

# **ExpressCluster<sup>®</sup> X Internet Server** **Agent 1.0 *for Linux***

## Administrator's Guide

8/31/2007

Fourth Edition



## Revision History

| Edition | Revised Date | Description  |
|---------|--------------|--|
| First   | 2006/09/08   | New manual   |
| Second  | 2006/12/12   | EXPRESSCLUSTER logo has been changed.                              |
| Third   | 2007/6/30    | Descriptions recommending using monitor resources have been added. |
| Fourth  | 2007/08/31   | Added information about setup in "Preface".                        |

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# Preface

If you newly set up Agents as monitor resource with installation of version 1.1.0-1 or later rpm, please refer to the following manuals.

Getting Started Guide

- "Supported distributions and kernel versions"
- "Applications supported by monitoring options"

Reference Guide

- Chapter 6 Monitor resource details

Please refer to this manual in case that

- you set up Agents with installation of version 1.0.X-X rpm.
- you use a shell scripts to control Agents that created with version 1.0.X-X rpm for another cluster system with version 1.1.0-1 or later rpm.

## Who Should Use This Guide

The *ExpressCluster X Internet Server Agent Administrator's Guide* is intended for system engineers and administrators who want to build, operate, and maintain a cluster system. Instructions for setting up a cluster system with ExpressCluster X Internet Server Agent is covered in this guide.

## Summary of the Guide

|                   |  |
|-------------------|--|
| <b>Chapter 1</b>  | <b>Overview of Internet Server Agent</b><br>This chapter provides information on a product overview of the Internet Server Agent and how to set it up.                                     |
| <b>Chapter 2</b>  | <b>Internet Server Agent command reference</b><br>This chapter provides detailed information on the script commands.   |
| <b>Chapter 3</b>  | <b>How to check monitor status</b><br>This chapter describes the monitoring method and the messages.   |
| <b>Chapter 4</b>  | <b>Settings for ExpressCluster X Internet Server Agent</b><br>This chapter describes how to create cluster configuration data using the Internet Server Agent and how to create a cluster. |
| <b>Appendix A</b> | <b>Script templates</b><br>The script template used in the ExpressCluster is introduced.   |
| <b>Appendix B</b> | <b>Glossary</b>  |
| <b>Appendix C</b> | <b>Index</b>   |

# ExpressCluster X Documentation Set

The ExpressCluster X manuals consist of the following four guides. The title and purpose of each guide is described below:

## **Getting Started Guide**

This guide is intended for all users. The guide covers topics such as product overview, system requirements, and known problems.

## **Installation and Configuration Guide**

This guide is intended for system engineers and administrators who want to build, operate, and maintain a cluster system. Instructions for designing, installing, and configuring a cluster system with ExpressCluster are covered in this guide.

## **Reference Guide**

This guide is intended for system administrators. The guide covers topics such as how to operate ExpressCluster, function of each module, maintenance-related information, and troubleshooting. The guide is supplement to the *Installation and Configuration Guide*.

## **Administrator's Guide (Add-on product)**

This guide is intended for system administrators. The detailed information on each product package is described in this guide. There are five guides for each optional product and topics such as product overview, instruction for setting up are covered:

**Alert Service Administrator's Guide**

**Application Server Agent Administrator's Guide**

**Database Agent Administrator's Guide**

**File Server Agent Administrator's Guide**

**Internet Server Agent Administrator's Guide**



## Conventions

In this guide, **Note**, **Important**, **Related Information** are used as follows:

---

**Note:**

Used when the information given is important, but not related to the data loss and damage to the system and machine.

---

---

**Important:**

Used when the information given is necessary to avoid the data loss and damage to the system and machine.

---

---

**Related Information:**

Used to describe the location of the information given at the reference destination.

---

The following conventions are used in this guide.

| Convention                             | Usage  | Example  |
|--|--|--|
| <b>Bold</b>                            | Indicates graphical objects, such as fields, list boxes, menu selections, buttons, labels, icons, etc.                 | In <b>User Name</b> , type your name.<br>On the <b>File</b> menu, click <b>Open Database</b> .         |
| Angled bracket within the command line | Indicates that the value specified inside of the angled bracket can be omitted.  | <code>clpstat -s[-h <i>host_name</i>]</code>   |
| #                                      | Prompt to indicate that a Linux user has logged on as root user.   | <code># clpcl -s -a</code>   |
| Monospace (courier)                    | Indicates path names, commands, system output (message, prompt, etc), directory, file names, functions and parameters. | <code>/Linux/1.0/eng/server/</code>  |
| <b>Monospace bold</b> (courier)        | Indicates the value that a user actually enters from a command line.   | Enter the following:<br><code># clpcl -s -a</code>   |
| <i>Monospace italic</i> (courier)      | Indicates that users should replace italicized part with values that they are actually working with.                   | <code>rpm -i expressclsbuilder<br/>-&lt;version_number&gt;-<br/>&lt;release_number&gt;.i686.rpm</code> |

## **Contacting NEC**

For the latest product information, visit our website below:

*<http://www.ace.comp.nec.co.jp/CLUSTERPRO/clp/global-link.html>*

# Chapter 1      Overview of Internet Server Agent

This chapter provides an overview of ExpressCluster X Internet Server Agent and instructions for how to register the license.

This chapter covers:

- What is ExpressCluster X Internet Server Agent? ..... 12
- Overview of monitoring with ExpressCluster X Internet Server Agent..... 12
- Using the Internet Server Agent ..... 15
- License registration for the Internet Server Agent ..... 16

## What is ExpressCluster X Internet Server Agent?

When ExpressCluster monitors applications, failing over the application when detecting an error at application startup is possible; however, an application stalling and errors cannot be detected once application is started up.

With ExpressCluster X Internet Server Agent, failover can be performed when an application is stalled or an error has occurred as well as at application startup. Thus you will be able to monitor applications on the cluster system.

ExpressCluster X Internet Server Agent achieves the monitoring of an application as described above by using monitor resources<sup>1</sup> and monitoring commands.

For details on the function of this product of monitoring applications using monitor resources, see Chapter 6, “Monitor resource details” in the *Reference Guide*.

The remainder of this guide explains the monitoring function using monitoring commands.

---

### Important:

It is recommended to perform monitoring using monitor resources since the WebManager and the `– clpstat` command enables you to monitor the status and to avoid describing dedicated scripts.

---

## Overview of monitoring with ExpressCluster X Internet Server Agent

ExpressCluster X Internet Server Agent configures the following three settings to monitor the internet server:

1. the exec resource for starting the target monitoring application (exec 1)
2. the exec resource for starting the monitoring command (exec 2)
3. the pid monitor resource that monitors exec 2

---

<sup>1</sup> Supported from ExpressCluster X version 1.1.0-1.

## Mechanism of monitoring

Start the target monitoring application in exec 1.

Create an exec resource (exec 2) that differs from this exec 1, and in this exec 2 script, write the monitoring command that monitors the application started in exec 1. Two exec resources are created to distinguish whether an error has occurred at an application startup or after it has been started.

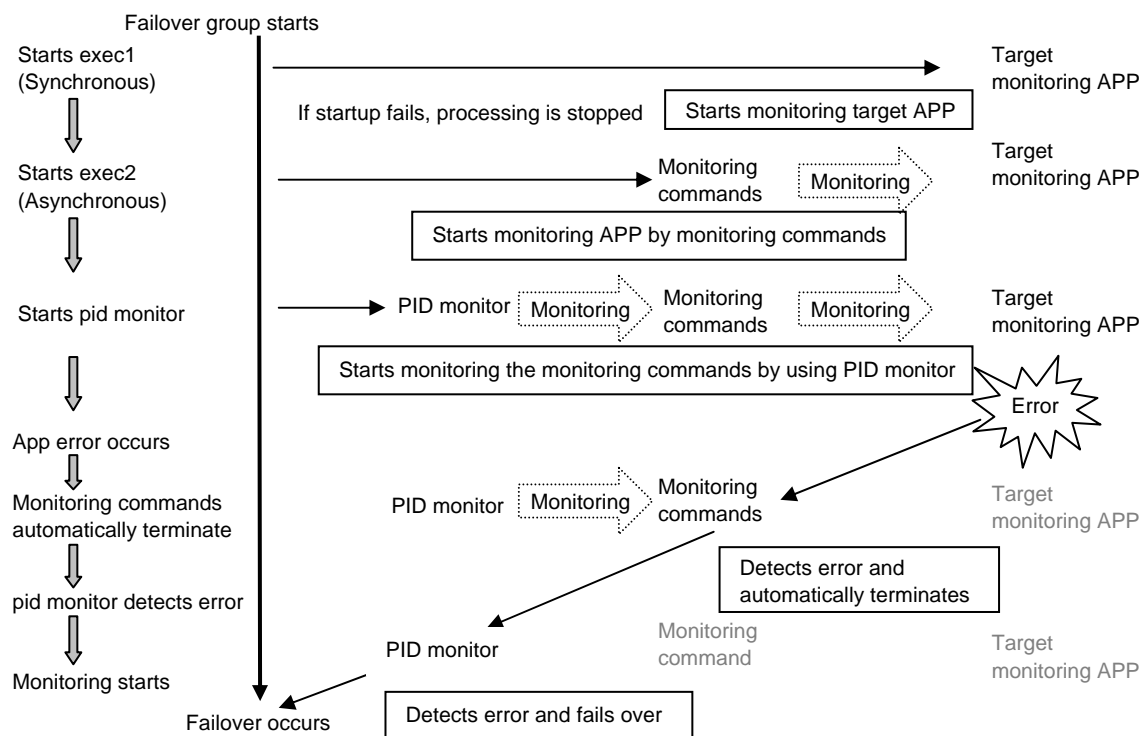
Configure the settings for the pid monitor resource to monitor exec 2.

The monitoring commands specified in exec 2 are provided by ExpressCluster X Internet Server Agent to monitor applications. These monitoring commands monitor the internet server at the intervals specified by the parameter, and if they detect an internet server error, they stop their own processes.

If these commands stop when an internet server error is detected, configure the settings to execute failover or server shutdown by the pid monitor that monitors them.

Using the mechanism above, you can detect a stalling problem and an error of the target monitoring application that cannot be detected by the ordinary settings and failover and shutdown become possible. The following figure explains this mechanism:

See below for an overview of the application (APP) monitoring using the monitoring command:



**Important:**

- These commands can detect an error which does not cause the target monitoring application to end abnormally (mainly stalling problem). This is indirectly achieved, by monitoring not the process ending of target monitoring application, but the monitoring operations such as attempting to access to the application server.
- The purpose of using these commands is to monitor the operation of the target monitoring application, and not to investigate or diagnose the cause when an error occurs on the application. When an error occurs, you need to use other means, such as application logs to see the details of its cause.
- Depending on the target monitoring application, access logs are output to syslog and other places, and logs are output to the local directory of target monitoring application every time you execute the monitoring processes. Since the settings cannot be controlled by these monitoring commands, configure these settings by the target monitoring application, if necessary. However, note that it may become difficult to investigate the cause because logs are not output when an error occurs, if the target monitoring application is set not to output logs.

Run the stop command (**clp\_XXXXXX XXXXXX --stop**) to stop these monitoring commands. If a process is stopped by using the kill command of Linux, the monitoring command may not be restarted because management information of the monitoring command will not be initialized.

---

**Related Information:**

For details, see Note 1 at “HTTP daemon monitoring command”, and Note 2 at “SMTP daemon monitoring command” in this guide.

---

## Target monitoring application

ExpressCluster X Internet Server Agent monitors Internet server working under the ExpressCluster environment. The following chart shows the version of ExpressCluster X Internet Server Agent and Internet server application that can be monitored.

| Internet Server | ExpressCluster Internet Server Agent 1.0-1 |
|-----------------|--|
| HTTP daemon     | Yes  |
| SMTP daemon     | Yes  |

Yes: Supported, No: Not supported

To monitor internet servers, monitoring commands for each Internet server are provided.

Refer to Chapter 2, “Internet Server Agent command reference” for more information on commands.

## Using the Internet Server Agent

In this section, how to use ExpressCluster X Internet Server Agent is introduced. The module for the Internet Server Agent is installed together with the ExpressCluster X. You only need to register the license to use the Internet Server Agent.

### System requirements for the Internet Server Agent

Check each item on all servers where the Internet Server Agent will be installed. The system requirements for the Internet Server Agent are the following.

| System requirements for the Internet Server Agent (monitoring module) |   |
|---|---|
| Hardware  | IA 32 server, x86_64 server   |
| OS  | Same system requirements for the ExpressCluster Server. Internet server system to be monitored need to be able to function. |
| ExpressCluster  | ExpressCluster X 1.0 or later   |
| Memory space  | 5 MB (per command)  |

Obtain the latest update of the Internet Server Agent. Refer to the update instructions for how to update the Internet Server Agent.

---

**Note:**

Since these monitoring commands run as a client application of an Internet server, it is necessary to make settings for client application to run on a server. Refer to the manuals for each Internet server for details.

---

### Before using the Internet Server Agent

The following tasks need to be completed before registering the license for the Internet Server Agent. If the tasks are not completed, refer to the Section II, “Installing and configuring ExpressCluster X” in the *Installation and Configuration Guide* for procedures and complete the tasks.

1. Installation of the ExpressCluster Server and ExpressCluster X Builder
2. Execution of the cluster creation command
3. License registration of the ExpressCluster Server

Upon completing 1 through 3 above, you can start operating the Internet Server Agent by following the procedures below:

1. License registration of the Internet Server Agent  
Register the license by following the procedure introduced in “License registration for the Internet Server Agent” on the next page.

## License registration for the Internet Server Agent

License registration is necessary to use the Internet Server Agent.

To register the license, log on as root user from the server which constitutes a cluster. You have to register a unique license key for each server.

---

**Note:**

When your ExpressCluster version does not support ExpressCluster X Internet Server Agent, you may not be able to register the license properly. In such a case, you have to update your ExpressCluster.

---

### Registering the license interactively

The explanation below is given using a product version as an example.

Check the following before installing a license:

- ◆ Verify that the ExpressCluster Server is installed, cluster creation command is executed, and the license for the ExpressCluster Server is registered.
- ◆ Prepare the license sheet for the Internet Server Agent obtained from your sales agent. You will need to enter the value indicated in the license sheet.

1. Run the following command on a server:

```
# clplcns -i -p ISAG10
```

2. The following is displayed. Enter 1 for the product version:

```
Software license
  1 Product version
  2 Trial version
Select the license version [1 or 2]...1
```

3. You will be prompted to enter the product serial number. Specify the number indicated in the license sheet:

```
Enter serial number [Ex. XXX0000000]... xxxxxxxxxx
```

4. You will be prompted to enter the product license key. Specify the number indicated in the license sheet.

---

**Note:**

Enter the license sheet information exactly as indicated because the license key is case-sensitive. To avoid any confusion with other letters and numbers, “I” and “O” in capital letter are not used in the ExpressCluster license key.

---

```
Enter license key
```

```
[Ex. XXXXXXXX-XXXXXXX-XXXXXXX-XXXXXXX] ...
```

```
xxxxxxxx-xxxxxxxx-xxxxxxxx-xxxxxxxx
```

After running the command, the message “Command succeeded” is displayed in the console to indicate that the command is successfully completed. If other completion messages are displayed, refer to “License management command” in Chapter 4, “ExpressCluster command reference” in the *Reference Guide*.



## Registering the license by specifying a license file

For a trial version, you may register the license using a license file in stead of a license sheet. License registration for trial version allows you to register the license for the entire cluster by registering to only one server in a cluster.

- ◆ Run the following command on a server:

```
# clplcnsd -i filepath -p ISAG10
```

Assign the file path to the license file specified by option `-i`.

After running the command, the message “Command succeeded” is displayed in the console to indicate that the command is successfully completed. If other completion messages are displayed, refer to “License management command” in Chapter 4, “ExpressCluster command reference” in the *Reference Guide*.

This completes the setup of ExpressCluster X Internet Server Agent. How to use the monitoring commands is introduced in the next chapter.



## Chapter 2      Internet Server Agent command reference

This chapter provides information regarding how to set up and operate ExpressCluster X Internet Server Agent. Internet server monitoring commands and Internet Server Agent commands are explained.

This chapter covers:

- List of Internet server monitoring commands ..... 20
- Internet Server Agent command reference..... 22

## List of Internet server monitoring commands

The Internet Server Agent provides Internet server monitoring commands to be written in the script.

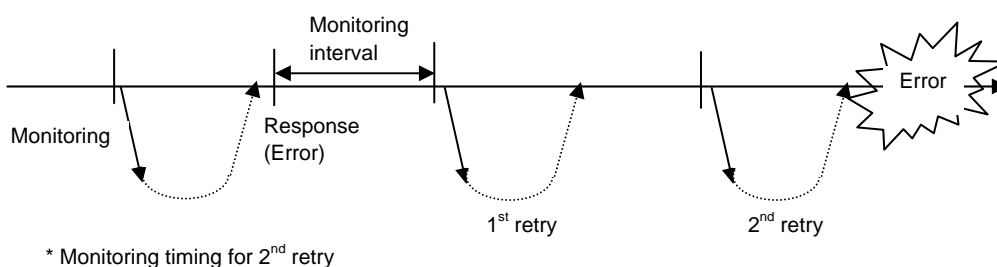
| Command     | Used for            | Refer to |
|-------------|---------------------|----------|
| clp_httpmon | Monitor HTTP daemon | Page 22  |
| clp_smtpmon | Monitor SMTP daemon | Page 26  |

### Note:

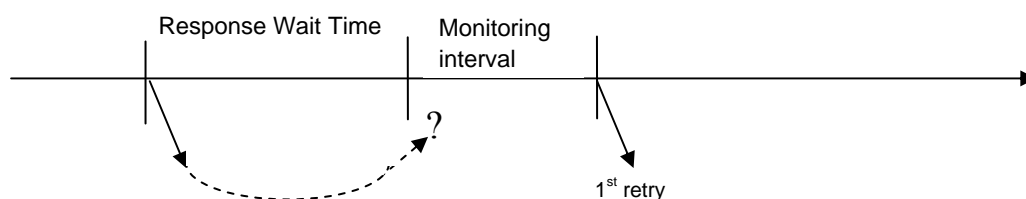
These commands should be run as root user. If an Internet server monitoring command is run by a user other than root user, you may not be able to acquire the license information and cannot run the command. When running these commands, /usr/sbin must be added to a path although it is normally added.

## Monitoring chart

Internet Server Agent detects an error in the following timing:



If the Agent does not get a response within the specified wait time, it is considered as an error and will perform a retry.



## Writing scripts to exec resource

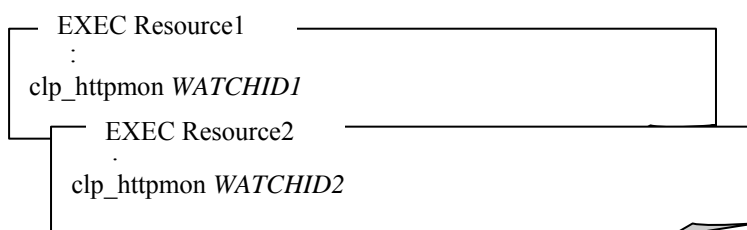
Note the following when you write a script to an exec resource:

- ◆ Before creating an exec resource where you will write start/end of monitoring commands, complete the exec resource where start/end of a target monitoring application is written. Then check if a failover group successfully starts, stops, moves, and fails over. If you create an exec resource where the start/end of the monitoring commands are written without checking these issues, it would be difficult to determine the cause of an error is detected by the monitoring commands at failover group startup. For example, if an error has actually occurred, various environments of the target monitoring application were set properly, or a parameter value of the monitoring commands is appropriate, is hard to distinguish.
- ◆ Configure the dependency of the resources so that the exec resource for start/end of the Agent starts up after the exec resource in which start/end of a target monitoring application to be written starts up. If you make incorrect settings, the Agent may consider that the target monitoring application has an error.

These monitoring commands can also be written to monitor multiple internet servers in one failover group.

Example:

Failover Group A



See Appendix A “Script templates” for example of s writing a script.

## Suspending and resuming monitoring

The Internet Server Agent can suspend and resume monitoring. While monitoring is suspended, internet server maintenance can be performed. Follow the procedure below:

1. Start up the monitoring command to start monitoring.
2. To suspend monitoring, run the following command from a server console whenever you wish to suspend:  
***Monitoring Command watchid --pause***
3. The following message is displayed on the ExpressCluster WebManager to indicate that monitoring has been suspended:  
`clp_XXXXmon will stop monitoring.. [ID:watchid]`
4. To resume monitoring, run the following command from the server console whenever you wish to resume:  
***Monitoring Command watchid --resume***
5. The following message is displayed on the ExpressCluster WebManager to indicate that monitoring is resumed:  
`clp_XXXXmon will start monitoring.. [ID:watchid]`

## Internet Server Agent command reference

This section provides information on command functions. Note the following to understand the command functions:

◆ **Command line**

Gives an idea what the user actually enters.

“[ ]” indicates that the enclosed parameter may be skipped.

“|” indicates one of the parameters separated by this symbol should be chosen.

◆ **Description**

Provides information on function.

◆ **Option**

Provides information on parameters used in the command line.

◆ **Remarks**

Gives supplementary information such as details on parameter settings.

◆ **Monitoring method**

Gives explanation on how to monitor.

◆ **Note**

Gives information on what should be noted when using the command.

◆ **Example of command entry**

Provides example of writing script when using the command.

## HTTP daemon monitoring command

**clp\_httpmon:** The clp\_httpmon monitors the HTTP daemon.

**Command line:**

|  |  |
|--|--|
| <u>Start Monitoring</u><br>clp_httpmon     | <i>Identifier</i> [-s <i>Server_name</i> ] [-n <i>Port_number</i> ]<br>[-i <i>Monitoring_interval</i> ] [-c <i>Retry_count</i> ] [-r <i>Response_wait_time</i> ]<br>[-v <i>HTTP_version</i> ] [-h <i>Request-URI</i> ] |
| <u>Stop Monitoring</u><br>clp_httpmon      | <i>Identifier</i> --stop [ <i>Stop_wait_time</i> ]   |
| <u>Interrupt Monitoring</u><br>clp_httpmon | <i>Identifier</i> --pause  |
| <u>Resume Monitoring</u><br>clp_httpmon    | <i>Identifier</i> --resume   |
| <u>Display Information</u><br>clp_httpmon  | <i>Identifier</i> --disp   |
| <u>Delete Information</u><br>clp_httpmon   | <i>Identifier</i> --del  |

|                    |   |
|--------------------|---|
| <b>Description</b> | <p>This monitoring command stops when an HTTP daemon error is detected.</p> <p>The command also stops, interrupts, and resumes monitoring.</p> <p>To specify --pause/--resume/--disp/--del, run from the root privileged console.</p> |
|--------------------|---|

| <b>Option</b> | <i>Identifier</i>                | <p>Specifies an identifier to uniquely identify the monitoring command.</p> <p>You must set an identifier.</p>   |
|---------------|----------------------------------|--|
|               | -s<br><i>Server_name</i>         | <p>Specifies the name of an Internet server to be monitored.</p> <p>Default value: localhost</p>   |
|               | -n<br><i>Port_number</i>         | <p>Specifies a port number to connect to the Internet server.</p> <p>Default value: 80</p>   |
|               | -i<br><i>Monitoring_interval</i> | <p>Specifies the Internet server monitoring interval in seconds (between 1 and 10000).</p> <p>Default value: 60</p>  |
|               | -c<br><i>Retry_count</i>         | <p>Specifies how many retries will be made after an error is detected when monitoring the Internet server (between 1 and 10000).</p> <p>Default value: 3</p> |
|               | -r<br><i>Response_wait_time</i>  | <p>Specifies a response wait time (between 1 and 10000) in Internet server monitoring in seconds.</p> <p>Default value: 10</p>                               |
|               | -v<br><i>HTTP_version</i>        | <p>Specifies the HTTP version (1.0 or 1.1).</p> <p>Default value: 1.1</p>  |
|               | -h<br><i>Request-URI</i>         | <p>Specifies Request-URI (ex. /index.html).</p> <p>Default Value /.</p>  |
|               | --stop                           | Stops the monitoring command   |
|               | <i>Stop_wait_time</i>            | <p>Specifies time to wait for the monitoring command to stop normally (between 1 and 10000).</p> <p>Default value: 10</p>                                    |
|               | --pause                          | Temporarily interrupts monitoring.   |
|               | --resume                         | Resumes monitoring.  |
|               | --disp                           | <p>Displays a process ID (pid) of the monitoring command identifier managed by the monitoring command.</p> <p>Not for ordinary use. (See Note 1)</p>         |
|               | --del                            | <p>Deletes information about the monitoring command identifier managed by the monitoring command.</p> <p>Not for ordinary use. (See Note 1)</p>              |

|                          |   |
|--------------------------|---|
| <b>Remarks</b>           | <p>About identifier:<br/>You need to specify a unique identifier on the system to control the monitoring command. You cannot use an identifier that is already used by a monitoring command for another monitoring command. Specify an identifier using alphanumeric characters. An identifier should be up to 255 bytes and is case sensitive.</p> <p>About -s -h parameter:<br/>A text can be specified up to 255 bytes with the s -h parameter. The actual effective length of text varies by each parameter. No verification for the effective length is performed with this monitoring command. The effective length complies with the HTTP daemon and the specification of the OS.</p>  |
| <b>Monitoring Method</b> | <p>This monitoring command monitors the following:<br/>By connecting to the HTTP daemon on the Internet server and issuing a HEAD request, the command determines the following results as an error:</p> <p>When monitored without specifying an -h parameter and:</p> <ul style="list-style-type: none"> <li>(1) No response to the HTTP daemon connection or the issued HEAD request within a response wait time (that is the -r parameter value)</li> <li>(2) an error is notified during the connection to the HTTP daemon</li> <li>(3) the response message to issuing a HEAD request is not started with "/HTTP"</li> </ul> <p>When monitored by specifying a URI other than "/" for the -h parameter and:</p> <ul style="list-style-type: none"> <li>(1) response to the connection to a HTTP daemon or the issued HEAD request is not received within the wait time (-r parameter value).</li> <li>(2) an error is notified during the connection to the HTTP daemon.</li> <li>(3) an error is notified for the response to the HEAD request (there are following two patterns) and <ul style="list-style-type: none"> <li>- the response message is not started with "/HTTP"</li> <li>- the status code is in 400s and 500s.</li> </ul> </li> </ul> <p>Furthermore, the monitoring cannot be performed if the user authentication is set to the URI specified to the -h parameter.</p> |
| <b>Note 1</b>            | <p>Management information is not initialized properly when the monitoring command process is stopped by a kill command during monitoring and the monitoring command with the same identifier may fail to start. If this happens, run the "clp_httpmon identifier --disp" command and you will see the process ID corresponding to the specified identifier. Use the ps command to check the process ID of the executable file and if the process is other than the monitoring command, remove management information by using the "clp_httpmon identifier --del" command.</p> <p>A monitoring command malfunctions if you run the "clp_httpmon identifier --del" command by specifying a normally operating identifier.</p>   |



|                                 |  |
|---------------------------------|--|
| <b>Example of command entry</b> | <pre>[start.sh] clp_httpmon httpwatch  [stop.sh] clp_httpmon httpwatch --stop</pre> <p>This command starts up from an exec resource.</p> |
|---------------------------------|--|

## SMTP daemon monitoring command

**clp\_smtpmon:** The clp\_smtpmon monitors the SMTP daemon.

### Command line:

|  |  |
|--|--|
| <u>Start Monitoring</u><br>clp_smtpmon     | <i>Identifier</i> [-s <i>Server_name</i> ] [-n <i>Port_number</i> ]<br>[-i <i>Monitoring_interval</i> ] [-c <i>Retry_count</i> ] [ <i>Response_wait_time</i> ] |
| <u>Stop Monitoring</u><br>clp_smtpmon      | <i>Identifier</i> --stop [ <i>Stop_wait_time</i> ]   |
| <u>Interrupt Monitoring</u><br>clp_smtpmon | <i>Identifier</i> --pause  |
| <u>Resume Monitoring</u><br>clp_smtpmon    | <i>Identifier</i> --resume   |
| <u>Display Information</u><br>clp_smtpmon  | <i>Identifier</i> --disp   |
| <u>Delete Information</u><br>clp_smtpmon   | <i>Identifier</i> --del  |

|                    |   |
|--------------------|---|
| <b>Description</b> | This monitoring command stops when an SMTP daemon error is detected.<br><br>The command also stops, interrupts and resumes monitoring.<br><br>To specify --pause/--resume/--disp/--del, run from the root privileged console. |
|--------------------|---|

|                |   |   |
|----------------|---|---|
| <b>Option</b>  | <i>Identifier</i>   | Specifies an identifier to uniquely identify the monitoring command.<br>You must set an identifier.   |
|                | <b>-s</b><br><i>Server_name</i>   | Specifies the name of an Internet server to be monitored.<br>Default value: localhost   |
|                | <b>-n</b><br><i>Port_number</i>   | Specifies a port number to connect to the Internet server.<br>Default value: 25   |
|                | <b>-i</b><br><i>Monitoring_interval</i>   | Specifies the Internet server monitoring interval in seconds (between 1 and 10000).<br>Default value: 60  |
|                | <b>-c</b><br><i>Retry_count</i>   | Specifies how many retries will be made after an error is detected when monitoring the Internet server (between 1 and 10000).<br>Default value: 3 |
|                | <b>-r</b><br><i>Response_wait_time</i>  | Specifies a response wait time (between 1 and 10000) in Internet server monitoring in seconds.<br>Default value: 10                               |
|                | <b>--stop</b>   | Stops the monitoring command  |
|                | <i>Stop_wait_time</i>   | Specifies time to wait for the monitoring command to stop normally in seconds (between 1 and 10000).<br>Default value: 10                         |
|                | <b>--pause</b>  | Temporarily interrupts monitoring.  |
|                | <b>--resume</b>   | Resumes monitoring.   |
|                | <b>--disp</b>   | Displays a process ID (pid) of the monitoring command identifier managed by the monitoring command.<br>Not for ordinary use. (See Note 2)         |
|                | <b>--del</b>  | Deletes information about the monitoring command identifier managed by the monitoring command.<br>Not for ordinary use. (See Note 2)              |
| <b>Remarks</b> | <p>About identifier:<br/>You need to specify a unique identifier on the system to control the monitoring command. You cannot use an identifier that is already used by a monitoring command for another monitoring command. Specify an identifier using alphanumeric characters. An identifier should be up to 255 bytes and is case sensitive.</p> <p>About <b>-s</b> parameter:<br/>A text can be specified up to 255 bytes with the <b>-s</b> parameter. The actual effective length of text varies by each parameter. No verification for the effective length is performed with this monitoring command. The effective length complies with the specification of the OS.</p> |   |

|                                 |   |
|---------------------------------|---|
| <b>Monitoring Method</b>        | <p>This monitoring command monitors the following:</p> <p>By connecting to the SMTP daemon on the Internet server and issuing the NOOP command, the command determines the following results as an error:</p> <ul style="list-style-type: none"><li>(1) No response to the SMTP daemon connection or the issued NOOP command within a response wait time (-r parameter value)</li><li>(2) An error reporting as the response to the SMTP daemon or issued NOOP command.</li></ul>   |
| <b>Note 1</b>                   | <p>If a state that the load average exceeds the RefuseLA value set in the sendmail.def file for a certain period of time, the monitoring commands may consider this as an error and perform failover.</p>   |
| <b>Note 2</b>                   | <p>Management information is not initialized properly when the monitoring command process is stopped by a kill command during monitoring and the monitoring command with the same identifier may fail to start. If this happens, run the “clp_smtpmon identifier --disp” command and you will see the process ID corresponding to the specified identifier. Use the ps command to check the process ID of the executable file and if the process is other than the monitoring command, remove management information by using the “clp_smtpmon identifier --del” command.</p> <p>A monitoring command malfunctions if you run the “clp_smtpmon identifier --del” command by specifying a normally operating identifier.</p> |
| <b>Example of command entry</b> | <pre>[start.sh] clp_smtpmon smtpwatch  [stop.sh] clp_smtpmon smtpwatch --stop</pre> <p>This command starts up from an exec resource.</p>  |

# Chapter 3      How to check monitor status

This chapter provides instructions for how to check the monitor status by using ExpressCluster X Internet Server Agent. This chapter also introduces the results of commands and messages on the screen or in the log.

This chapter covers:

- Verifying monitor information with monitoring commands ..... 30
- Alert messages ..... 31
- Messages being output by clp\_httpmon ..... 31
- Messages being output by clp\_smtpmon ..... 33

## Verifying monitor information with monitoring commands

Verify the monitor status by using the monitoring commands on the ExpressCluster WebManager alert view.

### Verifying alert messages on the WebManager

You can view alert messages that ExpressCluster displays on the WebManager.

The screenshot displays the ExpressCluster WebManager interface. On the left, a tree view shows the hierarchy: cluster > servers > server1 > lanhb1 > server2 > groups > tuxedo. The main panel shows the 'Group Name: tuxedo' details. It includes a 'Detail' button and a table with the following data:

| Property | Value  |
|----------|--------|
| Name     | tuxedo |
| Comment  |        |
| Status   | Online |

Below this is the 'Group On Server Status' table:

| Server Name | Status |
|-------------|--------|
| server1     | Online |
| server2     | Online |

Next is the 'Resource Status' table:

| Resource Name | Status |
|---------------|--------|
| tuxedo        | Online |
| tuxedomon     | Online |
| flp           | Online |

At the bottom, a table of alert messages is shown:

| Receive Time        | Time                | Server Name | Module Name | Event ID | Message   |
|---------------------|---------------------|-------------|-------------|----------|---|
| 2006/03/01 14:28:01 | 2006/03/01 14:28:00 | server1     | tux81mon    | 2        | The clp_tux81mon is going to watch Tuxedo server 'BBL'. [ID:tuxwatch] |
| 2006/03/01 14:26:58 | 2006/03/01 14:26:58 | server1     | tux81mon    | 1        | The clp_tux81mon has started watching Tuxedo. [ID:tuxwatch]           |
| 2006/03/01 14:26:36 | 2006/03/01 14:26:35 | server1     | rm          | 1        | Monitor pidw start.   |
| 2006/03/01 14:26:36 | 2006/03/01 14:26:35 | server1     | rc          | 11       | The start processing of a group tuxedo ended.                         |
| 2006/03/01 14:25:34 | 2006/03/01 14:25:33 | server1     | rc          | 10       | The start processing of a group tuxedo started.                       |

Displayed on the ExpressCluster WebManager alert view.

As shown above, messages are displayed on the alert view of the lower part of the WebManager window. If the messages shown are long, they are displayed in multiple lines. In such a case, other message may interrupt a message shown in multiple lines depending on the timing.

The same message displayed in the alert message is logged to the syslog.

Refer to “Alert messages” on page 31 for details on alert messages.

### Log collection when an error has occurred

Error logs of monitoring commands will be produced in the same directory where error logs of the ExpressCluster Server are produced. Logs are collected in the same way as how ExpressCluster logs are collected. For more information, see “Collecting logs by using the WebManager” in Chapter 1, “Functions of the WebManager” and “Collecting logs (clplogcc command)” in Chapter 4, “ExpressCluster command reference” in the *Reference Guide*.

## Alert messages

### Messages being output by clp\_httpmon

#### Messages indicating normal operation

| #  | Message  | Explanation   | Remarks   |
|----|--|---|---|
| 1  | clp_httpmon started monitoring the HTTP daemon. [ID:xx]            | clp_httpmon has started up.                         | -   |
| 2  | clp_httpmon will start monitoring the HTTP daemon. [ID:xx]         | clp_httpmon has started monitoring the HTTP daemon. | -   |
| 3  | clp_httpmon will stop monitoring the HTTP daemon. [ID:xx]          | clp_httpmon stops monitoring.                       | -   |
| 7  | clp_httpmon will stop monitoring. [ID:xx]                          | clp_httpmon suspended monitoring.                   | This message is displayed when monitoring is suspended by using the --pause command.  |
| 8  | clp_httpmon will start monitoring. [ID:xx]                         | clp_httpmon restarted monitoring.                   | This message is displayed when monitoring is restarted by using the --resume command. |
| 52 | clp_httpmon trial version is effective till nn/nn/nn (mm/dd/yyyy). | Running with a trial version license.               | -   |

#### Messages due to setting error

| #  | Message  | Explanation  | Remarks   |
|----|--|--|---|
| 11 | The parameter value of the clp_httpmon is invalid. [ID:xx]             | The format for parameter value of clp_httpmon is invalid.  | Check the parameter value of the monitoring command.  |
| 13 | An identifier is not specified in the clp_httpmon command.             | The identifier is not specified in clp_httpmon.  | Check the parameter value of the monitoring command.  |
| 14 | The specified identifier is already used. [ID:xx]                      | clp_httpmon cannot be restarted because the same identifier is already used.   | Check the parameter value of the monitoring command.  |
| 15 | clp_httpmon could not perform the end processing. [ID:xx]              | End processing could not be performed with --stop parameter.   | -   |
| 51 | The license of clp_httpmon is not registered.                          | The license is not registered  | Register the license.   |
| 53 | The trial version license has expired in nn/nn/nn (mm/dd/yyyy).        | The trial version license has expired.   | -   |
| 55 | The trial version license is effective from nn/nn/nn (mm/dd/yyyy).     | The trial version license cannot be used yet.  | -   |
| 56 | The registration license overlaps.                                     | The license key you have registered overlaps with another key.   | Register a different license key for each server.   |
| 72 | The clp_httpmon has detected network error(connect error[nn]). [ID:xx] | An error was detected during the connection process with HTTP server.<br>The error code is the error number of the socket system call. | The IP address and port number may be invalid or the httpd service may have stopped. Check the operating environment. |

| #  | Message   | Explanation  | Remarks   |
|----|---|--|---|
| 81 | Failed to obtain IP address.(error[nn]). [ID:xx]                            | Failed to obtain the IP address. The error code is the error number of the socket system call. | The server name specified to the -s parameter may be incorrect.   |
| 83 | clp_httpmon has detected an error in HTTP(invalid status code[nn]). [ID:xx] | The status code from HTTP server is invalid.   | The URI specified to the -h parameter may be invalid, and there may not be a permission to connect from the local server to the monitoring target URI. Check the HTTP server environment. |

## Messages being output when an error is detected in HTTP daemon monitoring

| #  | Message  | Explanation  | Remarks   |
|----|--|--|---|
| 6  | clp_httpmon detected an error and will be terminated. [ID:xx]        | Terminating because clp_httpmon detected an error.   | Troubleshoot the problem by following the message displayed immediately before. |
| 72 | clp_httpmon has detected network error(connect error[nn]). [ID:xx]   | An error was detected during the connection process to the HTTP server.<br>The error code is the error number of the socket system call.       | Troubleshoot the error according to the error code.                             |
| 73 | clp_httpmon has detected network error(send error[nn]). [ID:xx]      | An error was detected during the data sending process to the HTTP server.<br>The error code is the error number of the socket system call.     | Troubleshoot the error according to the error code.                             |
| 74 | clp_httpmon has detected network error(select error[nn]). [ID:xx]    | An error was detected during the response wait process from the HTTP server.<br>The error code is the error number of the socket system call.  | Troubleshoot the error according to the error code.                             |
| 75 | clp_httpmon has detected network error(recv error[nn]). [ID:xx]      | An error was detected during the data receiving process from the HTTP server.<br>The error code is the error number of the socket system call. | Troubleshoot the error according to the error code.                             |
| 82 | clp_httpmon has detected an error in HTTP(invalid response). [ID:xx] | The response from HTTP server is invalid.  | Troubleshoot the error according to the error code.                             |



## Messages due to system error

| #  | Message   | Explanation  | Remarks  |
|----|---|--|--|
| 42 | clp_httpmon has detected system error (xxx nn). [ID:xx]           | A Linux system error has occurred. xxx indicates a function name and nn indicates an error code. | Check the system status based on error codes   |
| 54 | Failed to check the license information of clp_httpmon.           | Failed to verify the license information.  | The license management module of ExpressCluster may be old. Check the module update. |
| 71 | clp_httpmon has detected network error(socket error[nn]). [ID:xx] | Failed to create the socket. The error code is the error number of the socket system call.       | Troubleshoot the error according to the error code.                                  |
| 81 | Failed to obtain the IP address. (error[nn]). [ID:xx]             | Failed to obtain the IP address. The error code is the error number of the socket system call.   | Troubleshoot the error according to the error code.                                  |

## Messages being output by clp\_smtpmon

### Messages indicating normal operation

| #  | Message   | Explanation   | Remarks  |
|----|---|---|--|
| 1  | clp_smtpmon started monitoring the SMTP daemon. [ID:xx]               | clp_smtpmon has started.                            | -  |
| 2  | clp_smtpmon will start monitoring the SMTP daemon. [ID:xx]            | clp_smtpmon has started monitoring the SMTP daemon. | -  |
| 3  | clp_smtpmon will stop monitoring the SMTP daemon. [ID:xx]             | clp_smtpmon stops monitoring.                       | -  |
| 7  | clp_smtpmon will stop monitoring. [ID:xx]                             | clp_smtpmon suspended monitoring.                   | The message is displayed when monitoring is suspended by using the --pause command.  |
| 8  | clp_smtpmon will start monitoring. [ID:xx]                            | clp_smtpmon restarted monitoring.                   | The message is displayed when monitoring is restarted by using the --resume command. |
| 52 | Trial version of clp_smtpmon is effective till nn/nn/nn (mm/dd/yyyy). | Running with a trial version license.               | -  |

### Messages due to setting error

| #  | Message   | Explanation  | Remarks  |
|----|---|--|--|
| 11 | The parameter value of clp_smtpmon is invalid. [ID:xx]      | The parameter value is invalid in its format.                                | Check the parameter value of the monitoring command. |
| 13 | The identifier is not specified in the clp_smtpmon command. | The identifier is not specified in clp_smtpmon.                              | Check the parameter value of the monitoring command. |
| 14 | The specified identifier is already used. [ID:xx]           | clp_smtpmon cannot be restarted because the same identifier is already used. | Check the parameter value of the monitoring command  |
| 15 | clp_smtpmon could not perform the end processing. [ID:xx]   | End processing could not be performed with --stop parameter.                 | -  |

| #  | Message  | Explanation   | Remarks   |
|----|--|---|---|
| 51 | The license of clp_smtpmon is not registered.                      | The license is not registered   | Register the license.   |
| 53 | The trial version license has expired on nn/nn/nn (mm/dd/yyyy).    | The trial version license has expired.  | -   |
| 55 | The trial version license is effective from nn/nn/nn (mm/dd/yyyy). | The trial version license cannot be used yet.   | -   |
| 56 | The registration license overlaps.                                 | The license key you have registered overlaps with another key.  | Register a different license key for each server.   |
| 72 | clp_smtpmon has detected network error(connect error[nn]). [ID:xx] | An error was detected during connection to the SMTP server. The error code is the error number of the socket system call. | The IP address and port number may be invalid or send mail service may have stopped. Check the SMTP server environment. |
| 81 | Failed to obtain IP address.(error[nn]) [ID:xx]                    | Failed to obtain the IP address. The error code is the error number of the socket system call.                            | The server name specified to -s parameter may be incorrect.   |

## Messages being output when error is detected in SMTP daemon monitoring

| #  | Message  | Explanation   | Remarks   |
|----|--|---|---|
| 6  | clp_smtpmon detected an error and will be terminated. [ID:xx]                | Terminating because clp_smtpmon detected an error.  | Troubleshoot the problem by following the message displayed immediately before. |
| 72 | clp_smtpmon has detected network error(connect error[nn]). [ID:xx]           | An error was detected during the connection process to the SMTP server. The error code is the error number of the socket system call.       | Troubleshoot the error according to the error code.                             |
| 73 | clp_smtpmon has detected network error(send error[nn]). [ID:xx]              | An error was detected during the data sending process to the SMTP server. The error code is the error number of the socket system call.     | Troubleshoot the error according to the error code.                             |
| 74 | clp_smtpmon has detected network error(select error[nn]). [ID:xx]            | An error was detected during the response wait process from the SMTP server. The error code is the error number of the socket system call.  | Troubleshoot the error according to the error code.                             |
| 75 | clp_smtpmon has detected network error(recv error[nn]). [ID:xx]              | An error was detected during the data receiving process from the SMTP server. The error code is the error number of the socket system call. | Troubleshoot the error according to the error code.                             |
| 83 | clp_smtpmon has detected an error in SMTP (invalid status code[nn]). [ID:xx] | The response from the SMTP server is invalid.   | Troubleshoot the error according to the error code.                             |

## Messages due to system error

| #  | Message   | Explanation  | Remarks  |
|----|---|--|--|
| 42 | clp_smtpmon has detected system error (xxx nn). [ID:xx]           | A Linux system error has occurred. xxx indicates a function name and nn indicates an error code. | Check the system status based on error codes   |
| 54 | Failed to check the license information of clp_smtpmon.           | Failed to verify the license information.  | The license management module of ExpressCluster may be old. Check the module update. |
| 71 | clp_smtpmon has detected network error(socket error[nn]). [ID:xx] | Failed to create the socket. The error code is the error number of the socket system call.       | Troubleshoot the error according to the error code.                                  |
| 81 | Failed to obtain IP address.(error[nn]). [ID:xx]                  | Failed to obtain the IP address. The error code is the error number of the socket system call.   | Troubleshoot the error according to the error code.                                  |



# Chapter 4      Settings for ExpressCluster X Internet Server Agent

This chapter provides explanation on how to set ExpressCluster X Internet Server Agent.

This chapter covers:

- Setting up ExpressCluster X Internet Server Agent ..... 38
- Step 1 Creating a failover group ..... 39
- Step 2 Adding the exec resource (exec 1) for starting the target monitoring application ..... 41
- Step 3 Confirmation test for target monitoring application startup..... 43
- Step 4 Adding the exec resource (exec 2) for starting monitoring command ..... 47
- Step 5 Adding the pid monitor resource ..... 50
- Step 6 Verifying the settings for monitoring command..... 53

## Setting up ExpressCluster X Internet Server Agent

To monitor the applications by using ExpressCluster X Internet Server Agent, follow the steps below.

### Step 1 Creating a failover group (for the target monitoring application)

Create a failover group for monitoring the target monitoring application and performing failover when an error occurs. Then add a group resource excluding exec resource, such as disk resource and IP resource.

\*If you have already created a failover group before setting up ExpressCluster X Internet Server Agent and it is used for monitoring, use that group. In this case, you do not need to perform Step 1.

### Step 2 Adding exec 1 (for starting the target monitoring application)

Add the exec resource for starting the target monitoring application to the failover group you have created in Step 1. In this guide, this exec resource is called exec 1.

### Step 3 Confirmation test

If you have finished Step 2, reflect the settings information to the server, and check that the target monitoring application is started normally by exec 1.

### Step 4 Adding exec 2 (for starting the monitoring command)

Add the exec resource for starting the monitoring command to the failover group. In this guide, this exec resource is called exec 2.

### Step 5 Adding a pid monitor resource

Add a pid monitor resource for monitoring the exec 2 that has been added in Step 4.

### Step 6 Verifying the settings for monitoring command and pid monitor resource

Reflect the settings information of the exec 2 and the pid monitor resource that you have added in Steps 4 and 5 to the server, and check that they can operate normally.

## Step 1 Creating a failover group

Create a failover group for the target monitoring application. Add the group resource excluding exec resource such as this disk resource or IP resource.

---

**Note:**

If you have already created a failover group before setting up ExpressCluster X Internet Server Agent, you can use this group. In this case, you do not have to perform Steps 1 to 3.

---

### Step 1-1 Adding a group

Add a failover group to an existing cluster system. The explanation is given with an example of creating a failover group that includes FIP resource and disk resource to add to a cluster system that consists of two servers (server1, 2). Replace the value when you actually operate.

---

**Note:**

When creating a new cluster, refer to Chapter 3, “Creating the cluster configuration data using the Builder” in the *Installation and Configuration Guide*.

---

1. Start up the Builder.  
(Default path: C:\Program Files\CLUSTERPRO\clpbuilder-1\clptrek.html)
2. Open the cluster configuration data where a group will be added.
3. Click **Groups** in the tree view, and select **Add** on the **Edit** menu.
4. **Group Definition** dialog box is displayed. Enter the group name **failover1** in the **Name** box, and click **Next**.
5. Click **server1** in the **Available Servers** and click **Add**. **server1** is added to the **Servers that can run the Group**. Likewise, add server2.
6. Check that **server1** and **server2** are set in this order to the **Servers that can run the Group**, and then click **Finish**.

Proceed to the following Step 1-2.

### Step 1-2 Adding a group resource (floating IP address)

Add a floating IP address to the group you created in Step 1-1.

1. Click **failover1** in the tree view, and click **Add** on the **Edit** menu.
2. The **Resource Definition** dialog box is displayed. Select the group resource type “**floating ip resource**” in the **Type** box, and enter the group name (floating ip address) in the **Name** box. Click **Next**.
3. Enter the IP address (ex. **10.0.0.12**) in the **IP Address** box. Click **Next**.
4. **Recovery Operation at Activation Failure Detection** and **Recovery Operation at Deactivation Failure Detection** are shown. Ignore them and click **Next**.
5. Click **Finish** in the screen shown.

Proceed to the following Step 1-3.

## Step 1-3 Adding a group resource (disk resource)

Add a disk resource to the group you added a FIP resource in Step 1-2.

1. Click **failover1** in the tree view, and click **Add** on the **Edit** menu.
2. Enter the 2<sup>nd</sup> group resource information in the **Resource Definition** dialog box. Select the group resource type (**disk resource**) in the **Type** box, and enter the group name **disk1** in the **Name** box. Click **Next**.
3. Enter the device name (ex. **/dev/sdb2**), mount point (ex. **/mnt/sdb2**) to their corresponding boxes. Select the file system **ext3** on the **File System** box and the disk type **Disk** from the **Disk Type** box. Click **Next**.
4. **Recovery Operation at Activation Failure Detection** and **Recovery Operation at Deactivation Failure Detection** are shown. Ignore them and click **Next**.
5. Click **Finish** in the screen shown.

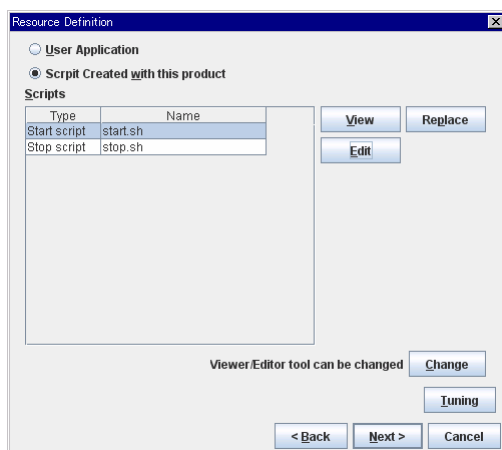
Proceed to the following Step 2.



## Step 2 Adding the exec resource (exec 1) for starting the target monitoring application

Add the exec resource for starting the target monitoring application to the failover group that you have created in Step 1. In this guide, this exec resource is called exec 1. You can use the script templates for starting the target monitoring application. Here, the settings for starting the HTTP daemon are given as an example.

1. If the Builder has not been started yet, start it.  
(Default path: C:\Program Files\CLUSTERPRO\clpbuilder-l\clptrek.html)
2. Right-click the target failover group, and click **Add Resource**.
3. The **Resource Definition** dialog box is displayed. Select **execute resource** in **Type**. Enter any name you like (enter **HTTP** in this example), and click **Next**.
4. The following window is displayed. Confirm that **Script Created with this product** is selected. Select **Start script** in **Type** in the **Scripts** table, and click **Replace**.



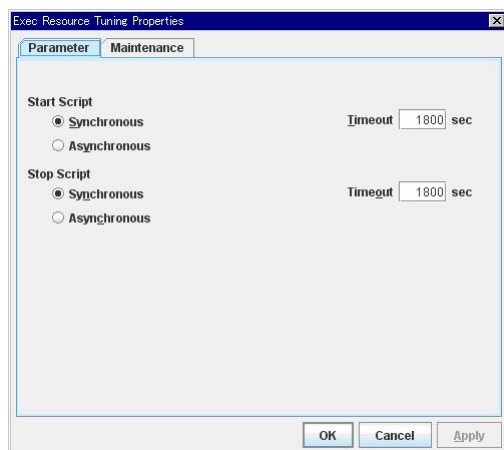
5. Select the script to start the target monitoring application. Move to the folder of the script templates, and specify the script, "start.sh" in the "http" folder. Click **Open**.

### Note:

The following is the default installation folder of the script templates.

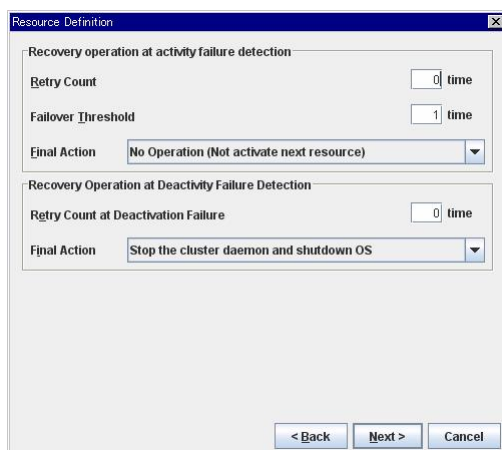
C:\Program Files\CLUSTERPRO\clpbuilder-l\scripts\linux

6. The replacement confirmation dialog box is displayed. Specify the original file to be replaced and the path, and select **Yes**.
7. In the same way, replace the end script. Select **Stop Script** in **Type** from the **Scripts** table and click **Replace**. Specify the script, "stop.sh" in the "http" folder, and click **Open**.
8. Modify the script. If you click **Edit**, the editor will open. You can modify the script according to the environment. See Appendix A "Script templates", for what to be modified.
9. Click **Tuning**, and check that **Synchronous** is set for **Start Script** and **Stop Script** on the **Parameter** tab. (**Synchronous** is set by default.)

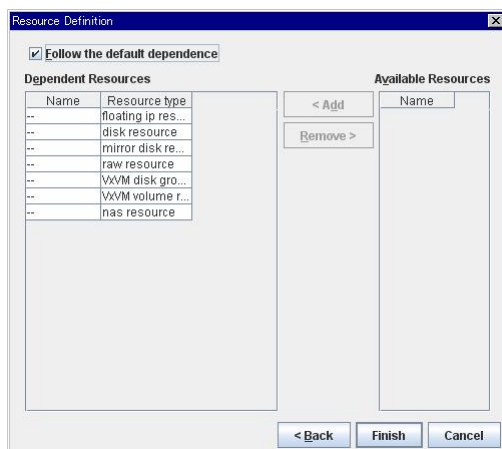
**Note:**

If you select **Synchronous**, the script is executed with the return value. Here, you need to set **Synchronous** to **Start Script** and **Stop Script** because it is required to confirm that the application has been started successfully.

10. In the following screen, you do not need to change the settings. If necessary, configure the settings according to your environment. Click **Next**.



11. In the following screen, you do not need to change the settings in particular. Make sure that the disk resource and IP resource exist on **Dependent Resources**, and click **Finish**.



12. Exec resource for the target monitoring application (exec 1) has been created. Move to the Step 3.

## Step 3 Confirmation test for target monitoring application startup

After completing the Steps 1 and 2, convert the configuration information to the server, and check that the monitored application is started normally by exec 1 after that.

The following describes how to modify the settings to the server using an example of editing the cluster configuration data with the Builder installed on the Windows machine and saving it to the floppy disk.

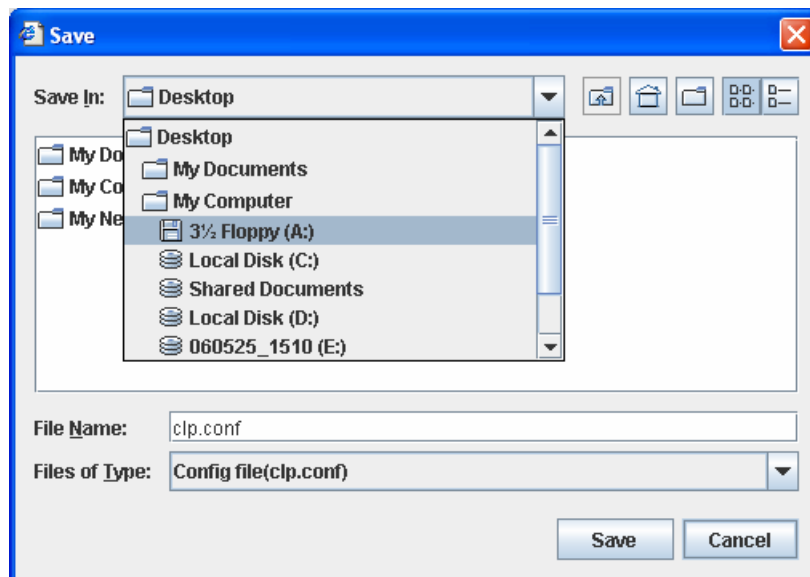
### Related Information:

For using the Builder installed on the Linux machine or saving the cluster configuration data on the file system, refer to “Saving the cluster configuration data” in Chapter 3 “Creating the cluster configuration data using the Builder” in the *Installation and Configuration Guide*.

## Saving the cluster configuration data on a floppy disk (Windows)

To save the cluster configuration data created with the Builder on Windows machine, follow the procedures below:

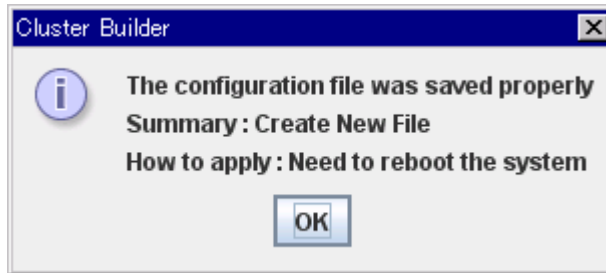
1. Insert the floppy disk into the floppy disk drive. Click **Save the configuration file** on the **File** menu. You can directly save it in the floppy disk without creating a directory in the floppy disk.
2. The following dialog box is displayed. Select the floppy disk drive in the **Save** box and click **Save**.



### Note:

Two files (clp.conf and clp.conf.rep) and the directory (scripts) are saved. If any of these are missing, the command to create a cluster does not run successfully. Make sure to treat these three as a set. If you have changed a newly created configuration data, clp.conf.bak is also created as well as those three files.

When the cluster configuration data is saved, the following message is displayed:



3. View what is contained in the floppy disk to check the two files (clp.conf and clp.conf.rep) and the directory (scripts) are located in the floppy disk. If they are in a directory in the floppy disk, you need to specify the directory when you run the command to create a cluster.

## Creating a cluster using the data in a floppy disk

To create a cluster using the cluster configuration data saved on a floppy disk, follow the procedures below. If the data is saved in a file system, refer to Chapter 4, “Installing ExpressCluster” in the *Installation and Configuration Guide*.

---

### Note:

- ◆ You have to restart all servers after installing the server RPM.
  - ◆ The server used to create a cluster is the one specified as a master server at the time of creating the cluster configuration data.
- 

1. Insert the floppy disk that contains the cluster configuration data created with the Builder into the floppy disk drive of the server specified as a master server.
- 

### Note:

In the clpcfctrl command, /dev/fd0 is used as the floppy disk device, and /mnt/floppy as the mount point by default. If your environment is different from these default values, specify them using the option. For details on option, refer to the *Reference Guide*.

---

2. Distribute the configuration data saved in the floppy disk to the servers.
    - To use the floppy disk that contains the data saved on Linux, run the following command:  
`clpcfctrl --push -l`
    - To use the floppy disk (1.44-MB formatted) that contains the data saved on Windows, or to use the Windows-formatted floppy disk that contains the data on Linux, run the following command:  
`clpcfctrl --push -w`
- 

### Note:

If the two files (clp.conf and clp.conf.rep) and one directory (scripts) that are requisite to create a cluster are saved directly in the floppy disk, you do not need to specify any directory.

---

The message below is displayed:

```
Need to shutdown system and reboot
please shutdown system after push. (hit return) :
```

3. Press **ENTER**.

When the cluster is successfully created, the message below is displayed:

```
success . (code : 0)
```

---

**Related Information:**

For troubleshooting of the clpcfctrl command, refer to the *Reference Guide*.

---

## Verifying the behavior of the target monitoring application

Execute the operations below from the WebManager or the command line to verify that the target monitoring application is running normally.

---

**Note:**

Be sure to execute Steps 1 to 4 below before you move to the next step (adding exec 2). If you execute these steps after adding exec 2, it becomes difficult to distinguish whether an error is caused when the application is being started or after it has been started.

---

Execute the following steps to confirm the monitoring target operation with the WebManager. Start the WebManager (`http://FIP_address_for_the_WebManager_group:port_number` (default value is 29003)), and execute the following four verification steps.

### (Verification 1) Starting up a group

1. Right-click the icon of the failover group that you want to start in the WebManager tree view, and click **Start**.
2. Check that the group icon has turned green and the application is running normally.

### (Verification 2) Stopping a group

1. Right-click the icon of the failover group that you want to start in the WebManager tree view, and click **Stop**.
2. Check that the group icon has turned gray and check that the application has stopped.

---

**Note:**

Check that the group has been started and/or stopped among all the servers that start the failover group.

---

### (Verification 3) Moving a group

Move a failover group among servers. Check that the started group properly moves by moving the group to other servers in order.

1. Right-click the icon of the failover group that you want to move in the WebManager tree view.
2. Click the group icon, and check that the group has been started on the destination server in the table view. Check also that the application is running normally.

---

**Note:**

Depending on the application startup/stop process described in the script, it may take a few minutes to complete moving a group. See the tree view on the main screen to check that the group has been moved successfully.

---

## (Verification 4) Failing over a group

Shut down the server on which the failover group is running, and check that the group fails over on the destination server.

1. In the WebManager tree view, right-click the server on which the group you want to fail over is running, and click **Reboot OS**.
2. Restart the server, and check that the failover group fails over to the destination server. Check also that the application is running normally on the destination server.

You have completed verifying that the application is running normally by exec 1. Move to Step 4.

---

### **Note:**

To verify the operation of the application from the command line, run the following commands.

(Verification 1) `clpgrp -s group_name`

(Verification 2) `clpgrp -t group_name`

(Verification 3) `clpgrp -m group_name`

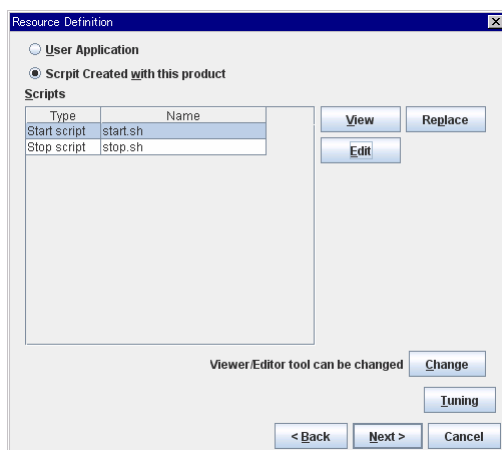
Run the `clpstat` command to confirm the cluster status.

---

## Step 4 Adding the exec resource (exec 2) for starting monitoring command

Add the exec resource for starting the monitoring command to the failover group. In this guide, this exec resource is called exec 2.

1. If the Builder has not been started, start it.  
(Default path: C:\Program Files\CLUSTERPRO\clpbuilder-1\clptrek.html)
2. Right-click the target failover group, and click **Add Resource**.
3. The **Resource Definition** dialog box is displayed. Select **execute resource** in **Type**. Enter any name you like (enter “httpmon” in this example), and click **Next**.
4. The following window is displayed. Confirm that **Script Created with this product** is selected. Select **Start script** in **Type** in the **Scripts** table, and click **Replace**.



5. Specify the script to start the monitoring command. Move to the folder of the script templates, and specify the script “start.sh” in the “http-mon” folder. Then click **Open**.

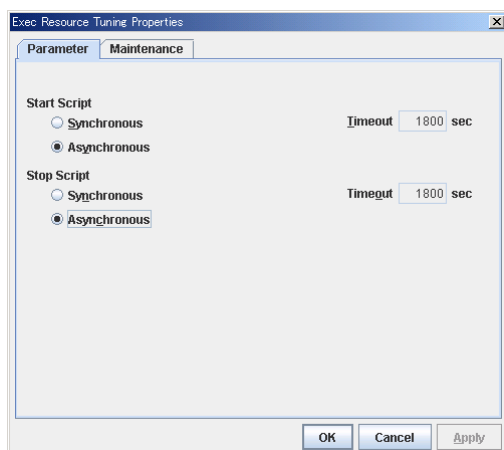
### Note:

- ◆ The following is the default installation folder of script template:  
C:\Program Files\CLUSTERPRO\clpbuilder-1\scripts\linux
- ◆ The target monitoring application name is given to the folder of the script templates for starting up the target monitoring application. “-mon” is added after the target monitoring application name in the folder of the script templates for starting up the target monitoring application.

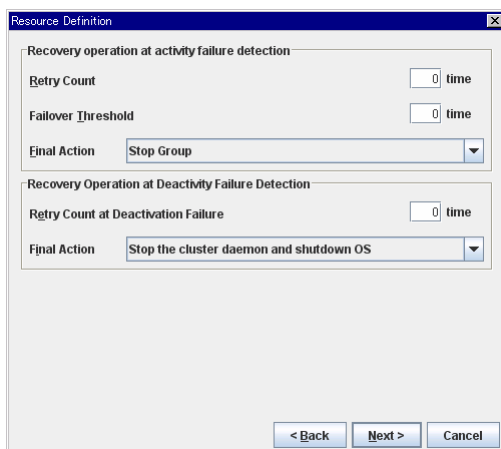
6. The confirmation dialog box asking for replacement is displayed. Specify the original file to be replaced and the path, and select **Yes**.
7. In the same way, replace the end script. Select **Stop Script** in **Type** and click **Replace**. Specify the script “stop.sh” in the “http-mon” folder, and click **Open**.
8. Modify the script. Open the editor by clicking **Edit** to modify the script according to your environment. See Appendix A “Script templates” for what to be modified.
9. Click **Tuning**, and check that **Asynchronous** is selected for **Start Script** and **Synchronous** for **Stop Script** on the **Parameter** tab.

**Important:**

If you select **Asynchronous**, the script is not started synchronously by the return value, and it is run by itself. The monitoring command enters the monitoring mode and will not take the return value. Be sure to set **Start Script** of the exec resource for running monitoring commands to **Asynchronous**.

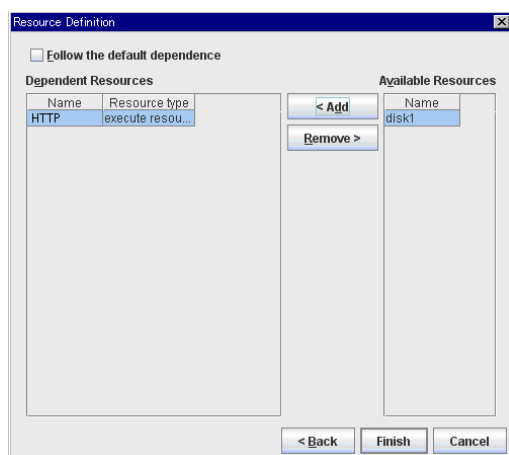


10. The following window is displayed. Set **0** to **Failover Threshold** of **Recovery Operation at Activation Failure Detection**, and set **Stop Group** to **Final Action**. Click **Next**.





11. In the following window, uncheck **Follow the default dependence** and set the exec resource (exec 1) created in Step 2 to **Dependent Resources**.

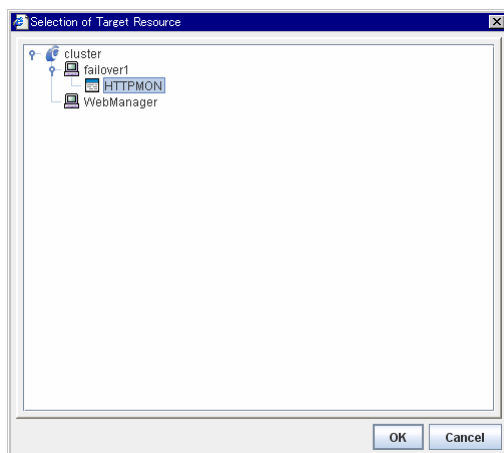


Click the **Finish** button. You have completed adding the exec resource (exec 2) for starting the monitoring command. Move to Step 5.

## Step 5 Adding the pid monitor resource

Add the pid monitor resource for monitoring the exec 2 that has been added in Step 4.

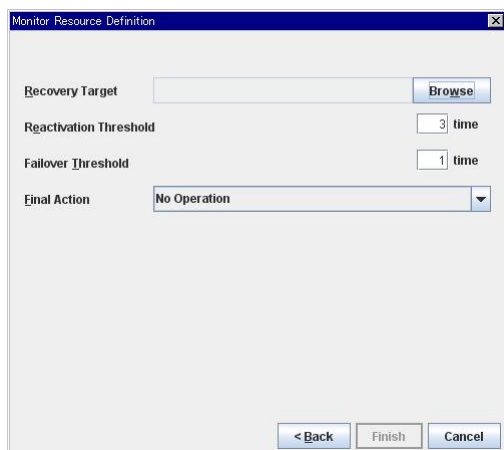
1. If the Builder has not been started yet, start it.  
(default path: C:\Program Files\CLUSTERPRO\clpbuilder-1\clptrek.html)
2. Right-click **Monitors** on the tree view, and click **Add Monitor Resource**.
3. The **Monitor Resource Definition** dialog box is displayed. Select the monitor resource type (pid monitor) and enter a monitor resource name in the **Name** box. Click **Next**.
4. Click **Browse** in the window displayed. The **Selection of Target Resource** window is displayed.



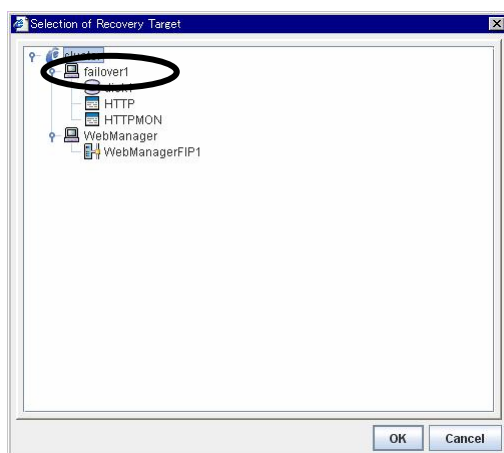
**Note:**

In the **Selection of Target Resource** window, only the exec resource set to **Asynchronous** in **Exec Resource Tuning Properties** is displayed as selectable target. If nothing can be selected, open the setting window for target exec resource and set the exec resource to **Asynchronous**.

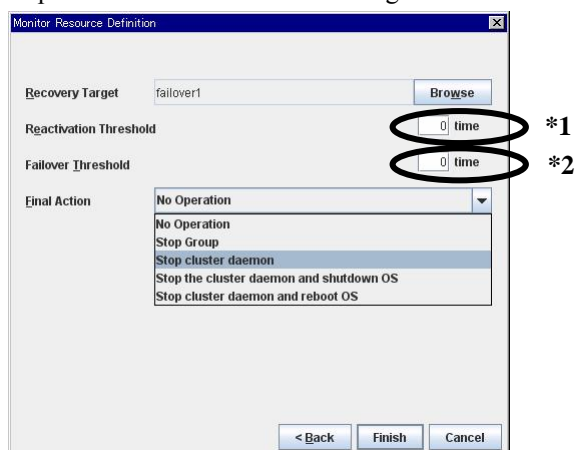
5. Specify the exec resource (exec 2) that starts the monitoring command and click **OK**.
6. Click **Next** to move to the next window and then click **Browse** of **Recovery Target**.



7. The **Selection of Recovery Target** dialog box is displayed. Select the failover group in which the target monitoring application exists.



8. Select an action to be taken for **Final Action**. This determines the operation of the ExpressCluster when the monitoring command detects an error in the monitored application.



9. When you finish configuring the settings, click **Finish**. You have finished creating the monitor resource. Move to Step 6.

## Failover soon after detecting an error

If you want to execute failover when an error is detected, set **0** to **Reactivation Threshold**. If you want to reactivate the group when an error is detected, specify a value other than **0** to **Reactivation Threshold**.

When you set a value other than 0 to **Reactivation Threshold**, you need to set a value longer than the time below to **Wait Time to Start Monitoring**.

From when a monitoring command is started to when it is terminated due to an error:

The time to terminate the monitoring command is determined by the values of -i parameter (monitoring interval), -c parameter (retry time) and -r parameter (response wait time).

Example: When the monitoring command is terminated because an error is detected in the internet server:

- ◆ -i (monitoring interval)
- ◆ : 60 (sec.)
- ◆ -c (retry time)
- ◆ : 2 (times)
- ◆ -r (response wait time)
- ◆ : 120 (sec.)

Approximate time to finish the monitoring command:

$60(\text{sec.}) \times 2(\text{times}) + \text{monitoring period} = 120 + \alpha (\text{sec.})$

\* Monitoring interval  $\times$  retry count + monitoring period

Depending on the type of error, the time to end the monitoring command slightly differs. For the monitoring command operation depending on the error type, see “Alert messages” on page 31.

## Executing failover without stopping a server

If you want to perform failover without stopping a server as a cluster when an error is detected, set **1** to **Failover Threshold**. In this case, other failover groups are operated continuously on the server that detected the error. When an error is also detected in the failover destination server, a failover occurs again and the failover group returns. If you want to perform failover by stopping a server as a cluster when an error is detected, set **0** to **Failover Threshold**.

In addition, specify either **Stop cluster daemon**, **Stop the cluster daemon and shut down OS**, or **Stop cluster daemon and reboot OS** to **Final Action**.

In this case, other failover group is terminated or a failover occurs because the server that detected an error will not be operated as a cluster.

Considering that the recovery will be done when an error occurs, it is recommended to specify as follows:

**Failover Threshold**      0

**Final Action**              Stop cluster daemon

## Step 6 Verifying the settings for monitoring command

In Step 2, you have added the exec resource for starting target monitoring application to the failover group created in Step 1. In Step 3, you have checked that the target monitoring application runs normally.

Then in Step 4, you have added the exec resource for starting monitoring commands. Finally, in Step 5, you have added the monitor resource for monitoring the exec resource for starting monitoring commands.

In Step 6, after updating a failover group, check that monitoring commands run normally by performing the following steps in the same way as you checked the operation of the target monitoring application.

---

**Note:**

You need to reflect the cluster configuration data edited in Steps 4 and 5 to the cluster system. For how to reflect the data, see “

Saving the cluster configuration data on a floppy disk (Windows),” “Creating a cluster using the data in a floppy disk” in Step 3.

---

Execute the following operation from the WebManager, and check that the target monitoring application runs normally.

Start the WebManager ([http://IP\\_address\\_for\\_the\\_WebManager\\_group:port\\_number](http://IP_address_for_the_WebManager_group:port_number) (default value: 29003)), and execute the following four verification steps.

### (Verification 1) Starting up a group

1. Right-click the icon of the failover group that you want to start in the WebManager tree view, and click **Start**.
2. Check that the group icon has turned green.
3. Check that the messages of the Event ID1 and ID2 of the monitoring command are displayed in the WebManager alert view.

---

**Note:**

If a monitoring command displays an error message in the ExpressCluster WebManager when the group is started, a parameter value of the monitoring command may not be appropriate. If an error message is displayed on a particular server, there may be an error in the environment settings of the target monitoring application.

---

### (Verification 2) Stopping a group

1. In the WebManager tree view, right-click the icon of the failover group you want to stop, and click **Stop**.
2. Check that the group icon has turned gray.
3. Check that the message of the Event ID 3 of the monitoring command is displayed in the WebManager alert view.

---

**Note:**

Check that the group has been started and/or stopped among all the servers that start the failover group.

---

## (Verification 3) Moving a group

Move a failover group among servers. Check that the started group properly moves by moving the group to other servers in order.

1. In the WebManager tree view, right-click the icon of the failover group that you want to move, and click **Move**.
2. Click the group icon, and check that the group has been started on the destination server in the table view.
3. Check that the monitoring command message is displayed in the WebManager alert view.

Server name: *Name\_of\_the\_server\_from\_which\_the\_group\_is\_moved*

Event ID: 3

Server name: *Name\_of\_the\_server\_to\_which\_the\_group\_is\_moved*

Event ID: 1, 2

---

**Note:**

Depending on the application startup/stop process described in the script, it may take a few minutes to complete moving a group. See the tree view on the main screen to check that the group has been moved.

---

## (Verification 4) Failing over a group

Shut down the server on which the failover group is running, and verify that the group fails over to the destination server.

1. In the WebManager tree view, right-click the server in which the group that you want to fail over is running, and click **Reboot OS**.
2. Check that the server is restarted and the failover group fails over to the destination server.
3. Verify that the message of the monitoring command is displayed in the WebManager alert view.

Server name: *Name\_of\_the\_server\_from\_which\_the\_failover\_group\_fails\_over*

Event ID: 3

Server Name: *Name\_of\_the\_server\_to\_which\_the\_failover\_group\_fails\_over*

Event ID: 1, 2

---

**Note:**

If you set an extremely small value such as 1 (one) to the monitoring interval and response time parameters, you may not be able to perform monitoring normally. Check the operation carefully beforehand.

---

---

**Related Information:**

For more information on messages, see “Alert messages” on page 31.

---

You have successfully completed the settings for ExpressCluster X Internet Server Agent.

---

**Note:**

Run the following commands to confirm the group failover from the command line.

(Verification 1) `clpgrp -s group_name`

(Verification 2) `clpgrp -t group_name`

(Verification 3) `clpgrp -m group_name`

Run the `clpstat` command to check the cluster status.

---

# Appendix A. Script templates

## Setting up script templates

ExpressCluster provides various script templates to monitor applications. Write the necessary information into templates to monitor applications effectively.

The script templates can be used from the ExpressCluster X Builder. There are Windows version and Linux version for the Builder and the templates are prepared for each version. Choose and set up the script templates according to your environment.

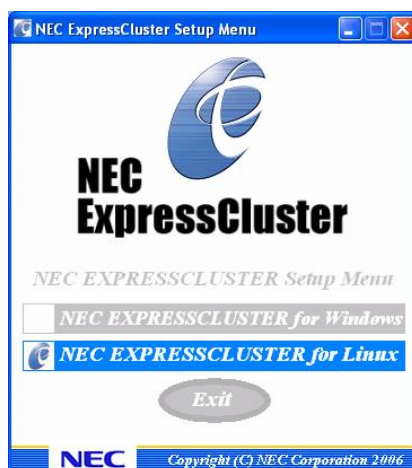
Obtain the latest version of the script templates and follow the instruction that comes with the product to update.

## Installing the script templates on Windows machine

Log on as administrator when installing the script templates on Windows machine.

Follow the procedures below:

1. Insert the ExpressCluster X CD into a CD drive.  
**The Setup Menu window is displayed automatically. If the window is not displayed, execute the menu.exe on the CD drive directly.**
2. Click **ExpressCluster for Linux**.



3. Click **ExpressCluster Template Scripts**.



4. A dialog box to verify where to install the template scripts is displayed. Check the path and click **Extract**.

## Installing script templates on Linux machine

Set up the script templates after the Builder for the Linux version has been set up. The script templates are installed in a folder having the scripts for the Builder. Refer to Chapter 3, “Creating the cluster configuration data using the Builder” in the *Installation and Configuration Guide* for how to install the Builder.

Log on as root user when installing the script templates on Linux machine.

Follow the procedures below:

1. Insert the ExpressCluster X CD into a CD drive.
2. Mount the CD.  

```
# mount /dev/cdrom
```
3. Move to the following directory:  

```
# cd /mnt/cdrom/Linux/1.0/en/script/Linux
```
4. Install the script templates using the rpm command.  

```
# rpm -i expresscls-script-1.0.0-1.1linux.i686.rpm
```

---

**Note:**

The rpm file name may vary depending on the version of the Agent. The command description may also vary depending on the type of Linux.

---

## Uninstalling the script templates

### Uninstalling the script templates for Windows

To uninstall the script templates, log on as an administrator and delete all folders except defaultl and defaultw under C:\Program Files\CLUSTERPRO\clpbuilder-l\scripts\linux.

---

**Note:**

Check the directory because the underlined part may vary depending on the terminal environment.

---

### Uninstalling the script templates for Linux

To uninstall the script templates, run the following command as root user:

```
# rpm -e expresscls-script
```

If you uninstall the Builder for Linux, the script templates (the Builder for Linux) will be uninstalled as well, but the rpm module information will be remained. Therefore, it is necessary to forcefully delete the package using the rpm command:

(Example): `rpm -e --force expresscls-script`



## Details on script templates

Two templates, `start.sh` and `stop.sh`, are provided for the scripts. Modify and use them according to your system requirements. Modifications to the scripts need to be made are underlined boldface italics.

## For HTTP daemon startup

### `start.sh`

```
#!/bin/sh
#*****
#*          start.sh          *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "NORMAL1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "NORMAL2"
    else
        echo "ON_OTHER1"
    fi

    date +"%Y/%m/%d %T"
    echo "`/etc/init.d/httpd start`"
else
    echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "FAILOVER1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "FAILOVER2"
    else
        echo "ON_OTHER2"
    fi

    date +"%Y/%m/%d %T"
    echo "`/etc/init.d/httpd start`"
else
    echo "ERROR_DISK from FAILOVER"
fi
else
echo "NO_CLP"
fi

echo "EXIT"
exit 0
```

## stop.sh

```
#!/bin/sh
#*****
#*                stop.sh                *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "NORMAL1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "NORMAL2"
    else
        echo "ON_OTHER1"
    fi

    date +"%Y/%m/%d %T"
    echo "`/etc/init.d/httpd stop`"
else
    echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "FAILOVER1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "FAILOVER2"
    else
        echo "ON_OTHER2"
    fi

    date +"%Y/%m/%d %T"
    echo "`/etc/init.d/httpd stop`"
else
    echo "ERROR_DISK from FAILOVER"
fi
else
    echo "NO_CLP"
fi

echo "EXIT"
exit 0
```

## For HTTP daemon monitoring

### start.sh

```

#!/bin/sh
#*****
#*          start.sh          *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
echo "NORMAL1"

if [ "$CLP_SERVER" = "HOME" ]
then
echo "NORMAL2"
else
echo "ON_OTHER1"
fi

date +"%Y/%m/%d %T"
echo "clp_httpmon start"
clp_httpmon httpwatch
else
echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
echo "FAILOVER1"

if [ "$CLP_SERVER" = "HOME" ]
then
echo "FAILOVER2"
else
echo "ON_OTHER2"
fi

date +"%Y/%m/%d %T"
echo "clp_httpmon start"
clp_httpmon httpwatch
else
echo "ERROR_DISK from FAILOVER"
fi
else
echo "NO_CLP"
fi

echo "EXIT"
exit 0

```

## stop.sh

```
#!/bin/sh
#*****
#*          stop.sh          *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "NORMAL1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "NORMAL2"
    else
        echo "ON_OTHER1"
    fi

    date +"%Y/%m/%d %T"
    echo "clp_httpmon stop"
    clp_httpmon httpwatch --stop
else
    echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "FAILOVER1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "FAILOVER2"
    else
        echo "ON_OTHER2"
    fi

    date +"%Y/%m/%d %T"
    echo "clp_httpmon stop"
    clp_httpmon httpwatch --stop
else
    echo "ERROR_DISK from FAILOVER"
fi
else
    echo "NO_CLP"
fi

echo "EXIT"
exit 0
```

## For SMTP daemon startup

### start.sh

```

#!/bin/sh
#*****
#*          start.sh          *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
echo "NORMAL1"

if [ "$CLP_SERVER" = "HOME" ]
then
echo "NORMAL2"
else
echo "ON_OTHER1"
fi

date +"%Y/%m/%d %T"
echo "~/etc/init.d/sendmail start`"
else
echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
echo "FAILOVER1"

if [ "$CLP_SERVER" = "HOME" ]
then
echo "FAILOVER2"
else
echo "ON_OTHER2"
fi

date +"%Y/%m/%d %T"
echo "~/etc/init.d/sendmail start`"
else
echo "ERROR_DISK from FAILOVER"
fi
else
echo "NO_CLP"
fi

echo "EXIT"
exit 0

```

## stop.sh

```
#!/bin/sh
#*****
#*                stop.sh                *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "NORMAL1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "NORMAL2"
    else
        echo "ON_OTHER1"
    fi

    date +"%Y/%m/%d %T"
    echo "`/etc/init.d/sendmail stop`"
else
    echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "FAILOVER1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "FAILOVER2"
    else
        echo "ON_OTHER2"
    fi

    date +"%Y/%m/%d %T"
    echo "`/etc/init.d/sendmail stop`"
else
    echo "ERROR_DISK from FAILOVER"
fi
else
    echo "NO_CLP"
fi

echo "EXIT"
exit 0
```

## For SMTP daemon monitoring

### start.sh

```

#!/bin/sh
#*****
#*          start.sh          *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
echo "NORMAL1"

if [ "$CLP_SERVER" = "HOME" ]
then
echo "NORMAL2"
else
echo "ON_OTHER1"
fi

date +"%Y/%m/%d %T"
echo "clp_smtpmon start"
clp_smtpmon smtpwatch
else
echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
echo "FAILOVER1"

if [ "$CLP_SERVER" = "HOME" ]
then
echo "FAILOVER2"
else
echo "ON_OTHER2"
fi

date +"%Y/%m/%d %T"
echo "clp_smtpmon start"
clp_smtpmon smtpwatch
else
echo "ERROR_DISK from FAILOVER"
fi
else
echo "NO_CLP"
fi

echo "EXIT"
exit 0

```

## stop.sh

```
#!/bin/sh
#*****
#*          stop.sh          *
#*****

if [ "$CLP_EVENT" = "START" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "NORMAL1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "NORMAL2"
    else
        echo "ON_OTHER1"
    fi

    date +"%Y/%m/%d %T"
    echo "clp_smtpon stop"
    clp_smtpon smtpwatch --stop
else
    echo "ERROR_DISK from START"
fi
elif [ "$CLP_EVENT" = "FAILOVER" ]
then
if [ "$CLP_DISK" = "SUCCESS" ]
then
    echo "FAILOVER1"

    if [ "$CLP_SERVER" = "HOME" ]
    then
        echo "FAILOVER2"
    else
        echo "ON_OTHER2"
    fi

    date +"%Y/%m/%d %T"
    echo "clp_smtpon stop"
    clp_smtpon smtpwatch --stop
else
    echo "ERROR_DISK from FAILOVER"
fi
else
    echo "NO_CLP"
fi

echo "EXIT"
exit 0
```

## Appendix B. Glossary

|                           |   |
|---------------------------|---|
| <b>Cluster partition</b>  | A partition on a mirror disk. Used for managing mirror disks.<br>(Related term: Disk heartbeat partition)                   |
| <b>Interconnect</b>       | A dedicated communication path for server-to-server communication in a cluster.<br>(Related terms: Private LAN, Public LAN) |
| <b>Virtual IP address</b> | IP address used to configure a remote cluster.  |

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|                                 |   |
|---------------------------------|---|
| <b>Management client</b>        | Any machine that uses the WebManager to access and manage a cluster system.   |
| <b>Startup attribute</b>        | A failover group attribute that determines whether a failover group should be started up automatically or manually when a cluster is started.   |
| <b>Shared disk</b>              | A disk that multiple servers can access.  |
| <b>Shared disk type cluster</b> | A cluster system that uses one or more shared disks.  |
| <b>Switchable partition</b>     | A disk partition connected to multiple computers and is switchable among computers.<br>(Related terms: Disk heartbeat partition)  |
| <b>Cluster system</b>           | Multiple computers are connected via a LAN (or other network) and behave as if it were a single system.   |
| <b>Cluster shutdown</b>         | To shut down an entire cluster system (all servers that configure a cluster system).  |
| <b>Active server</b>            | A server that is running for an application set.<br>(Related term: Standby server)  |
| <b>Secondary server</b>         | A destination server where a failover group fails over to during normal operations.<br>(Related term: Primary server)   |
| <b>Standby server</b>           | A server that is not an active server.<br>(Related term: Active server)   |
| <b>Disk heartbeat partition</b> | A partition used for heartbeat communication in a shared disk type cluster.   |
| <b>Data partition</b>           | A local disk that can be used as a shared disk for switchable partition. Data partition for mirror disks.<br>(Related term: Cluster partition)  |
| <b>Network partition</b>        | All heartbeat is lost and the network between servers is partitioned.<br>(Related terms: Interconnect, Heartbeat)   |
| <b>Node</b>                     | A server that is part of a cluster in a cluster system. In networking terminology, it refers to devices, including computers and routers, that can transmit, receive, or process signals. |
| <b>Heartbeat</b>                | Signals that servers in a cluster send to each other to detect a failure in a cluster.<br>(Related terms: Interconnect, Network partition)  |
| <b>Public LAN</b>               | A communication channel between clients and servers.<br>(Related terms: Interconnect, Private LAN)  |
| <b>Failover</b>                 | The process of a standby server taking over the group of resources that the active server previously was handling due to error detection.   |

---

|                                 |   |
|---------------------------------|---|
| <b>Failback</b>                 | A process of returning an application back to an active server after an application fails over to another server.   |
| <b>Failover group</b>           | A group of cluster resources and attributes required to execute an application.   |
| <b>Moving failover group</b>    | Moving an application from an active server to a standby server by a user.  |
| <b>Failover policy</b>          | A priority list of servers that a group can fail over to.   |
| <b>Private LAN</b>              | LAN in which only servers configured in a clustered system are connected.<br>(Related terms: Interconnect, Public LAN)  |
| <b>Primary (server)</b>         | A server that is the main server for a failover group.<br>(Related term: Secondary server)  |
| <b>Floating IP address</b>      | Clients can transparently switch one server from another when a failover occurs.<br>Any unassigned IP address that has the same network address that a cluster server belongs to can be used as a floating address. |
| <b>Master server</b>            | The server displayed on top of the <b>Master Server</b> in <b>Cluster Properties</b> in the Builder.  |
| <b>Mirror connect</b>           | LAN used for data mirroring in a data mirror type cluster. Mirror connect can be used with primary interconnect.  |
| <b>Mirror disk type cluster</b> | A cluster system that does not use a shared disk. Local disks of the servers are mirrored.  |

# Appendix C. Index

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