FUJITSU

PRIMECLUSTER Wizard for NAS 4.3

Configuration and Administration Guide

Oracle Solaris

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 1 appendix:

- Chapter 1 Feature

- Chapter 2 Environment configuration

- Chapter 3 Operation

- Chapter 4 Command

- Chapter 5 Notice

- Chapter 6 Message

- Appendix A GLS configuration

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

Notational convention

The document conforms to the following notational conventions:

P 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.

Date of publication and edition

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:

Environment Setup	Environment setup tool to enable clustering of NAS on PRIMECLUSTER
Monitoring	Releases the file lock on NAS in scalable operation Control facility of the NAS-Cluster(optional)
Start and Stop Control	Release the file lock and control export on NAS
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".

File locks release in scalable operation (Monitoring, Start and stop control)

The detector monitors the Netapp resource during scalable operation. In the event of a Netapp resource failure, the detector releases the file lock of the node in which the resource failure occurred.

Start and stop control

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

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 "3.3 Recovery sequence after control facility of the NAS-Cluster".
. . . .

1.2 Operating environment

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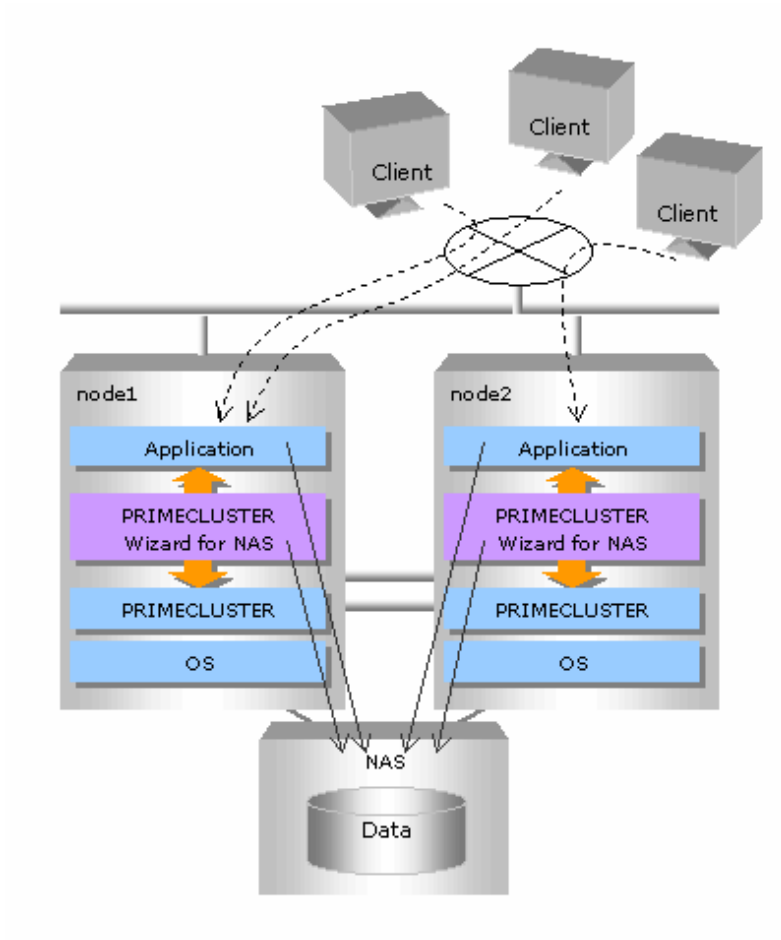
In scalable operation, NAS is operated on all nodes. Then, the file lock is shared on all the nodes.

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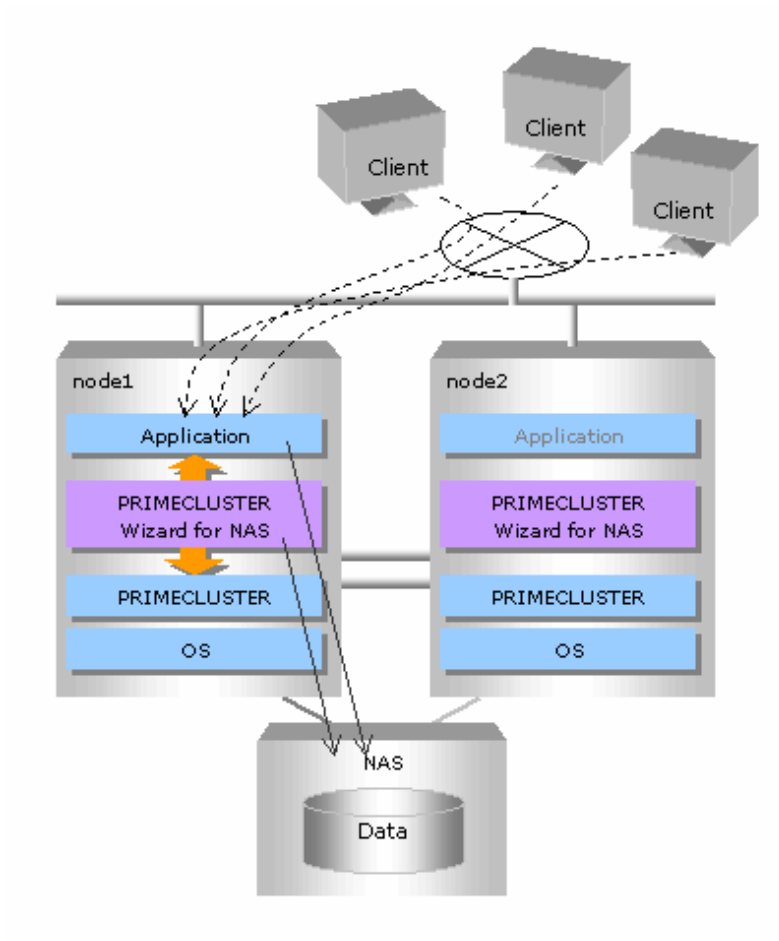
In standby operation, a cluster system consists of an operating node and standby nodes. Only on an operating node, NAS is active. On standby nodes, NAS is inactive. In the event of a failure, NAS is activated after userApplication is switched to one of the standby nodes, and the file lock of the operating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

Configure hardware

Configure hardware required for PRIMECLUSTER.

Install software

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

For Scalable operation, PRIMECLUSTER Enterprise Edition is required.
For Standby operation, PRIMECLUSTER Enterprise Edition, HA Server or Clustering Base is required.

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

Configure a cluster system

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

2.3 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 qtree according to the NAS manual. The volume name or qtree 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 register the host name of cluster node that uses NAS and IP address. If you do not use a DNS server, register a host name and an IP address using the following steps:

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

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

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

Note

You must specify the same host name as that of the cluster node in the DNS or NAS "/etc/hosts" file. 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
Fri Dec 09 11:30:28 JST 2011
```

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

2.4 userApplication and Netapp resource

2.4.1 /etc/vfstab.pcl setup

Define mounting of the NAS volume or qtree in /etc/vfstab.pcl as follows:

```
#RMS#<NAS host name:NAS volume or qtree name> - <mount point> nfs - no <options>
```

- For standby operation, the following options are recommended:

```
rw,bg,hard,nointr,rsize=32768,wsize=32768,proto=tcp,forcedirectio,vers=3
```

- For scalable operation, the following options are recommended:

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

Example

```
#RMS#netapp1:/vol/vol1 - /mountpoint1 nfs - no
rw,bg,hard,nointr,rsize=32768,wsize=32768,proto=tcp,forcedirectio,vers=3
```

Information

forcedirectio option avoids cache data erasing if the server goes down.

Note

- Specify the options to suit for your operations requirements.

- Specify the same NAS host name as that registered in DNS or /etc/hosts. With an IP address, the file lock might not be properly controlled at times.

- Create directories of mount point name which is described in /etc/vfstab.pcl. Do not create sub directories or files in the mount point which is described in /etc/vfstab.pcl. If they exist, the mount control cannot be normally performed on PRIMECLUSTER.

2.4.2 userApplication creation

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

See

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

Scalable operation

userApplication is configured as shown in the illustration.
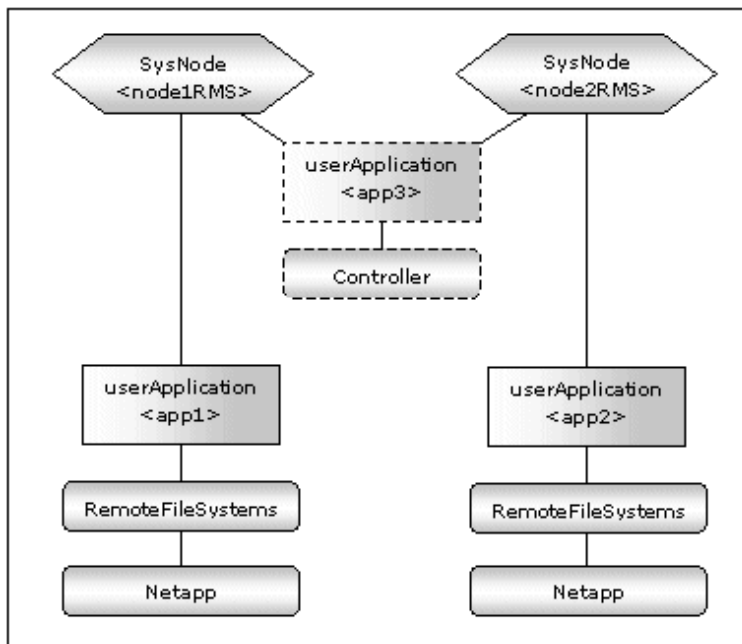
Standby operation

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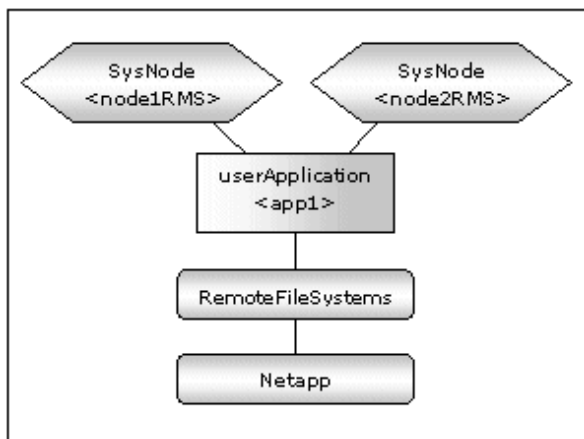
RMS Configuration Wizard Start

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

```
# hvw -n <definition name>
```

You can specify any definition name for the hvw command.

userApplication creation

1. When the RMS Configuration 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
2) QUIT
3) RETURN
4) OPTIONS
5) CRM
6) DEMO
7) GENERIC
8) NETAPP
9) SYMFOWARE
Application Type: 8
```

3. Select Machines+Basics.

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

4. Machines+Basics wizard is displayed.

```
Machines+Basics (app1:consistent)
 1) HELP                          14) (AutoStartUp=no)
 2) -                             15) (AutoSwitchOver=No)
 3) SAVE+EXIT                     16) (PreserveState=no)
 4) REMOVE+EXIT                   17) (PersistentFault=0)
 5) AdditionalMachine             18) (ShutdownPriority=)
 6) AdditionalConsole             19) (OnlinePriority=)
 7) Machines[0]=node1RMS          20) (StandbyTransitions=)
 8) (PreCheckScript=)             21) (LicenseToKill=no)
 9) (PreOnlineScript=)            22) (AutoBreak=yes)
10) (PostOnlineScript=)           23) (AutoBreakMaintMode=no)
11) (PreOfflineScript=)           24) (HaltFlag=no)
12) (OfflineDoneScript=)          25) (PartialCluster=0)
13) (FaultScript=)                26) (ScriptTimeout=)
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.

2.4.3 Netapp resource creation

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

```
Settings of turnkey wizard "NETAPP"
 1) HELP                          12) Crm:SystemState2(-)
```

```
 2) -                               13) LocalFileSystems(-)
 3) SAVE+EXIT                        14) RemoteFileSystems(-)
 4) -                               15) IpAddresses(-)
 5) ApplicationName=APP1             16) RawDisks(-)
 6) Machines+Basics(app1)           17) RC-VolumeManagement(-)
 7) CommandLines(-)                 18) VERITAS-VolumeManagement(-)
 8) Controllers(-)                  19) Netapp(-)
 9) Crm:Application(-)              20) Gds:Global-Disk-Services(-)
10) Crm:BasicApplication(-)         21) Gls:Global-Link-Services(-)
11) Crm:SystemState3(-)
Choose the setting to process: 19
```

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

```
Netapp (Netapp_APP1:not yet consistent)
 1) HELP
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) AdditionalNetAppFiler
 6) (PreOnlineScript=)
 7) (PostOnlineScript=)
 8) (PreOfflineScript=)
 9) (PostOfflineScript=)
10) (FaultScript=)
11) (NetappClusterFlag=no)
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
2) NO-SAVE+RETURN
3) -
4) AdditionalExportpoint
5) UnLockFlag=always
6) ExportFlag=no
7) UnExportFlag=no
8) ScriptTimeout=300
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
2) NO-SAVE+RETURN
3) SAVE+RETURN
4) AdditionalExportpoint
5) UnLockFlag=always
```

```
6) ExportFlag=no
7) UnExportFlag=no
8) ScriptTimeout=300
9) Exportpoint[0]=/vol/vol1
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. The setting of exportfs at "2.3 NAS configuration" is used. 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
 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=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.

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
 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=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                           9) (PreOfflineScript=)
 2) -                             10) (PostOfflineScript=)
 3) SAVE+EXIT                     11) (FaultScript=)
 4) REMOVE+EXIT                   12) (NetappClusterFlag=yes)
 5) AdditionalNetAppFiler         13) NetappClusterDeviceName=
 6) NetAppFiler[0]=netapp1        14) (NetappClusterPingCount=10)
 7) (PreOnlineScript=)            15) (NetappClusterPingTimeout=5)
 8) (PostOnlineScript=)           16) (NetappClusterPingInterval=5)
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 command is specified. Default: 10 (1 - 60)
NetappClusterPingTimeout	The time-out time (sec) for launching of the ping command is specified. Default: 5 (1 - 300)
NetappClusterPingInterval	The execution interval (sec) of the ping command is specified. Default: 5 (1 - 300)

📒 Note

The NAS device is monitored by the ping command.

In this step, it is possible to set the execution frequency, the time-out time, and the execution interval of the ping command executed in fixed-cycle monitoring. It is recommended these parameters are used like default.

📑 See

Refer to "Appendix B Turning of the control facility for the NAS-Cluster" for the parameter of the ping 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)
Choose the setting to process: 3
```

2.4.4 RemoteFileSystems resource creation

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

```
Settings of turnkey wizard "NETAPP"
 1) HELP                        12) Crm:SystemState2(-)
 2) -                           13) LocalFileSystems(-)
 3) SAVE+EXIT                   14) RemoteFileSystems(-)
 4) -                           15) IpAddresses(-)
 5) ApplicationName=APP1        16) RawDisks(-)
 6) Machines+Basics(app1)       17) RC-VolumeManagement(-)
 7) CommandLines(-)             18) VERITAS-VolumeManagement(-)
 8) Controllers(-)              19) Netapp(Netapp_APP1)
 9) Crm:Application(-)          20) Gds:Global-Disk-Services(-)
10) Crm:BasicApplication(-)     21) Gls:Global-Link-Services(-)
```

```
11) Crm:SystemState3(-)
Choose the setting to process: 14
```

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

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

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

```
1) HELP
2) RETURN
3) FREECHOICE
4) ALL
5) /mountpoint1
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: /mountpoint1  Currently set: REMOTE,AUTORECOVER (RA)
 1) HELP
 2) -
 3) SAVE+RETURN
 4) DEFAULT
 5) SYNC(Y)
 6) NOT:AUTORECOVER(A)
 7) SERVERCONTROLLED(C)
 8) MONITORONLY(M)
 9) RCFS(T)
10) 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
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) AdditionalMountPoint
 6) MountPoints[0]=RA:/mountpoint1
 7) (RootDirectory=)
 8) (ServerTimeout=300)
 9) (Filter=)
```

```
10) (Timeout=300)
Choose the setting to process: 3
```

2.4.5 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                            12) Crm:SystemState2(-)
 2) -                              13) LocalFileSystems(-)
 3) SAVE+EXIT                      14) RemoteFileSystems(Rfs_APP1)
 4) -                              15) IpAddresses(-)
 5) ApplicationName=APP1           16) RawDisks(-)
 6) Machines+Basics(app1)          17) RC-VolumeManagement(-)
 7) CommandLines(-)                18) VERITAS-VolumeManagement(-)
 8) Controllers(-)                 19) Netapp(Netapp_APP1)
 9) Crm:Application(-)             20) Gds:Global-Disk-Services(-)
10) Crm:BasicApplication(-)        21) Gls:Global-Link-Services(-)
11) Crm:SystemState3(-)
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 "2.5 User application installation onto NAS".
....

2.4.6 userApplication resource creation (scalable)

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

1. Create userApplications for each node according to 2.4.2 - 2.4.5.

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".
....

2.4.7 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 Configuration 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
```

2.4.8 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.

P Point

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".

2.5 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.

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".

2.6 Creation/configuration of application resources

Register the resources for user applications that are created at "2.4 userApplication and Netapp resource".

![Point icon] **Point**

- When you use PRIMECLUSTER Wizard for Oracle, create Oracle resources referring to the "PRIMECLUSTER Wizard for Oracle Installation and Administration Guide".

- When you use PRIMECLUSTER Wizard for Oracle, you can skip from "2.6.1 Creation of Online/Offline script" to "2.6.2 Configure userApplication".

2.6.1 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 used to stop a user application or clear the FAULT state.

![Note icon] **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.

  Since Offline script is also executed to stop the applications, and clear the fault state, Offline script needs to terminate normally regardless of the state of the applications.

![See icon] **See**

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

2.6.2 Configure userApplication

Start RMS Configuration Wizard

Start the RMS Configuration Wizard and configure userApplication.

The definition name that is specified for the hvw command should be the same as that is specified at "2.4.2 userApplication creation".

Edit userApplication

1. The RMS Configuration 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 (restricted):
1) HELP
2) QUIT
3) RETURN
4) OPTIONS
5) APP1
Application Name: 5
```

3. Select CommandLines in the NETAPP turnkey wizard.

```
Settings of turnkey wizard "NETAPP"
 1) HELP                        12) Crm:SystemState2(-)
 2) -                           13) LocalFileSystems(-)
 3) SAVE+EXIT                   14) RemoteFileSystems(Rfs_APP1)
 4) -                           15) IpAddresses(-)
 5) ApplicationName=APP1        16) RawDisks(-)
 6) Machines+Basics(app1)       17) RC-VolumeManagement(-)
 7) CommandLines(-)             18) VERITAS-VolumeManagement(-)
 8) Controllers(-)              19) Netapp(Netapp_APP1)
 9) Crm:Application(-)          20) Gds:Global-Disk-Services(-)
10) Crm:BasicApplication(-)     21) Gls:Global-Link-Services(-)
11) Crm:SystemState3(-)
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 "2.6.1 Creation of Online/Offline script".

```
CommandLines (Cmd_APP1:not yet consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalStartCommand
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 "2.6.1 Creation of Online/Offline script".

```
CommandLines (Cmd_APP1:consistent)
 1) HELP
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) AdditionalStartCommand
 6) StartCommands[0]='/nas/start.sh'
```

```
 7) StopCommands[0]=none
 8) CheckCommands[0]=none
 9) CheckCommandTimeouts[0]=none
10) Flags[0]=DT300
11) (ReturnCodes)
Choose the setting to process: 7
```

```
1) HELP
2) RETURN
3) FREECHOICE
Set a start 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
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) AdditionalStartCommand
 6) StartCommands[0]='/nas/start.sh'
 7) StopCommands[0]='/nas/stop.sh'
 8) CheckCommands[0]=none
 9) CheckCommandTimeouts[0]=none
10) Flags[0]=DT300
11) (ReturnCodes)
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                          12) Crm:SystemState2(-)
 2) -                             13) LocalFileSystems(-)
 3) SAVE+EXIT                     14) RemoteFileSystems(Rfs_APP1)
 4) -                             15) IpAddresses(-)
 5) ApplicationName=APP1          16) RawDisks(-)
 6) Machines+Basics(app1)         17) RC-VolumeManagement(-)
 7) CommandLines(Cmd_APP1)        18) VERITAS-VolumeManagement(-)
 8) Controllers(-)                19) Netapp(Netapp_APP1)
 9) Crm:Application(-)            20) Gds:Global-Disk-Services(-)
10) Crm:BasicApplication(-)       21) Gls:Global-Link-Services(-)
11) Crm:SystemState3(-)
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 Configuration 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:
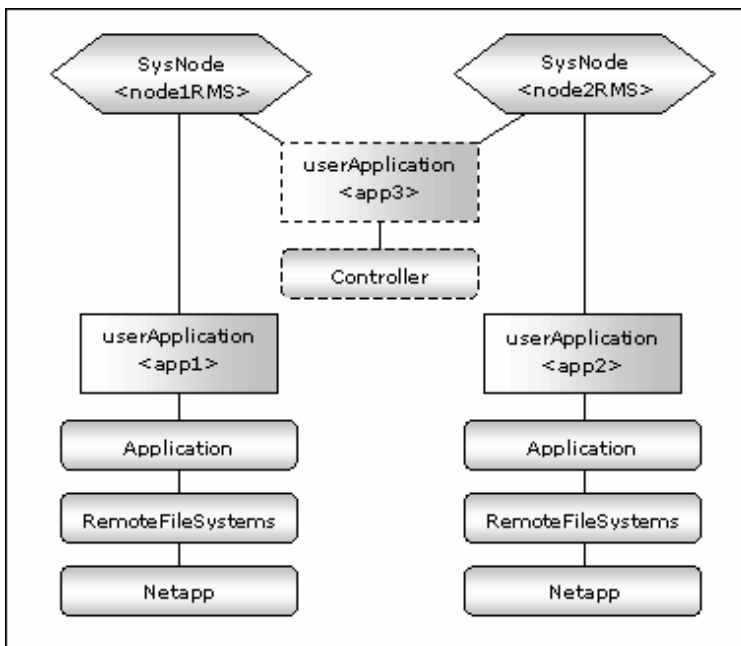
Standby operation

userApplication is configured as follows:
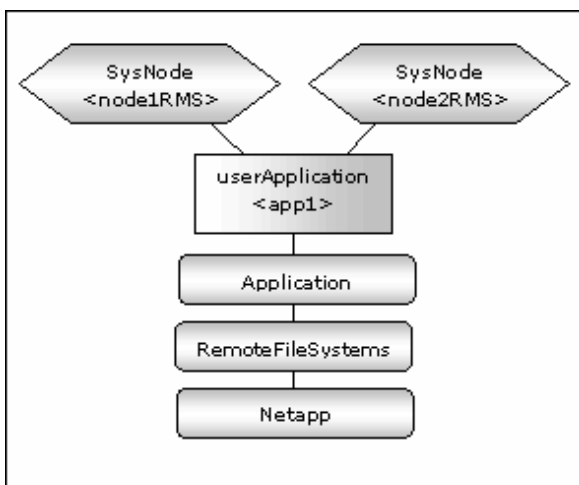
2.6.3 userApplication check

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.

P 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 a 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.

User Application 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>.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 Collect troubleshooting information

The following information is helpful to investigate problems.

PRIMECLUSTER

PRIMECLUSTER Wizard for NAS

- Definition file

  /usr/opt/reliant/etc/hvgdconfig
  /usr/opt/reliant/build/<definition 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 "fjsnap" command. fjsnap is a system information tool, and it comes with the FJSVsnap Package. If an error occurs on a PRIMECLUSER system, the command will collect required information to solve the problem.

  ·

3.3 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.

   ```
   cf giveback
   ```

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

   ```
   cf status
   ```

4. Execute "hvnasenable" command for Netapp resource, and then make sure the Netapp resource status changes from Warning to Online.

   ```
   # /opt/FJSVclnas/sbin/hvnasenable -a
   ```

- 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 *application_name resource_name*

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

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

application_name resource_name

Specify the name of userApplication with resources that discontinue to be monitored.
resource_name
Specify the name of Netapp resources that discontinue to be monitored
Both names should be available on a local node.

-a [*application_name*]

Disables monitoring all the Netapp resources of userApplication that is available on a local node, and is specified in *application_name*.
If it is not specified, hvnasdisable will only stop monitoring all the Netapp resources on the local node.

Exit status

0 : Normal termination
1 : Abnormal termination
2 : Abnormal termination (fails to stop monitoring resources with the -a option)

📖 **Note**

. . . .

- 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 *application_name resource_name*

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

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

application_name resource_name

Specify the name of userApplication with resources that discontinue to be monitored.
resource_name
Specify the name of Netapp resources that discontinue to be monitored
Both names should be available on a local node.

-a [*application_name*]

Restarts monitoring all Netapp resources of userApplication that is available on a local node, and is specified in *application_name*.
If is not specified, hvnasenable will only restart monitoring all the Netapp resources on the local node.

Exit status

0 : Normal termination
1 : Abnormal termination
2 : Abnormal termination (fails to restart monitoring resources with the -a option)

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 "2.4.2 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
 2) QUIT
 3) RETURN
 4) OPTIONS
 5) CRM
 6) DEMO
 7) GENERIC
 8) NETAPP
 9) NETWORKER
10) ORACLE
11) SYMFOWARE
Application Type:8
```

- ExportFlag (included in 4.3A10 or later) described in "2.4.2 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.
  The default value for ExportFlag is "no", and it means Export processing is not executed. If you set it to "no", make sure that setup of NAS is completed and it is enable to mount the NAS volume on cluster nodes.

- 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 a NAS host name in /etc/vfstab.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 name 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" functions 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/vfstab.pcl are replaced with symbolic links to the mount points controlled by PRIMECLUSTER.

![Example icon] Example
. . . .

```
# mount
    :
/opt/SMAW/SMAWRrms/dev/nfs/RMSNFS10103_mountpoint1 on netapp1:/vol/vol2 remote/read/write/setuid/
devices/rstchown/bg/hard/nointr/rsize=32768/wsize=32768/proto=tcp/vers=3/xattr/dev=9cc002c on Sat
Dec 09 16:07:15 2011
/opt/SMAW/SMAWRrms/dev/nfs/RMSNFS10104_mountpoint2 on netapp2:/vol/vol2 remote/read/write/setuid/
devices/rstchown/bg/hard/nointr/rsize=32768/wsize=32768/proto=tcp/vers=3/xattr/dev=9cc002c on Sat
Dec 09 16:07:15 2011
# df -h
Filesystem              Size    Used   Available Capacity   Mounted on
    :
netapp1:/vol/vol2    2.1G   1.6G       522M    76%     /opt/SMAW/SMAWRrms/dev/nfs/
RMSNFS10103_mountpoint1
netapp2:/vol/vol2    2.1G   1.2G       922M    57%     /opt/SMAW/SMAWRrms/dev/nfs/
RMSNFS10104_mountpoint2
# ls -l /mountpoint1
lrwxrwxrwx   1 root     root           55 Dec 09 16:07 /mountpoint1 -> /usr/opt/reliant/dev/nfs/
RMSNFS10103_mountpoint1
# ls -l /mountpoint2
lrwxrwxrwx   1 root     root           55 Dec 09 16:07 /mountpoint2 -> /usr/opt/reliant/dev/nfs/
RMSNFS10104_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.

[Error] [0208/0210] Failed to cancel the NFS locking on the NAS storage (Details *host name*, *NetApp Filer name*)

[Description]

Script failed to cancel the lock on the NAS(*NetApp Filer name*) kept by the host(*host name*).

[Corrective action]

See [Error] [0205] that is previously output and take corrective action.

[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] [1206/1208/1212/1214] Failed to cancel the NFS locking on the NAS storage (Details *host name*, *NetApp Filer name*)

[Description]

Script failed to cancel the lock on the NAS(*NetApp Filer name*) kept by the host(*host name*).

[Corrective action]

See [Error] [0205] that is previously output and take corrective action.

[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.

[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 ping command for the NAS name(*NetApp Filer name)* failed.

[Corrective action]

See "3.3 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]

Ping 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] [2301/2302] 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.

[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 ping command for the NAS name(*NetApp Filer name)* failed.

[Corrective action]

See "3.3 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]

Ping 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 a 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 a 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 or Multilink Ethernet.

A.1 NIC switching mode

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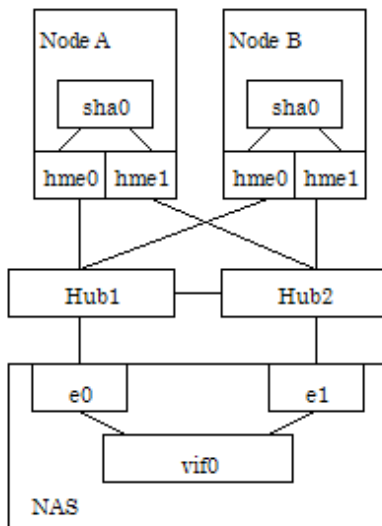
The details will be given later in this document.

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 Configuration 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.

A.2 Multilink Ethernet

In Multilink Ethernet, a cluster configuration is as follows:
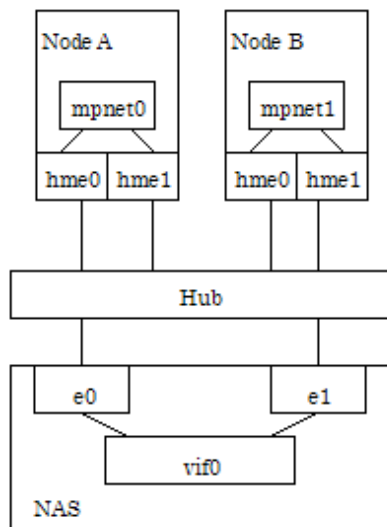
The details will be given later in this document.

Note

When you use a Multilink Ethernet method, Hub must support this method.

A.2.1 NAS configuration

When you use Multilink Ethernet on NAS, it is necessary to create a multi-type virtual interface from multiple interfaces by executing the following command on NAS;

```
vif create multi <virtual interface name> -b [rr|mac|ip] <interface1>, <interface2>, …
```

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

The value -b indicates load balancing. rr indicates round-robin distribution mode, mac indicates a MAC address, and ip indicates an IP address. Specify proper values according to the environment.

Example

```
vif creates multi vif0 -b ip e0,e1
```

The virtual interface is created with the above command. If NAS is restarted, the virtual interface will be lost. Using the following steps, it is necessary to set /etc/rc that a virtual interface is automatically created during NAS restart:

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. The ifconfig sets up an actual interface in /etc/rc of NAS. Then, give a commentary # to the ifconfig, and add a new ifconfig line for the virtual interface.

Example

```
vif create multi vif0 -b ip 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.2.2 GLS (Multilink Ethernet) configuration

Set up Multilink Ethernet method using GLS referring to "Chapter3 Configuration" of the "PRIMECLUSTER Global Link Services Configuration and Administration:Multipath Function".

1. Register an IP and host name in /etc/hosts. In scalable operation, register an IP and host name in /etc/hosts of all the nodes.

2. Set up mpnet0 for standby operation and mpnet0, mpnet1, … for scalable operation when editing /etc/opt/FJSVmpnet/conf/config. For scalable operation, all the mpnet interface setup should be the same.

Example

```
mpnet0 ether hme0:hme1
mpnet1 ether hme0:hme1
```

3. Specify 1 for func-mode when editing /etc/opt/FJSVmpnet/conf/parameters. For trunk-mode, use the same load balancing as NAS.

📝 **Example**
. . . .
```
mpnet0 -:1:2
mpnet1 -:1:2
```
. . . .

4. Specify the host name that is registered at 1. in /etc/opt/FJSVmpnet/conf/hosts. This is used for the mpnet interface. For scalable operation, register all the mpnet interfaces.

📝 **Example**
. . . .
```
mpnet0 node1mpnet
mpnet1 node2mpnet
```
. . . .

5. Execute the "/opt/FJSVmpnet/cluster/bin/mpnet_copyfile -a" command and distribute the configuration file to all the nodes.

6. Execute the "/opt/FJSVmpnet/cluster/bin/mpnet_addrid -d mpnet interface name" command on each node and register resources. For standby operation, specify mpnet0 for the mpnet interface name. For scalable operation, specify a mpnet interface that is used for each node.

A.2.3 GLS configuration with Gls Wizard

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

1. Select Gls:Crm-MPNET in the NETAPP turnkey wizard.

2. Select AdditionalResource in the Crm wizard selection menu.

3. Select the MPNET resource for the mpnet interface in a list of resources.

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 command. When ping 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 PRIMECLUSTER Wizard for NAS.

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.
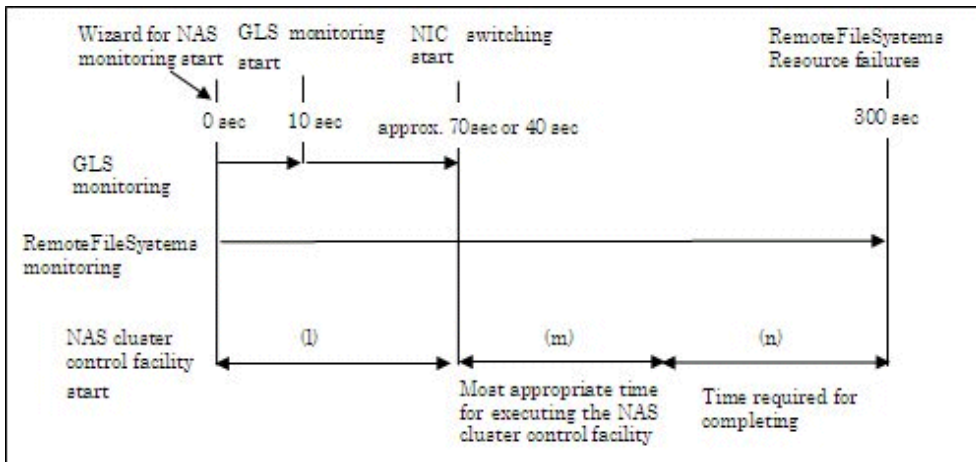   In a word, it becomes like the next expression.

   > 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:

Wizard for NAS   GLS monitoring   NIC switching   RemoteFileSystems
monitoring start   start   start   Resource failures

0 sec   10 sec   approx. 70sec or 40 sec   300 sec

GLS
monitoring

RemoteFileSystems
monitoring

NAS cluster
control facility   (l)   (m)   (n)
start
                                    Most appropriate time   Time required for
                                    for executing the NAS   completing
                                    cluster control facility

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 PRIMECLUSTER Wizard for NAS Configuration for ping command

Default value is following:

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