



[Enhancement] No.1 market share in Japan for 20 consecutive years*

Version 5.0 **New** Enhancement

May, 2022

NEC Corporation,

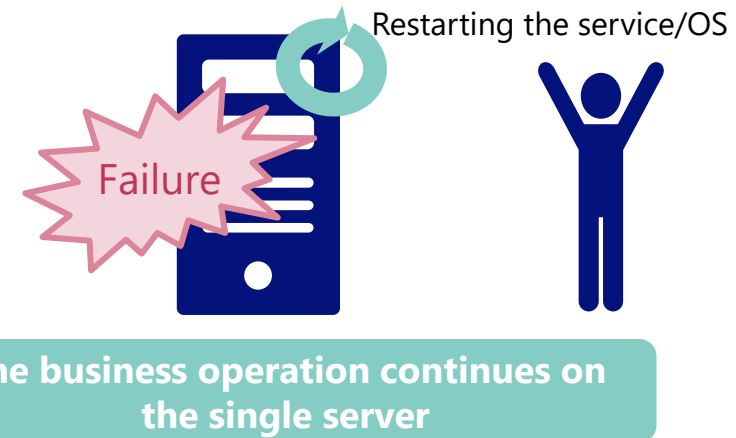
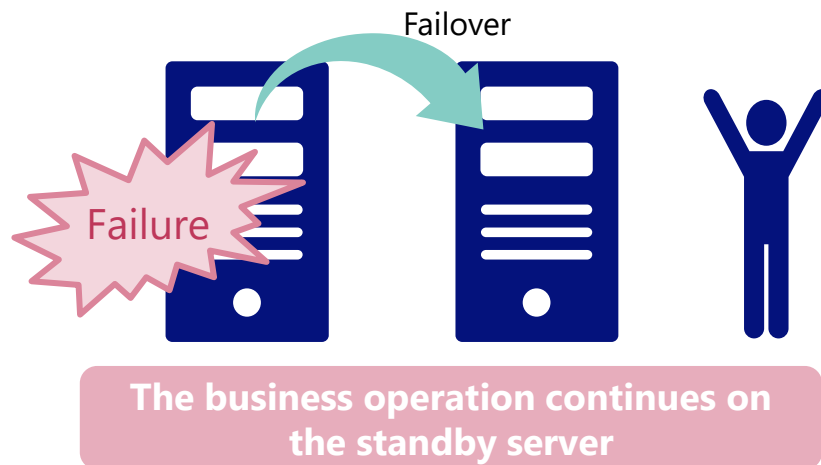
Smart Orchestration Service Department,

(EXPRESSCLUSTER)

What Is EXPRESSCLUSTER?

EXPRESSCLUSTER is a solution to maximize the uptime of customer's business operation.

- ◆ No.1 market share in Japan for 20 consecutive years*
- ◆ Prevents any failure from interrupting the business
 - Makes the business system (including its hardware and OS) redundant
 - Monitors the hardware, OS, and applications for failures; keeps the business in operation with a healthy server even if a failure occurs
 - Supports not only multivendor servers and storages, but also public cloud environments (e.g. AWS and Microsoft Azure)
- ◆ Realizes the maximization with software for HA clustering and for increasing server availability



Why EXPRESSCLUSTER Has Been Used in Clouds?

- ◆ The conditions of an IaaS SLA* often require redundancy. One of the solutions is to configure an HA cluster.
- ◆ The IaaS SLA* is only for infrastructure. The user of a cloud-based system must take measures for building a mechanism to ensure and improve the availability.
- ◆ Unlike many other HA cluster applications, EXPRESSCLUSTER officially supports its operation in public clouds. It allows an HA cluster to be configured without a shared disk through data mirroring.
- ◆ PaaS, involving functional restrictions and performance differences, often require alterations or additional integration evaluations to cooperate with applications. EXPRESSCLUSTER allows a whole on-premises environment to be lifted to a cloud, reducing the cost of application alteration and reevaluation. EXPRESSCLUSTER also enables the entire environment to be returned from the cloud to the on-premises structure. Therefore, cloud vendor lock-in can be avoided.
- ◆ EXPRESSCLUSTER can redundantize all HA-cluster-supporting applications, without using application-side redundantizing functions. This leads to reducing the application cost as well.

* SLA (Service Level Agreement): the content, scope, and quality achievement level of a cloud service presented by the cloud vendor

History

Providing various platforms with high availability in harmony with the times



Released
in Apr. 2022

First release
for Windows
in Oct. 1996

Ver. 1.0

First release
for Linux
in Sep. 2000

Ver. 1.0

First release of
X Series
in Sep. 2006

X 1.0

X 2.0/2.1

X 3.0 to 3.3

X 4.0 to 4.3

X 5.0

With various enhancements to meet the demands of the times, such as supporting:

- Remote clustering
- Virtualized infrastructures
- The cloud

Enhancement Points of EXPRESSCLUSTER X 5.0

Enhancements of IaC and security, for the cloud

- Supported HA clustering in the same AZ of AWS: Added AWS secondary IP resources
- Added forced-stop resources for AWS and OCI
- Supported time specification to delay starting the cluster service after an OS startup
- Added the clpcfadm.py command for enhancing the creation of cluster configuration data files
- Added the clpfcwctrl command for simplifying firewall configuration
- Supported SELinux enforcing mode

Usability enhancements

- Enhanced Cluster WebUI (for copying, moving, and collectively configuring resources and monitors)
- Enhanced the functionality of checking cluster configuration data
- Added the clpcfconv command for converting cluster configuration data

Additionally supported platforms and applications

- Windows Server 2022
- SUSE LINUX Enterprise Server 15 SP3 and Ubuntu 20.04.3 LTS
- PostgreSQL 14.1 and MariaDB 10.5

Enhancements of IaC and Security, for the Cloud

Supported HA clustering in the same AZ of AWS: Added AWS secondary IP resources

Added forced-stop resources for AWS and OCI

Supported time specification to delay starting the cluster service after an OS startup

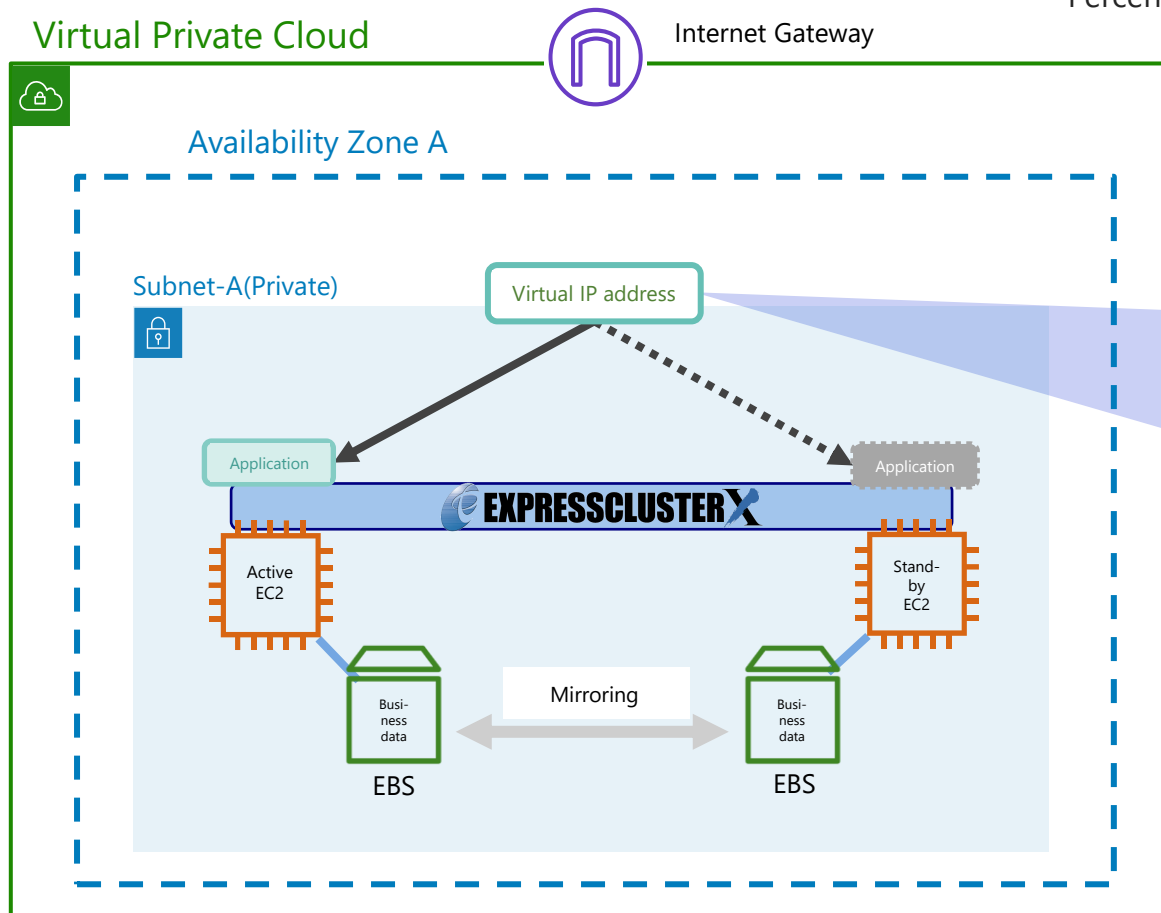
Added the `clpcfadm.py` command for enhancing the creation of cluster configuration data files

Added the `clpfwctrl` command for simplifying firewall configuration

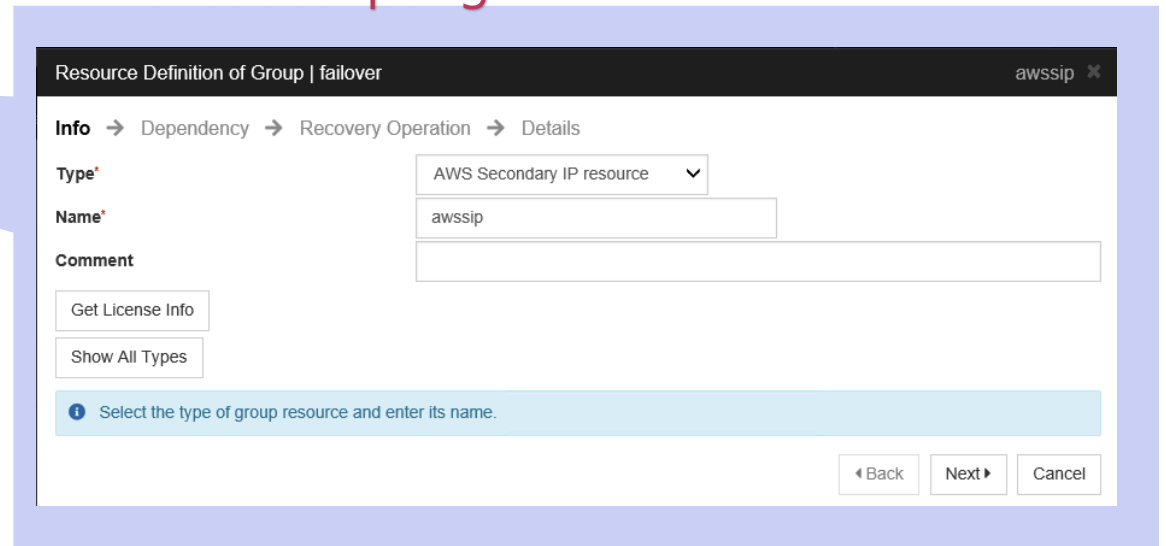
Supported HA Clustering in the Same AZ of AWS

HA clustering becomes easy with an AWS secondary IP resource, even in the same AZ (Availability Zone) of AWS.

Note: No HA clusters created in the same AZ will meet the Service Commitment (a Monthly Uptime Percentage for each AWS region, during any monthly billing cycle, of at least 99.99%) of AWS.

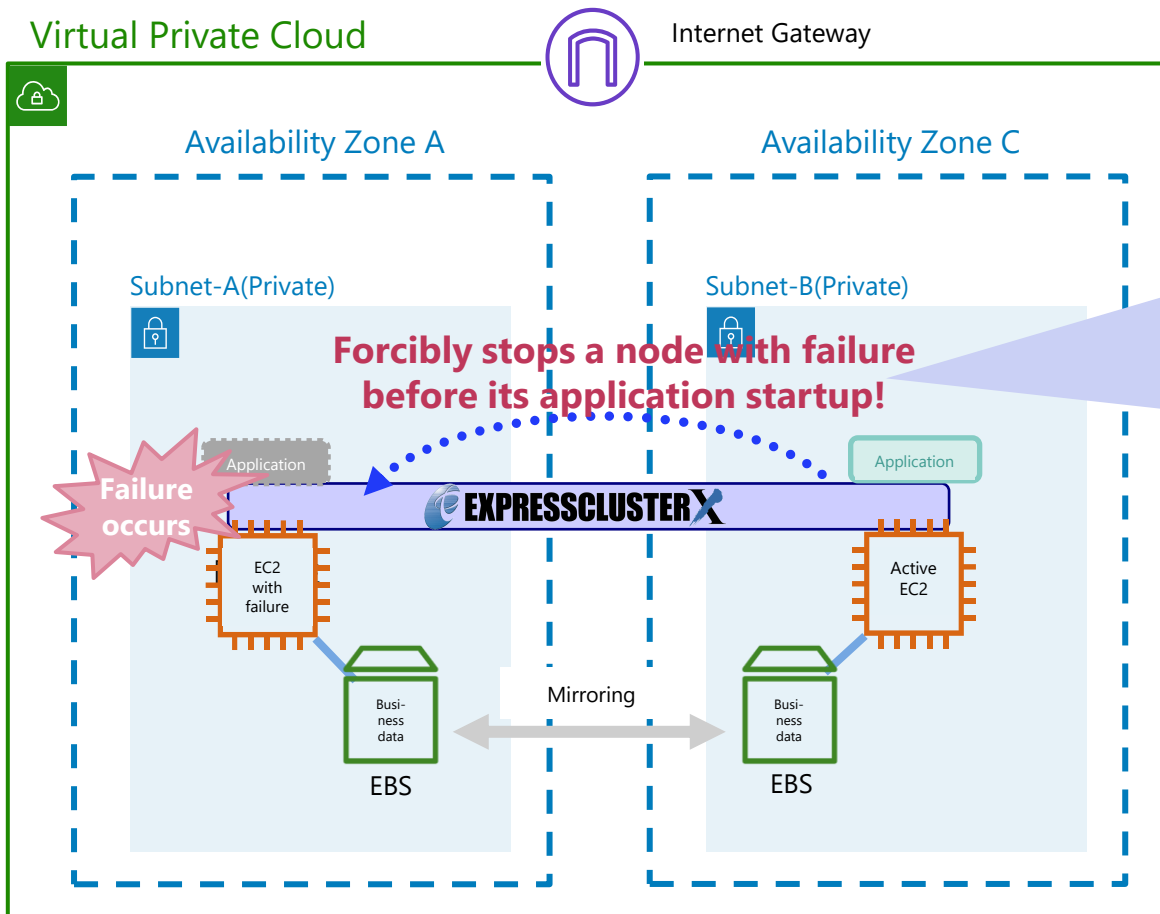


Resource configurable through GUI without scripting

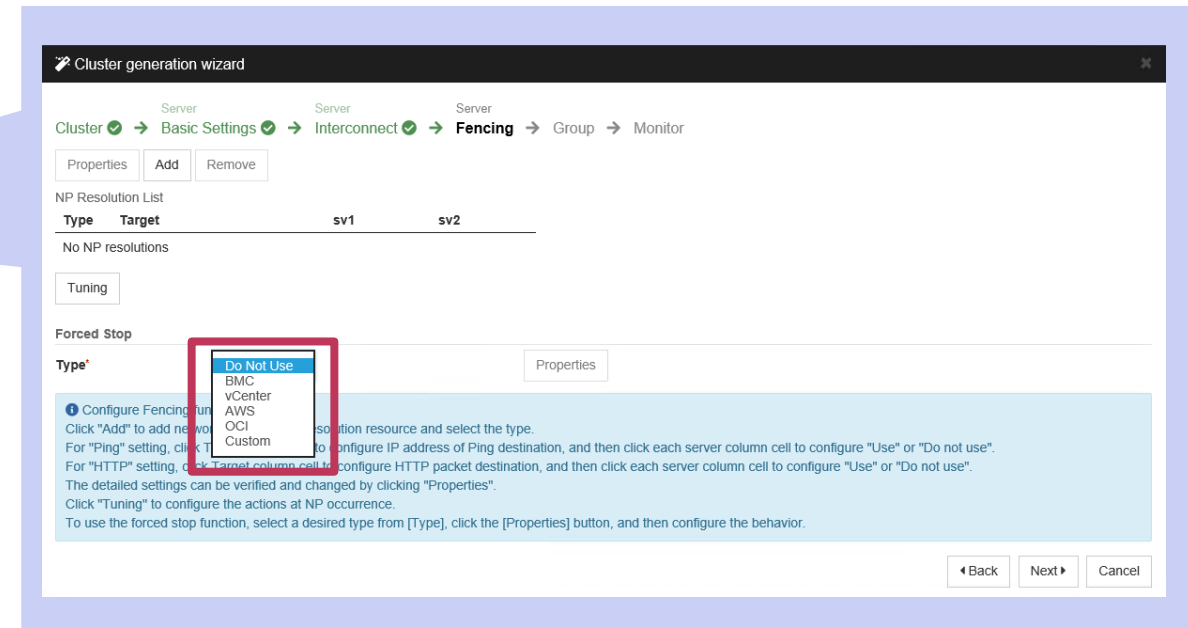


Added Forced-Stop Resources for AWS and OCI

The GUI allows the advanced configuration of forcibly stopping a node with failure before its application startup, eliminating the need for scripting the forced stop.



Resource configurable through GUI without scripting



Supported Time Specification to Delay Starting the Cluster Service after an OS Startup*

The delay time can now be specified, even for an environment where neither bcdedit nor GRUB2 can be used or handled.

EXPRESSCLUSTER allows system integrators to specify the delay time, even in an environment where they cannot change the OS settings.

The screenshot shows the 'Cluster Properties | cluster' dialog box with the 'Timeout' tab selected. The 'Service Startup Delay Time*' field is highlighted with a red box and contains the value '0' with a 'sec' unit. Other fields include 'Server Sync Wait Time*' (5 min), 'Heartbeat' (Interval: 3 sec, Timeout: 90 sec), and 'Server Internal Timeout*' (180 sec). There is an 'Initialize' button and 'OK', 'Cancel', and 'Apply' buttons at the bottom.

See "Reference Guide" -> "2. Parameter details" -> "2.2. Cluster properties" -> "2.2.4. Timeout tab" -> "Service Startup Delay Time"

* A setting required to make the OS restart time longer than the heartbeat timeout time, mainly in a cloud environment or a virtualized environment.

Added the clpcfadm.py Command for Enhancing the Creation of Cluster Configuration Data Files

This command, the successor to clpcfset, allows listing tag names specifiable on command lines, for promoting IaC (Infrastructure as Code).

◆ mod: A new option to list tag names

Listing tag names (child elements of /root)

```
# clpcfadm.py mod -t
```

Display example:

```
# all
# cluster
# messages
# pm
# rm
# webalert
# webmgr
```

Listing tag names (child elements of /root/pm/exec0)

```
# clpcfadm.py mod -t pm/exec0
```

Display example

(value in []: current setting):

```
# recover [5]
# retry [5]
# type [rc]
# wait [1800]
```

Added the clpfwctrl Command for Simplifying Firewall Configuration

This command allows easily configuring the firewall needed for EXPRESSCLUSTER.

◆ Adding a firewall rule with the clpfwctrl command

- Executing the command adds or deletes a firewall rule on servers for EXPRESSCLUSTER.

■ Command lines (on Linux)

- `clpfwctrl --add [--zone=<ZONE>]`
- `clpfwctrl --remove`
- `clpfwctrl --help`

■ Execution examples (on Linux)

- Adding a rule to the default zone

```
# clpfwctrl.sh --add  
Command succeeded.
```

- Adding a rule to the home zone

```
# clpfwctrl.sh --add --zone=home  
Command succeeded.
```

■ Command lines (on Windows)

- `clpfwctrl --add [--profile public | private | domain]`
- `clpfwctrl --remove`
- `clpfwctrl --help`

■ Execution examples (on Windows)

- Adding an inbound firewall rule without the `--profile` option

```
# clpfwctrl.bat --add  
Command succeeded.
```

- Adding an inbound firewall rule with domain and private (the `--profile` option) specified

```
# clpfwctrl.bat --profile domain private  
Command succeeded.
```

Usability Enhancements

Enhanced Cluster WebUI (for copying, moving, and collectively configuring resources and monitors)

Enhanced the functionality of checking cluster configuration data

Enhanced Cluster WebUI

(for Copying, Moving, and Collectively Configuring Resources and Monitors)

Cluster WebUI has been drastically improved! The GUI now allows copying the settings of groups, resources, and monitors; and collectively configuring them.

Cluster WebUI Offline

Warning
Change the following settings for the copied group and group resource:
Name of the copied group
Name of the copied group resource
Settings specific to the copied group resource
The dependency of the copied group resource is set to [Follow the default dependency].
Do you want to copy the group?
Yes No

Monitor Common Properties

CSV Download

Name	Type	Interval	Timeout	Retry Count	Monitor Timing	Target Resource	Send polling time metrics	
awsvipw1	AWS Virtual IP monitor	60 sec	180 sec	1	time	Active	awsvip	Off
mdnw1	Mirror connect monitor	60 sec	120 sec	0	time	Always	-	Off
mdw1	Mirror disk monitor	10 sec	60 sec	0	time	Always	-	Off
pidw1	Process ID monitor	30 sec	30 sec	0	time	Always	-	Off
userw	User mode monitor	3 sec	90 sec		time	Always	-	Off

cluster

Servers

- sv1
- sv2

Groups

- failover
 - awsvip
 - exec
 - md
- failover - Copy
 - awsvip - Copy
 - exec - Copy
 - md - Copy

Monitors

- awsvipw1
- mdnw1
- mdw1
- pidw1
- userw

Allows copying and moving groups, resources, and monitors

Allows collectively configuring the settings of monitors and resources
Also allows exporting the settings in CSV format

Enhanced the Functionality of Checking Cluster Configuration Data

This enhancement allows even beginners to easily and confidently create and check cluster configuration data.

cluster

Overall Result

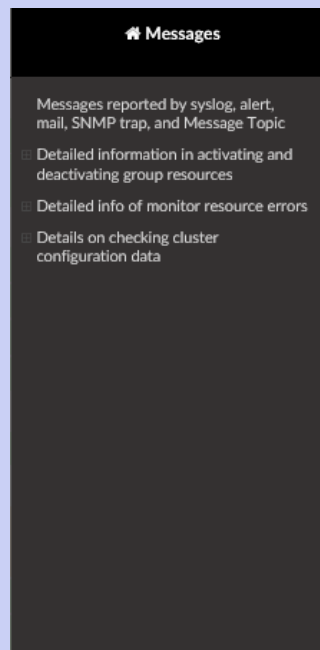
	sv1	sv2
Result summary	FAIL	FAIL
Check started at	2022/03/29 11:54:57	2022/03/29 11:55:02
Check ended at	2022/03/29 11:55:02	2022/03/29 11:55:08

Results by Category

Cluster Property	sv1	sv2
Number check on Port No. tab	PASS	PASS
Number check on Port No.(Mirror) tab	PASS	PASS

Unrecommended Settings Check

Recovery action check for deactivation failure(exec)	ID: 6001 "No operation" is set for Recovery Operation at Deactivation Failure Detection. It is recommended to select any other value.	ID: 6001 "No operation" is set for Recovery Operation at Deactivation Failure Detection. It is recommended to select any other value.
Recovery action check for deactivation failure(md)	PASS	PASS



Check item	ID	Message	Action
Kernel check	5031	Unsupported kernel found. Please check the supported kernel version.	Check the supported kernel version.
Presence check for zip command	5051	Failed.	Check if the which command is available.
	5052	zip command is not found.	Install the zip command.

Unrecommended settings check

Check item	ID	Message	Action
Recovery action check for deactivation failure (%1)	6001	"No operation" is set for Recovery Operation at Deactivation Failure Detection. It is recommended to select any other value.	It is recommended to select a value other than "No operation" for the final action on deactivation failure detection.

Displayed by only clicking the cell that describes the measure against the unrecommended setting

Additionally Supported Platforms and Applications

Windows Server 2022

SUSE LINUX Enterprise Server 15 SP3 and Ubuntu 20.04.3 LTS

PostgreSQL 14.1 and MariaDB 10.5

Supported OSs and Platforms

Red text means newly supported ones

◆ OSs

- Windows Server 2016, 2019, and 2022
- Red Hat Enterprise Linux 7.9, 8.1, 8.2 and 8.4
- MIRACLE LINUX 8.4
- Oracle Linux 7.9 and 8.4 (Red Hat Compatible Kernel)
- Oracle Linux 7.7 and 8.3* (UEK)
- Amazon Linux 2
- SUSE Enterprise Linux 12 SP5, 15 SP2, and 15 SP3
- Ubuntu 20.04 LTS and 20.04.3 LTS

◆ Cloud platforms

- AWS (Amazon Web Services), Microsoft Azure, OCI (Oracle Cloud Infrastructure), and Google Cloud Platform

◆ Virtualized environments

- VMware vSphere, Hyper-V, and KVM

* Supported only for shared-disk type clusters

Notes

Notes

- ◆ Forced-stop function and scripts
 - These have been redesigned as individual forced-stop resources adapted to environment types. Since the forced-stop function and scripts configured before the upgrade are no longer effective, set them up again as forced-stop resources.
- ◆ Stopping our support for OSs and applications which are no longer supported by the corresponding vendors
 - For details, see Getting Started Guide available in the following page:
<https://www.nec.com/en/global/prod/expresscluster/en/doc/manual.html>

Notes

◆ EXPRESSCLUSTER X 5.0 no longer includes the following functions:

- COM network partition resolution resources
- COM heartbeat resource
- NAS resources
- NAS monitor resources
- Print spooler resources
- Print spooler monitor resources
- Virtual machine groups
- Virtual machine resources
- Virtual machine monitor resources
- SCVMM-based forced-stop of virtual machines
- Sybase monitor resources
- clpsybasestill command to control the rest point of Sybase
- Compatible commands such as ARMLOAD
- clptrnreq command to process inter-cluster linkage
- clpprer command to estimate the amount of resource usage
- BMC linkage
- clpledctrl command to control the chassis ID lamp
- clpbmccnf command to change BMC information
- clpcpufreq command to control CPU frequency
- EXPRESSCLUSTER clients
- Load balancer linkage settings (JVM monitor resources)
- VxVM linkage

Thank You



An Integrated High Availability and Disaster Recovery Solution

For more product information & request for trial license,
visit >> <https://www.nec.com/expresscluster/>

For more information, feel free to contact us - info@expresscluster.jp.nec.com



\Orchestrating a brighter world

NEC creates the social values of safety, security, fairness and efficiency to promote a more sustainable world where everyone has the chance to reach their full potential.

\ Orchestrating a brighter world

NEC