



SingleServerSafe Product Introduction

July, 2019

NEC Corporation,
Cloud Platform Division,
(EXPRESSCLUSTER)



Orchestrating a brighter world

NEC brings together and integrates technology and expertise to create the ICT-enabled society of tomorrow.

We collaborate closely with partners and customers around the world, orchestrating each project to ensure all its parts are fine-tuned to local needs.

Every day, our innovative solutions for society contribute to greater safety, security, efficiency and equality, and enable people to live brighter lives.

Index

1. Requirements for High Availability
2. Product Overview
3. Features in Operation (Screen, Usability)
4. Usage Scene

1. Requirements for High Availability



Requirements for high availability

- Requirement for high availability expanded from traditional mission critical system to servers in departments/shops.
- Impact of server failure in complex and highly-developed IT society is getting bigger and bigger.
- Usage of Windows / Linux servers in low-end to middle-range became general in recent years, and higher availability / usability has been required more and more.



Technology of EXPRESSCLUSTER X can be applied to single server.

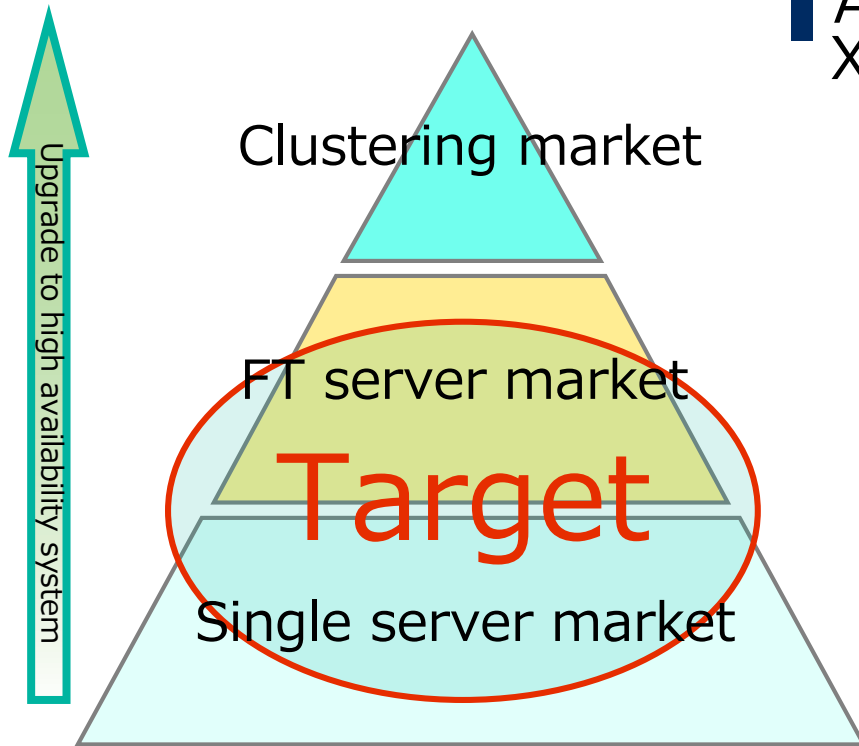
Maximum usage of EXPRESSCLUSTER X technology for enabling to improve availability and to avoid failure on single server.



EXPRESSCLUSTER X SingleServerSafe

Target of EXPRESSCLUSTER X SingleServerSafe

How you avoid the server disruption of mission critical systems?



Advantage of EXPRESSCLUSTER X SingleServerSafe;

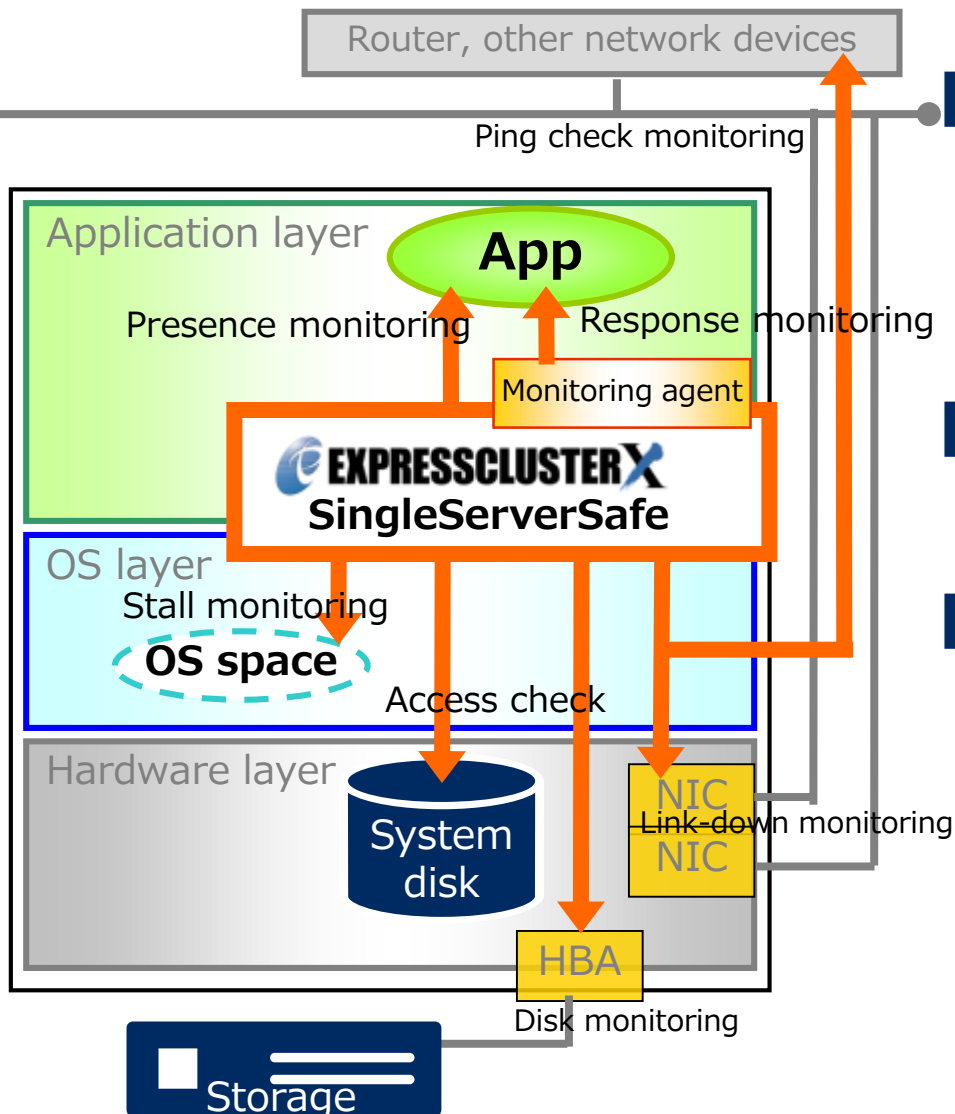
- Duplication in required systems enables to improve availability in single server.
- Monitors abnormality of HW & SW, recovers them from failure, and improves availability!
- FT server (HW duplicated server) also acquires SW availability to become server with higher reliability!
- For further availability, upgrade to clustering system is enabled.

Easy implementation compared with cluster, achieving high robustness to the failure.

2. Product Overview

Detectable failure (monitoring target)

Accurate monitoring to check the actual status



Application layer:

- Presence monitoring of process
 - Restarts when process abnormality is detected
- Monitoring agent
 - Restarts when abnormality in SQL, HTTP and so on is detected

OS layer

- User space monitoring
 - Restarts when abnormality in AP layer such as hang-up is detected.

Hardware layer

- Disk monitoring
 - Restarts when disk access abnormality is detected.
- Ping monitoring
 - Restarts when ping abnormality is detected.
- NIC Link UP/DOWN monitoring
 - Restarts when link-down is detected.
 - Availability can be improved by NIC duplication.

Benefit of monitoring Agent

Improves high availability due to appropriate monitoring of application

- Same monitoring Agent as Agent of EXPRESSCLUSTER X can be used.

Without Agent



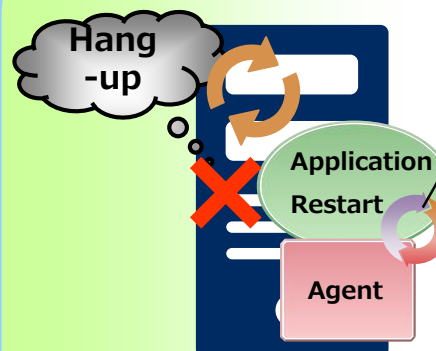
EXPRESSCLUSTER X SSS feature enables existence monitoring of process. When the process disappears, this is regarded as abnormal.

× Hang-up detection of application

× Response detection from application

○ Abnormal termination of application
(Existence monitoring setting is required)

With Agent



Agent sends request to target application periodically. Simultaneously, Agent waits for response with clock timer, and checks the content of it.

○ Hang-up detection of application

○ Response detection from application

○ Abnormal termination of application

***Monitoring Agent is strongly recommended**

Monitoring target of Agent

Frequently used key apps in six fields are supported.

System Resource (System Resource Agent)

Windows Linux

CPU, memory, file, and so on

Java VM Resource (Java Resource Agent)

Windows

WebOTX, WebLogic

Linux

WebOTX, WebLogic, JBoss, Tomcat

Database (Database Agent)

Windows

Oracle, SQL Server, DB2, ODBC, PowerGres, etc

Linux

Oracle, DB2, PostgreSQL, PowerGresPlus, MySQL

Internet Server (Internet Server Agent)

Windows

IIS, SMTP/POP/IMAP4, HTTP/HTTPS, etc

Linux

apache, httpd, sendmail, postfix, popd, etc

File Server (File Server Agent)

Linux

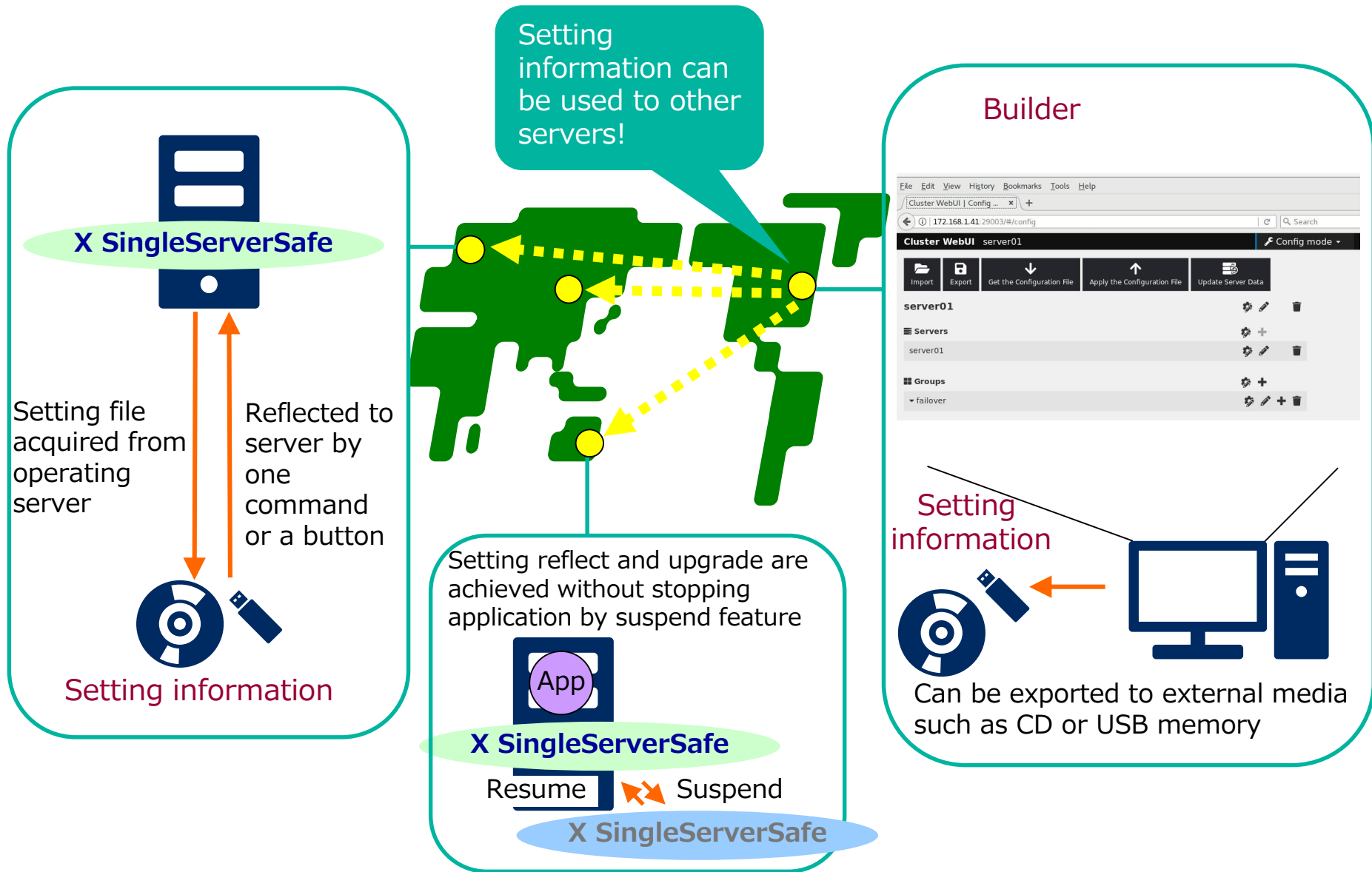
Samba, NFS

Application Server (Application Server Agent)

Windows Linux

Oracle AS, Tuxedo, WebLogic, WebSphere, WebOTX

Off-line creation of setting information can be applied to other servers



Alert and support in case of failure

The diagram illustrates a management terminal interface for monitoring server status and logs. The interface is titled "Cluster WebUI" and shows a dashboard with various sections:

- Servers:** Online: 1, Offline: 0, Err/Warn: 0
- Groups:** Online: 1, Offline: 0, Err/Warn: 0
- Monitors:** Normal: 3, Err/Warn: 0

The "Alert log graph" section shows a table of alert logs:

Type	Received time	Time	Server name	Module name	Event ID	Message
i	2019/05/14 12:01:30.833	2019/05/14 12:01:30.834	server01	rm	1	Monitoring pidw has started.
i	2019/05/14 12:01:26.989	2019/05/14 12:01:26.971	server01	rm	1	Monitoring diskw has started.
i	2019/05/14 12:01:26.969	2019/05/14 12:01:26.958	server01	rm	1	Monitoring userw has started.

Callouts provide additional information:

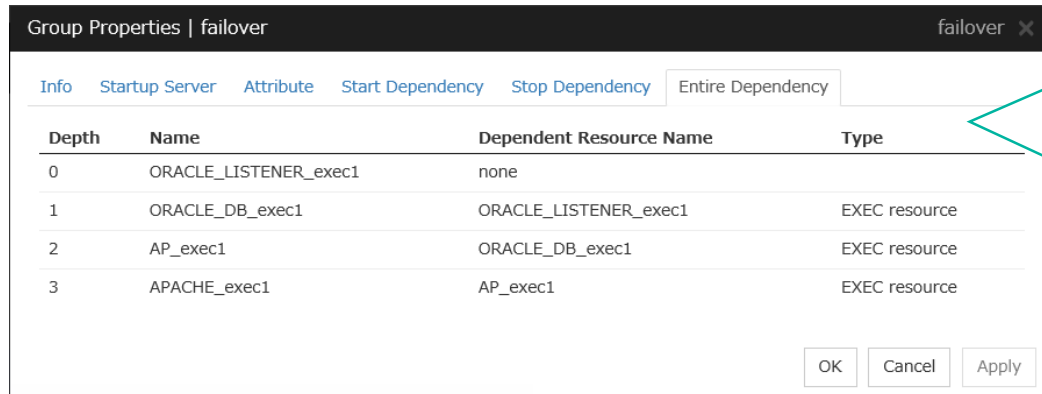
- "Status can be checked with view of management terminal." (pointing to the dashboard)
- "Log information of all servers can be collected from management terminal in one click." (pointing to the alert logs table)
- "Email alert can be done in case of failure." (pointing to a person receiving a notification)

A "Failure!" callout points to a "Log" icon, which is associated with the "EXPRESSCLUSTER X SingleServerSafe" system. A person icon with a "!?" speech bubble indicates a user receiving a notification.

3. Features in Operation (Screen, Usability)

Features in operation

Start / stop order and recovery process from abnormal status can be set up.



Group Properties | failover

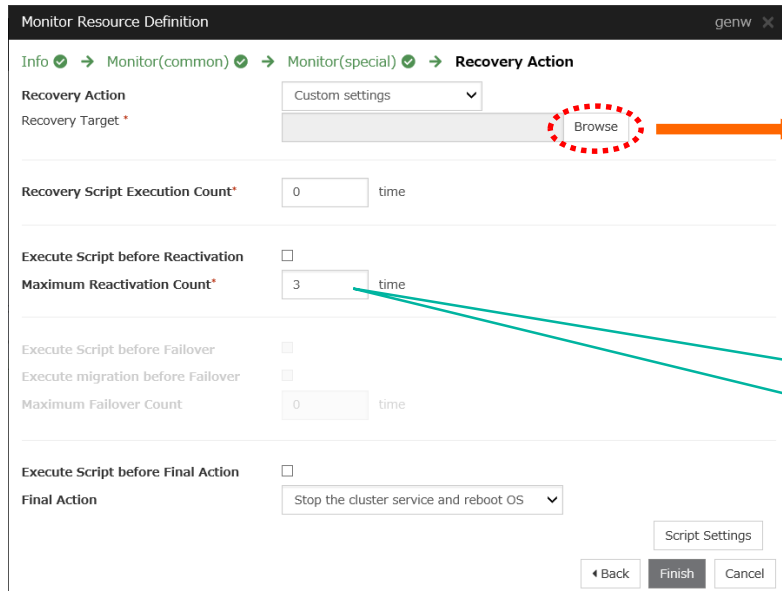
Info Startup Server Attribute Start Dependency Stop Dependency Entire Dependency

Depth	Name	Dependent Resource Name	Type
0	ORACLE_LISTENER_exec1	none	
1	ORACLE_DB_exec1	ORACLE_LISTENER_exec1	EXEC resource
2	AP_exec1	ORACLE_DB_exec1	EXEC resource
3	APACHE_exec1	AP_exec1	EXEC resource

OK Cancel Apply

Makes system groups in operation unit, and set up procedure of start /stop

Enables setting from operation point of view unlike start procedure of OS service manager (Windows) or init script(Linux).



Monitor Resource Definition

Info → Monitor(common) → Monitor(special) → Recovery Action

Recovery Action: Custom settings

Recovery Target * Browse

Recovery Script Execution Count* time

Execute Script before Reactivation

Maximum Reactivation Count* time

Execute Script before Failover

Execute migration before Failover

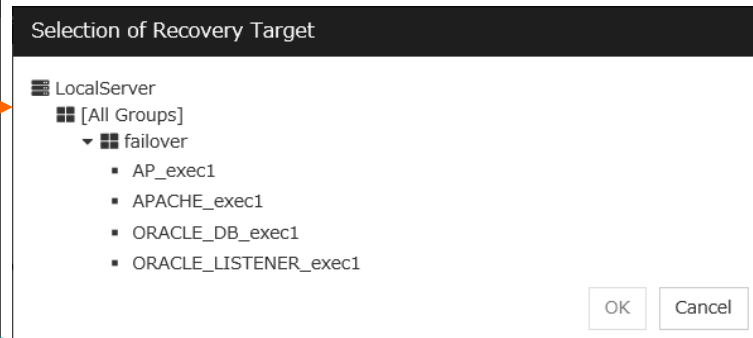
Maximum Failover Count time

Execute Script before Final Action

Final Action: Stop the cluster service and reboot OS

Script Settings

Back Finish Cancel



Selection of Recovery Target

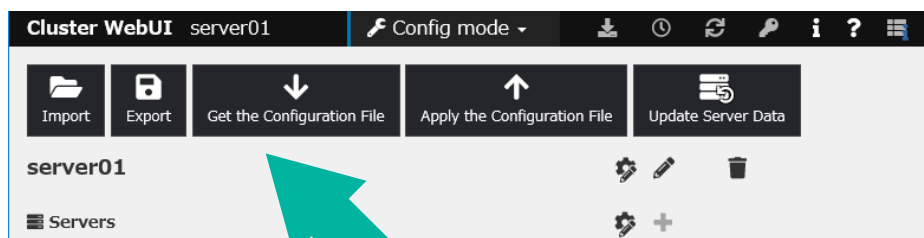
- LocalServer
 - [All Groups]
 - failover
 - AP_exec1
 - APACHE_exec1
 - ORACLE_DB_exec1
 - ORACLE_LISTENER_exec1

OK Cancel

Sets up restart in resource unit, group unit, or server unit, as a recovery procedure from abnormal situation.

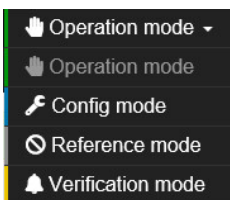
Operating procedure

- Same GUI as one for EXPRESSCLUSTER X can be used for environment configuration
- Server status monitoring, start / stop of operation group, and log collection can be done from Cluster WebUI, as well as CLI.



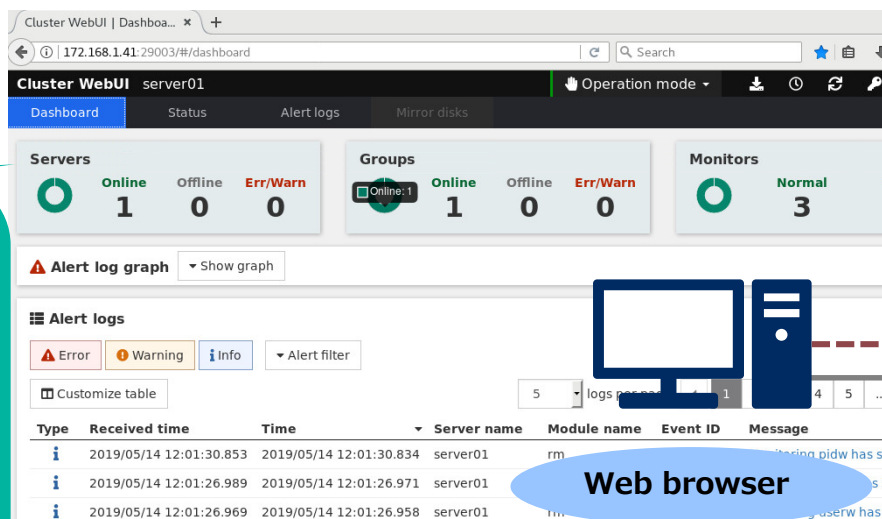
← Cluster WebUI (Config mode)

↓ Cluster WebUI (Dashboard)



Stop/restart of server and group (operation service) can be unified by EXPRESSCLUSTER command!

With integrated management of all server, reduction of operator's effort and human error, know-how and information sharing are enabled.



Management terminal

EXPRESSCLUSTER X SSS implemented server



EXPRESSCLUSTER X SSS service

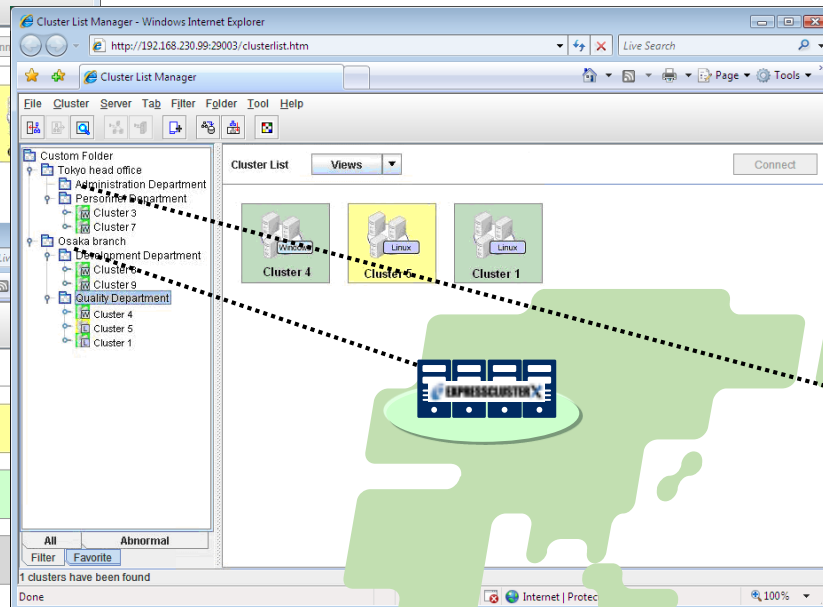
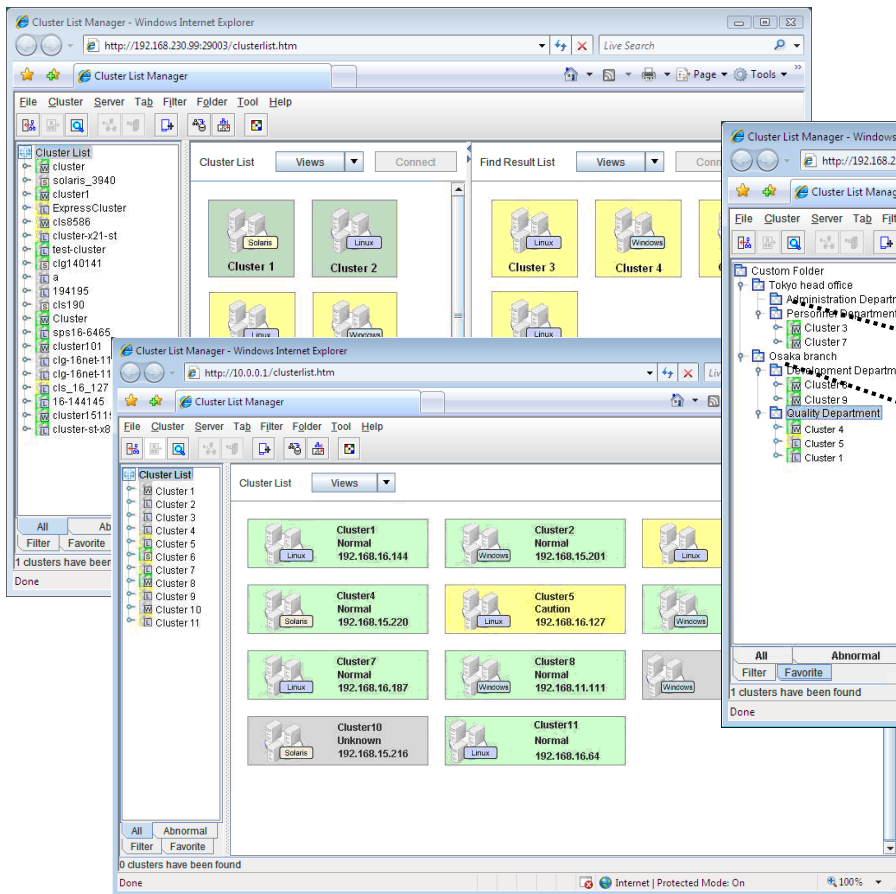
Simple view of server status with integrated Manager

Enables to refer to clustering configuration status of both EXPRESSCLUSTER X and SingleServerSafe in the same LAN.

Enables to run several WebManager separately

Rapid search of node by search filter

Selected cluster display in business application unit by using group display filter



Easy implementation for virtualization environment

Easy setting of start / stop / monitoring of virtual machine

- Only needs to input required items to GUI wizard format

Resource Definition of Group | virtualmachine

Info → Dependency → Recovery Operation → Details

Type*

Name*

Comment

Get license Info

Select the type of

Resource Definition of Group | virtualmachine

Info ✓ → Dependency

Follow the default dependency

Dependent Resources

Name	Resource type
No Dependent Resources	

Resource Definition of Group | virtualmachine

Info ✓ → Dependency ✓ → Recovery Operation → Details

Execute Script before or after Activation or Deactivation

Settings

Recovery Operation at Activation Failure Detection

Retry Count* 5 time

Failover Target Server

Stable server

Maximum priority server

Failover Threshold 0 time

Final Action* Stop the cluster service and r

Execute Script before Final A

Recovery Operation at Deactivation Failure Detection

Retry Count at Deactivation Failure* 0 time

Final Action* Stop the cluster service and s

Execute Script before Final A

Resource Definition of Group | virtualmachine

Info ✓ → Dependency ✓ → Recovery Operation ✓ → Details

VM Type* Hyper-V

VM Name* sample

VM Path* c:sample

Tuning

◀ Back Finish Cancel

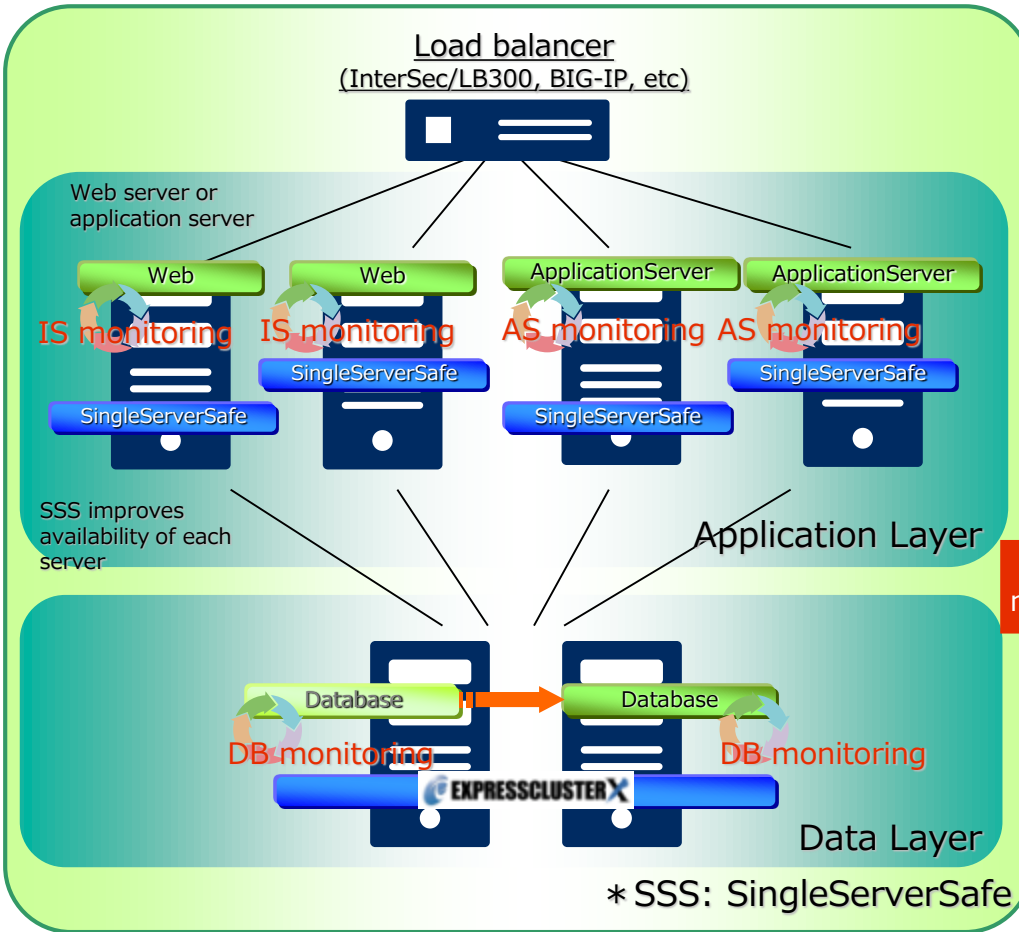
◀ Back Next ▶

Enables integration of virtual machine to one platform with HA feature

4. Usage Scene

Solution to improve reliability for Web 3 layer system

Enables integrated management of system under load balancer using SingleServerSafe

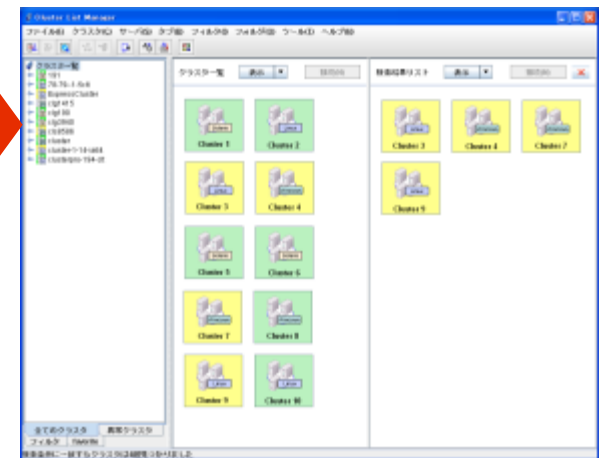


Improves availability of whole system by deploying EXPRESSCLUSTER X SSS in web server / app server under load balancer and deploying EXPRESSCLUSTER X to DB server.

Integrated management of whole system

With EXPRESSCLUSTER X integrated manager, enables to manage whole system configured for different purpose and on heterogeneous OS.

Integrated management



Achieves higher availability and usability of whole system

"System Resource Agent" usage situation

Realize stable operation by avoiding system resource failure

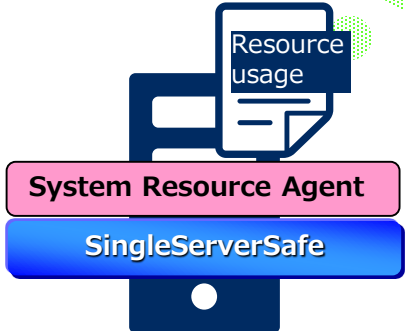
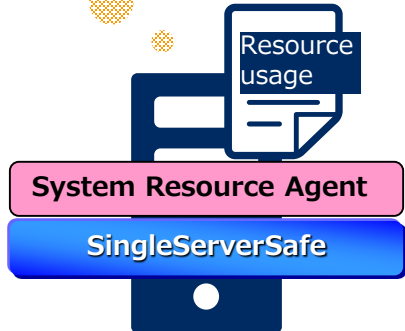
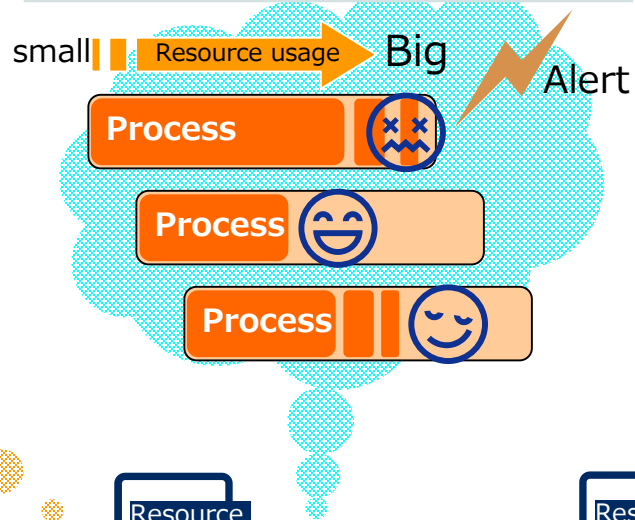
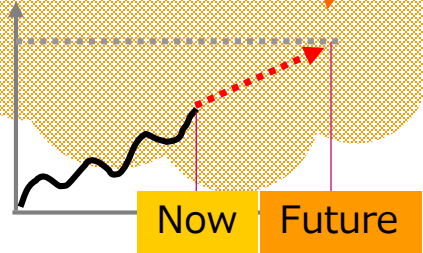
Monitors whole system resource
Prevents trouble in advance

Monitors resource of each process
Alerts abnormal resource usage

Stores system resource information
Can be used for sizing or reporting

System resource
- CPU
- Memory
etc

Predicts resource shortage near future



Thank You



An Integrated High Availability and Disaster Recovery Solution

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

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



 **Orchestrating** a brighter world

NEC