

FUJITSU Software

PRIMECLUSTER Wizard for NAS 4.5

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

Configuration and Administration Guide

Oracle Solaris

J2S0-0464-01ENZ0(00)
April 2017

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 NAS device (NetApp Filer and ETERNUS DX series).

Outline

The document consists of the following 6 chapters and 4 appendices:

- Chapter 1 Feature
- Chapter 2 Environment Configuration
- Chapter 3 Operation
- Chapter 4 Command
- Chapter 5 Notice
- Chapter 6 Messages
- Appendix A How to configure GLS
- Appendix B Turning of the control facility for the NetApp Filer-Cluster
- Appendix C Adding an Oracle resource and a NetWorker resource
- Appendix D Deleting a userApplication including a NAS resource

Technical term

For technical words related to clusters in this document, see the manual.

The following is explanation of the term of the NAS device used in this document.

- NetApp Filer
The Data ONTAP that operates on NetApp Filer has two types (7-Mode and cDOT(clustered Data ONTAP)).
The NetApp Filer that operates by Data ONTAP of 7-Mode is referred to as "NetApp Filer(7-Mode)".
The NetApp Filer that operates by clustered Data ONTAP is referred to as "NetApp Filer(cDOT)".
When "NetApp Filer(7-Mode)" and "NetApp Filer(cDOT)" are not distinguished, referred to as "NetApp Filer".
- ETERNUS DX series
Referred to as "ETERNUS DX", or "ETERNUS DX device" in this document.
- NAS device
When "NetApp Filer" and "ETERNUS DX series" are not distinguished, referred to as "NAS device".

Notational convention

The document conforms to the following notational conventions:



.....
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.

Export Controls

Exportation/release of this document may require necessary procedures in accordance with the regulations of your resident country and/or US export control laws.

Trademarks

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

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 are the property of their respective owners.

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

Requests

- No part of this document may be reproduced or copied without permission of FUJITSU LIMITED.
- The contents of this document may be revised without prior notice.

Date of publication and edition

Date of publication and edition	Manual code
April 2017, First edition	J2S0-0464-01ENZ0(00)/J2S0-0464-01ENZ2(00)

Copyright

Copyright FUJITSU LIMITED 2017

Contents

Chapter 1 Feature.....	1
1.1 Feature outline.....	1
1.2 Operating environment.....	2
Chapter 2 Environment Configuration.....	4
2.1 Configuration procedure.....	4
2.2 PRIMECLUSTER installation and configuration.....	4
2.3 PRIMECLUSTER Wizard for NAS installation.....	4
2.4 NAS configuration.....	5
2.5 userApplication and NAS resource.....	6
2.5.1 /etc/vfstab.pcl setup.....	6
2.5.2 userApplication creation.....	7
2.5.3 NAS resource creation (NetApp Filer(7-Mode) is used).....	10
2.5.4 NAS resource creation (NetApp Filer(cDOT) is used).....	15
2.5.5 NAS resource creation (ETERNUS DX is used).....	21
2.5.6 RemoteFileSystems resource creation.....	24
2.5.7 Addition of other resources.....	26
2.5.8 userApplication resource creation (scalable).....	26
2.5.9 Enabling resources.....	27
2.5.10 userApplication operation check.....	28
2.6 User application installation onto NAS.....	28
2.7 Creation/configuration of application resources.....	28
2.7.1 Creation of Online/Offline script.....	28
2.7.2 Configure userApplication.....	29
2.7.3 userApplication check.....	32
Chapter 3 Operation.....	34
3.1 Corrective action during failover.....	34
3.2 NAS device Maintenance.....	35
3.3 Collect troubleshooting information.....	36
3.4 Recovery sequence after control facility of the NetApp Filer-Cluster.....	36
Chapter 4 Command.....	38
4.1 hvnasdisable - Discontinue monitoring resource.....	38
4.2 hvnasenable - Restart monitoring resource.....	38
4.3 clnasdpxreset - Preconfigure command for ETERNUS DX.....	39
Chapter 5 Notice.....	41
Chapter 6 Messages.....	43
Appendix A How to configure GLS.....	48
A.1 NIC switching mode.....	48
A.1.1 NAS configuration.....	48
A.1.2 GLS (NIC switching) configuration.....	49
A.1.3 GLS configuration with Gls Wizard.....	49
A.2 Multilink Ethernet.....	49
A.2.1 NAS configuration.....	50
A.2.2 GLS (Multilink Ethernet) configuration.....	51
A.2.3 GLS configuration with Gls Wizard.....	52
Appendix B Turning of the control facility for the NetApp Filer-Cluster.....	53
Appendix C Adding a Oracle resource and a NetWorker resource.....	55
Appendix D Deleting a userApplication including a NAS resource.....	57

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 and ETERNUS DX series.

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	PRIMECLUSTER Wizard for NAS releases the file lock of the NAS device.
Monitoring the NetApp Filer-Cluster	In the NetApp Filer-Cluster in which the controller is made double with two NetApp Filer devices, the failover of the NetApp Filer-Cluster is done even when data cannot be accessed by the network failure between the cluster node and the NetApp Filer 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, scripts automatically control the export/unexport of the Netapp Filer(7-Mode) volume. When NetApp Filer(cDOT) or ETERNUS DX device is used, do not control the export/unexport.

Releases the file lock

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 NetApp Filer-Cluster (Control facility for the NetApp Filer-Cluster)

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

Setup and Operation Commands

PRIMECLUSTER Wizard for NAS provides auxiliary commands to discontinue or restart monitoring resource and command to set up ETERNUS DX beforehand. For details, refer to "[Chapter 4 Command](#)".

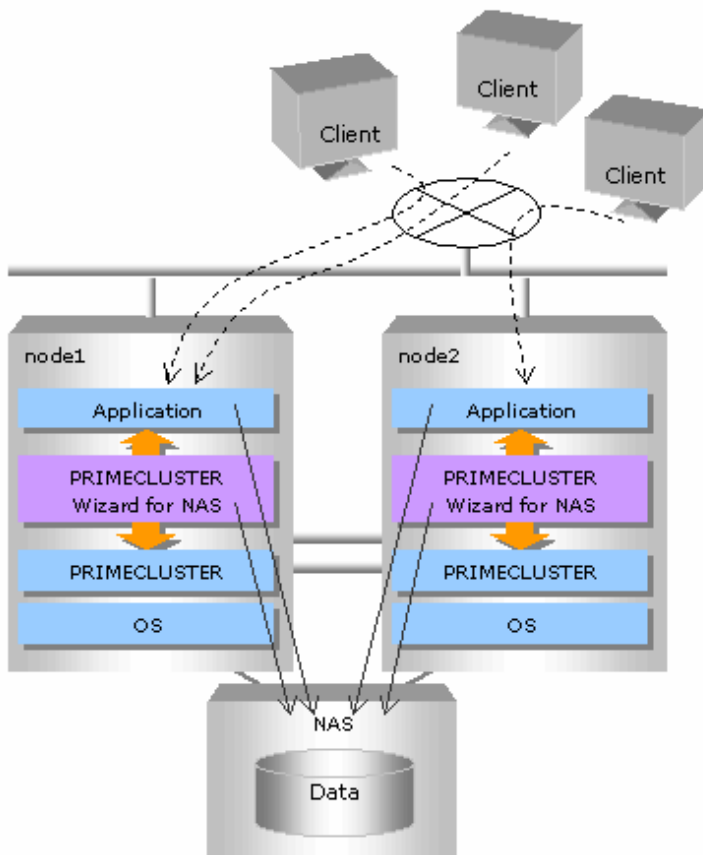


See

.....
If you need a recovery of the NetApp Filer-Cluster after its failover, refer to "[3.4 Recovery sequence after control facility of the NetApp Filer-Cluster](#)".
.....

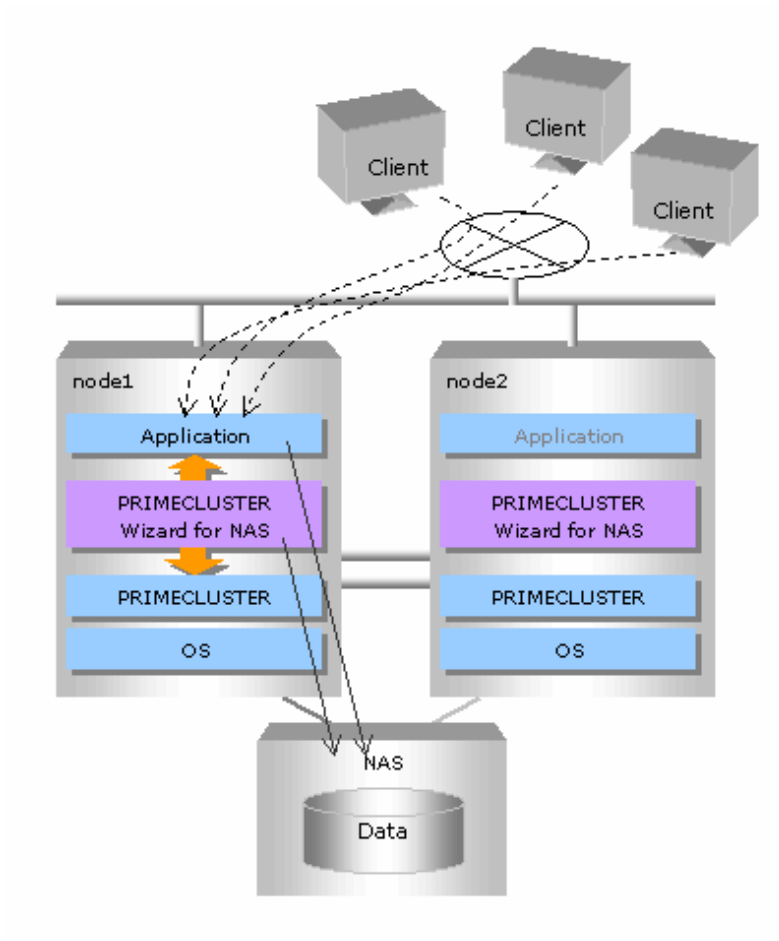
1.2 Operating environment

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, NAS 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
- PRIMECLUSTER Clustering Base

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. The host name of NAS device is required when the environment of the PRIMECLUSTER Wizard for NAS is configured.

Information

In NetApp Filer(cDOT), there are two kinds of host names for the data access and for management. The host names are required when the environment of the PRIMECLUSTER Wizard for NAS is configured.

Volume creation

Create a volume or a 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

You need to register a NAS host name and an IP address in the "/etc/hosts" file of the cluster node. Confirm the cluster node can access the NAS device after registration.

When NetApp Filer(7-Mode) is used, you must specify the same host name as that of the cluster node in the "/etc/hosts" file of NAS. If the name is different, the file lock might not be properly controlled.

When the control facility for the NetApp Filer-Cluster with NetApp Filer(cDOT) is used, register the node name(specified by storage failover takeover command of NetApp Filer(cDOT)) as management host name for PRIMECLUSTER Wizard for NAS in the "/etc/hosts" file of the cluster node. If the name is different, the control facility for the NetApp Filer-Cluster does not work.

Port setting of the ETERNUS DX device (only when ETERNUS DX device is used)

When ETERNUS DX device is used, it is necessary to open the port used with PRIMECLUSTER according to the following procedures.

1. login CLI of the ETERNUS DX device.
2. The CLI command of the ETERNUS DX device is executed, and the port of PRIMECLUSTER is opened.

```
CLI>set nas-port -port <ports> -primecluster open
```

See

Refer to "ETERNUS CLI User's Guide" for CLI command of the ETERNUS DX device.

SSH setup

This product uses the SSH 2.0 protocol to control the NAS. Setup the SSH 2.0 protocol that uses the public key authentication to cluster node and NAS. It is necessary to be able to connect from cluster node to NAS without the password.

For details about setup procedure, refer to a manual of NAS.

After setup, confirm the command can be executed by using ssh without the password from cluster node to NAS.

When the ETERNUS DX device is used, execute the command of "[4.3 clnasdxpreset - Preconfigure command for ETERNUS DX](#)" on all nodes included in the cluster.

```
<NetApp Filer(7-Mode) is used>
# /usr/bin/ssh -2 nas1 date
Mon Jan 19 13:45:30 JST 2015
```

```

<NetApp Filer(cDOT) is used>
# /usr/bin/ssh -2 -l admin cdot1 date
Node      Date              Time zone
-----
cdot1
           Wed May 20 17:01:32 2015 Japan
cdot2
           Wed May 20 17:01:32 2015 Japan
2 entries were displayed.

```

```

<ETERNUS DX device is used>
# /opt/FJSVclnas/sbin/clnasdpxpreset dxs31
Presetting OK.
# /usr/bin/ssh -2 dxs31 date
Mon Jan 19 13:45:30 JST 2015

```

exportfs setup(NetApp Filer(7-Mode) is used)

Set up exportfs using the following steps.

1. Mount the "/vol/vol0" volume on the NetApp Filer(7-Mode) management server.
2. Register a volume name or a qtree name of NetApp Filer(7-Mode) and names of cluster nodes that access to the volume on the "/etc/exports" file of NetApp Filer(7-Mode).

2.5 userApplication and NAS resource

2.5.1 /etc/vfstab.pcl setup

Set up a NAS volume or a qtree.

1. Make the directories of the mount points. 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 in /etc/vfstab.pcl.

```

<NetApp Filer(7-Mode) or ETERNUS DX is used>
#RMS#<NAS host name:NAS volume or qtree name> - <mount point> nfs - no <option>

```

```

<NetApp Filer(cDOT) is used>
#RMS#<NAS host name(for the data access):NAS volume or qtree name> - <mount point> nfs - no
<option>

```

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

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

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

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

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

```
rw,bg,hard,nointr,rsize=32768,wsiz=32768,proto=tcp6,forcedirectio,vers=3
```

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

```
rw,bg,hard,nointr,rsize=32768,wsiz=32768,proto=tcp6,noac,vers=3
```

Example

```
<Standby operation using NAS device with IPv4 address case>  
#RMS#netappl:/vol/voll - /mountpoint1 nfs - no  
rw,bg,hard,nointr,rsize=32768,wsiz=32768,proto=tcp,forcedirectio,vers=3
```

```
<Standby operation using NAS device with IPv6 address case>  
#RMS#netappl:/vol/voll - /mountpoint1 nfs - no  
rw,bg,hard,nointr,rsize=32768,wsiz=32768,proto=tcp,forcedirectio,vers=3
```

Information

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

2.5.2 userApplication creation

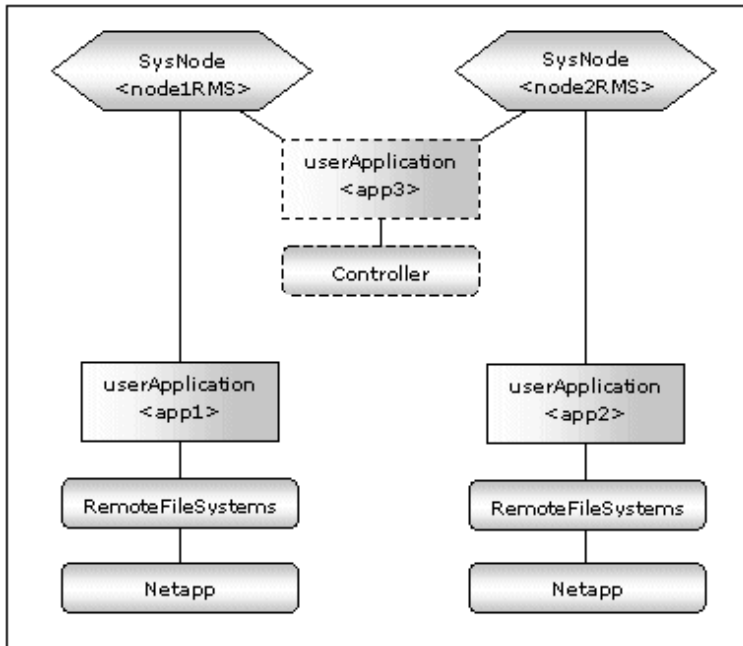
Create userApplication and NAS resources using the RMS Configuration Wizard, which is the CUI configuration wizard.

See

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

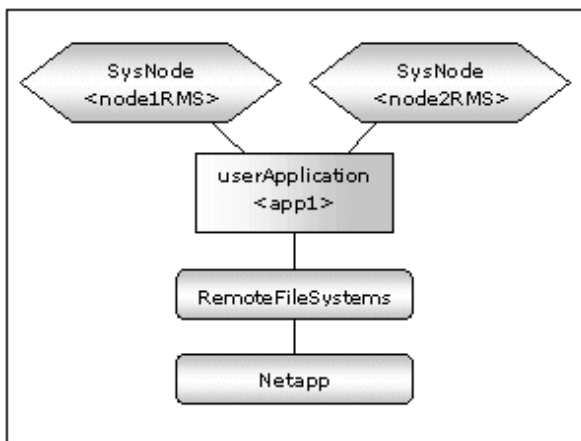
Scalable operation

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 <RMS configuration name>
```

You can specify any configuration 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
2) QUIT
3) Application-Create
4) Application-Edit
10) Configuration-Remove
11) Configuration-Freeze
12) Configuration-Thaw
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 NAS. When the environment definition file made with PRIMECLUSTER Wizard for NAS 4.2A30/4.3A10/4.3A20 is continuously used, NETAPP is used.

```

Creation: Application type selection menu:
1) HELP
2) QUIT
3) RETURN
4) OPTIONS
5) CRM
6) DEMO
7) GENERIC
8) NAS
9) NETAPP
10) SYMFOWARE
Application Type: 8

```

3. Select Machines+Basics.

```

Settings of turnkey wizard "NAS"
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 (appl: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. The other attributes not described below are optional.

- 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.

Register the NAS resource by the following procedures. The NAS resource registration procedure is different according to the NAS device used. When NetApp Filer(7-Mode) is used, refer to "[2.5.3 NAS resource creation \(NetApp Filer\(7-Mode\) is used\)](#)". When NetApp Filer(cDOT) is used, refer to "[2.5.4 NAS resource creation \(NetApp Filer\(cDOT\) is used\)](#)". When ETERNUS DX device is used, refer to "[2.5.5 NAS resource creation \(ETERNUS DX is used\)](#)".

2.5.3 NAS resource creation (NetApp Filer(7-Mode) is used)

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

```
Settings of turnkey wizard "NAS"
1) HELP
2) -
3) SAVE+EXIT
4) -
5) ApplicationName=APP1
6) Machines+Basics(app1)
7) CommandLines(-)
8) Controllers(-)
9) Crm:Application(-)
10) Crm:BasicApplication(-)
11) Crm:SystemState3(-)
12) Crm:SystemState2(-)
13) LocalFileSystems(-)
14) RemoteFileSystems(-)
15) IpAddresses(-)
16) RawDisks(-)
17) RC-VolumeManagement(-)
18) VERITAS-VolumeManagement(-)
19) Netapp(-)
20) Eternusdx(-)
21) Gds:Global-Disk-Services(-)
22) Gls:Global-Link-Services(-)
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) AdditionalUnlockMachines
7) (PreOnlineScript=)
8) (PostOnlineScript=)
9) (PreOfflineScript=)
10) (PostOfflineScript=)
11) (FaultScript=)
12) 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
9) Mode=7-Mode
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) Mode=7-Mode
10) 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. 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)
Mode	When NetApp Filer(7-Mode) is used, set to "7-Mode". When NetApp Filer(cDOT) is used, set to "cDOT". You have to set "7-Mode". Default: 7-Mode (7-Mode, cDOT)

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

You return to the Netapp Wizard. If you want to add any further NAS device, select AdditionalNetAppFiler. When NetApp Filer(7-Mode) is used, do not select AdditionalUnlockMachines.

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) AdditionalUnlockMachines
8) (PreOnlineScript=)
9) (PostOnlineScript=)
10) (PreOfflineScript=)
11) (PostOfflineScript=)
12) (FaultScript=)
13) NetappClusterFlag=no
Choose the setting to process:

```

Attributes	Description
PreOnlineScript	Executed before Online processing.
PostOnlineScript	Executed after Online processing.
PreOfflineScript	Executed before Offline processing.

Attributes	Description
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 Configuration and Administration Guide".

9. Next, it is set for PRIMECLUSTER to control the NetApp Filer cluster if necessary. If you do not use the NetApp Filer cluster, you can skip Step 9, Step 10 and Step 11. 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 NetApp Filer-Cluster.

Selects NetappClusterFlag for monitoring the NetApp Filer-Cluster.

```

Netapp (Netapp_APP1:consistent)
 1) HELP
 2) -
 3) SAVE+EXIT
 4) REMOVE+EXIT
 5) AdditionalNetAppFiler
 6) NetAppFiler[0]=netappl
 7) AdditionalUnlockMachines
 8) (PreOnlineScript=)
 9) (PostOnlineScript=)
10) (PreOfflineScript=)
11) (PostOfflineScript=)
12) (FaultScript=)
13) NetappClusterFlag=no
Choose the setting to process: 13

```

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



Note

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

10. If you use NetApp Filer-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
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalNetAppFiler
6) NetAppFiler[0]=netapp1
7) AdditionalUnlockMachines
8) (PreOnlineScript=)
9) (PostOnlineScript=)
10) (PreOfflineScript=)
11) (PostOfflineScript=)
12) (FaultScript=)
13) NetappClusterFlag=yes
14) NetappClusterDeviceName=
15) NetappClusterManagementDeviceName=
16) NetappClusterPingCount=10
17) NetappClusterPingTimeout=5
18) 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
NetappClusterManagementDeviceName	Do not set when you use NetApp Filer(7-Mode).
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**

These attributes is set for each userApplication.

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.

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 NetApp Filer-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) AdditionalUnlockMachines
8) (PreOnlineScript=)
    
```

```

 9) (PostOnlineScript=)
10) (PreOfflineScript=)
11) (PostOfflineScript=)
12) (FaultScript=)
13) NetappClusterFlag=yes
14) NetappClusterDeviceName=netapp1:netapp2
15) NetappClusterManagementDeviceName=
16) NetappClusterPingCount=10
17) NetappClusterPingTimeout=5
18) NetappClusterPingInterval=5
Choose the setting to process: 3

```

2.5.4 NAS resource creation (NetApp Filer(cDOT) is used)

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

```

Settings of turnkey wizard "NAS"
 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) Eternusdx(-)
10) Crm:BasicApplication(-)             21) Gds:Global-Disk-Services(-)
11) Crm:SystemState3(-)                 22) Gls:Global-Link-Services(-)
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) AdditionalUnlockMachines
 7) (PreOnlineScript=)
 8) (PostOnlineScript=)
 9) (PreOfflineScript=)
10) (PostOfflineScript=)
11) (FaultScript=)
12) NetappClusterFlag=no
Choose the setting to process: 5

```

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

```

 1) HELP
 2) RETURN
 3) FREECHOICE
Set an additional NetApp Filer: 3
    >> netapp2

```

4. When the following menu is displayed, select AdditionalExportpoint. The volume name or qtree is required.

```

1) HELP
2) NO-SAVE+RETURN
3) -
4) AdditionalExportpoint
5) UnLockFlag=always
6) ExportFlag=no
7) UnExportFlag=no
8) ScriptTimeout=300
9) Mode=7-Mode
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/vol2
    
```

6. The following menu is displayed.

```

1) HELP
2) NO-SAVE+RETURN
3) SAVE+RETURN
4) AdditionalExportpoint
5) UnLockFlag=always
6) ExportFlag=no
7) UnExportFlag=no
8) ScriptTimeout=300
9) Mode=cDOT
10) ManagementNodeName=
11) Exportpoint[0]=/vol/vol2
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	Set to "no".
UnExportFlag	Set to "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)
Mode	When NetApp Filer(7-Mode) is used, set to "7-Mode". When NetApp Filer(cDOT) is used, set to "cDOT". You have to set "cDOT". Default: 7-Mode (7-Mode, cDOT)
ManagementNodeName	Specify the NAS device name (for the management).

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

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

8. Internet Protocol address information on a server necessary to unlock is set. The hostname and Internet Protocol address of the cluster server (for the data access) are set. Select AdditionalUnlockMachines.

```
Netapp (Netapp_APP1:not yet consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalNetAppFiler
6) NetAppFiler[0]=netapp2
7) AdditionalUnlockMachines
8) (PreOnlineScript=)
9) (PostOnlineScript=)
10) (PreOfflineScript=)
11) (PostOfflineScript=)
12) (FaultScript=)
13) NetappClusterFlag=no
Choose the setting to process: 7
```

9. The cluster server name is selected.

```
1) HELP
2) RETURN
3) FREECHOICE
4) node1
5) node2
Set an additional UnlockMachine Name: 4
```

10. When Internet Protocol address to the hostname is IPv4 address, "Ipv4address=" is selected. When Internet Protocol address to the hostname is IPv6 address, "Ipv6address=" is selected. It is also possible to set both. Procedure 11. and 12., it is a procedure of the IPv4 address.

```
1) HELP
2) NO-SAVE+RETURN
3) -
4) Ipv4address=
5) Ipv6address=
Choose the setting to process: 4
```

11. When the following menu is displayed, select FREECHOICE and enter IPv4 address.

```
Setting item : Ipv4address=
1) HELP
2) NONE
3) RETURN
4) FREECHOICE
Set an appropriate ipaddress of the unlock machines: 4
>> 192.168.246.10
```

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

```

1) HELP
2) NO-SAVE+RETURN
3) SAVE+RETURN
4) Ipv4address= 192.168.246.10
5) Ipv6address=
Choose the setting to process: 3

```

13. Internet Protocol address of other node (node2) is set. Repeat from Step 8 to Step 12.

```

Netapp (Netapp_APP1:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalNetAppFiler
6) NetAppFiler[0]=netapp2
7) AdditionalUnlockMachines
8) UnlockMachinesName[0]=node1
9) UnlockMachinesName[1]=node2
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (PostOfflineScript=)
14) (FaultScript=)
15) NetappClusterFlag=no
Choose the setting to process:

```

14. 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]=netapp2
7) AdditionalUnlockMachines
8) UnlockMachinesName[0]=node1
9) UnlockMachinesName[1]=node2
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (PostOfflineScript=)
14) (FaultScript=)
15) 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 Configuration and Administration Guide".

- Next, it is set for PRIMECLUSTER to control the NetApp Filer cluster if necessary. If you do not use the NetApp Filer cluster, you can skip Step 15, Step 16 and Step 17. 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 (storage failover takeover) of the NetApp Filer-Cluster.

Selects NetappClusterFlag for monitoring the NetApp Filer-Cluster.

```

Netapp (Netapp_APP1:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalNetAppFiler
6) NetAppFiler[0]=netapp2
7) AdditionalUnlockMachines
8) UnlockMachinesName[0]=node1
9) UnlockMachinesName[1]=node2
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (PostOfflineScript=)
14) (FaultScript=)
15) NetappClusterFlag=no
Choose the setting to process: 15

```

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



Note

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

- If you use NetApp Filer-Cluster, select yes.

```

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

```

17. Set parameters.

```

Netapp (Netapp_APP1:not yet consistent)
1) HELP                                11) (PostOnlineScript=)
2) -                                    12) (PreOfflineScript=)
3) SAVE+EXIT                            13) (PostOfflineScript=)
4) REMOVE+EXIT                          14) (FaultScript=)
5) AdditionalNetAppFiler                 15) NetappClusterFlag=yes
6) NetAppFiler[0]=netapp2                16) NetappClusterDeviceName=
7) AdditionalUnlockMachines              17) NetappClusterManagementDeviceName=
8) UnlockMachinesName[0]=node1           18) NetappClusterPingCount=10
9) UnlockMachinesName[1]=node2           19) NetappClusterPingTimeout=5
10) (PreOnlineScript=)                   20) NetappClusterPingInterval=5
Choose the setting to process:
    
```

Attributes	Description
NetappClusterDeviceName	The NAS device name (for the data access) is specified. Delimit by ":" and specify two NAS device names. example: netapp1:netapp2
NetappClusterManagementDeviceName	The NAS device name (for the management) is specified. Delimit by ":" and specify two NAS device names in order of the "NetappClusterDeviceName". example: netapp1-MNG:netapp2-MNG
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**

These attributes is set for each userApplication.

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.

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 NetApp Filer-Cluster](#)" for the parameter of the ping command.

18. 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]=netapp2
7) AdditionalUnlockMachines
8) UnlockMachinesName[0]=node1
9) UnlockMachinesName[1]=node2
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (PostOfflineScript=)
14) (FaultScript=)
15) NetappClusterFlag=yes
16) NetappClusterDeviceName=netapp1:netapp2
17) NetappClusterManagementDeviceName=netapp1-MNG:netapp2-MNG
18) NetappClusterPingCount=10
19) NetappClusterPingTimeout=5
20) NetappClusterPingInterval=5
Choose the setting to process: 3

```

2.5.5 NAS resource creation (ETERNUS DX is used)

1. When you return to the NAS turnkey wizard, select Eternusdx.

```

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

```

2. When the Eternusdx wizard is displayed, select AdditionalEternusdx.

```

Eternusdx (Eternusdx_APP1:not yet consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalEternusdx
6) AdditionalUnlockMachines
7) (PreOnlineScript=)
8) (PostOnlineScript=)
9) (PreOfflineScript=)
10) (PostOfflineScript=)
11) (FaultScript=)
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 Eternusdx Name: 3
>> dx1
```

4. The following menu is displayed.

```
1) HELP
2) NO-SAVE+RETURN
3) SAVE+RETURN
4) UnLockFlag=always
5) ScriptTimeout=300
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 NAS resource failure and a node with the NAS resource is down. Selecting "nodedown" enables Unlock processing only when the node with the NAS resource is down. Default: always (always, nodedown)
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)

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

You return to the Eternusdx Wizard. If you want to add any further NAS device, select AdditionalEternusdx.

6. Internet Protocol address information on a server necessary to unlock is set. The hostname and Internet Protocol address of the cluster server (for the data access) are set. Select AdditionalUnlockMachines.

```
Eternusdx (Eternusdx_APPL:not yet consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalEternusdx
6) EternusdxName[0]=dx1
7) AdditionalUnlockMachines
8) (PreOnlineScript=)
9) (PostOnlineScript=)
10) (PreOfflineScript=)
11) (PostOfflineScript=)
12) (FaultScript=)
Choose the setting to process: 7
```

7. The cluster server name is selected.

```
1) HELP
2) RETURN
3) FRECHOICE
4) node1
5) node2
Set an additional UnlockMachine Name: 4
```

8. When Internet Protocol address to the hostname is IPv4 address, "Ipv4address=" is selected. When Internet Protocol address to the hostname is IPv6 address, "Ipv6address=" is selected. It is also possible to set both. Procedure 9. and 10., it is a procedure of the IPv4 address.

```
1) HELP
2) NO-SAVE+RETURN
3) -
4) Ipv4address=
5) Ipv6address=
Choose the setting to process: 4
```

9. When the following menu is displayed, select FREECHOICE and enter IPv4 address.

```
Setting item : Ipv4address=
1) HELP
2) NONE
3) RETURN
4) FREECHOICE
Set an appropriate ipaddress of the unlock machines: 4
  >> 192.168.246.10
```

10. When the setting is completed, SAVE+RETURN is selected.

```
1) HELP
2) NO-SAVE+RETURN
3) SAVE+RETURN
4) Ipv4address= 192.168.246.10
5) Ipv6address=
Choose the setting to process: 3
```

11. Internet Protocol address of other node (node2) is set. Repeat from Step 6 to Step 10.

```
Eternusdx (Eternusdx_APPL:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalEternusdx
6) EternusdxName[0]=dx1
7) AdditionalUnlockMachines
8) UnlockMachinesName[0]=node1
9) UnlockMachinesName[1]=node2
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (PostOfflineScript=)
14) (FaultScript=)
Choose the setting to process:
```

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

```
Eternusdx (Eternusdx_APPL:consistent)
1) HELP
2) -
3) SAVE+EXIT
```

```

4) REMOVE+EXIT
5) AdditionalEternusdx
6) EternusdxName[0]=dx1
7) AdditionalUnlockMachines
8) UnlockMachinesName[0]=node1
9) UnlockMachinesName[1]=node2
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (PostOfflineScript=)
14) (FaultScript=)
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 Configuration and Administration Guide".

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

```

Eternusdx (Eternusdx_APP1:consistent)
1) HELP
2) -
3) SAVE+EXIT
4) REMOVE+EXIT
5) AdditionalEternusdx
6) EternusdxName[0]=dx1
7) AdditionalUnlockMachines
8) UnlockMachinesName[0]=node1
9) UnlockMachinesName[1]=node2
10) (PreOnlineScript=)
11) (PostOnlineScript=)
12) (PreOfflineScript=)
13) (PostOfflineScript=)
14) (FaultScript=)
Choose the setting to process: 3

```

2.5.6 RemoteFileSystems resource creation

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

```

Settings of turnkey wizard "NAS"
1) HELP
12) Crm:SystemService2(-)

```

```

2) -
3) SAVE+EXIT
4) -
5) ApplicationName=APP1
6) Machines+Basics(appl)
7) CommandLines(-)
8) Controllers(-)
9) Crm:Application(-)
10) Crm:BasicApplication(-)
11) Crm:SystemState3(-)
13) LocalFileSystems(-)
14) RemoteFileSystems(-)
15) IpAddresses(-)
16) RawDisks(-)
17) RC-VolumeManagement(-)
18) VERITAS-VolumeManagement(-)
19) Netapp(Netapp_APP1)
20) Eternusdx(-)
21) Gds:Global-Disk-Services(-)
22) Gls:Global-Link-Services(-)
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
```

2.5.7 Addition of other resources

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

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

When it is complete, select SAVE+EXIT



See

.....
 If you create userApplication resources using Global Link Services (hereinafter 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](#)".

2.5.8 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 2.5.2 - 2.5.7.
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 "PRIMECLUSTER Installation and Administration Guide".

2.5.9 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

```

2.5.10 userApplication operation check

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

- NAS device

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.



.....
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 Configuration and Administration Guide](#)".
.....

2.7 Creation/configuration of application resources

Register the resources for user applications in userApplication that is created at "[2.5 userApplication and NAS resource](#)".



.....
PRIMECLUSTER Wizard for Oracle is used

- Create Oracle resources referring to the "[PRIMECLUSTER Wizard for Oracle Configuration and Administration Guide](#)".
 - 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 used to stop a user application or clear the FAULT state.



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.



For Online/Offline scripts, see "PRIMECLUSTER Installation and Administration Guide"

2.7.2 Configure userApplication

Start RMS Configuration Wizard

Start the RMS Configuration 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 Configuration Wizard is displayed. Select Application-Edit

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

```
Settings of turnkey wizard "NAS"
1) HELP
2) -
3) SAVE+EXIT
4) -
5) ApplicationName=APP1
6) Machines+Basics(appl)
7) CommandLines(-)
8) Controllers(-)
9) Crm:Application(-)
10) Crm:BasicApplication(-)
11) Crm:SystemState3(-)
12) Crm:SystemState2(-)
13) LocalFileSystems(-)
14) RemoteFileSystems(Rfs_APP1)
15) IpAddresses(-)
16) RawDisks(-)
17) RC-VolumeManagement(-)
18) VERITAS-VolumeManagement(-)
19) Netapp(Netapp_APP1)
20) Eternusdx(-)
21) Gds:Global-Disk-Services(-)
22) 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
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 "[2.7.1 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 NAS turnkey wizard. Create or edit other userApplication resources if necessary. When it is completed, select SAVE+EXIT.

```

Settings of turnkey wizard "NAS"
1) HELP
2) -
3) SAVE+EXIT
4) -
5) ApplicationName=APP1
6) Machines+Basics(app1)
7) CommandLines(Cmd_APP1)
8) Controllers(-)
9) Crm:Application(-)
10) Crm:BasicApplication(-)
11) Crm:SystemState3(-)
12) Crm:SystemState2(-)
13) LocalFileSystems(-)
14) RemoteFileSystems(Rfs_APP1)
15) IpAddresses(-)
16) RawDisks(-)
17) RC-VolumeManagement(-)
18) VERITAS-VolumeManagement(-)
19) Netapp(Netapp_APP1)
20) Eternusdx(-)
21) Gds:Global-Disk-Services(-)
22) 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 Configuration Wizard. Select Configuration-Generate, and then Configuration-Activate, and enables the configuration. When it is done, select QUIT.

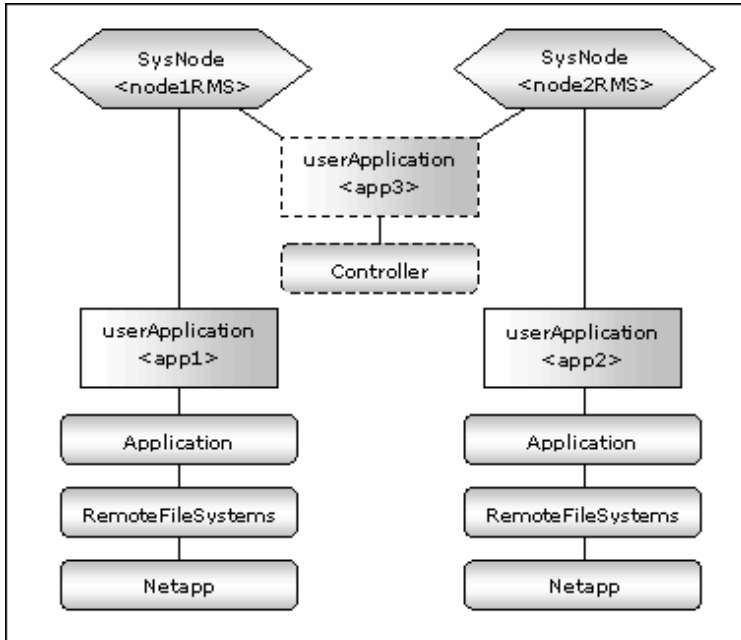
```

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

```

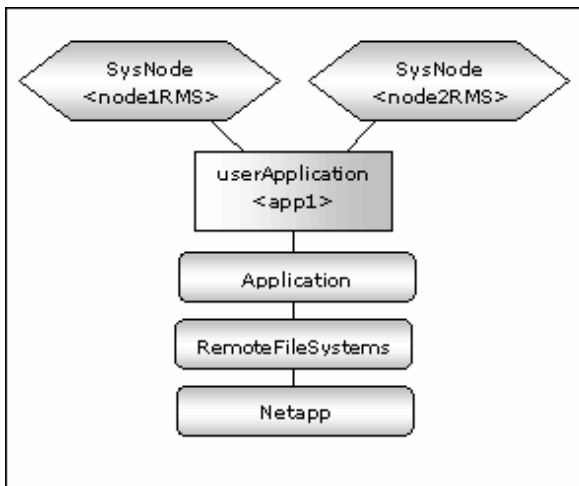
Scalable operation

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 device

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).

- User application

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 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.

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 device name>.log
```

The format of the log file is as follows:

```
date/command name/category/ID/text
2014/12/27 17:11:24 : FJSVclnas [Info] [0108] Online(Scalable)
2014/12/27 17:11:24 : FJSVclnas [Info] [0109] Export /vol/voll on NetApp Filer(filer)
2014/12/27 17:11:24 : FJSVclnas [Error] [0203] exportfs Error Message:Protocol error, filer closed
connection,EXIT_CODE:1
2014/12/27 17:11:24 : FJSVclnas [Error] [0215] Cannot connect to NetApp Filer(filer) with /usr/bin/
ssh -2
```

- Date

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

- Category

Indicates a classification. (Information, Error, Warning)

- ID

Indicates a message number.

- Text

indicates a message content.



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.



See

.....
For details, see "PRIMECLUSTER Global Link Services Configuration and Administration Guide: Redundant Line Control Function"
.....

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 NAS 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 NetApp Filer-Cluster with PRIMECLUSTER or in scalable operation, stop monitoring the NAS 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 NetApp Filer-Cluster with PRIMECLUSTER or in scalable operation, restart monitoring the NAS 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 Information



See

See "PRIMECLUSTER Installation and Administration Guide".

PRIMECLUSTER Wizard for NAS Information

- Definition file

/usr/opt/reliant/etc/hvgdconfig

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

3.4 Recovery sequence after control facility of the NetApp Filer-Cluster

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

Recovery sequence

< NetApp Filer(7-Mode) is used >

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 NetApp Filer-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/FJSSVclnas/sbin/hvnasenable -a
```

< NetApp Filer(cDOT) is used >

1. Recover the NAS devices failure.
2. Execute "storage failover giveback " command on NAS devices.

```
storage failover giveback -ofnode <node name of NAS device>
```

3. Execute "storage failover show" command on NAS devices, and then make sure NetApp Filer-Cluster is normal.

```
storage failover show
```

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

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



See

-
- cf giveback / storage failover giveback

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

- cf status / storage failover show

The command of cf status / storage failover show 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 NAS 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 NAS 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 NAS resources that will be discontinued monitoring.

Specify the NAS resource that will be discontinued monitoring.

Specify them on the local node.

-a [*userApplication*]

The option discontinues monitoring all NAS 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 NAS 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 state transition of *userApplication* is in progress.
- In standby operation and not using control facility for the NetApp Filer-Cluster, NAS resource does not go into Warning state.
- In using control facility for the NetApp Filer-Cluster, execute the *hvnasdisable* command to all NAS 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 NAS 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 NAS resources that will be restarted monitoring.

Specify the NAS resource that will be restarted monitoring.

Specify them on the local node.

`-a [userApplication]`

The option restarts monitoring all NAS 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 NAS 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)



Do not execute this command while state transition of userApplication is in progress.

4.3 clnasdxpreset - Preconfigure command for ETERNUS DX

User

Super user

Format

`/opt/FJSVclnas/sbin/clnasdxpreset <ETERNUS DX device name>`

Function

Preconfigure command for executing the command from PRIMECLUSTER Wizard for NAS to the ETERNUS DX device by using ssh without the password. The entry of the ETERNUS DX device is added to .ssh/known_hosts of the root user of the cluster server name.

Parameter

ETERNUS DX device name

Specify the ETERNUS DX device name that PRIMECLUSTER Wizard for NAS accesses.

Exit status

0 : Normal termination

1 : Abnormal termination

Chapter 5 Notice

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

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

Information

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

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

- 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 a NAS host name in /etc/vfstab.pcl, the NFS lock control might fail. You must specify a host name.
- When you register a host name of a cluster node in the hosts file of the NetApp Filer(7-Mode), 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 NetApp Filer(7-Mode), 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, NAS resource does not goes into Warning state.
 - When control facility for the NetApp Filer-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 Data ONTAP7.2 or later.

If NAS device after failover is recovered (giveback), discontinue monitoring NAS 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

```
# 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 /usr/bin/ssh -2

[Description]

Cluster nodes cannot be connected to NAS using SSH 2.0.

[Corrective action]

Check if a NAS name is correct, SSH 2.0 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 `/usr/bin/ssh -2`**[Description]**

Cluster nodes cannot be connected to NAS using SSH 2.0.

[Corrective action]

Check if a NAS name is correct, SSH 2.0 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.

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

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

[Corrective action]

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

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

[Description]

The all of the NetApp Filer-Cluster are down.

[Corrective action]

Recover the all of the NetApp Filer-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 NetApp Filer-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 /usr/bin/ssh -2

[Description]

Cluster nodes cannot be connected to NAS using SSH 2.0.

[Corrective action]

Check if a NAS name is correct, SSH 2.0 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 NetApp Filer-Cluster will be done because ping command for the NAS name(NetApp Filer name) failed.

[Corrective action]

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

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

[Description]

The all of the NetApp Filer-Cluster are down.

[Corrective action]

Recover the all of the NetApp Filer-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 NetApp Filer-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

[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(IM) 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

[Description]

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

[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 NAS 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 NAS 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

[Description]

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

[Corrective action]

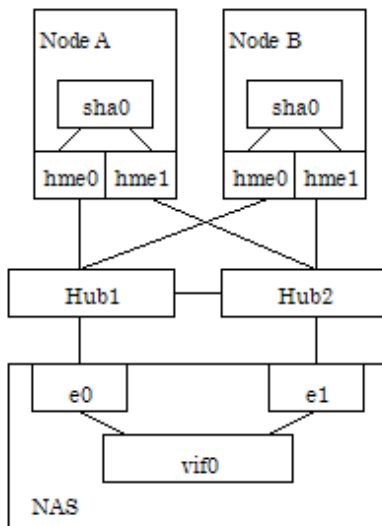
Retry with a correct resource name or retry on a correct node.

Appendix A How to configure GLS

If you want to create redundant transfer routes to NetApp Filer(7-Mode) 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 NetApp Filer(7-Mode);

```
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 NetApp Filer(7-Mode) is restarted, the virtual interface will be lost. You need to set up /etc/rc as the virtual interface can automatically be created during NetApp Filer(7-Mode) restart using the following steps:

1. Mount /vol/vol0 on the NetApp Filer(7-Mode) 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 NetApp Filer(7-Mode). 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 "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
```

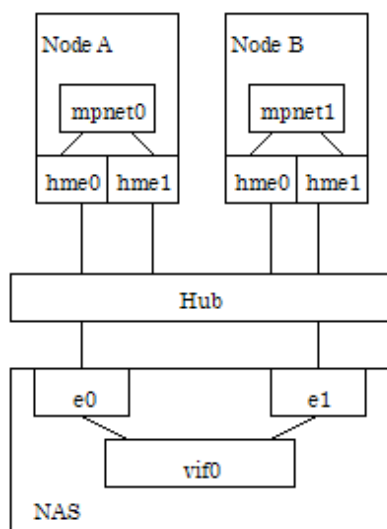
A.1.3 GLS configuration with Gls Wizard

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

1. Select Gls:Global-Link-Services in the NAS 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 NetApp Filer(7-Mode), it is necessary to create a multi-type virtual interface from multiple interfaces by executing the following command on NetApp Filer(7-Mode);

```
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 NetApp Filer(7-Mode) 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 NetApp Filer(7-Mode) restart:

1. Mount /vol/vol0 on the NetApp Filer(7-Mode) 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 "PRIMECLUSTER Global Link Services Configuration and Administration Guide: 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 NAS turnkey wizard of the RMS Configuration Wizard.

1. Select Gls:Crm-MPNET in the NAS 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 NetApp Filer-Cluster

In PRIMECLUSTER Wizard for NAS, it is monitored to the NetApp Filer-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 NetApp Filer-Cluster. In the following, it explains the method of the tuning of the parameter of Netapp resource.

Turning of the control facility for the NetApp Filer-Cluster

It is necessary to consider monitoring between the cluster node and Switching-HUB, and monitoring between the cluster node and the NetApp Filer to decide the turning of the control facility for the NetApp Filer-Cluster.

1. The GLS resource monitors it between the cluster node and Switching-HUB. It should be set that failover of the NetApp Filer-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 NetApp Filer-Cluster failover (X)

$$(a) + (b) = 10 \text{ (sec)} + 30 \text{ (sec)} \text{ or } 60 \text{ (sec)} < X \text{ (sec)}$$

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 Configuration and Administration Guide: Redundant Line Control Function."

2. After 300(recommended value) seconds pass, the RemoteFileSystems resource to monitor between the cluster node and the NetApp Filer becomes faulted resource if the trouble is detected.

Therefore, the value in which the failure detection time of NetApp Filer-Cluster and the failover time of NetApp Filer-Cluster are added should be within at 300 seconds.

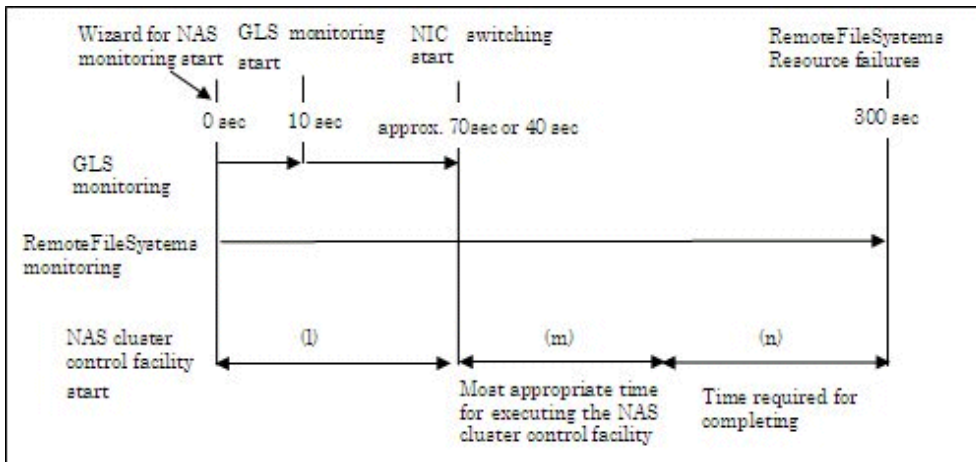
In a word, it becomes like the next expression.

$$\text{Starting time of the NetApp Filer-Cluster failover (X)} \leq \text{RemoteFileSystems failure time (300 sec)} - \text{time of the NetApp Filer-Cluster failover}$$

Therefore, it becomes the following.

$$\text{About } 40 \text{sec. or about } 70 \text{sec.} < X < 300 \text{ sec} - \text{time of the NetApp Filer-Cluster failover} \quad (1)$$

The NetApp Filer cluster control facility will be initiated as follows:



GLS: Global Link Services

As shown in the above figure, the time required for completing the NAS cluster control facility (l) 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 command

Default value is following:

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

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

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

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

Note

The required time for failover changes by the environment.

Appendix C Adding a Oracle resource and a NetWorker resource

This section describes the procedure to add an Oracle resource and a NetWorker resource into the userApplication including a NAS resource.

1. Stop RMS on all nodes.
2. Start the RMS Configuration Wizard by executing the following command on any one of nodes in a cluster system:

```
# hvw -n <RMS configuration name>
```

Where RMS configuration name is the RMS configuration name created at "2.5.2 userApplication creation".

3. When the RMS Configuration Wizard is started, the following menu is displayed. Select Application-Edit to delete 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: 4
```

4. When the selection menu of the turnkey wizard is displayed, select the userApplication including the NAS resource.

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

5. The NAS turnkey wizard or the Netapp wizard is displayed.

If you add the Oracle resource, select Oracle.

If you add the NetWorker resource, select Nwcl, Nwst or Nwsv.

```
Settings of turnkey wizard "NAS"
1) HELP                                14) Oracle(-)
2) READONLY                            15) Crm:SystemState3(-)
3) SAVE+EXIT                            16) Crm:SystemState2(-)
4) -                                     17) LocalFileSystems(-)
5) ApplicationName=APP1                  18) RemoteFileSystems(Rfs_APP1)
6) Machines+Basics(app1)                 19) IpAddresses(-)
7) CommandLines(-)                       20) RawDisks(-)
8) Controllers(-)                        21) RC-VolumeManagement(-)
9) Nwcl(-)                                22) VERITAS-VolumeManagement(-)
10) Nwst(-)                               23) Netapp(Netapp_APP1)
11) Nwsv(-)                               24) Eternusdx(-)
12) Crm:Application(-)                   25) Gds:Global-Disk-Services(-)
13) Crm:BasicApplication(-)              26) Gls:Global-Link-Services(-)
Choose the setting to process: 14
```

For details about the settings of the Oracle resource, refer to "2.2.7.2 Oracle Resource Creation" in "PRIMECLUSTER Wizard for Oracle Configuration and Administration Guide".

For details about the settings of the NetWorker resource, refer to "2.6.1.2 Server cluster operation" or "2.6.1.3 Client cluster operation" in "PRIMECLUSTER Wizard for NetWorker Configuration and Administration Guide".

6. After the setting of the Oracle resource or the NetWorker resource, you return to the NAS turnkey wizard or NETAPP turnkey wizard. To complete the setting, select SAVE+EXIT.

```
Settings of turnkey wizard "NAS"
1) HELP
2) READONLY
3) SAVE+EXIT
4) -
5) ApplicationName=APP1
6) Machines+Basics(app1)
7) CommandLines(-)
8) Controllers(-)
9) Nwcl(Nwcl_APP1)
10) Nwst(-)
11) Nwsv(-)
12) Crm:Application(-)
13) Crm:BasicApplication(-)
14) Oracle(Ora_APP1)
15) Crm:SystemState3(-)
16) Crm:SystemState2(-)
17) LocalFileSystems(-)
18) RemoteFileSystems(Rfs_APP1)
19) IpAddresses(-)
20) RawDisks(-)
21) RC-VolumeManagement(-)
22) VERITAS-VolumeManagement(-)
23) Netapp(Netapp_APP1)
24) Eternusdx(-)
25) Gds:Global-Disk-Services(-)
26) Gls:Global-Link-Services(-)
Choose the setting to process: 3
```

7. You return to Application selection menu. select RETURN.

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

8. 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
2) QUIT
3) Application-Create
4) Application-Edit
5) Application-Remove
6) Application-Clone
7) Configuration-Generate
8) Configuration-Activate
9) Configuration-Copy
10) Configuration-Remove
11) Configuration-Freeze
12) Configuration-Thaw
13) Configuration-Edit-Global-Settings
14) Configuration-Consistency-Report
15) Configuration-ScriptExecution
16) RMS-CreateMachine
17) RMS-RemoveMachine
Choose an action: 2
```

Appendix D Deleting a userApplication including a NAS resource

This section describes the procedure to delete a userApplication including a NAS resource.

1. Stop RMS on all nodes.
2. Start the RMS Configuration Wizard by executing the following command on any one of nodes in a cluster system:

```
# hvw -n <RMS configuration name>
```

Where RMS configuration name is the RMS configuration name created at "[2.5.2 userApplication creation](#)".

3. When the RMS Configuration Wizard is started, the following menu is displayed.
Select Application-Remove to delete 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: 5
```

4. When the selection menu of the turnkey wizard is displayed, select the userApplication including the NAS resource.

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

5. The confirmation screen is displayed. Enter yes.

```
About to remove all data of APP1,
Please confirm this by typing yes: yes
```

6. 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
```