EXPRESSCLUSTER X

[Enhancement] No.1 market share in Japan for 21 consecutive years*

Version 5.0 New Enhancement

Nov, 2022

NEC Corporation,
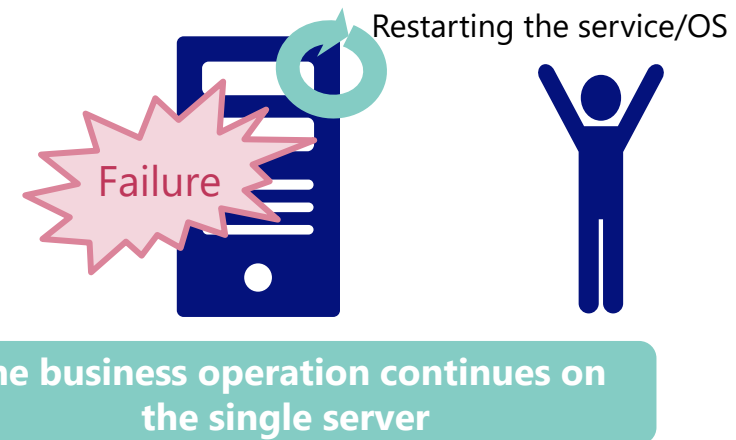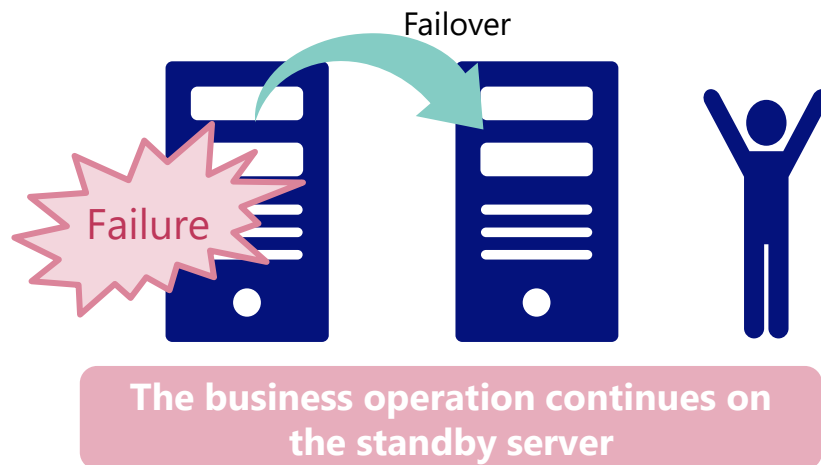
Smart Orchestration Service Department,

(EXPRESSCLUSTER)

What Is EXPRESSCLUSTER?

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

◆ No.1 market share in Japan for 21 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

Failover

Restarting the service/OS

Failure

Failure

The business operation continues on the standby server

The business operation continues on the single server

*Citation: IDC Japan, June,2022 'Japan Computing and Network Infrastructure Software Market Shares, 2021'(JP47878522)

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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.

◆ PaaSs, 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

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History

EXPRESSCLUSTER X

Released
in Apr. 2022

X 5.0

X 4.0 to 4.3

First release of
X Series
in Sep. 2006

X 3.0 to 3.3

First release
for Linux
in Sep. 2000

X 2.0/2.1

First release
for Windows
in Oct. 1996

X 1.0

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

Ver. 1.0

Ver. 1.0

- Remote clustering
- Virtualized infrastructures
- The cloud

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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
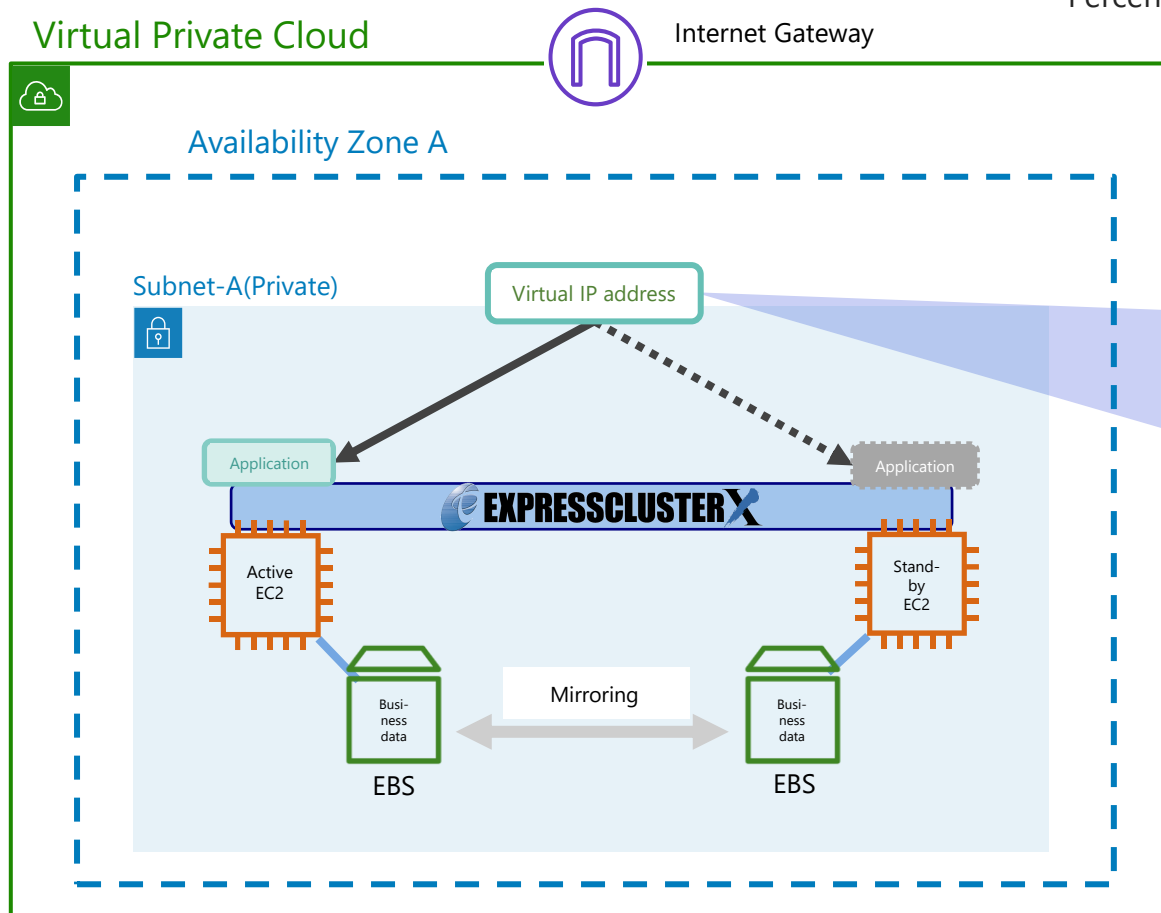- Supported time specification to delay starting the cluster service after an OS startup
- Added the clpcfadm.py command for enhancing the creation of cluster configuration data files
- Added the clpfwctrl command for simplifying firewall configuration
- Supported SELinux enforcing mode

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

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Enhancements of IaC and Security, for the Cloud

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

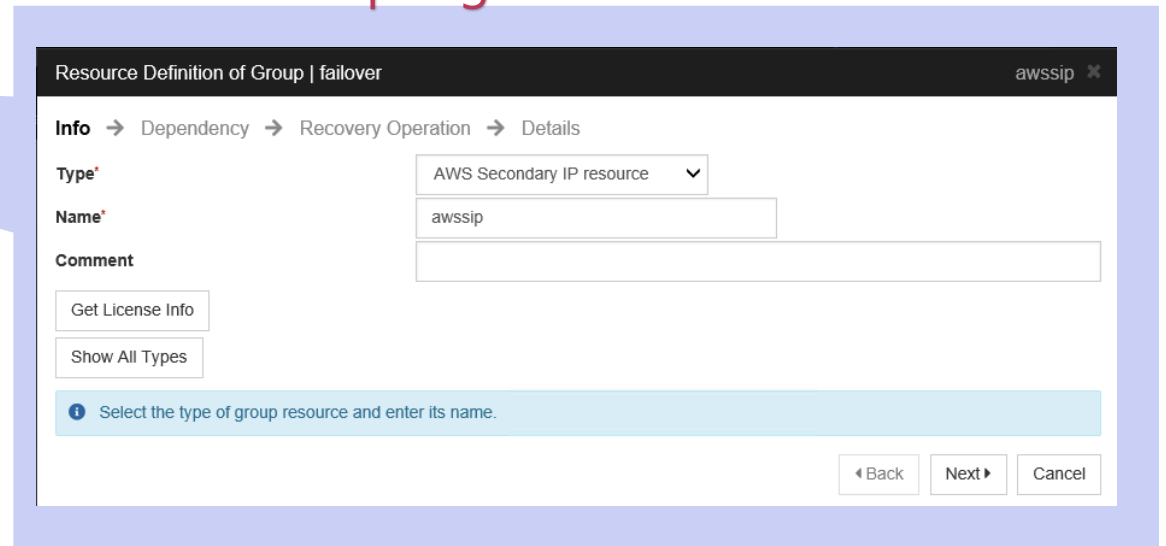Added the clpfwctrl command for simplifying firewall configuration

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.
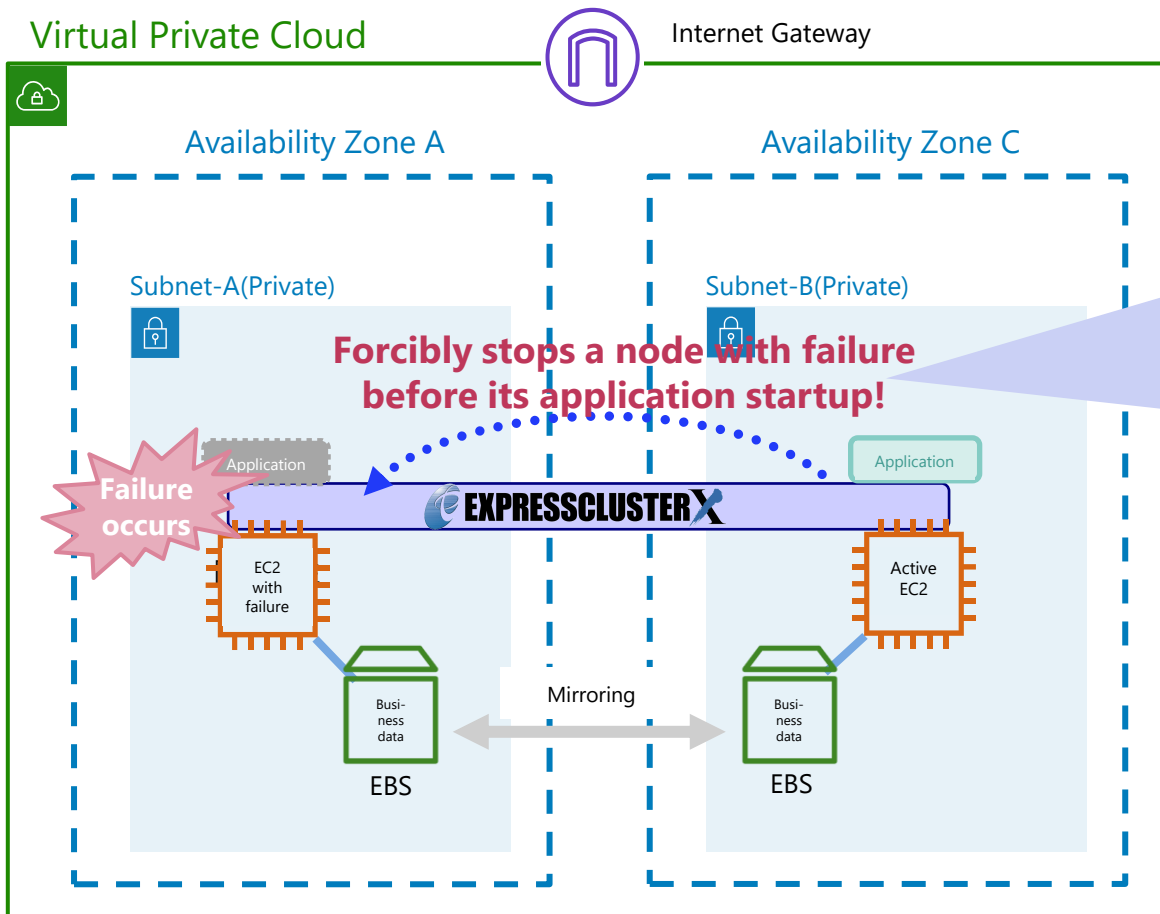
Virtual Private Cloud

Internet Gateway

Availability Zone A

Resource configurable through GUI without scripting

Subnet-A(Private)

Virtual IP address

Application

Application

EXPRESSCLUSTER X

Active EC2

Stand-by EC2

Busi-ness data

Mirroring

Busi-ness data

EBS

EBS

Resource Definition of Group | failover   awssip ✕

Info → Dependency → Recovery Operation → Details

Type*   AWS Secondary IP resource ⌄

Name*   awssip

Comment

Get License Info

Show All Types

ⓘ Select the type of group resource and enter its name.

◀ Back   Next ▶   Cancel
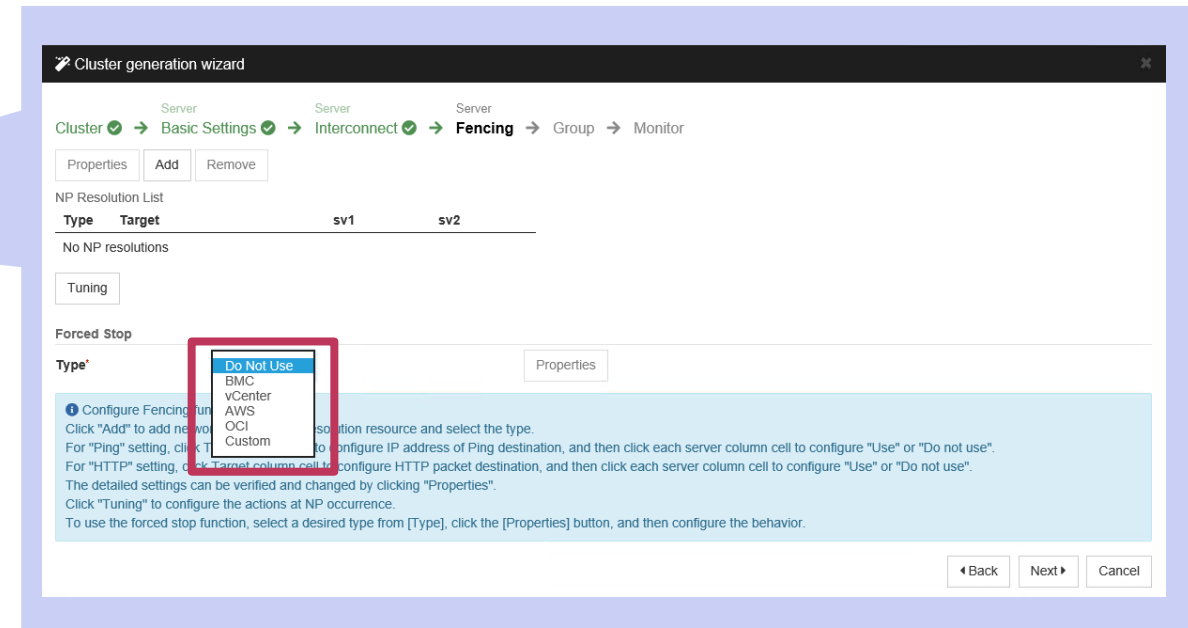
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Added Forced-Stop Resources for AWS and OCI

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.

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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.

Cluster Properties | cluster

Info   Interconnect   Fencing   Timeout   Port No.   Port No.(Mirror)   Port No.(Log)   Monitor   Recovery   Alert Service

WebManager   API   Encryption   Alert Log   Delay Warning   Mirror Agent   Mirror Driver   Cloud   Extension

Service Startup Delay Time*	0	sec
Server Sync Wait Time*	5	min

Heartbeat

Interval*	3	sec
Timeout*	90	sec
Server Internal Timeout*	180	sec

Initialize

OK   Cancel   Apply

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.

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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]
```

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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

■ Command lines (on Windows)

- clpfwctrl --add [--profile public | private | domain]
- 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.
```

■ 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.
```

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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.

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

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Enhanced the Functionality of Checking Cluster Configuration Data

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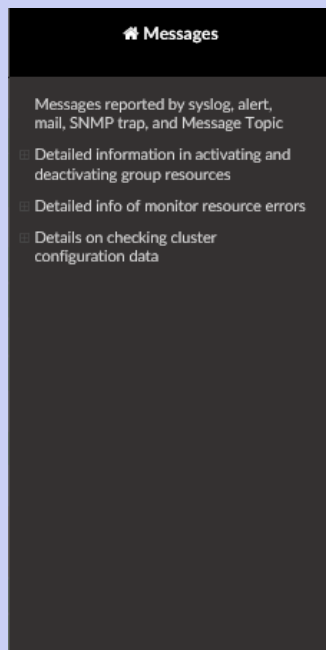

Displayed by only clicking the cell that describes the measure against the unrecommended setting

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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

◆ OSs
- Windows Server 2016, 2019, and 2022
- Red Hat Enterprise Linux 7.9, 8.1, 8.2 and 8.4, 8.6
- MIRACLE LINUX 8.4, 8.6
- 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

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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

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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

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Thank You

EXPRESSCLUSTER X

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

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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.

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