NEC EXPRESSCLUSTER
System Construction Guide

NEC EXPRESSCLUSTER for Windows Ver 7.0

NEC EXPRESSCLUSTER for Windows Ver7.0

Command Reference

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Revision History

Revision	Revision Date	Revision Page	Description
First	06/30/2003		New manual.
Second	05/26/2004	20	Descriptions of *parameter-n* option added.
			Descriptions of /FOV option added.
		23	Precautions (6) and (7) added.
		28	Descriptions of return value 5 added.
		3	FastSync Option and Exchange2000 Support Kit R1.0 support-related descriptions deleted.

PREFACE

The "NEC EXPRESSCLUSTER/System Construction Guide" is intended for administrators who will construct cluster systems and for system engineers or maintenance personnel who will provide user support for these systems.

AUXILIARY INFORMATION

[Concerning the OS upgrade]

If an invalid procedure is used when upgrading the operating system of the cluster server, a failover may occur unexpectedly, or in the worst case, the system may be damaged.

This also holds for the application of service packs.

NEC EXPRESSCLUSTER/System Construction Guide Categories

The NEC EXPRESSCLUSTER/System Construction Guides are divided into separate volumes as follows according to the situations in which they are to be used and according to readers. If you are to construct a cluster system for the first time, please read "Introduction" first.

[Setup Card]
> This is a reference card attached to the product, which describes the product configuration, operating environment, and so on.

[Introduction]
> This is an introduction for someone who is to design and construct a cluster system for the first time.

[System Design (BASIC/Shared Disk, BASIC/Mirror Disk]
> This manual describes information necessary to install NEC EXPRESSCLUSTER and construct a system.
> It explains necessary information and precautions concerning system construction.
> There are two volumes, one for Shared Disk type and the other for Mirror Disk type.

[System Design (Application)]
> This manual is a collection of knowhows for using advanced functions of NEC EXPRESSCLUSTER   that are not described in System Design (BASIC).

[Cluster Installation and Configuration Guide (Shared Disk, Mirror Disk)]
> This manual clearly explains environment settings to be made after installing NEC EXPRESSCLUSTER in the order that you will follow to build a cluster system.
> There are two volumes, one for Shared Disk type and the other for Mirror Disk type.

 [Operation/Maintenance]
> This is a document that describes information required for operating a cluster system, how to deal with system failure, and lists of errors.

[GUI Reference]
> This manual explains required concepts concerning NEC EXPRESSCLUSTER operation and describes how to operate NEC EXPRESSCLUSTER by using a graphical user interface (GUI) from a management client or a server.

[Command Reference]
> This is a reference of commands that can be put in NEC EXPRESSCLUSTER scripts and maintenance commands that can be executed from the server's command prompt.

[For PP]
> Every PP mentioned in this document can be executed in cooperation with NEC EXPRESSCLUSTER.
> It explains settings, script writings, and some notes that are necessary to operate the PPs and NEC EXPRESSCLUSTER together.
> Read carefully the respective PP edition for the PP you would like to use.

[Notes]
> This reference describes items to be remembered in constructing, operating, and trouble shooting a cluster system.
> Read when necessary.

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1 NEC EXPRESSCLUSTER Commands
1.1   NEC EXPRESSCLUSTER command list

NEC EXPRESSCLUSTER provides several commands that can be specified in scripts in addition to the OS standard commands.

Also, for the system administrator's convenience, NEC EXPRESSCLUSTER provides several commands that can be executed from the server's command prompt instead of by operations from NEC EXPRESSCLUSTER Manager. These commands, however, cannot be specified in scripts.

For details about using these commands, see Section 1.2 NEC EXPRESSCLUSTER Command

Command that can be specified in scripts		
Command	*Use*	*Page*
ARMBCAST.EXE	Enables the default or an arbitrary message to be displayed at clients where NEC EXPRESSCLUSTER Client is operating.	8
ARMCALL.EXE	Enables the command or program specified as a parameter to be exclusively executed among nodes.	9
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ARMGWAIT.EXE	Causes processing to wait for the startup/stop of a failover group.	17
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ARMLOADC.EXE	Starts up/shuts down application/service and interrupts/restarts monitoring.	24
ARMLOG.EXE	Registers log messages in the log file.	26
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ARMSETCD.EXE	Sets a value for an arbitrary variable, which can be referenced by the ARMGETCD command.	33
ARMWHSHR.EXE	Monitors an abnormal disconnection to a shared name.	37

Command that can be specified in scripts and can be executed from server's command prompt		
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ARMFOVER.EXE	Moves or performs failover for a failover group.	13
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ARMGSTOP.EXE	Stops failover group.	16
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ARMPAUSE.EXE	Temporarily halts the script. This can be used as a debugger. Use it when "Allow Service to Interact with Desktop" is permitted. When "Allow Service to Interact with Desktop " can be set from a control panel service. ("Dialogue with Desktop" can be set from "Program"- "Management tool"-"Service" in Windows 2000 whereas in Windows NT, it can be set from "Control panel"-"Service".)	30
ARMSLEEP.EXE	Enables script execution to be interrupted for a specified interval.	34
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ARMWSSET.EXE	Specifies an IP address returned to the local server by gethostbyname() for an application.	40
VCOMSTOP.EXE	Deletes the virtual computer name you made it effective with VCOMSTRT.	43
VCOMSTRT.EXE	Assigns a virtual computer name to the active server.	44

Commands can be executed from server's command prompt		
Command	*Use*	*Page*
ARMDELAY.EXE	Sets and views the delay time at NEC EXPRESSCLUSTER Server service startup on the NEC Express5800/ft servers or equivalent fault-tolerant servers.	10
ARMEM.EXE	Set or reference mode when an emergency shutdown occurs.	12
ARMSTDN.EXE	Executes cluster shutdown.	35
ARMVCSET.EXE	Releases/Sets a correspondence of a virtual computer name with floating IP address.	36
MDCLOSE.EXE	Closes the access path to make mirror disks inaccessible.	41
MDOPEN.EXE	opens the access path to make mirror disks accessible.	42

1.2　NEC EXPRESSCLUSTER Command details

This section explains the functions of NEC EXPRESSCLUSTER commands. The explanations are presented in the following format.
　Command line
　　This shows an actual image of the command to be entered by the user.
　Explanation
　　This is an explanation related to the functions of the command.
　Parameters
　　This is an explanation related to the parameters shown in the command line.
　　+　[　] indicate that the enclosed parameters can be omitted.
　　+　| indicates that one of the separated parameters should be selected.
　Return value
　　This indicates the return code returned after command execution.
　Remarks
　　This is supplementary information.

| **ARMBCAST** | :Display a message at one or more clients. |

Command line
Format 1   ARMBCAST.EXE /ID *n* /S *group-name*

Format 2   ARMBCAST.EXE /MSG *msg-strings* [/A | /S *group-name*]

Explanation   Displays the default message or an arbitrary message on the client monitor.

Parameters   /ID *n*   Displays the message corresponding to the ID at the clients. This message must be registered in advance at the clients. This parameter cannot be specified at the same time as /MSG.

/MSG *msg-strings*   Displays the character string *msg-strings*, which follows /MSG, at the clients. The maximum size of the character string is 128 bytes. This parameter cannot be specified at the same time as /ID.

/A   Displays the message at all clients.

/S *group-name*   Displays the message at all clients that are using the server specified by *group-name*.

* This parameter cannot be omitted in format 1.

* This parameter cannot be specified at the same time as /A in format 2. The parameters /A and /S can both be omitted. If they are omitted, /A is assumed to have been specified by default.

Return value   0   Success (the message was sent).
                      7   NEC EXPRESSCLUSTER Client service has not been started up.
                      9   A parameter is invalid.

Precautions   Cannot be used when a server returns to cluster (in case of the environment variable "ARMS_EVENT" of the startup script is "RECOVER").

Remarks   Can be specified in scripts.

ARMCALL	:Executes the command or program exclusively between nodes.

Command line

ARMCALL.EXE [/L *lockname*] *exec-name* [parameter-1 parameter-2 ....]

Explanation Calls and executes another program from within a script without terminating that script and returns control to the calling script again.
At this time, the program is executed exclusively between nodes.

Parameters /L *lockname* Specifies the lock name. If this option is omitted, the lock name becomes "Default".
Exclusive control is performed for command execution for each lock name specified here.

exec-name Specifies the command or program to be executed.

parameter-n Specifies command line information required for execution.

Return value 0 Success.
8 An error occurred and the command or program was not executed.
9 A parameter is invalid.

Examples Process <A> must be executed at all nodes, and the execution of process <A> must be exclusive between nodes.

```
       Node1      2      3      4
        <A>    :      :      :
Time           <A>    :      :
                      <A>    :
                             <A>
```

START.BAT

| ARMCALL WORK.BAT |

WORK.BAT

| <A> (execute A) |

Process <A> should be executed only by one node, process <B> must be executed at all nodes, and process <B> must wait for the completion of process <A> execution.

```
       Node1      2      3      4
        <A>    :      :      :
Time    <B>   <B>   <B>   <B>
```

START.BAT

| ARMCALL WORK.BAT |
| <B> (execute B) |

WORK.BAT

```
ARMGETCD /C PROC
IF ERRORLEVEL 1 GOTO END
<A> (execute A)
ARMSETCD /C PROC 1
:END
```

Remarks Can be specified in scripts.

ARMDELAY	: Sets and views the delay time at NEC EXPRESSCLUSTER Server service startup

Command line
ARMDELAY.EXE /N [*seconds*]

Explanation	This command sets and views the delay time at NEC EXPRESSCLUSTER Server service startup.	
Parameters	/N [*seconds*]	Specify the delay time at NEC EXPRESSCLUSTER Server service startup in seconds NEC EXPRESSCLUSTER Server service starts the startup process upon expiration of this delay time Valid values in *seconds* are 0 through 3600. If *seconds* is omitted, the currently specified value is displayed.
	/NOLOG	Specify if you do not want to output ARMSLEEP command logs to \<installation path\> \arm.log.

Return value	0	Success
	7	An error occurred in WIN32API.
	9	A parameter is invalid.

Remarks	The default value by installation is 0 second. The mode specified by this command is effective until uninstallation. You can specify different modes for each server. With this command, you specify the waiting time for the NEC EXPRESSCLUSTER Server service to start up on the NEC Express5800/ft servers or equivalent fault-tolerant servers.
Note	If you stop a service (*mode* = stop) which is monitored and has a watch ID, you should stop monitoring it (*mode* = pause) first, and then stop the service. Otherwise, a service error (event ID = 14016) will be detected.

ARMDOWN	:Executes server shutdown.

Command line

ARMDOWN.EXE [*reboot* | *off* | *stop*]

Explanation　Shuts down the server.

Parameters　*reboot*　　　　　Automatically reboots the server after shutting the server down. This parameter can be omitted. If this parameter is omitted, only shutdown processing is performed.　This parameter cannot be specified at the same time as the ***off/stop*** parameter.

　　　　　　　　off　　　　　Turns off the server power after shutting the server down.
　　　　　　　　　　　　　　This parameter is effective only at a server that supports a function for turning off the power from software. This parameter can be omitted. This parameter cannot be specified at the same time as the ***reboot, stop*** parameter.

　　　　　　　　stop　　　　　Stops NEC EXPRESSCLUSTER Server service only without executing shout-down. This parameter can be omitted. This parameter can not be specified with reboot or off parameter simultaneously.

Return value　0　　　　Success (server shutdown was started).
　　　　　　　　8　　　　NEC EXPRESSCLUSTER Server service has not been started up.
　　　　　　　　9　　　　A parameter is invalid.

Remarks　Can be specified in scripts and can be executed from server's command prompt.
　　　　　To shut down a server independently, shutdown processing must be executed by using this command or NEC EXPRESSCLUSTER Manager.
　　　　　When this command is used to perform shutdown processing, NEC EXPRESSCLUSTER decides that the server was abnormally terminated and begins recovery operations for a server shutdown.
　　　　　To shut down the cluster system normally, execute the ARMSTDN command.
　　　　　If you stop NEC EXPRESSCLUSTER Server service with stop parameter, restart a server in order to restart NEC EXPRESSCLUSTER Server service. (Do not restart NEC EXPRESSCLUSTER Server service from "control panel" - "service".)
　　　　　This command should be booted from a batch file booted with "START Batch file name" from startup script and shutdown script. Do not use this command apart from the above method. Particularly if you startup this command directly from begin command and end command, an operation might be stopped due to an occurrence of deadlock.

ARMEM	: Set or reference mode when emergency shutdown occurs

Command line
ARMEM.EXE [/M] [mode]

Explanation : Set or reference mode when emergency shutdown occurs

Parameters /M *[mode]* Sets the mode when an emergency shutdown occurs.
The following values can be specified for mode.

shutdown Only shutdown is performed.
reboot   System is automatically rebooted after shutdown.
poweroff Power is turned off after shutdown.

If mode is omitted, the current mode is displayed.

Return value 0 Success.
7 An error occurred in WIN32API.
9 A parameter is invalid.

Remarks Can be executed from server's command prompt.
The default mode immediately after installation is shutdown.
The mode set by this command is effective until uninstallation is performed.
This mode can be set per server.

ARMFOVER	:Moves or performs failover of a failover group.

Command line
ARMFOVER.EXE [/F] *group-name*

> **Explanation**　　Moves or performs failover of a failover group.
>
> **Parameters**　　/F　　　　　　　　　Performs failover of the failover group. This sets
> **ARMS_EVENT=FAILOVER** for the environment variable of
> the startup script that is executed at the failover destination.
> This parameter can be omitted. If it is omitted, the failover group
> is moved. In this case, **ARMS_EVENT=START** is set for the
> environment variable.
>
> 　　　　　　　　*group-name*　　　This is the failover group name.
>
> **Return value**　　0　　　　Success (movement or failover was performed).
> 　　　　　　　　7　　　　The specified failover group has not been started.
> 　　　　　　　　8　　　　NEC EXPRESSCLUSTER Server service has not been started up.
> 　　　　　　　　9　　　　A parameter is invalid.
>
> **Remarks**　　Can be specified in scripts and can be executed from server's command prompt.
> This command should be booted from a batch file booted with "START Batch file name"
> from startup script and shutdown script. Do not use this command apart from the above
> method. Particularly if you startup this command directly from begin command and end
> command, an operation might be stopped due to an occurrence of deadlock.

ARMGETCD	: Gets the code that was set by the ARMSETCD command.

Command line
ARMGETCD.EXE [/C] *variable*

Explanation	Gets the code that was set by the ARMSETCD command.	
Parameters	/C	Specifies a cluster-wide variable. If this option is omitted, the variable becomes a local variable.
	variable	This is a variable name that was registered by the ARMSETCD command.
Return value	0	An error occurred.
	not 0	The value from 1 to 255 that was set by the ARMSETCD command.

Remark   Can be specified in scripts.
The value that was set by the ARMSETCD command is returned for the return value. If a variable that has not been set by the ARMSETCD command was specified or if an error occurred for some reason, 0 is returned.

ARMGSTRT	: Start up failover group.

Command line
ARMGSTRT.EXE *group-name* [*server-name*]

Explanation   Starts up on a server that specifies failover group.

Parameters   *group-name*   Specifies a failover group for a start-up.
                   server-name   Specifies a server name in the destination of startup. This parameter
                                    can be omitted. When an omission is taken place, the omission is
                                    executed on a server with a highest failover policy at the moment.

Return value   0   Success (Failover group is executed.)
                   1   Not status that the specified operation is available. (Under confirming
                         powering shared disk on.)
                   7   Specified failover group has been executed already.
                   8   NEC EXPRESSCLUSTER Server service is not executed.
                   9   Parameter is invalid.

Remarks   Can be specified in scripts and can be executed from server's command prompt.
                This command should be booted from a batch file booted with "START Batch file name"
                from startup script and shutdown script. Do not use this command apart from the above
                method. Particularly if you boot this command directly from begin command and end
                command, an operation might be stopped due to an occurrence of deadlock.

Notes   This command should be booted from a batch file booted with "START Batch file name"
                from startup script and shutdown script. Do not use this command apart from the above
                method. Particularly if you startup this command directly from begin command and end
                command, an operation might be stopped due to an occurrence of deadlock.

ARMGSTOP	: Stop failover group.

Command line

ARMGSTOP.EXE *group-name*

Explanation   Stops failover group.

Parameters   *group-name*   Specifies a failover group to be stopped.

Return value   0   Success (Failover group is executed.)
7   Specified failover group has not been executed.
8   NEC EXPRESSCLUSTER Server service is not executed.
9   Parameter is invalid.

Remarks   Can be specified in scripts and can be executed from server's command prompt.
This command should be booted from a batch file booted with "START Batch file name" from startup script and shutdown script. Do not use this command apart from the above method. Particularly if you boot this command directly from begin command and end command, an operation might be stopped due to an occurrence of deadlock.

Notes   This command should be booted from a batch file booted with "START Batch file name" from startup script and shutdown script. Do not use this command apart from the above method. Particularly if you startup this command directly from begin command and end command, an operation might be stopped due to an occurrence of deadlock.

ARMGWAIT	:Causes processing to wait for the startup/stop of a failover group.

Command line
ARMGWAIT.EXE *group-name* [*timeout*] [*/stop*]

Explanation   Wait Failover group's start-up/stop. When you wait failover group to start-up, wait until the group becomes start-up status (activate status) or time reaches into time-out. When you wait failover group to stop, wait until the group becomes stop status (deactivate status) or time reaches into time-out.

Parameters   *group-name*   Specifies the failover group.

timeout   Specifies the timeout interval in seconds.
If **timeout** is omitted, the timeout interval will be 120 seconds.

/stop   Specify failover group as waiting to be finished. This parameter can be omitted. When the parameter is omitted, a status will become waiting to be start-up.

Return value   0   The failover group is active or not active.
1   The timeout interval elapsed.
7   NEC EXPRESSCLUSTER Server service has not been started or was isolated from the cluster.
8   The specified failover group does not exist.
9   A parameter is invalid.

Remarks   Can be specified in scripts.
This command should be executed from a batch file that is started up by "START batch-file-name" from a startup or shutdown script.

Notes   This command should be booted from a batch file booted with "START Batch file name" from startup script and shutdown script.
Do not use this command in any way other than as described above. In particular, if this command is directly executed from a startup or shutdown script, <u>deadlock may occur and the application may be stopped</u>.

| ARMKILL | :Terminates the application or service. |

Command line
ARMKILL.EXE *watchID* [/C | /T time]

Explanation   Terminates the application or service that was started up by using the ARMLOAD command.
When one service is operated with several ARMLOAD commands (object of management) (when several ARMLOAD commands with /A option operated one service), the service will not be terminated until ARMKILL is executed for all watchID.

Parameter   *watchID*   This is the monitoring ID of the application or service to be terminated.
For this ID, use the one that was specified when the application or service was started up by the ARMLOAD command.

/C   Cancels the monitoring of the application or service but does not terminate the application or service.
This parameter can be omitted. If it is omitted, the application or service is terminated. Also, this parameter cannot be specified at the same time as the /T parameter.

/T time   Sets the wait time for waiting until the application or service ends.
The range that can be specified is from 0 to 3600 seconds.
If 0 is specified, the wait time is unlimited. This parameter can be omitted. If it is omitted, the wait time is 40 seconds. Also, this parameter cannot be specified at the same time as the /C parameter.

Return value   0   Success (the target application or service was terminated).
1   The application or service has already been terminated.
2   The application or service was not terminated.
(Application/service is on finishing status.)
8   NEC EXPRESSCLUSTER Server service has not been started up.
9   The parameter is invalid.

Remarks   (1) Can be specified in scripts.
(2)To termination of an application, this command sends the WM_CLOSE message to the application. If the application does not terminate within the specified time (/T time), Terminate Process ( ) is executed for the target application to forcibly terminate the application process.
(3) When a service is terminated, Service stop requirement is made for a service control manager (SCM). When a termination is not completed within the specified time (/T time), 2 is returned as returned value.
(4) If /C is specified when ARMKILL is executed, the application or service cannot be terminated by ARMKILL.

```
┌─────────────────────────────────────────────────────────────────────────────┐
│ ARMLOAD                          :Starts up an application or service.         │
└─────────────────────────────────────────────────────────────────────────────┘
```

Command line (Format 1: Application, Format 2: Service)
Format 1   ARMLOAD.EXE *watchID* [/U *user-name*] | [<mode>]
               exec-name [*parameter-1 parameter-2 ...*]
               You can select one of the followings as <mode>.
                  * /W
                  * /M [/FOV [/CNT count]]
                  * /R retry [/H hour] [/SCR] [/FOV [/CNT count]] [/INT time]
               (Note) In Windows NT3.51, you cannot select both /U and /Windows simultaneously.

Format 2   ARMLOAD.EXE *watchID* /S [/A] [<mode *service-name*
               You can select one of the followings as <mode>.
                  * /M [/FOV [/CNT count]] [/WAIT time]
                  * /R retry [/H hour] [/SCR] [/FOV [/CNT count]] [/WAIT time] [/INT time]

Explanation   Starts up an application or service.
                  If a fault occurs in the started application or service, the application or service is restarted or
                  failover occurs (when monitoring has been specified for that application or service). The
                  monitoring of the occurrence of faults continues until the application or service is terminated
                  by the ARMKILL command.
                  For an application, a fault means that the process disappears. For a service, a fault means that
                  the service is stopped (SERVICE_STOPPED) and abnormally terminated.

Parameters   *watchID*   This is the ID used for monitoring.
                                   This ID is used for terminating the application or service by the
                                   ARMKILL command.
                                   * The ID must be unique name within a cluster.
                                   * IDs that begin with "NEC_" are reserved. They cannot be used by users.
                                   (NEC_product-name + "" is used for NEC program products.)
                                   * Set the ID using at most 255 single-byte alphanumeric characters.
                                   (Uppercase and lowercase letters are not distinguished.)

                 /U *user-name*   Specifies the user account name that is to execute the application. This
                                   parameter can be omitted. If it is omitted, the application or service is
                                   started up by using the local system account.
                                   * This parameter cannot be specified in format 2.
                                   * When specified, see Precaution (1).

                 /WINDOW *size*   Specifies application's window-size. The following specification is
                                   possible for size.
                                   maximum: Activate with a maximum display size of window.
                                   normal: Activate under a condition that the window is displayed with the
                                   size defined by application.
                                   hide: Activate without displaying the window.
                                   This parameter can be omitted. On an omission, activate with a minimum
                                   display size of the window.
                                   * This parameter cannot be specified in the format 2.

                 /WIDKEEP   Using NEC EXPRESSCLUSTER Task Manager or   ARMLOADC
                                   command, can execute or stop an application or a service with no
                                   monitoring parameters(/M, /R).
                                   * This parameter is ignored when /W, /M or /R options are used.

                                                    19
```

| | |
|---|---|
| /W | Causes processing to wait for program execution. If this parameter is specified, control is not returned from this command until the application terminates. This parameter can be omitted.<br>* This parameter cannot be specified at the same time as the /M or /R parameter.<br>* This parameter cannot be specified in format 2. |
| /M | Causes the application or service to be monitored. This parameter can be omitted. If it is omitted, no monitoring is performed.<br>* This parameter cannot be specified at the same time as the /W or /R parameter.<br>* If this parameter is not used along with /FOV, shutdown is performed when the trouble is occurred. |
| /R *retry* | Causes the application or service to be monitored and specifies the threshold value for the number of restart attempts at that time.<br>* The specification range is from 1 to 9.<br>* This parameter cannot be specified at the same time as the /M or /W parameter. |
| /H *hour* | This is the time until the restart count is returned to zero for the application or service. The time can be specified in units of one hour. This parameter can be omitted.<br>* The specification range is from 1 to 24.<br>  If this parameter is omitted when the /R parameter is specified, the restart count is not reset. |
| /SCR | Specifies that when the monitoring of the application or service is restarted, it is restarted from a script. This parameter can be omitted.<br>* If this parameter is omitted when the /R parameter is specified, the application or service is restarted. |
| /CNT count | When failover is executed for more than  /CNT option's specified times, failover will not be executed. The purpose of this is to prevent failover from repeating. How many times failover is executed are counted per server separately.<br>  Numeric value that can be specified is from 1 to 255.<br>  When this parameter is omitted, repeat counts become 8 times.<br> In the following case, failover counts are reset to 0 on the appropriate server<br>  * Normal status has been continued more than one hour.<br>  * The server is restarted.<br>  * Failover group is activated. |
| /FOV | Fails over to the highest priority server among normal servers if the restart count exceeds the threshold in application/service monitoring. This parameter can be omitted.<br>* If this parameter is omitted when the /M or /R parameter is specified, server shutdown is performed. |
| *exec-name* | This is an executable file name.<br>* This parameter cannot be specified in format 2. |
| *parameter-n* | This is a parameter assigned for the executable file. This parameter can be omitted.<br>* You cannot specify this parameter if the run file is a batch file (the extension is .bat or .cmd). To specify parameters for a batch file, follow the instructions in **Precautions (7)** below. |

| | | |
|---|---|---|
| /S | Specifies that the entity to be started up is a service. This parameter can be omitted. | |

/S　　　　　　Specifies that the entity to be started up is a service. This parameter can be omitted.
　　　　　　　* This parameter cannot be specified in format 1.

/A　　　　　　Although a service has already started, this parameter is specified if it is the object to manage. This parameter can be omitted.
　　　　　　　* This parameter cannot be specified in the format1.

/WAIT time　　Specify by the second for waiting time of the completion of the service startup. If this parameter is specified, the control is not returned until service startup is completed (SERVICE_RUNNING) or until time dose not exceed the specified waiting time. This parameter can be omitted. If the parameter is omitted, waiting startup completion will not be executed.
　　　　　　　* This parameter will not be specified in format1.
　　　　　　　* The specified range is from 0 to 3600. If 0 is specified, waiting time becomes infinity.

/INT time　　 Specify by the seconds for re-starting a singular application/service or a restart interval of the script. This parameter can be omitted. If the parameter is omitted, a re-start interval is 0 second.
　　　　　　　* This parameter becomes effective when /R or/R, /SCR option is specified.
　　　　　　　* Specified range is from 0 to 3600.

service-name　This is the service name.
　　　　　　　* This parameter cannot be specified in format 1.
　　　　　　　Search in the following registry's location xxx whose key "Display Name" matches with service name. (In Windows 2000, when startup by following "Program"-"Management tool"-"Service", a name becomes visible. In Windows NT, when startup by following "Control Panel"-"Service", a name becomes visible.)

　　　　　　　HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\xxx

　　　　　　　e.g.) FTP service in IIS
　　　　　　　Visible name in Service
　　　　　　　　FTP Publishing Service
　　　　　　　Visible name in Registry
　　　　　　　HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet
　　　　　　　\Services\MSFTPSVCDisplayName:REG_SZ: FTP Publishing Service
　　　　　　　The format is as follows.
　　　　　　　ARMLOAD WatchID /S MSFTPSVC


**Return value**　0　　Success (the target application or service was started up).
　　　　　　　　　1　　The target application or service cannot be started up.
　　　　　　　　　2　　Process monitoring cannot be performed.
　　　　　　　　　3　　The specified *watchID* is already being used.
　　　　　　　　　4　　Timeout occurred on waiting the target service to be started up.
　　　　　　　　　　　(The service is yet under being started up.)
　　　　　　　　　8　　NEC EXPRESSCLUSTER Server service has not been started up.
　　　　　　　　　9　　A parameter is invalid.

**Remarks**   Multiple parameters to be assigned for an executable file can be specified.

The actions performed when a fault occurs in an application or service that was started up by the ARMLOAD command are shown below.
(1) Start up the application or service by using the ARMLOAD command.
(2) A fault occurs.
(3) Check the threshold value.
(4) If the threshold value has not been exceeded, restart the application or service from a script.
(4)-1: Execute shutdown script, (4)-2: Execute startup script
(5) If the threshold value has been exceeded, perform failover or server shutdown.
(5)-1: Execute shutdown script, (5)-2: Perform failover to a different NEC EXPRESSCLUSTER Server



(5) Failover or shut down server
(4) Request restart from script

Server 1 — NEC ExpressCluster
START ARMLOAD (4)-2
STOP (4)-1 ARMKILL (5)-1
(1) Startup
Restart application or service
(3) Check threshold value
(2) Process disappears Service stopped

Server 2 — NEC ExpressCluster
START ARMLOAD (4)-2
STOP ARMKILL

**Precautions**   (1) Can be specified in scripts.

(2) If you would like to run a GUI application without specifying an account, check "Allow Service to Interact with Desktop" on the "NEC EXPRESSCLUSTER Server" service. If not checked, the GUI of the application will not appear on the screen.

(3) When a user account is specified, that account must have "local logon" as the user authority. For information about user authorities, refer to the help files of the domain user administrator.

When you specify a domain name explicitly, a procedure is as follows. However, you cannot use more than 15 characters for specifying a domain name and a user name.
* For local administrator
   armload watchid /u administrator ap.exe
* For domain\administrator
   armload watchid /u domain\administrator ap.exe

(4)When the ARMLOAD command monitoring function (/M option) is used, set the operating system prescribed debugger to the Dr. Watson program (DRWTSN32.EXE).

To verify this, start up the registry editor and search for the names Debugger and Auto within \\HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\AeDebug. Confirm that the value of Auto is set to 1 and the value of Debugger is set to DRWTSN32.

If the values differ, change the settings so that the Windows NT Dr. Watson program is used in place of the other debugger that had been used by default previously. To do this, start up Dr. Watson by using the command "drwtsn32 -i" from the command prompt.

When OS is installed, 1 is set for the Auto value and "DRWTSN32" is set for the Debugger value.

(5)Applications not suitable with ARMLOAD monitoring function
An application where started process is permanently not resident, is unsuitable for process monitoring (*). Since a process monitoring is supposed to be resident permanently and not to terminate autonomously, an occurrence of failure is regarded in application if started process is terminated.
(*)For example, the following applications are relevant.
*Application where process started by ARMLOAD is not resident permanently.
*Application where process started by ARMLOAD starts up a child process and started process at first is not resident permanently.

(6) If you start, with this ARMLOAD command, an application which requires GUI, and then log off, the application may be terminated.  To prevent the unexpected application termination, start it with account (/U option).

(7) You cannot specify *parameter-n* option if the run file is a batch file (the extension is .bat or .cmd).  To give parameters to a batch file and start it, you have to,
·     Create a separate batch file to give parameters to a batch file.
·     Write codes in ARMLOAD command so that the above batch file can start.

      Samples are shown below on the assumptions that,
·     Separate batch file name:     "c:\Program Files\wrapper.bat"
·     Run file name:                "c:\Program Files\test.bat".

Sample code of separate batch file to pass parameters to a batch file:

"c:\Program Files\test.bat" para1 para2 para3
                    ~~~~~ ~~~~~ ~~~~~ → Specify parameters here.
ARMLOAD command sample:

ARMLOAD WatchID /M /FOV "c:\Program Files\wrapper.bat"

**Limitations**  (1) The ARMLOAD command with account cannot be used in a batch program executed with an account.
(2) An application (including a child process) executed with an account cannot use the LogonUser() function.
(3) Since a 16-bit application cannot be terminated by the ARMKILL command do not execute it.
(4) To include a single-byte space within a parameter, enclose the parameter in quote marks.
    Example ARMLOAD Wid1 "\Program Files\Application.exe"
(5) Only a process that was started up from the ARMLOAD command can be terminated by the ARMKILL command.
(6) Do not execute the application (XXXX.EXE) which NEC EXPRESSCLUSTER gives except for ARMRSP command.
(7) Under the status which an access to a domain controller is not possible (Server-down, network disconnection etc.), if application with an account is started, ARMLOAD might be terminated abnormally.

| ARMLOADC | : Starts/terminates application/service and interrupts/restarts monitoring. |
|----------|-------------------------------------------------------------------------------|

**Command line**

ARMLOADC.EXE  WatchID  /W mode [ /T *time* ]

**Explanation**  Starts up/terminates application/service and interrupts/restarts monitoring.
When startup/termination of application/service is completed, this command is terminated.

**Parameters**  *watchID*  This is the monitoring ID of the application/service for which monitoring is to be interrupted or restarted.
For this ID, use the one that was specified when the service was started up by the ARMLOAD command.

/W mode  Controls monitoring.
The following values can be specified for mode.

pause  Interrupts application/service monitoring.
continue  Restarts application/service monitoring.
start  Starts application/service.
stop  Terminates application/service

/T *time*  This parameter is effective only when continue, start and stop are assigned to a mode of W mode.
Continue and start are assigned to a mode of W mode:
Specify waiting time to start service. (Invalid for an application)
Specified range is from 0 to 3600 seconds. If 0 is specified, waiting time becomes infinity. This parameter can be omitted. When the parameter is omitted, only service startup is executed. Control is returned without waiting a completion of a startup.
Stop is assigned to a mode of W mode:
Specify waiting time to start service. Specified range is from 0 to 3600 seconds. If 0 is specified, waiting time becomes infinity. This parameter can be omitted. When the parameter is omitted, maximum waiting time is 40 seconds.

**Return value**  0  Success (movement or failover was performed).
1  Status is invalid.
2  Application/service has not been terminated.
7  An error occurred in WIN32API.
9  A parameter is invalid.

**Remarks**  (1) Can be specified in scripts and can be executed from server's command prompt.
(2)To terminate an application, WM_CLOSE message is sent for an application. When application is not terminated within the specified time (/T time), TerminateProcess is executed for an appropriate application and application process is forced to terminate.
(3) To start/terminate service, service startup/termination request is made to a Service Control Manager (SCM). When startup/termination is not completed within the specified time(/T time), 2 is returned as returned value.
(4) mode which can be specified, is determined according to the rule of the following rule.
When mode is invalid, 1 is returned as returned value.

**Precautions**  When stopping a service (mode = stop) whose name is monitored by watchID, interrupt (mode = pause) the monitoring of the watchID before stopping the service.
If stopping a service without interrupting the monitoring, service failure will be detected (event ID=14016).

Application/Service specification matrix

| Status / mode | Monitoring | | | | Interruption of monitoring | | | |
|---|---|---|---|---|---|---|---|---|
| | Start | Starting | Terminating | Terminate | Start | Starting | Terminating | Terminate |
| pause | Y | Y | N | - | N | N | N | N |
| continue | N | N | N | - | Y | Y | Y (*2) | Y (*2) |
| start | N | N | N | - | N | N | N | Y |
| stop | Y (*1) | Y | N | - | Y | Y | N | N |

Y: Executable     N: Not executable (Invalid status)     -: This matching does not exist.
(*1) When stop is executed, interruption/Termination process of monitoring application/service, is proceeded.
(*2) When continue is executed, process of starting application/service and restarting monitoring, is proceeded.

| **ARMLOG** | : Registers a log in the log file. |

**Command line**
ARMLOG.EXE *log-strings* [/arm]

**Explanation** Stores a user-specified log entry in the NEC EXPRESSCLUSTER log file. The log is written to the local disk (file name: arm.log) of the machine at which the ARMLOG command is executed.
The log can also be posted to NEC EXPRESSCLUSTER Manager at the same time.

**Parameters** *log-strings* This is the character string to be registered in the log file.
The maximum size of the character string is 128 bytes. If a space is included in the character string, enclose the character string in double quotes (").

/arm Posts the character string to NEC EXPRESSCLUSTER Manager at the same time. This parameter can be omitted.

**Return value** 0 The log was registered.
1 An error occurred, and the log was not registered.
8 NEC EXPRESSCLUSTER Server service has not been started up.
9 A parameter is invalid.

**Remarks** Can be specified in scripts.

| ARMMODE | : Executes returning/forced returning server to cluster and disconnects server |
|---|---|

**Command line**

ARMMODE.EXE    [/F | /C | /I]

**Explanation**    Executes returning/forced returning current server to cluster. And isolates from cluster.

**Parameters**

/F    Executes forced returning server to cluster. This parameter can be omitted. When this parameter is omitted, cluster return is executed. This parameter cannot be specified with /C and /I parameter at the same time.

/C    Isolates from cluster. But if the server that composes a cluster system, is only server in a normal operation status, the server is not disconnected. This parameter can be omitted. When this parameter is omitted, cluster return is executed. This parameter cannot be specified with /F and /I parameter at the same time.

/I    Isolates from cluster. Even if the server that composes a cluster system, is only server in a normal operation status, the server is isolated. This parameter can be omitted. When this parameter is omitted, cluster return is executed. This parameter cannot be specified with /F and /C parameter at the same time.

**Return value**

0    Success (the server was returned to normal mode).
1    The specified operation cannot be performed.
8    NEC EXPRESSCLUSTER Server service has not been started up.
9    A parameter is invalid.

**Remarks**    Can be specified in scripts and can be executed from server's command prompt.
If a problem occurs at a server forming a cluster system and the server fails, NEC EXPRESSCLUSTER begins recovery operations (restart after down status). In this case, the server cannot operate as a member of the cluster system. To return the server from restart after down mode to normal operation mode, this command or NEC EXPRESSCLUSTER Manager must be used.
This command should be booted from a batch file booted with "START Batch file name" from startup script and shutdown script.

**Precautions**    This command should be booted from a batch file booted with "START Batch file name" from startup script and shutdown script. Do not use this command apart from the above method. Particularly if you startup this command directly from begin command and end command, an operation might be stopped due to an occurrence of deadlock.

| ARMNSADD | :Starts network drive sharing. |
|----------|-------------------------------|

**Command line**
ARMNSADD.EXE *share-name  path-name*

**Explanation**   Begins network drive sharing.  This is functionally equivalent to "net share share-name=path-name" .

**Parameters**   *share-name*   This is the share name for which sharing is to begin.

**Return value**

| 0 | Normal termination. |
|---|---------------------|
| 1 | A parameter is invalid. |
| 2 | The path name cannot be found. |
| 3 | The share name is invalid. |
| 5 | No access right to path name |
| 7 | Insufficient memory. |
| 8 | Sharing is already being performed using the same name. |
| 9 | Other error. |

**Remarks**   Can be specified in scripts and can be executed from server's command prompt.
If a share name that exceeds eight characters is specified using net share, processing will wait for input from the console.  Therefore, a problem will occur if this is specified in a script.To use a share name that exceeds eight characters, specify this command in the script instead of net share.

| ARMNSDEL | : Cancels sharing. |
|----------|--------------------|

**Command line**
ARMNSDEL.EXE *share-name*

**Explanation** Forcibly cancels network sharing that was set by "net share share-name=path-name". This is functionally equivalent to "net share share-name /delete".

**Parameters** *share-name* This is the share name for which sharing is to be canceled.

**Return value**
| 0 | Normal termination. |
|------|-------------------------------------|
| 1 | A parameter is invalid. |
| 5 | Access was denied. |
| 8 | Available memory is insufficient. |
| 2310 | The share name cannot be found. |

**Remarks** Can be specified in scripts and can be executed from server's command prompt.
When sharing is canceled by using net share, processing waits for input from the console depending on the connection status from the client. Therefore, a problem will occur if this is specified in a shutdown script. Also, if this is not specified, disk disconnection may fail depending on the connection status from the client.
In contrast, armnsdel.exe unconditionally cancels sharing regardless of the connection status from the client.
Specify this command in a script to cancel sharing.

| ARMPAUSE | : Temporarily halts a script. |
|----------|------------------------------|

**Command line**

ARMPAUSE.EXE *msg-strings*

**Explanation** Interrupts script execution. Script execution can be resumed by clicking OK in the message box.

**Parameters** *msg-strings* This is the contents to be displayed in the message box. The maximum size of the character string is 128 bytes.

**Return value** 0 Message display was terminated.
1 The message cannot be displayed.
9 The parameter is invalid.

**Remarks** Can be specified in scripts and can be executed from server's command prompt. This command can only be used for debugging a script. To use it, "Allow Service to Interact with Desktop" must be permitted for NEC EXPRESSCLUSTER Server service. This can be set from a "control panel"-> " service".

| **ARMRSP** | : Monitor resource problems |
| --- | --- |

**Command line**

ARMRSP. <kind> [/TIME *time*] [/CNT *count*]
Specify follows as <kind >. (You can select more than one parameters.)
/N, /D, /I, /C, /P, /L, /S, /A, /PL *ip_addr*

**Explanation**

Monitors cluster resource problems. If a problem occurs and the problem persists for a fixed time, failover operations will be performed for the group.
IF monitoring is executed with "Resource monitoring" resource set by NEC EXPRESSCLUSTER Manager, ARMRSP command written in a script of the same failover group.

**Parameters**

| | |
| --- | --- |
| /N | Monitors CLUSTER disk partition problems. |
| /D | Monitors switched partition and switch-mirror disk problems. |
| /I | Monitors virtual IP address and floating IP address problems. |
| /C | Monitors virtual computer name problems. |
| /P | Monitors printer spool problems. |
| /L | Monitors line switching unit(LSW) problems. |
| /S | Monitors script and Registry synchronization problems. |
| /A | Monitors problems for all of the above resources. If this option is specified at the same time as any of the above options, /A will be effective. Public LAN monitoring is not included. |
| /PL ip_addr | Monitors Public LAN problems by pinging the specified address. This parameter can be specified multiple times. Specify one address per PL parameter. Example) ARMRSP.EXE /PL 192.168.0.1 /PL 192.168.0.2 When more than one parameters are specified, failover is executed if an abnormality is detected in one of addresses. |
| /TIME time | Performs failover operations if the problem persists for the specified time (in seconds). The values that can be specified are **1 to 86400**. If this parameter is omitted, failover operations are performed if the problem persists for 30 seconds. |

| /CNT count | When failover is executed for more than /CNT option's specified times, failover will not be executed. The purpose of this is to prevent failover from repeating. How many times failover is executed are counted per server separately. |
| | The values that can be specified are **1 to 255**. |
| | If this parameter is omitted, failover operations will be repeated at most eight times. |
| | |
| | In the following case, failover counts are reset to 0 on the appropriate server. |
| | *When a normal status has persisted for at least one hour. |
| | *When the server is booted or rebooted |
| | *When the failover group is started up |

| **Return value** | 0 | Success. |
| | 6 | An error occurred in the NEC EXPRESSCLUSTER API |
| | 7 | An error occurred in WIN32API. |
| | 8 | Processing for getting the group name failed |
| | 9 | A parameter is invalid |

**Remarks**     Can be specified in scripts.

To use this command, you must specify it in a script.

For example, to monitor switched partition and switch-mirror disk problems, specify the following in the startup script.

(Location that is executed when ARMS_EVENT is START or FAILOVER)

ARMLOAD *watchID* /R 9 /H 1 /FOV ARMRSP /D

Even if this command is abnormally terminated due to an error, it will be restarted according to the ARMLOAD options (/R 9 /H 1 /FOV). However, if the abnormal termination occurs more than 9 times within the specified time, failover will occur. The counter will be reset if the restart count is not exceeded for at least one hour.

Specify the following in the shutdown script.
(Location that is executed when ARMS_EVENT is START or FAILOVER)

ARMKILL *watchID*

For information about the *watchID* parameter of the ARMLOAD or ARMKILL command, see the ARMLOAD reference.

**Remarks**     In <Install path>\ARM.LOG, "armrsp failed in the NEC EXPRESSCLUSTER Server API (%s). The error code is (*1)." is displayed due to large load of server CPU. But no problem for an operation.

    (*1) : 0x20000004 or 0x20000005

| ARMSETCD | :Sets a code that can be referenced by using the ARMGETCD command. |
|---|---|

**Command line**

ARMSETCD.EXE  [/C]  *variable  value*

|  |  |  |
|---|---|---|
| **Explanation** | Sets a code that can be referenced by using the ARMGETCD command. | |
| **Parameters** | /C | Specifies a cluster-wide variable. When this option is omitted, the variable becomes a local variable. |
|  | *variable* | This is the variable name to be registered. When the ARMGETCD command is used, specify this variable name to reference the variable. * Specify up to 127 half-sized alphanumeric characters. (Distinguish between large characters and small characters.) |
|  | *value* | This is the value that is set for the registered *variable*. However, this value must be **an integer from 1 to 255**. |
| **Return value** | 0 | The value was registered. |
|  | 8 | An error occurred, and the value was not registered. |
|  | 9 | A parameter is invalid. |
| **Precautions** | A local variable and a cluster-wide variable can be registered using the same variable name. In this case, they are handled as two separate variables. | |
|  | The variable that is set by this command is reset when the local server is shut down if it is a local variable or when the cluster is shut down if it is a cluster-wide variable. | |
| **Remarks** | Can be specified in scripts. | |
|  | Local variable | This is a variable that is not shared between nodes. |
|  | Cluster-wide variable | This is a variable that is to be shared between nodes.  For example, variable A, which was set at Server 1, can be accessed at Server 2. |

| **ARMSLEEP** | :Interrupts script execution for the specified interval. |
|---|---|

**Command line**
ARMSLEEP.EXE *seconds*

**Explanation** — Interrupts script execution for the specified interval.

**Parameters** — *seconds* — Specifies the interval for which execution is to be interrupted, in seconds.

**Return value**
0 — Success.

9 — A parameter is invalid.

**Remarks** — Can be specified in scripts and can be executed from server's command prompt.

| ARMSTDN | :Executes a cluster shutdown. |
|---------|------------------------------|

**Command line**

ARMSTDN.EXE  [*reboot | off | stop* ]

**Explanation**     Executes a normal shutdown of the cluster.

**Parameters**     *Reboot*     Automatically reboots the cluster after shutting the cluster down. When this parameter is omitted, the cluster is not rebooted.  This parameter cannot be specified at the same time as the ***off/stop*** parameter.

*Off*     Turns off the cluster power after shutting the cluster down.  This parameter is effective only at a server that supports a function for turning off the power from software.  This parameter can be omitted.  This parameter cannot be specified at the same time as the ***reboot*** parameter.

*stop*     Only stop NEC EXPRESSCLUSTER Server service, not shutting the cluster down.
This parameter can be omitted.  This parameter cannot be specified at the same time as the ***reboot*** or ***off*** parameter.

**Return value**     0     Success (cluster shutdown started).
8     NEC EXPRESSCLUSTER Server service has not been started up.
9     A parameter is invalid.

**Remarks**     Can be executed from server's command prompt.
To shut down a cluster system normally, shutdown processing must be executed by using this command or NEC EXPRESSCLUSTER Manager.
If the cluster is shut down by any other method, NEC EXPRESSCLUSTER decides that the server was abnormally terminated and begins recovery operations for the server failure.

| **ARMVCSET** | : Sets/releases a correspondence between a virtual computer name and a floating IP address. |
|---|---|

**Command line**
ARMVCSET  [/disablefip | /enablefip ]]

**Explanation**    Sets/releases a correspondence between a virtual computer name and a floating IP address.

**Parameters**    /disablefip    Releases a correspondence between a virtual computer name and a floating IP address.

/enablefip    Sets a correspondence between a virtual computer name and a floating IP address.
When a parameter is omitted, displays the current settings.

**Return value**    0    Success
1    Failure

**Remarks**    (1) Can be executed from server's command prompt.
(2)Needs to be executed on all servers that compose NEC EXPRESSCLUSTER.
(3) From the next failover startup, release/set-up becomes effective.
(4) Notes/restriction that correspondence between a virtual computer name and a floating IP address is set, is same as notes/restriction that automatic correspondence is made with a usage of /enablefip. For more detail, please refer to "*NEC EXPRESSCLUSTER System Construction Guide/ System Design*".

| ARMWHSHR | : Monitors an abnormal disconnection to a shared name. |
|----------|-------------------------------------------------------|

**Command line**
ARMWHSHR.EXE *share-name ip-addr* [/INT *time*] [/LOG *log-strings*]
       [/PROC *exec-name parameter-1 parameter-2 ... parameter-n*]

**Explanation**    Monitors an abnormal disconnection to a shared name. Monitors regularly PING arrival confirmation for specified server having shared name and an abnormal disconnection to a shared name. Executes Event log output (ID:14018) regarding as an abnormal disconnection to a shared name when PING arrival confirmation is normal and an abnormal disconnection to a shared name occurs. Executes a notification to NEC EXPRESSCLUSTER Manager and a specified execution file startup.

**Parameters**    *share-name*    Specifies shared name (UNC name).
More than one designation are possible for this parameter. (the maximum value is 128.)

            *ip-addr*    Specifies IP address of a server that shares shared name.

            /INT *time*    Specifies monitoring interval (by second).
Specified range is from 30 to 86400. This parameter can be omitted. When this parameter is omitted, the interval becomes 180 seconds.

            /LOG *log-strings*    Specified to notify string(s) to NEC EXPRESSCLUSTER Manager when an abnormal connection to a shared name occurs. The maximum size is 128 bytes. When a space is included in the string, put a double quotation (") at the beginning and end of the string. This parameter can be omitted.

            /PROC *exec-name*    Specifies an execution file name for an operation when an abnormal connection to a shared name occurs. This parameter can be omitted.

            *parameter-n*    A parameter that is given to an execution file. This parameter can be omitted.

**Return value**    0    Success
            1    Invalid parameter
            2    Insufficient memory
            8    NEC EXPRESSCLUSTER Server service has not been operated.

**How to use**  Set the followings if you use ARMWHSHR command.

(1) Register a user account

Register a user account with Administrator authority from NEC EXPRESSCLUSTER Manager. For registration method, refer "Account" from "Help" of NEC EXPRESSCLUSTER Manager.

(2) Description into ARMWHSHR script

Create new failover group for monitoring an abnormal connection to a shared name (*). Describe ARMWHSHR command into a script.

*Set failover group

1. Remove all checks for [Resource monitoring] tab - [Resource type of monitoring].
2. Use only one server to be added to [Failover policy] - [Server for group starting].

For example, describe the following in order to monitor an abnormal connection to a shared name (temp) a server (Server name: server, Public LAN IP address: 100.100.100.1). (Location to be executed when ARMS_EVENT is START.)

ARMLOAD /U Administrator watchID
ARMWHSHR \\server\temp 100.100.100.1

Describe the following for shutdown script. (Location to be executed when ARMS_EVENT is START.)
ARMKILL watchID

**Usage example**  This command is used to confirm whether access to server's local disk on network is possible or not. In case of two server structured cluster system, accessibility to both servers' local desk on the network can be confirmed by monitoring a shared name of the other party's server from each server. The followings are a configuration example and script description example.

*Server Information

|  | Server 1 | Server 2 |
|---|---|---|
| Server name | Server 1 | Server 2 |
| Public LAN IP address | 100.100.100.1 | 100.100.100.2 |
| Shared name | (1)share1<br>(2)share3 | (1)share2 |

*Script example

(1) Start.bat of Server 1

```
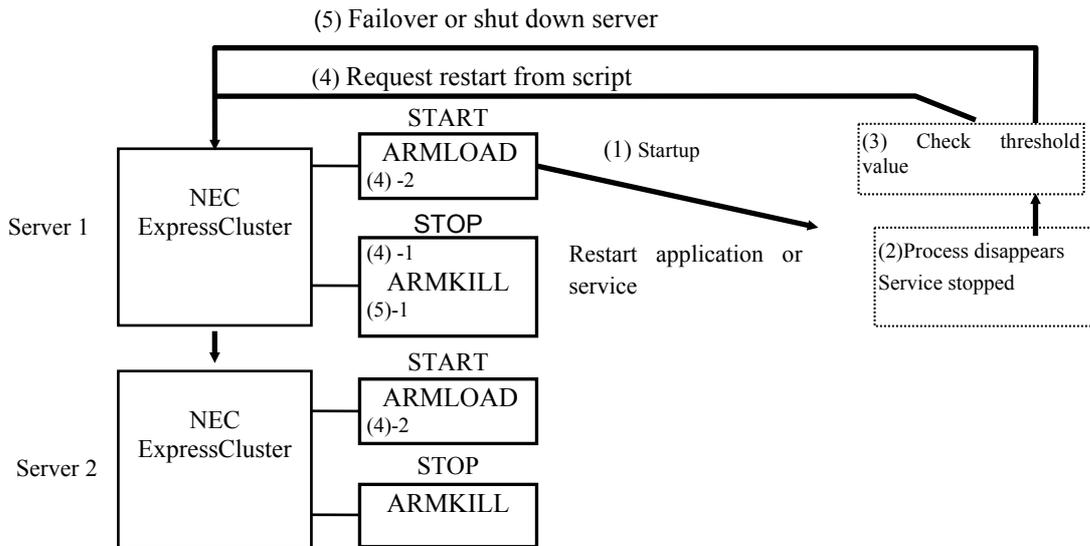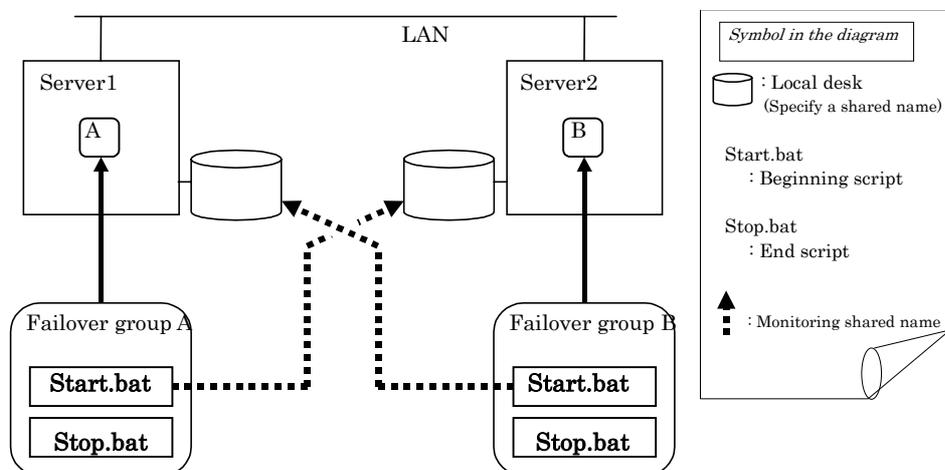IF "%ARMS_EVENT%" == "START" GOTO NORMAL
GOTO EXIT
:NORMAL
ARMLOAD W1 /U Administrator ARMWHSHR \\server2\share2 100.100.100.2
:EXIT
EXIT
```

(2) Stop.bat of Server 1

```
ARMKILL W1
EXIT
```

(3) Start.bat of Server 2

```
IF "%ARMS_EVENT%" == "START" GOTO NORMAL
GOTO EXIT
:NORMAL
ARMLOAD W2 /U Administrator ARMWHSHR \\server1\share1 100.100.100.1
ARMLOAD W3 /U Administrator ARMWHSHR \\server1\share3 100.100.100.1
:EXIT
```

(4) Stop.bat of Server 2

```
ARMKILL W2
ARMKILL W3
EXIT
```

Remarks

| **ARMWSSET** | : Specifies an IP address returned to the local server by gethostbyname() for an application. |

Command line

Format 1 ARMWSSET.EXE [/P] *fullpath* [*ip-addr1 ip-addr2 ip-addr3 ...*]

Format 2 ARMWSSET.EXE /L

Format 3 ARMWSSET.EXE /DEL

Explanation   This command specifies an IP address returned to the local server by gethostbyname() for an application. With this command, you pass a virtual IP address to application if you want to use it as the local server's IP address. The settings are effective until the system restarts by default (/P option is not specified). They will be deleted when the system restarts.

Parameters   /P   Specify the nonvolatile mode. If you make settings with this nonvolatile mode, they will not be deleted even if the system is restarted.

   fullpath   Specify the run file name of application that uses gethostbyname().

   ip-addr   Specify the IP address returned by gethostbyname(). Delimit IP addresses with a space if you want to specify multiple addresses. gethostbyname() will return them in array in the order you specified them. If omitted, the previous settings for the application specified with fullpath will be deleted.

   /L   Lists the current settings.

   /DEL   Deletes all of current settings.

Return value 0   Success
   1   Failed to make settings.

Remarks   Can be specified in scripts and can be executed from server's command prompt.

Note   Before starting up the application with the startup script, you should execute ARMWSSET.EXE. If you execute ARMWSSET.EXE for an application many times, the last successful ARMWSSET.EXE is effective.

How to use   -   Copy the OS-original wsock32.dll (the file of WindowsNT4.0/2000 is located in <system drive>\winnt\system32.) in the same directory as the application, and rename it to wsock__.dll.
   -    Copy the NEC EXPRESSCLUSTER wsock32.dll (located in <installation path>\armmontr) in the same directory as the application.
   -    Before starting up the application with the startup script, ARMWSSET.EXE should   be   described
        Example: ARMWSSET "c:\Program files\app\app.exe" 192.168.0.1 192.168.0.2

| **MDCLOSE** | :Closes the access path to make mirror disks inaccessible. |

Command line
MDCLOSE.EXE mirrorset-name

Explanation Closes the access path to make mirror disks inaccessible.
You should execute this command when no task is accessing the mirror set you want to close.

Parameters *mirrorset-name* Specify the mirror set name you want to close the access path.

Return value 0 Success
1 A parameter is invalid.
2 or larger Other error (possible cases are as follows.)
- NEC EXPRESSCLUSTER LE/LX is not installed.
- Registry access error
- A task is accessing the mirror set you want to close.
- Internal error

Remarks Can be executed from server's command prompt.

Do not try to restore servers if partitions are accessible. For instance, if MDCLOSE is not performed or MDCLOSE failed. Otherwise, file systems on both servers may be broken.

This MDCLOSE command is designed to execute snapshot backup in batch process. See the "*System Construction Guide/ GUI Reference*" for details of snapshot backup.

Can be used on NEC EXPRESSCLUSTER LE/LX.

MDOPEN	: Opens the access path to make mirror disks accessible.

Command line
MDOPEN.EXE mirrorset-name

Explanation   This command opens the access path to make mirror disks accessible.

Parameters   *mirrorset-name*   Specify the mirror set name you want to open the access path.

Return value   0   Success
              1   A parameter is invalid.
              2   Mirroring in progress. Cannot open.
              3   or Other error (possible cases are as follows.)
              larger   - NEC EXPRESSCLUSTER LE/LX is not installed.
                         - Registry access error
                         - A task is accessing the mirror set you want to close.
                         - Internal error

Remarks   Can be executed from server's command prompt.

              Before trying to restore servers, you should make partitions inaccessible with MDCLOSE if you have made them accessible with MDOPEN.

              This MDOPEN command is designed to execute snapshot backup in batch process. See the "*System Construction Guide/ GUI Reference*" for details of snapshot backup.

              Can be used on NEC EXPRESSCLUSTER LE/LX.

| **VCOMSTOP** | : Deletes the virtual computer name you made it effective with VCOMSTRT. |

Command line
VCOMSTOP vcomname

Explanation   This command deletes the virtual computer name you made it effective with VCOMSTRT.

Parameters   *vcomname*   Specify the vcomname which was specified in vcomstrt.

Return value   0   Success
1   Failure

Remarks   Can be executed from server's command prompt.

If the -i option is specified in VCOMSTRT for the vcomname, the floating IP (ipaddress) is deleted together.

VCOMSTRT	: Assigns a virtual computer name to the active server.

Command line
VCOMSTRT [-i ipaddress] vcomname

Explanation   This command assigns a virtual computer name to the active server.

Parameters   *-i ipaddress*   Specify the associated IP address if you want to associate the virtual computer name with floating IP address. This IP address also will be assigned to the OS with this VCOMSTRT command.

vcomname   Specify a virtual computer name you want to give to the active server.

Return value 0   Success
1   Failure

Remarks   Can be executed from server's command prompt.

With this VCOMSTRT command, the virtual computer name and FIP functions of NEC EXPRESSCLUSTER become available.

See the "*System Design (Basic/Shared Disk)*"or "*System Design (Basic/Mirror Disk)*" of "*NEC EXPRESSCLUSTER System Construction Guide*" for details of virtual computer name and FIP.

Notes   (1)The virtual computer names assigned with this VCOMSTRT command should be deleted with the VCOMSTOP command when they become unnecessary.
(2)This command ignores the setting in ARMVCSET command about association between virtual computer name and floating IP address. This command determines it from -i option only.

1.3 NEC EXPRESSCLUSTER Client Command details

This section explains the functions of NEC EXPRESSCLUSTER Client commands. The explanations are presented in the following format.

Command line
This shows an actual image of the command to be entered by the user.

Explanation
This is an explanation related to the functions of the command.

Parameters
This is an explanation related to the parameters shown in the command line.
+ [ ] indicate that the enclosed parameters can be omitted.
+ | indicates that one of the separated parameters should be selected.

Return value
This indicates the return code returned after command execution.

Remarks
This is supplementary information.

| **ARMCLND** | : Connects the cluster server switched partition to the client. |

Command line
ARMCLND.EXE *clustername groupname sharename drivename*

Explanation Connects the cluster server switched partition as the client's network drive on startup. Also, this command is made resident in memory, and when the switched partition is switched when failover occurs, for example, it is automatically reconnected.

Parameters *clustername* Specifies the cluster name of the cluster for which the switched partition is to be connected. If a space is included in the cluster name, the name should be enclosed in double quotes (").

groupname Specifies the failover group name of the switched partition to be connected.

sharename Specifies the share name of the switched partition.

drivename Specifies the drive name to be assigned to the network drive at the client.

Remarks If a virtual computer name is used, the switched partition can be connected as the network drive by using only operating system functions. The ARMCLND command need not be used.

The ARMCLND command is used to connect the switched partition as the network drive when a virtual computer name is not used. To use the ARMCLND command, the following four conditions must be satisfied.

> Network sharing must be started by using the "net share" or "ARMNSADD" command in the failover group's startup script. Also, sharing should be canceled by using the NEC EXPRESSCLUSTER command ARMNSDEL in the failover group's shutdown script.
> A user account having the authority to connect the network driver must be used to logon to the network before ARMCLND.EXE is executed.
> NEC EXPRESSCLUSTER Server service must have been started up at the server.
> Network sharing can be started by the "net share" or ARMNSADD command only when a password is unnecessary.
> Since a password is not requested, NEC EXPRESSCLUSTER Client and NEC EXPRESSCLUSTER Server must exist in the same domain.

The ARMCLND command can be used at a Windows machine at which NEC EXPRESSCLUSTER Client is installed. If the ARMCLND.EXE icon is registered in advance in the startup group, the switched partition can be automatically connected when Windows is started up.

ARMCLND Command Example

When the cluster name is CLUSTER, the failover group name is GROUP, and the switched partition is assigned on the I: drive, the following example explains how to connect I:\ARM as the client's Z: drive.

(1) Specify that the following command is to be executed when ARMS_EVENT is START and FAILOVER in the server's startup script.

    net share ARM=I:\ARM

(2) Register the ARMCLND icon in the client's startup group.

(3) Change the link destination of the startup group's ARMCLND.EXE properties as follows.

    "(installation-directory)\ARMCL\ARMCLND.EXE" CLUSTER GROUP ARM Z:

This becomes effective when the user logs on Windows again.

ARMCLPL	: Displays a status of public LAN and updates to public LAN with the highest priority.

Command line
ARMCLPL.EXE [/R]

Explanation   Displays a status of public LAN. Each server name and the server's status of each cluster with client setting, IP address of an each public LAN, gateway address and a status of public LAN, are displayed.

Parameters   /R   Change over is taken place if a normal public LAN with higher priority than currently using public LAN.

Remarks   Server status is displayed in the following style.

Server status	Display
Normal as cluster	Normal
Restart status after down	Isolated
Stop, down and disconnection	Stopped

A status of public LAN is displayed in the following style.

Status of public LAN	Display
Normal and in use	UP(CURRENT)
Normal and unused	UP
Normal but waiting a response from public LAN	UP(WAITING)
No response from server	DOWN

Display example

```
CLUSTER: cluster
    SERVER: server1         Normal
    PUBLICLAN: 10.0.0.1     10.1.0.254     UP
    PUBLICLAN: 10.0.1.1     10.2.0.254     UP(CURRENT)
    SERVER: server2         Stopped
    PUBLICLAN: 10.0.0.2     10.1.0.254     DOWN
    PUBLICLAN: 10.0.1.2     10.2.0.254     DOWN
```

When the above display example is executed with specifying /R, public LAN of server1 is switched from 10.0.1.1.to 10.0.0.1.

Notes   An order to display a server list is not fixed.

2 Standard Output Message

Outputs a message(s) to a standard output.

Error log(s) outputted to Arm.log, is also outputted to a standard output simultaneously. Command(s) which is /are outputted to standard output becomes a command(s) which is (are) executable except NEC EXPRESSCLUSTER script. "Usable commands inside and outside a script(s)" and "Usable command(s) outside a script(s)"of "1.1 NEC EXPRESSCLUSTER command list" are covered.

Standard output message list

Returned value(*2)	Content	Output message(*3)
0	Success	Command succeeded.
1	Timeout time has over.	-
	Application/service has been terminated already.	-
	Subject application/service cannot be started.	-
	Status is invalid.	Invalid status.
	Error occurred. Log has not been registered.	-
	Specified operation cannot be executed.	Invalid status.
	Invalid parameter	-
	Message cannot be displayed.	Message is not able to be displayed.
2	Application or Service was not able to start or stop.	Application or Service was not able to start or stop.
	Process monitoring cannot be executed.	-
	Path name cannot be found.	-
3	Specified WatchID has been used already.	-
	Shared name is invalid.	-
4	-	-
5	No restrictions	-
	Access denied.	-
6	Error occurred in NEC EXPRESSCLUSTER -API.	-
7	NEC EXPRESSCLUSTER Client service has not been started.	-
	Specified failover group has not been started.	Group is not started.
	Specified failover group has not been started.	Group is already started.
	Error occurred in WIN32API.	Win32API error.
	NEC EXPRESSCLUSTER Server service has not started or has been separated from a cluster.	-
	Insufficient memory	-
	Available memory is insufficient.	-
8	NEC EXPRESSCLUSTER Server service has not been started.	NEC EXPRESSCLUSTER Server service is not started.
	Error occurred and execution did not run.	-
	Specified failover group does not exist.	-
	Shared with the same name already.	-
	Failed to obtain group name(s).	-
	Error occurred and value has not been registered.	
9	Invalid parameter	Invalid parameter.
	Other error	-
2310	Shared name has not been found.	-

(*1) Executable commands outside the script are as follows.
  Usable commands inside and outside a script(s)
* ARMDOWN
* ARMFOVER
* ARMGSTRT
* ARMGSTOP
* ARMLOADC
* ARMPAUSE
* ARMSLEEP
* ARMSDEL
  Usable commands only outside a script(s)
* ARMEM
* ARMMODE
* ARMSTDN
* ARMVCSET

(*2) When a returned value is other than 0, output message to be displayed in a standard output message list is outputted in the standard style on the second line onwards after "Command failed." Is outputted in the standard style.

(*3) -(Hyphen) outputs error log which is outputted in ARM.LOG in the standard style.

3 Hints for Creating Scripts

Note the following points when creating scripts.

When starting up or shutting down an application or service within a script, be sure to output a log indicating that the startup or shutdown of the application or service was completed. This log can be output by using the ARMLOG command.

This log can be used during debugging to differentiate whether the problem was in the application or service or in NEC EXPRESSCLUSTER.

(Example: Image within script)
  ARMLOG "net start OracleTNSListener"
  net start OracleTNSListener
  ARMLOG "net start OracleTNSListener Finish"

To start up an application that requires a GUI, make sure that "Allow service to interact with desktop" is permitted for NEC EXPRESSCLUSTER Server Services. Set by following "Programs"-"Administrative tools"-"Services" step.

By permitting " Allow Service to Interact with Desktop " for NEC EXPRESSCLUSTER Server Services, you can check the script progress from the screen. This can be used effectively when debugging scripts.