeout of the RemoteFileSystems resource to about 300 seconds. The value varies depending on an environment.

- In the following cases, Netapp resource does not goes into Warning state.
  - When control facility for the NAS-Cluster is not used in standby operation.
  - When failover of the NAS device has been caused by manual operation or failure other than failure of network.
  - When failover of the NAS device has been caused by the "Negotiated Failover for Networking" function of DataONTAP7.2 or later.

- If NAS device after failover is recovered (giveback), discontinue monitoring Netapp resources so that failover doesn't occur again while recovering.

- Mount points controlled by PRIMECLUSTER are displayed by mount(1) or df(1) commands after userApplication transitioned to Online state and NAS volumes were mounted. The mount points listed in /etc/fstab.pcl are replaced with symbolic links to the mount points controlled by PRIMECLUSTER.

📑 Example
....

```
# mount
nas1:/vol/vol2 on /opt/SMAW/SMAWRrms/dev/nfs/RMSNFS10015_mountpoint1 type nfs
(rw,hard,bg,nointr,rsize=32768,wsize=32768,tcp,nfsvers=3,addr=10.20.30.40)
nas2:/vol/vol2 on /opt/SMAW/SMAWRrms/dev/nfs/RMSNFS10016_mountpoint2 type nfs
(rw,hard,bg,nointr,rsize=32768,wsize=32768,tcp,nfsvers=3,addr=10.20.30.41)
# df -h
nas1:/vol/vol2    900M  1.5M  899M   1% /opt/SMAW/SMAWRrms/dev/nfs/RMSNFS10015_mountpoint1
```

```
nas2:/vol/vol2     900M  1.5M  899M   1% /opt/SMAW/SMAWRrms/dev/nfs/RMSNFS10016_mountpoint2
# ls -l /mountpoint1
lrwxrwxrwx 1 root root 47 May 31 18:07 /mountpoint1 -> /usr/opt/reliant/dev/nfs/
RMSNFS10015_mountpoint1
# ls -l /mountpoint2
lrwxrwxrwx 1 root root 47 May 31 18:07 /mountpoint2 -> /usr/opt/reliant/dev/nfs/
RMSNFS10016_mountpoint2
#
```

Chapter 6 Messages

This Chapter describes messages related to the PRIMECLUSTER Wizard for NAS and corrective action. These messages appear in the internal log files or syslog(daemon.notice).

Online/Offline script

[Error] [0203] exportfs Error Message: *Message*,EXIT_CODE:*EXIT_CODE*

[Description]

Volume export operation on NAS output *Message* and terminated with *EXIT_CODE*.

[Corrective action]

Check *Message* and *EXIT_CODE*, and take corrective action.

[Error] [0204] exportfs -u Error Message: *Message*,EXIT_CODE: *EXIT_CODE*

[Description]

Volume unexport operation on NAS output *Message* and terminated with *EXIT_CODE*.

[Corrective action]

Check *Message* and *EXIT_CODE*, and take corrective action.

[Error] [0206] Failed to acquire a host name

[Description]

Script failed to acquire a node state.

[Corrective action]

Check if there is sufficient memory in the failed node.

[Error] [0207/0209/0211/0213/0215] Cannot connect to NetApp Filer(*NetApp Filer name*) with rsh

[Description]

Cluster nodes cannot be connected to NAS using rsh.

[Corrective action]

Check if a NAS name is correct, rsh can be used on NAS, and there is no problem with a network system.

[Warn] [0301] exportfs Message:*Message*

[Description]

Volume export operation on NAS output *Message*.

[Corrective action]

Check *Message* and take corrective action.

[Warn] [0302] exportfs -u Message:*Message*

[Description]

Volume unexport operation on NAS output *Message*.

[Corrective action]

Check *Message* and take corrective action.

[Warn] [0303/0305] Cannot export *Export point* on NetApp Filer(*NetApp Filer name*)

[Description]

Export of Export point failed on NAS.

[Corrective action]

See [Error] [0203] that is previously output and take corrective action.

[Warn] [0304] Cannot unexport *Export point* on NetApp Filer(*NetApp Filer name*)

[Description]

Unexport of Export point failed on NAS.

[Corrective action]

See [Error] [0204] that is previously output and take corrective action.

Error messages in scalable operation

[Error] [1205/1207/1209/1210/1211/1213] Cluster nodes cannot be connected to NetApp Filer($*NetApp Filer name*) with rsh

[Description]

Cluster nodes cannot be connected to NAS using rsh.

[Corrective action]

Check if a NAS name is correct, rsh can be used on NAS, and there is no problem with a network system.

[Error] [1217] Failed to check resources

[Description]

The detector failed to monitor the resource state.

[Corrective action]

Check if there is enough space in /opt, and if there is sufficient memory in the failed node.

[Error] [1218] Failed to check nodes

[Description]

The detector failed to monitor the node state.

[Corrective action]

Check if there is enough space in /opt, and if there is sufficient memory in the failed node.

[Warn] [1301/1302] Unknown host(*NetApp Filer name*)

[Description]

NetApp Filer name is Unknown.

[Corrective action]

Check if the NAS name(*NetApp Filer name*) is correct, and there is no problem with a network system. Verify that the access to the NAS device is possible by the type of IPaddress of NetappClusterPingIPType at "2.5.2 userApplication creation"

[Warn] [1303/1304/1305/1306] The ping(*NetApp Filer name*) failed, Takeover is executed

[Description]

The failover of the NAS-Cluster will be done because the ping / ping6 command for the NAS name(*NetApp Filer name)* failed.

[Corrective action]

See "3.4 Recovery sequence after control facility of the NAS-Cluster" and take corrective action.

[Warn] [1307] The ping of both host(*NetApp Filer name, NetApp Filer name*) failed

[Description]

The all of the NAS-Cluster are down.

[Corrective action]

Recover the all of the NAS-Cluster.

[Warn] [1308] The ping(*NetApp Filer name*) failed, count *COUNT*.

[Description]

The ping / ping6 command for the NAS name(*NetApp Filer name)* failed.
If *COUNT* reaches to the value of NetappClusterPingCount, the failover of the NAS-Cluster will be done.

[Corrective action]

Check if the NAS name(*NetApp Filer name*) is correct, and there is no problem with a network system.

Error messages in standby operation

[Error] [2203/2204] Cluster nodes cannot be connected to NetApp Filer(*NetApp Filer name*) with rsh

[Description]

Cluster nodes cannot be connected to NAS using rsh.

[Corrective action]

Check if a NAS name is correct, rsh can be used on NAS, and there is no problem with a network system.

[Warn] [2303/2304/2305/2306] The ping(*NetApp Filer name*) failed, Takeover is executed

[Description]

The failover of the NAS-Cluster will be done because the ping / ping6 command for the NAS name(*NetApp Filer name)* failed.

[Corrective action]

See "3.4 Recovery sequence after control facility of the NAS-Cluster" and take corrective action.

[Warn] [2307] The ping of both host(*NetApp Filer name, NetApp Filer name*) failed

[Description]

The all of the NAS-Cluster are down.

[Corrective action]

Recover the all of the NAS-Cluster.

[Warn] [2308] The ping(*NetApp Filer name*) failed, count *COUNT*.

[Description]

The ping / ping6 command for the NAS name(*NetApp Filer name)* failed.
If *COUNT* reaches to the value of NetappClusterPingCount, the failover of the NAS-Cluster will be done.

[Corrective action]

Check if the NAS name(*NetApp Filer name*) is correct, and there is no problem with a network system.

hvnasdisable/hvnasenable messages

🔷 See

· ·

For details of hvnasdisable or hvnasenable command, refer to "4.1 hvnasdisable - Discontinue monitoring resource", "4.2 hvnasenable - Restart monitoring resource".

· ·

command: ERROR: Internal error! (*details*)

[Description]

Internal error occurred.

[Corrective action]

Contact your system administrator.

command: ERROR: Failed to disable/enable resource monitoring - *resource_name*

[Description]

Cannot disable or enable monitoring.

[Corrective action]

Contact your system administrator.

command: ERROR: hvgdconfig does not exist!

[Description]

hvgdconfig file does not exist.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

command: ERROR: Obtaining local SysNode Name failed!

[Description]

Cannot get a local SysNode name.

[Corrective action]

Check if CF (Cluster Foundation) has been configured and is "UP" state.

command: ERROR: Obtaining RMS configuration Name failed!

[Description]

Cannot get RMS configuration name.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

command: ERROR: Result of hvw is invalid!

[Description]

Cannot execute RMS command hvw(1M) correctly.

[Corrective action]

Check if building a userApplication (cluster application) has been completed.

command: ERROR: Failed to disable/enable resource monitoring! (*details*)

[Description]

Cannot disable or enable monitoring because of details.

[Corrective action]

Check if PRIMECLUSTER installation, cluster setup and building a cluster application (userApplication) have been completed.

command: ERROR: No Wizard for NAS resources belong to specified userApplication! - *userApplication_name*

[Description]

There is no Wizard for NAS resources in the specified userApplication *userApplication_name*.

[Corrective action]

Retry with a correct userApplication name.

command: ERROR: No Wizard for NAS resources are in the current RMS configuration!

[Description]

There is no Wizard for NAS resources in the current RMS configuration.

[Corrective action]

Check if building a userApplication (cluster application) has been completed or Netapp resources are included in the userApplication.

command: ERROR: No Wizard for NAS resources exist on this node! - *SysNode_name*

[Description]

There is no Wizard for NAS resources on a local node *SysNode_name*.

[Corrective action]

Check if building a userApplication (cluster application) has been completed or Netapp resources are included in the userApplication.

command: ERROR: Invalid userApplication or Resource!

[Description]

The specified userApplication name or resource name is invalid.

[Corrective action]

Retry with a correct userApplication name and resource name.

command: ERROR: The specified resource does not exist on *SysNode_name*! - *resource_name*

[Description]

The specified resource does not exist on a local node *SysNode_name*.

[Corrective action]

Retry with a correct resource name or retry on a correct node.

Appendix A How to configure GLS

If you want to create redundant transfer routes to NAS and/or make high-speed communication over a wide broadband area using the PRIMECLUSTER Wizard for NAS, you can use NIC switching mode.

A.1   NIC switching mode

In NIC switching mode, a cluster configuration is as follows:
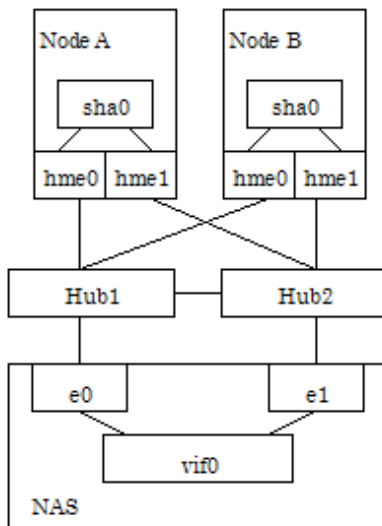
The details will be given later in this document.

A.1.1   NAS configuration

When you create redundant transfer routes on the network, you need to create a single type virtual interface from multiple interfaces by executing the following command on NAS;

```
vif create single virtual interface name interface 1, interface 2, ...
```

The virtual interface name is specified as vif0, vif1, vif2, and so on.

Example
. . . .
```
vif create single vif0 e0,e1
```
. . . .

The virtual interface is created using the above command. If NAS is restarted, the virtual interface will be lost. You need to set up /etc/rc as the virtual interface can automatically be created during NAS restart using the following steps:

1. Mount /vol/vol0 on the NAS management server.

2. Add the "vif create single" command that is used to create a virtual interface above the ifconfig line. ifconfig sets up an actual interface in /etc/rc of NAS. Then, give commentary # to ifconfig and add the new ifconfig line for the virtual interface.

Example
. . . .
```
vif create single vif0 e0,e1
#ifconfig e0 192.168.0.1 mediatype auto
```

```
#ifconfig e1 192.168.0.2 mediatype auto
ifconfig vif0 192.168.0.1 mediatype auto
```

A.1.2 GLS (NIC switching) configuration

Set up NIC switching mode using GLS referring to "6.2 Initial GLS Setup" of "PRIMECLUSTER Installation and Administration Guide".

In scalable operation, execute the following command without using the logical IP:

```
# /opt/FJSVhanet/usr/sbin/hanetconfig create -n sha0 -m e -i physical IP -t device1, device2
```

Example

```
# /opt/FJSVhanet/usr/sbin/hanetconfig create -n sha0 -m e -i 192.168.0.2 -t hme0,hme1
```

A.1.3 GLS configuration with Gls Wizard

Configure GLS using the Gls Wizard in the NETAPP turnkey wizard of the RMS Wizard.

1. Select Gls:Global-Link-Services in the NETAPP turnkey wizard.

2. Select AdditionalTakeoverIpaddress in the Gls wizard selection menu.

3. Select the IP address that is set up at "A.1.2 GLS (NIC switching) configuration". (logical IP in standby operation or physical IP in scalable operation). If it is not displayed, select FREECHOICE and enter it manually.

4. Select SAVE+RETURN.

5. Select SAVE+RETURN.

Appendix B Turning of the control facility for the NAS-Cluster

In PRIMECLUSTER Wizard for NAS, it is monitored to the NAS-Cluster accessible by the ping / ping6 command. When the ping / ping6 command doesn't respond (It is not possible to access it), PRIMECLUSTER Wizard for NAS executes failover of the NAS-Cluster. In the following, it explains the method of the tuning of the parameter of Netapp resource.

Turning of the control facility for the NAS-Cluster

1. The GLS resource monitors it between the cluster node and Switching-HUB. It should be set that failover of the NAS-Cluster doesn't execute it until the switching of the NIC of GLS is completed.
   In a word, it is necessary to meet the requirement of following.
   Monitoring Interval of GLS detector (a) + Switching time of the NIC with GLS (b) < Starting time of the NAS-Cluster failover (X)

   (a) + (b) = 10 (sec) + 30(sec) or 60(sec) < X (sec)

   ### 📖 Example
   ....
   * Switching time of the NIC with GLS

case1	not monitoring between HUB and HUB	about 30 sec
case2	monitoring between HUB and HUB	about 60 sec

   ....

   ### 📑 See
   ....
   Refer to "PRIMECLUSTER Global Link Services Installation and Administration Guide."
   ....

2. After 300(recommended value) seconds pass, the RemoteFileSystems resource to monitor between the cluster node and the NAS device becomes faulted resource if the trouble is detected.
   Therefore, the value in which the failure detection time of NAS-Cluster and the failover time of NAS-Cluster are added should be within at 300 seconds.
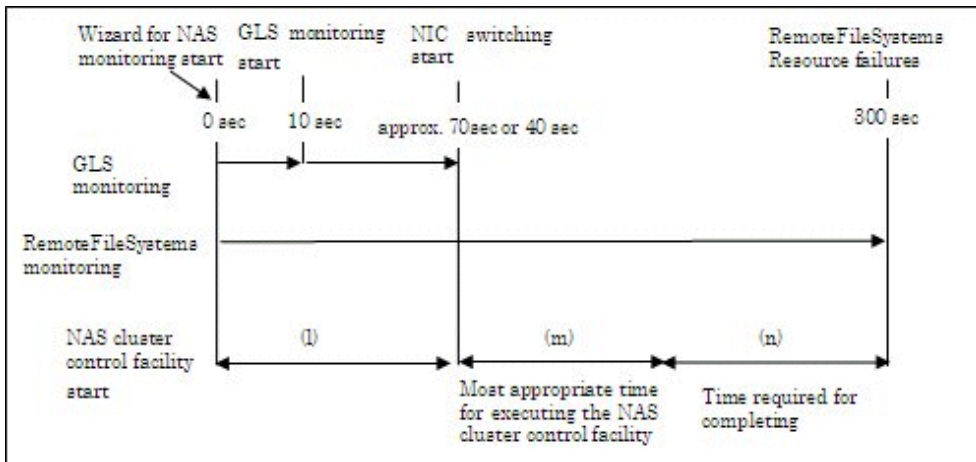   In a word, it becomes like the next expression.

   Starting time of the NAS-Cluster failover (X) <
   RemoteFileSystems failure time (300 sec) - time of the NAS-Cluster failover
   ---

   Therefore, it becomes the following.

   About 40sec. or about 70sec. < X < 300 sec - time of the NAS-Cluster failover (1)

The NAS cluster control facility will be initiated as follows:

As shown in the above figure, the time required for completing the NAS cluster control facility (1) is (m).

- When executing takeover with the range of (l)
  The NAS cluster control facility will be initiated being unable to access NAS devices because of NIC switching, so this will disable takeover processing.

- When executing takeover with the range of (n)
  RemoteFileSystems resources will time out and enter faulted before the NAS cluster control facility is completed, so this will disable takeover processing.

Turning of the Netapp resource setting for the ping / ping6 command

Default value is following:

A	Count of the ping / ping6 command for NAS-Cluster	10 count
B	Timeout time of the ping / ping6 command for NAS-Cluster	5 sec
C	Execution interval of the ping / ping6 command for NAS-Cluster	5 sec

The NAS-Cluster failover beginning time in default can be calculated from the following expression.

$(B + C) * (A - 1) + B = (5+5) * 9 + 5 = 95$ sec.

The NAS-Cluster failover beginning time in default is 95 sec.

🖐 **Note**

. . . .

The required time for failover changes by the environment.

. . . .