EXPRESSCLUSTER X for Linux
SAP NetWeaver Configuration Example

Release 7

NEC Corporation

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CHAPTER

ONE

PREFACE

This document describes the creation of a cluster system described in the document "EXPRESSCLUSTER X for Linux SAP NetWeaver System Configuration Guide" and gives an example of settings how to operate.

1.1 Who Should Use This Guide

This manual is intended for administrators, who want to build a cluster system, system engineers who want to provide user support, and maintenance personnel.

This manual introduces software whose operation in an EXPRESSCLUSTER environment has been checked.

The software and setup examples introduced here are for reference only. They are not meant to guarantee the operation of each software product.

The bundled scripts are for achieving failover.
Since these scripts are not designed to monitor all the SAP processes, check and (if necessary for their usage environments and their monitoring targets) customize their contents.

1.2 EXPRESSCLUSTER X for Linux SAP NetWeaver Documentation Set

This guide includes the following two documents:

- "EXPRESSCLUSTER X for Linux SAP NetWeaver System Configuration Guide"
- "EXPRESSCLUSTER X for Linux SAP NetWeaver Configuration Example"

1.3 Conventions

In this guide, Note, Important, See also 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.

See also:

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

The following conventions are used in this guide.

Convention	Usage	Example
Bold	Indicates graphical objects, such as text boxes, list boxes, menu selections, buttons, labels, icons, etc.	Click Start. Properties dialog box
Angled bracket within the command line	Indicates that the value specified inside of the angled bracket can be omitted.	`clpstat -s[-h host_name]`
#	Prompt to indicate that a Linux user has logged on as root user.	`# clpstat`
Monospace	Indicates path names, commands, system output (message, prompt, etc.), directory, file names, functions and parameters.	`/Linux`
bold	Indicates the value that a user actually enters from a command line.	Enter the following: **# clpcl -s -a**
italic	Indicates that users should replace italicized part with values that they are actually working with.	`# ping <IP address>`


In the figures of this guide, this icon represents EXPRESSCLUSTER.

1.4 EXPRESSCLUSTER X Documentation Set (for Internal Version 3.3.*x*/4.0.*x*)

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

EXPRESSCLUSTER X Getting Started Guide

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

EXPRESSCLUSTER X 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.

EXPRESSCLUSTER X 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.

EXPRESSCLUSTER X Integrated WebManager Administrator's Guide

> This guide is intended for system administrators who manage cluster systems using EXPRESSCLUSTER with Integrated WebManager, and also intended for system engineers who introduce Integrated WebManager. This guide describes detailed issues necessary for introducing Integrated WebManager in the actual procedures.

1.5 EXPRESSCLUSTER X Documentation Set (for Internal Version 4.1.*x*or later)

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

EXPRESSCLUSTER X Getting Started Guide

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

EXPRESSCLUSTER X 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.

EXPRESSCLUSTER X Reference Guide

> This guide is intended for system administrators. The guide covers topics such as how to operate EXPRESSCLUSTER, function of each module and troubleshooting. The guide is supplement to the Installation and Configuration Guide.

EXPRESSCLUSTER X Maintenance Guide

> This guide is intended for administrators and for system administrators who want to build, operate, and maintain EXPRESSCLUSTER-based cluster systems. The guide describes maintenance-related topics for EXPRESSCLUSTER.

EXPRESSCLUSTER X Hardware Feature Guide

> This guide is intended for administrators and for system engineers who want to build EXPRESSCLUSTER-based cluster systems. The guide describes features to work with specific hardware, serving as a supplement to the Installation and Configuration Guide.

1.6 Related documents

1.6.1 SAP NetWeaver documents

For details of SAP NetWeaver please refer to the official SAP documentation available at

https://help.sap.com/viewer/nwguidefinder

Make sure to check the "Master Guide" and the "Installation Guide" for NetWeaver according to the database you are installing on.

SAP NOTEs

- #0171356: SAP software on Linux: General information
- #0784391: SAP support terms and 3rd-party Linux kernel drivers
- #2002167: Red Hat Enterprise Linux 7.x: Installation und Upgrade
- #0941735: SAP memory management system for 64-bit Linux systems
- #1382721: Linux: Interpreting the output of the command 'free'
- #0174911: Determining the hardware key (customer key)
- #0181543: License key for high availability environment
- #0870871: License key installation
- #1391070: Linux UUID solutions
- #0146003: Application servers cannot be started
- #1553301: 7.20 EXT Kernel - Usage
- #1768213: Support details for NEC EXPRESSCLUSTER
- #2182373: NEC EXPRESSCLUSTER X: Rolling Kernel Switch in HA environments
- #2464065: Check of automatic maintenance mode for HA solutions
- #2630416: Support for Standalone Enqueue Server 2
- #2711036: Usage of the Standalone Enqueue Server 2 in an HA Environment

Note: Related documents and URL in this guide are subject to change without notice.

1.7 Terminology in this guide

Provides information of terminology used in this guide.

This product

- For EXPRESSCLUSTER X 3.3
  EXPRESSCLUSTER X for Linux SAP NetWeaver
- For EXPRESSCLUSTER X 4.0 or later
  EXPRESSCLUSTER X for Linux SAP NetWeaver/SAP HANA

Configuration Guide EXPRESSCLUSTER X for Linux SAP NetWeaver System Configuration Guide

Configuration Example EXPRESSCLUSTER X for Linux SAP NetWeaver Configuration Example

Connecter for SAP The connecter which links with SAP included in this product.

SAP NW SAP NetWeaver

ASCS ABAP SAP Central Services Instance

ERS Enqueue Replication Server

PAS Primary Application Server

AAS Additional Application Server

HANA The SAP HANA database used for SAP NW

DA Diagnostics Agent

ENSA Standalone Enqueue Server

ENSA2 Standalone Enqueue Server 2

CHAPTER

TWO

CONFIGURATION EXAMPLE

2.1 Examplary settings of the environment for SAP NW

Terminology used in this chapter.

SID SAP System ID

DASI Diagnostics Agent SAP System ID

INO Instance Number

The additional terminology used in a configuration consisting of one NFS server and a cluster configuration cosisting of two NFS servers is described in the following sections:

- 2.1.3. *Static IP and floating IP for an NFS server*
- 2.1.3. *Network configuration*

2.1.1 HA Database for SAP NW

Since SAP NW can run on several database technologies, e.g. SAP HANA, SAP MaxDB, IBM DB2, Oracle, Microsoft SQLSERVER, this guide assumes there is already a high available database setup in place. If you need help how create an HA setup for your database scenario please follow related EXPRESSCLUSTER documents on https://www.nec.com/en/global/prod/expresscluster/.

Throughout this document the HA database setup will be referred to as "database".

2.1.2 Mount Points

The following shows an example of NFS server shares and according mount points for each node needed.

Mount Type	Node#1 / Node#2	NFS Server
fstab(NFS)	/usr/sap/trans /sapmnt/<*SID*>	/opt/nfsroot/saptrans /opt/nfsroot/sapmnt/<*SID*>
EXPRESSCLUSTER	/usr/sap/<*SID*>/ASCS<*INO*>	/opt/nfsroot/sapascs

Before installing SAP NW, it is necessary to create a symbolic link from /usr/sap/<*SID*>/SYS of Node#1 and Node#2 to mount point /sapmnt/<*SID*>. For how to create a symbolic link, refer to the SAP NW document.

2.1.3 Static IP and floating IP

Static IP and floating IP for SAP NW

The following table shows the static IP and floating IP setting example for a SAP NW cluster consisting of an active node (Node#1) and standby node (Node#2).

	Node#1	Node#2
Host Name	*sap1*	*sap2*
Static IP(eth0)	*172.16.30.135/24*	*172.16.30.136/24*
Static IP(eth1)	*10.0.0.1/24*	*10.0.0.2/24*
Floating IP(eth0)	*managesv:172.16.30.137/24* *ascssv:172.16.30.138/24* *erssv:172.16.30.139/24* (required only when ENSA2 is used)	

Static IP and floating IP for an NFS server

The following table shows the static IP setting example for a configuration consisting of one NFS server (Node#3). In this configuration, no floating IP is required.

	Node#3
Host Name	*nassv*
Static IP(eth0)	*172.16.30.140/24*
Static IP(eth1)	*10.0.0.3/24*

The following table shows the static IP and floating IP setting example for a unidirectional standby cluster configuration consisting of two nodes (Node#3 and Node#4) as an NFS server.

	Node#3	Node#4
Host Name	*nas1*	*nas2*
Static IP(eth0)	*172.16.30.140/24*	*172.16.30.141/24*
Static IP(eth1)	*10.0.0.4/24*	*10.0.0.5/24*
Floating IP(eth1)	*nassv:10.0.0.3/24*	

Network configuration

This section describes the network configurations between a SAP NW cluster and NFS servers used in this guide (for the Internal Version 3.3.*x*/4.0.*x*). When the Internal Version is 4.1.*x*or later, the "Floating IP for WebManager" in the diagram below is replaced with "Floating IP for Cluster WebUI".

Network configuration consisting of one NFS server

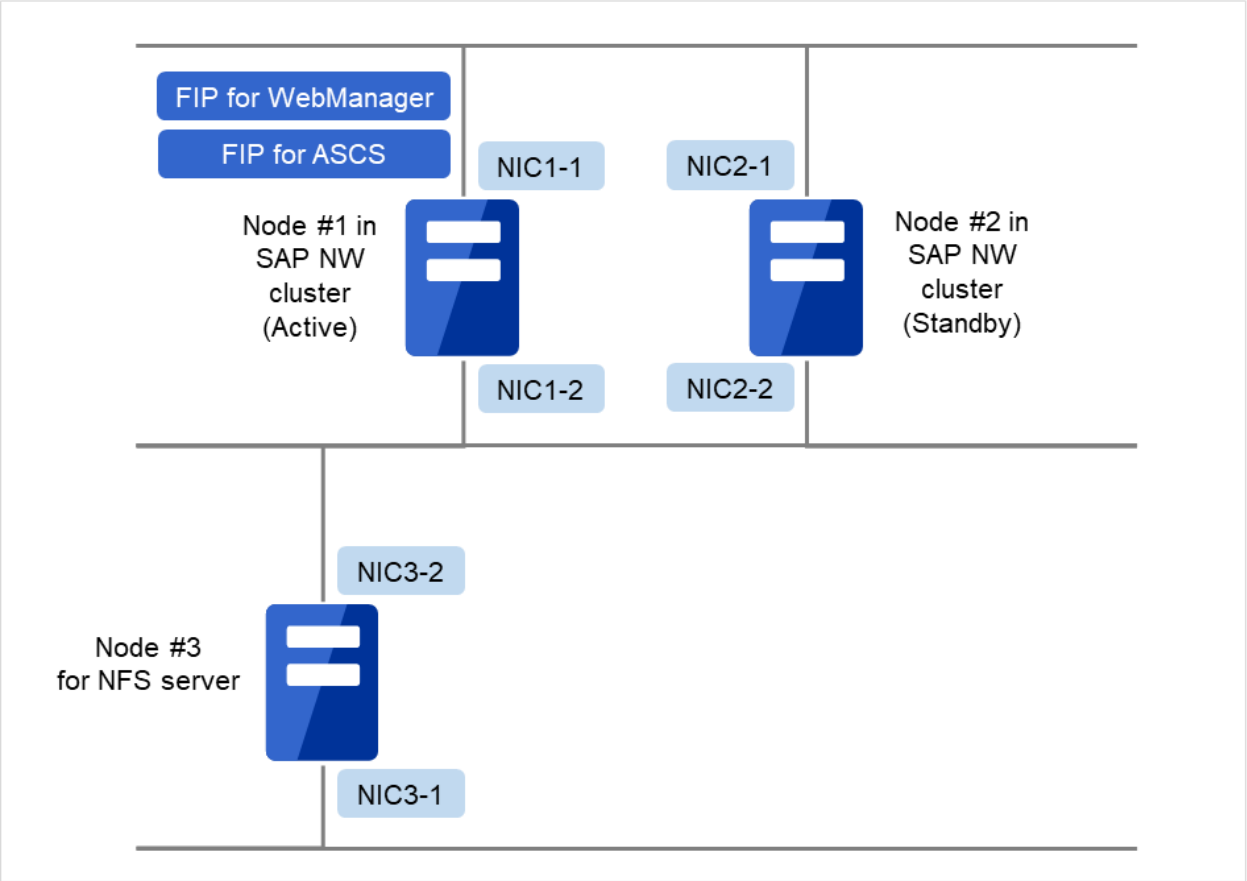

Fig. 2.1: Network configuration with one NFS server

Floating IP (FIP) for WebManager	172.16.30.137/24
Floating IP (FIP) for ASCS	172.16.30.138/24
NIC1-1 (eth0) IP address	172.16.30.135/24
NIC1-2 (eth1) IP address	10.0.0.1/24
NIC2-1 (eth0) IP address	172.16.30.136/24
NIC2-2 (eth1) IP address	10.0.0.2/24
NIC3-1 (eth0) IP address	172.16.30.140/24
NIC3-2 (eth1) IP address	10.0.0.3/24

Network configuration for a cluster configuration consisting of two NFS servers

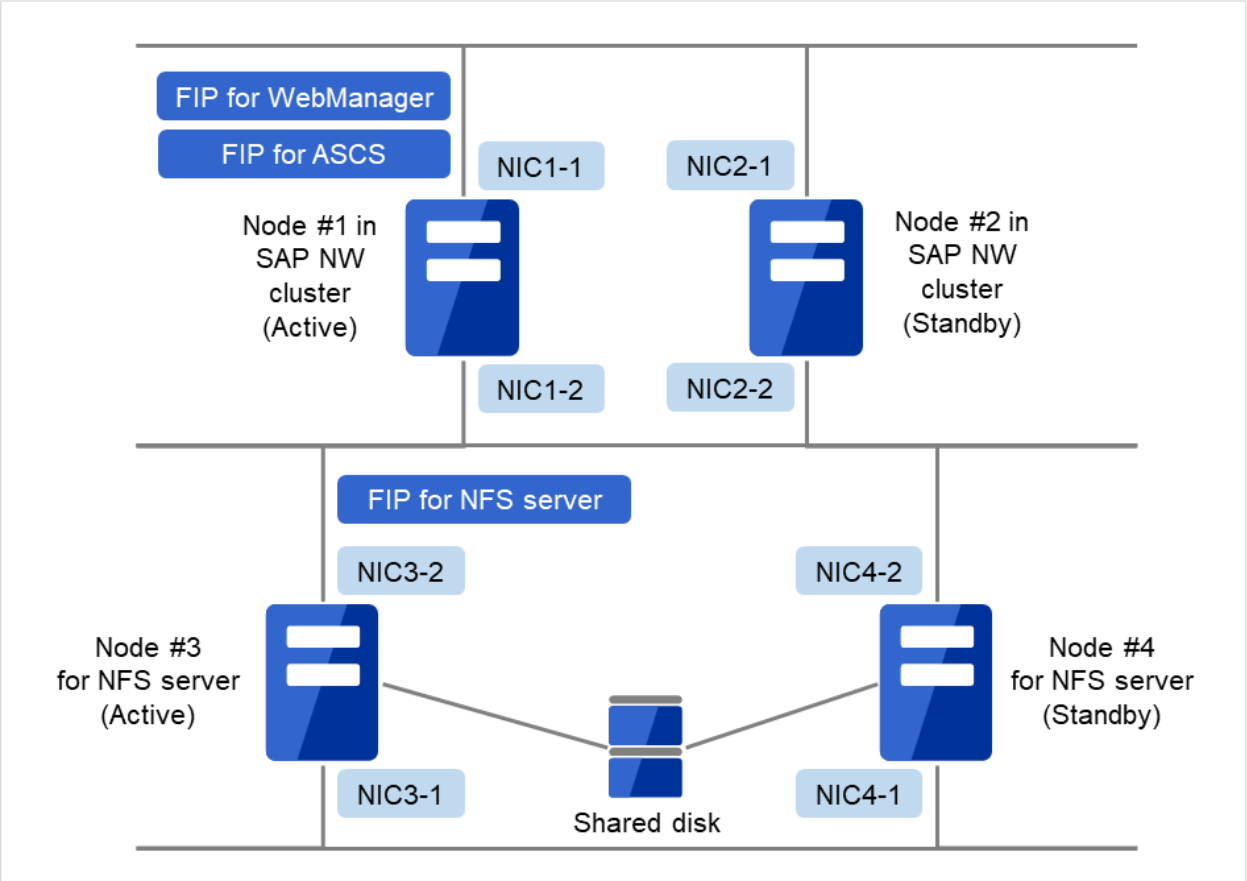

Fig. 2.2: Network configuration with two NFS servers

Floating IP (FIP) for WebManager	172.16.30.137/24
Floating IP (FIP) for ASCS	172.16.30.138/24
NIC1-1 (eth0) IP address	172.16.30.135/24
NIC1-2 (eth1) IP address	10.0.0.1/24
NIC2-1 (eth0) IP address	172.16.30.136/24
NIC2-2 (eth1) IP address	10.0.0.2/24
Floating IP (FIP) for NFS server	10.0.0.3/24
NIC3-1 (eth0) IP address	172.16.30.140/24
NIC3-2 (eth1) IP address	10.0.0.4/24
NIC4-1 (eth0) IP address	172.16.30.141/24
NIC4-2 (eth1) IP address	10.0.0.5/24

2.1.4 An example of setting OS

An example of settings for Red Hat Enterprise Linux 7.*x* is shown below.

- Setting of SELinux

```
Host Name    Status
sap1         Disabled
sap2         Disabled
```

- Installation and setting of indispensable software

```
# yum groupinstall <Group Name>
                   #Group Name
                   base
                   compat-libraries
                   debugging
                   directory-client
                   hardware-monitoring
                   large-systems
                   network-file-system-client
                   perl-runtime
                   storage-client-multipath
                   x11
# yum install uuidd.x86_64
# systemctl start uuidd
# systemctl enable uuidd
```

- Adding nodes to /etc/hosts (or use DNS)

```
# vi /etc/hosts
10.0.0.3  nassv
172.16.30.135 sap1
172.16.30.136 sap2
172.16.30.137 managesv
172.16.30.138 ascssv
172.16.30.139 erssv # required only when ENSA2 is used
```

- Creating mount points

```
# mkdir -p /sapmnt/<SID>
# mkdir -p /usr/sap/<SID>/ASCS<INO>
# mkdir -p /usr/sap/trans
```

- Setting for NFS to be mounted at boot time

```
# vi /etc/fstab
nassv:/opt/nfsroot/sapmnt/<SID> /sapmnt/<SID> nfs defaults 0 0
nassv:/opt/nfsroot/saptrans  /usr/sap/trans  nfs defaults 0 0
```

- Setting of kernel parameters

```
# vi /etc/sysctl.d/sap.conf
# SAP settings
kernel.sem=1250 256000 100 1024
vm.max_map_count=2000000
```

  Enter the following to apply the setting.

```
# sysctl --system
```

- Setting of limits.conf

```
# vi /etc/security/limits.conf
@sapsys          hard    nofile          32800
@sapsys          soft    nofile          32800
```

2.1.5 Sample settings for SAP NW

An overview of "hostname", "instance name" and "instance number" of SAP NW used in this manual is shown below.

Host Name	Floating IP Address	Note
managesv	*172.16.30.137*	For EXPRESSCLUSTER Management Group
ascssv	*172.16.30.138*	For ASCS

Instance	Parameter name	Value of the setting
SAP NW	SID	*NEC*
ASCS	The instance number	*10*
	The instance name	ASCS10
	Host name	*ascssv*
ERS1	The instance number	*20*
	The instance name	ERS20
ERS2	The instance number	*21*
	The instance name	ERS21
PAS	The instance number	*30*
	The instance name	D30
AAS	The instance number	*40*
	The instance name	D40
DA1	The instance number	*97*
	The instance name	SMDA97
DA2	The instance number	*96*
	The instance name	SMDA96

2.2 EXPRESSCLUSTER settings

Terminology used in this chapter.

SID SAP System ID

The additional terminology used in a configuration consisting of one NFS server and a cluster configuration cosisting of two NFS servers is described in the following section:

- 2.2.2. *Sample configuration of EXPRESSCLUSTER in an NFS cluster*

2.2.1 Sample configuration of EXPRESSCLUSTER in a SAP NW cluster

The following table outlines the EXPERSSCLUSTER settings for creating a cluster environment for SAP NW.

For some parameters, the setting value changes depending on whether ENSA or ENSA2 is used.

Configuration example for failover groups

- Cluster configuration

	Parameter name	Value of the setting
	Cluster name	cluster
	The number of servers	2
	The number of failover groups	For ENSA configuration: 12 For ENSA2 configuration: 9
Heartbeat	Lankhb	2
	Lanhb	2
Node#1 (Server of master)	Server name	sap1
	IP address of interconnect (Kernel Mode, Priority1)	172.16.30.135
	IP address of interconnect (Kernel Mode, Priority2)	10.0.0.1
	IP address of interconnect (User Mode, Priority3)	172.16.30.135
	IP address of interconnect (User Mode, Priority4)	10.0.0.1
Node#2	Server name	sap2

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Table 2.7 – continued from previous page

	Parameter name	Value of the setting
	IP address of interconnect (Kernel Mode, Priority1)	172.16.30.136
	IP address of interconnect (Kernel Mode, Priority2)	10.0.0.2
	IP address of interconnect (User Mode, Priority3)	172.16.30.136
	IP address of interconnect (User Mode, Priority4)	10.0.0.2

- 1st group (for WebManager/Cluster WebUI)

	Type	failover
	Group name	Management Group
	Startup Server	Failover is possible on all servers
	The number of group resources	1
1st group resource	Type	floating ip resource
	Group resource name	Management IP
	IP Address	172.16.30.137

- 2nd group (for ASCS) For EXPRESSCLUSTER Internal Version 3.x/4.x

	Parameter name	Value of the setting
	Type	failover
	Group name	ASCS-Group
	Startup Server	Failover is possible on all servers
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Manual Failback
	Failover Exclusive Attribute	Normal exclusion

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Table 2.9 – continued from previous page

	Parameter name	Value of the setting
	Stop Dependent group	ERS1-Group (For ENSA configuration) ERS-Group (For ENSA2 configuration) PAS-Group ERS2-Group (For ENSA configuration) AAS-Group
		Wait the Dependent Groups when a Cluster Stops Wait the Dependent Groups when a Server Stops
	The number of group resources	4
1st group resource Depth 0	Type	floating ip resource
	Dependent Resources	Follow the default dependency
	Group resource name	fip-ascssv
	IP Address	172.16.30.138
2nd group resource Depth 1	Type	nas resource
	Group resource name	nas-ascs
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Server Name	nassv
	Shared Name	/opt/nfsroot/sapascs
	Mount Point	/usr/sap/NEC/ASCS10
	File System	nfs

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Table 2.9 – continued from previous page

	Parameter name	Value of the setting
3rd group resource Depth 2	Type	EXEC resource
	Group resource name	exec-ascs-SAP-instance_NEC_10
	Dependent Resources	fip-ascssv nas-ascs
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start path : /root/sample/scripts/SAP-ASCS-instance/ascs_start.sh Stop path : /root/sample/scripts/SAP-ASCS-instance/ascs_stop.sh Refer to "2.3.1. *Usage of the sample scripts*" for how to specify scripts.
4th group resource Depth 2	Type	EXEC resource
	Group resource name	exec-ascs-SAP-service_NEC_10
	Dependent Resources	fip-ascssv nas-ascs

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Table 2.9 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 2nd group (for ASCS) For EXPRESSCLUSTER Internal Version 5.x

	Parameter name	Value of the setting
	Type	failover
	Group name	ASCS-Group
	Startup Server	Failover is possible on all servers
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Manual Failback
	Failover Exclusive Attribute	Normal exclusion
	Stop Dependent group	ERS1-Group (For ENSA configuration) ERS-Group (For ENSA2 configuration) PAS-Group ERS2-Group (For ENSA configuration) AAS-Group

Continued on next page

Table 2.10 – continued from previous page

	Parameter name	Value of the setting
		Wait the Dependent Groups when a Cluster Stops Wait the Dependent Groups when a Server Stops
	The number of group resources	4
1st group resource Depth 0	Type	floating ip resource
	Dependent Resources	Follow the default dependency
	Group resource name	fip-ascssv
	IP Address	172.16.30.138
2nd group resource Depth 1	Type	exec resource
	Group resource name	exec-nas-ascs
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh An example of start.sh mount -t nfs nassv:/opt/nfsroot/sapascs /usr/sap/NEC/ASCS10 An example of stop.sh umount /usr/sap/NEC/ASCS10

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Table 2.10 – continued from previous page

	Parameter name	Value of the setting
3rd group resource Depth 2	Type	EXEC resource
	Group resource name	exec-ascs-SAP-instance_NEC_10
	Dependent Resources	fip-ascssv exec-nas-ascs
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start path : /root/sample/scripts/SAP-ASCS-instance/ascs_start.sh Stop path : /root/sample/scripts/SAP-ASCS-instance/ascs_stop.sh Refer to "2.3.1. *Usage of the sample scripts*" for how to specify scripts.
4th group resource Depth 2	Type	EXEC resource
	Group resource name	exec-ascs-SAP-service_NEC_10
	Dependent Resources	fip-ascssv exec-nas-ascs

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Table 2.10 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 3rd group (For ERS1 with ENSA used, NOT required with ENSA2 used)

	Parameter name	Value of the setting
	Type	failover
	Group name	ERS1-Group
	Startup Server	sap1
	Startup Attribute	Manual Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off
	Start Dependent group	ASCS-Group
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	2
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-ERS1-SAP-instance_NEC_20
	Dependent Resources	Follow the default dependency

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Table 2.11 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start path : /root/sample/scripts/SAP-ERS-instance/ers_start.sh Stop path : /root/sample/scripts/SAP-ERS-instance/ers_stop.sh Refer to "2.3.1. *Usage of the sample scripts*" for how to specify scripts.
2nd group resource Depth 0	Type	EXEC resource
	Group resource name	exec-ERS1-SAP-service_NEC_20
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 3rd group (For ERS with ENSA 2 used, NOT required with ENSA used)

	Parameter name	Value of the setting
	Type	failover
	Group name	ERS-Group
	Startup Server	sap2 sap1
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off
	Start Dependent group	ASCS-Group
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	4
1st group resource Depth 0	Type	floating ip resource
	Group resource name	fip-erssv
	Dependent Resources	Follow the default dependency
	IP Address	172.16.30.139
2nd group resource Depth 1	Type	EXEC resource
	Group resource name	exec-check-ENSA2
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 Stop Group
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS

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Table 2.12 – continued from previous page

	Parameter name	Value of the setting
	Details	Script created with this product Start script: start.sh
3rd group resource Depth 2	Type	EXEC resource
	Group resource name	exec-ERS-SAP-instance_NEC_20
	Dependent Resources	exec-check-ENSA2
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start path : /root/sample/scripts/SAP-ERS-instance/ers_start.sh Stop path : /root/sample/scripts/SAP-ERS-instance/ers_stop.sh Refer to "2.3.1. *Usage of the sample scripts*" for how to specify scripts.
4th group resource Depth 2	Type	EXEC resource
	Group resource name	exec-ERS-SAP-service_NEC_20
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)

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Table 2.12 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 4th group (for PAS)

	Parameter name	Value of the setting
	Type	failover
	Group name	PAS-Group
	Startup Server	sap1
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off
	Start Dependent group	ASCS-Group
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	2
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-PAS-SAP-instance_NEC_30
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)

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Table 2.13 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh
2nd group resource Depth 0	Type	EXEC resource
	Group resource name	exec-PAS-SAP-service_NEC_30
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 5th group (For ERS2 with ENSA used, NOT required with ENSA2 used)

	Parameter name	Value of the setting
	Type	failover
	Group name	ERS2-Group
	Startup Server	sap2
	Startup Attribute	Manual Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off

Continued on next page

Table 2.14 – continued from previous page

	Parameter name	Value of the setting
	Start Dependent group	ASCS-Group
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	2
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-ERS2-SAP-instance_NEC_21
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start path : /root/sample/scripts/SAP-ERS-instance/ers_start.sh Stop path : /root/sample/scripts/SAP-ERS-instance/ers_stop.sh Refer to "2.3.1. *Usage of the sample scripts*" for how to specify scripts.
2nd group resource Depth 0	Type	EXEC resource
	Group resource name	exec-ERS2-SAP-service_NEC_21
	Dependent Resources	Follow the default dependency

Continued on next page

Table 2.14 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not Deactivate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 6th group (for AAS)

	Parameter name	Value of the setting
	Type	failover
	Group name	AAS-Group
	Startup Server	sap2
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off
	Start Dependent group	ASCS-Group
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	2
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-AAS-SAP-instance_NEC_40
	Dependent Resources	Follow the default dependency

Continued on next page

Table 2.15 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh
2nd group resource Depth 0	Type	EXEC resource
	Group resource name	exec-AAS-SAP-service_NEC_40
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 7th group (for DA1)

	Parameter name	Value of the setting
	Type	failover
	Group name	DA1-Group
	Startup Server	sap1
	Startup Attribute	Auto Startup

Continued on next page

Table 2.16 – continued from previous page

	Parameter name	Value of the setting
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off
	Start Dependent group	-
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	2
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-DA1-instance_DAA_97
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh
2nd group resource Depth 0	Type	EXEC resource
	Group resource name	exec-DA1-service_DAA_97
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)

Continued on next page

Table 2.16 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 8th group (for DA2)

	Parameter name	Value of the setting
	Type	failover
	Group name	DA2-Group
	Startup Server	sap2
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off
	Start Dependent group	-
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	2
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-DA2-instance_DAA_96
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)

Continued on next page

Table 2.17 – continued from previous page

	Parameter name	Value of the setting
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh
2nd group resource Depth 0	Type	EXEC resource
	Group resource name	exec-DA2-service_DAA_96
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 9th group (for hostexec1)

	Parameter name	Value of the setting
	Type	failover
	Group name	hostexec1-Group
	Startup Server	sap1
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off

Continued on next page

Table 2.18 – continued from previous page

	Parameter name	Value of the setting
	Start Dependent group	-
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	1
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-hostexec1
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 10th group (for hostexec2)

	Parameter name	Value of the setting
	Type	failover
	Group name	hostexec2-Group
	Startup Server	sap2
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Off
	Start Dependent group	-

Continued on next page

Table 2.19 – continued from previous page

	Parameter name	Value of the setting
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	1
1st group resource Depth 0	Type	EXEC resource
	Group resource name	exec-hostexec2
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

- 11th group (For exclusive control of Node#1)

Note: This group is required only if ENSA is used.

	Parameter name	Value of the setting
	Type	failover
	Group name	Exclusive-Group1
	Startup Server	sap1
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Normal exclusion
	Start Dependent group	-

Continued on next page

Table 2.20 – continued from previous page

	Parameter name	Value of the setting
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	0

- 12th group (For exclusive control of Node#2)

Note: This group is required only if ENSA is used.

	Parameter name	Value of the setting
	Type	failover
	Group name	Exclusive-Group2
	Startup Server	sap2
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Auto Failback
	Failover Exclusive Attribute	Normal exclusion
	Start Dependent group	-
	Stop Dependent group	- Wait the Dependent Groups when a Cluster Stops
	The number of group resources	0

Example of the configuration of the Monitor Resources

- 1st monitor resource(create of default)

Parameter name	Value of the setting
Type	user mode monitor
Monitor resource name	userw

- 2nd monitor resource

Parameter name	Value of the setting
Type	NIC Link Up/Down monitor
Monitor resource name	miiw-eth0
Monitor Target	eth0
Monitor Timing	Always

Continued on next page

Table 2.23 – continued from previous page

Parameter name	Value of the setting
Recovery Action	Executing failover to the recovery target
Recovery Target	All Groups

- 3rd monitor resource

Parameter name	Value of the setting
Type	NIC Link Up/Down monitor
Monitor resource name	miiw-eth1
Monitor Target	eth1
Monitor Timing	Always
Recovery Action	Executing failover to the recovery target
Recovery Target	All Groups

- 4th monitor resource(for ASCS instance ENQ)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-ASCS-instance-ENQ
Interval	30 sec
Timeout	120 sec
Retry Count	2 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-ascs-SAP-instance_NEC_10
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-ASCS-instance-ENQ.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	ASCS-Group
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	1 time
Final Action	Stop the cluster service and shutdown OS

- 5th monitor resource(for ASCS instance MSG)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-ASCS-instance-MSG
Interval	30 sec
Timeout	120 sec
Retry Count	2 time

Continued on next page

Table 2.26 – continued from previous page

Parameter name	Value of the setting
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-ascs-SAP-instance_NEC_10
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-ASCS-instance-MSG.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	ASCS-Group
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	1 time
Final Action	No operation

- 6th monitor resource(for ASCS service)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-ASCS-service
Interval	15 sec
Timeout	60 sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-ascs-SAP-service_NEC_10
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-ASCS-service.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-ascs-SAP-service_NEC_10
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	1 time
Final Action	No operation

- 7th monitor resource(For ERS1 instance with ENSA used or ERS instance with ENSA2 used)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	For ENSA configuration: genw-ERS1-instance For ENSA2 configuration: genw-ERS-instance
Interval	30 sec
Timeout	120 sec
Retry Count	2 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	For ENSA configuration: Active, exec-ERS1-SAP-instance_NEC_20 For ENSA2 configuration: Active, exec-ERS-SAP-instance_NEC_20
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	For ENSA configuration: /opt/nec/clusterpro/log/genw-ERS1-instance.log For ENSA2 configuration: /opt/nec/clusterpro/log/genw-ERS-instance.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	For ENSA configuration: exec-ERS1-SAP-instance_NEC_20 For ENSA2 configuration: exec-ERS-SAP-instance_NEC_20
Recovery Script Execution Count	For ENSA configuration: 1 time For ENSA2 configuration: 0 time
Maximum Reactivation Count	For ENSA configuration: 0 time For ENSA2 configuration: 3 time
Maximum Failover Count	For ENSA configuration: 0 time For ENSA2 configuration: 1 time
Final Action	No operation

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Table 2.28 – continued from previous page

Parameter name	Value of the setting
User Application [Recovery Script]	For ENSA configuration: /root/sample/genw/ers_mon_preaction_wrapper.sh Refer to "2.3.2. *Usage of the recovery scripts (only for ENSA configuration)*" for how to specify recovery script. For ENSA2 configuration: No settings required
Timeout [Recovery Script]	5 sec

- 8th monitor resource(For ERS1 service with ENSA used or ERS service with ENSA2 used)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	For ENSA configuration: genw-ERS1-service For ENSA2 configuration: genw-ERS-service
Interval	15 sec
Timeout	60 sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	For ENSA configuration: Active, exec-ERS1-SAP-service_NEC_20 For ENSA2 configuration: Active, exec-ERS-SAP-service_NEC_20
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	For ENSA configuration: /opt/nec/clusterpro/log/genw-ERS1-service.log For ENSA2 configuration: /opt/nec/clusterpro/log/genw-ERS-service.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	For ENSA configuration: exec-ERS1-SAP-service_NEC_20 For ENSA2 configuration: exec-ERS-SAP-service_NEC_20
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time

Continued on next page

Table 2.29 – continued from previous page

Parameter name	Value of the setting
Maximum Failover Count	For ENSA configuration: 0 time For ENSA2 configuration: 1 time
Final Action	No operation

- 9th monitor resource(For ERS2 instance with ENSA used, NOT required with ENSA2 used)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-ERS2-instance
Interval	30 sec
Timeout	120 sec
Retry Count	2 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-ERS2-SAP-instance_NEC_21
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-ERS2-instance.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-ERS2-SAP-instance_NEC_21
Recovery Script Execution Count	1 time
Maximum Reactivation Count	0 time
Maximum Failover Count	0 time
Final Action	No operation
User Application [Recovery Script]	/root/sample/genw/ers_mon_preaction_wrapper.sh Refer to "2.3.2. *Usage of the recovery scripts (only for ENSA configuration)*" for how to specify recovery script.
Timeout [Recovery Script]	5 sec

- 10th monitor resource(For ERS2 service with ENSA used, NOT required with ENSA2 used)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-ERS2-service
Interval	15 sec
Timeout	60 sec
Retry Count	1 time

Continued on next page

Table 2.31 – continued from previous page

Parameter name	Value of the setting
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-ERS2-SAP-service_NEC_21
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-ERS2-service.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-ERS2-SAP-service_NEC_21
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 11th monitor resource(for PAS instance)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-PAS-instance
Interval	30 sec
Timeout	120 sec
Retry Count	2 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-PAS-SAP-instance_NEC_30
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-PAS-instance.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-PAS-SAP-instance_NEC_30
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 12th monitor resource(for PAS service)

Parameter name	Value of the setting
Type	custom monitor

Continued on next page

Table 2.33 – continued from previous page

Parameter name	Value of the setting
Monitor resource name	genw-PAS-service
Interval	15 sec
Timeout	60 sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-PAS-SAP-service_NEC_30
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-PAS-service.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-PAS-SAP-service_NEC_30
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 13th monitor resource(for AAS instance)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-AAS-instance
Interval	30 sec
Timeout	120 sec
Retry Count	2 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-AAS-SAP-instance_NEC_40
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-AAS-instance.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-AAS-SAP-instance_NEC_40
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 14th monitor resource(for AAS service)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-AAS-service
Interval	15 sec
Timeout	60sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-AAS-SAP-service_NEC_40
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-AAS-service.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-AAS-SAP-service_NEC_40
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 15th monitor resource(for DA1 instance)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-DA1-instance
Interval	30 sec
Timeout	120 sec
Retry Count	2 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-DA1-instance_DAA_97
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-DA1-instance.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-DA1-instance_DAA_97
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 16th monitor resource(for DA1 service)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-DA1-service
Interval	15 sec
Timeout	60 sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-DA1-service_DAA_97
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-DA1-service.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-DA1-service_DAA_97
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 17th monitor resource(for DA2 instance)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-DA2-instance
Interval	30 sec
Timeout	120 sec
Retry Count	2 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-DA2-instance_DAA_96
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-DA2-instance.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-DA2-instance_DAA_96
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 18th monitor resource(for DA2 service)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-DA2-service
Interval	15 sec
Timeout	60 sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-DA2-service_DAA_96
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-DA2-service.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-DA2-service_DAA_96
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 19th monitor resource(for hostexec1)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-hostexec1
Interval	30 sec
Timeout	120 sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-hostexec1
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-hostexec1.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-hostexec1
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 20th monitor resource(for hostexec2)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-hostexec2
Interval	30 sec
Timeout	120 sec
Retry Count	1 time
Wait Time to Start Monitoring	30 sec
Monitor Timing	Active exec-hostexec2
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-hostexec2.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	exec-hostexec2
Recovery Script Execution Count	0 time
Maximum Reactivation Count	3 time
Maximum Failover Count	0 time
Final Action	No operation

- 21th monitor resource

Parameter name	Value of the setting
Type	disk monitor
Monitor resource name	diskw-NFS
Interval	15 sec
Timeout	30 sec
Retry Count	0 time
Wait Time to Start Monitoring	0 sec
Monitor Timing	Always
Method	READ(O_DIRECT)
Monitor Target	/sapmnt/<*SID*>/.nfscheck
Recovery Action	Final action only
Final Action	No operation

- 22th monitor resource(Required only with ENSA2 used)

Parameter name	Value of the setting
Type	custom monitor
Monitor resource name	genw-check-ENSA2
Interval	30 sec
Timeout	30 sec
Retry Count	0 time
Wait Time to Start Monitoring	5 sec

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Table 2.43 – continued from previous page

Parameter name	Value of the setting
Monitor Timing	Active exec-ascs-SAP-instance_NEC_10
Script created with this product	genw.sh
Monitor Type	Synchronous
Log Output Path	/opt/nec/clusterpro/log/genw-check-ENSA2.log
Rotate Log	ON
Rotation Size	1000000 byte
Normal Return Value	0
Recovery Action	Custom settings
Recovery Target	ERS-Group
Recovery Script Execution Count	0 time
Maximum Reactivation Count	0 time
Maximum Failover Count	1 time(node count - 1)
Final Action	Stop Group

Note: The /sapmnt/<*SID*>/.nfscheck file to be set to **Monitor Target** of the disk monitor resource must be created in advance.

2.2.2 Sample configuration of EXPRESSCLUSTER in an NFS cluster

The following table outlines the EXPRESSCLUSTER settings for creating a NFS server cluster environment. The following settings are not necessary when using one node as an NFS server.

Configuration example for failover groups

- Cluster configuration

	Parameter name	Value of the setting
	Cluster name	Cluster-nfs
	The number of servers	2
	The number of failover groups	1
	The number of monitor resources	1
Heartbeat	Lankhb	2
	Lanhb	2
Node#3 (Server of master)	Server name	nas1
	IP address of interconnect (Kernel Mode, Priority 1)	10.0.0.4

Continued on next page

Table 2.44 – continued from previous page

	Parameter name	Value of the setting
	IP address of interconnect (Kernel Mode, Priority 2)	172.16.30.140
	IP address of interconnect (User Mode, Priority 3)	10.0.0.4
	IP address of interconnect (User Mode, Priority 4)	172.16.30.140
Node#4	Server name	nas2
	IP address of interconnect (Kernel mode, priority 1)	10.0.0.5
	IP address of interconnect (Kernel mode, priority 2)	172.16.30.141
	IP address of interconnect (User mode, priority 3)	10.0.0.5
	IP address of interconnect (User mode, priority 4)	172.16.30.141

- 1st group(for NFS server)

	Parameter name	Value of the setting
	Type	failover
	Group name	NFS-Group
	Startup Server	Failover is possible on all servers
	Startup Attribute	Auto Startup
	Failover Attribute	Auto Failover Use the startup server settings
	Failback Attribute	Manual Failback
	Failover Exclusive Attribute	Off
	The number of group resources	3
1st group resource Depth 0	Type	floating ip resource

Continued on next page

Table 2.45 – continued from previous page

	Parameter name	Value of the setting
	Group resource name	fip-nfs
	Dependent Resources	Follow the default dependency
	IP Address	10.0.0.3
2nd group resource Depth 1	Type	disk resource
	Group resource name	disk-nfs
	Dependent Resources	Follow the default dependency
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Disk Type	disk
	File System	ext4
	Device Name	/dev/sda2
	Mount Point	/opt/nfsroot
3rd group resource Depth 2	Type	EXEC resource
	Group resource name	exec-nfs
	Dependent Resources	disk-nfs
	Recovery Operation at Activation Failure Detection	Retry Count 0 Failover Threshold 1 No operation (not activate next resource)
	Recovery Operation at Deactivation Failure Detection	Retry Count at Deactivation Failure 0 Stop the cluster service and shutdown OS
	Details	Script created with this product Start script: start.sh Stop script: stop.sh

Example of the configuration of the monitor resources

- 1st monitor resource(create of default)

Parameter name	Value of the setting
Type	user mode monitor
Monitor resource name	userw

- 2nd monitor resource

Parameter name	Value of the setting
Type	nfs monitor
Monitor resource name	nfsw
Interval	30 sec
Timeout	60 sec
Retry Count	1 time
Wait Time to Start Monitoring	0 sec
Monitor Timing	Active exec-nfs
Share Directory	/opt/nfsroot
NFS Server	127.0.0.1
NFS Version	v4

2.3 Bundled scripts

Terminology used in this chapter.

SID SAP System ID

DASID Diagnostics Agent SAP System ID

INO Instance Number

start.sh Default script for starting exec resource

stop.sh Default script for stopping exec resource

genw.sh Default script for custom monitor

The bundled scripts on the media are stored in the following directory.

- For EXPRESSCLUSTER Internal Version 3.3.*x*/4.0.*x*

  media/Linux/*<Version of EXPRESSCLUSTER>*/common/sample

- For EXPRESSCLUSTER Internal Version 4.1.*x*or later

  media/Linux/*<Version of EXPRESSCLUSTER>*/common/nw/sample

The structure of this directory is shown below.

- For EXPRESSCLUSTER Internal Version 3.3.*x*/4.0.*x*

```
sample/
     scripts/
           SAP-ASCS-instance/
                 ascs_post_handler.sh
                 ascs_start.sh
                 ascs_stop.sh

           SAP-ERS-instance/
                 exclusive_control.sh
                 ers_start.sh
                 ers_stop.sh

           SAP-HostExec/
                 Hostexec_start.sh
                 Hostexec_stop.sh

           SAP-instance/
                 instance_start.sh
                 instance_stop.sh

           SAP-service/
                 service_start.sh
                 service_stop.sh
genw/
     as_instance_genw.sh
     ascs_enq_genw.sh
     ascs_msg_genw.sh
     check_monitor_status.sh
     da_instance_genw.sh
     ers_instance_genw.sh
     ers_mon_preaction.sh
     ers_mon_preaction_wrapper.sh
```

(continues on next page)

(continued from previous page)

```
    hostexec_genw.sh
    service_genw.sh
```

Note:

for EXPRESSCLUSTER Internal Version 3.3.*x*):
If the "as_instance_genw.sh", "da_instance_genw.sh", "ers_instance_genw.sh" and "check_monitor_status.sh" are not bundled on the media, you can download them form the support portal (Content ID: 9510100151).

- For EXPRESSCLUSTER Internal Version 4.1.*x*or later

```
sample/
    scripts/
          SAP-ASCS-instance/
                ascs_post_handler.sh
                ascs_start.sh
                ascs_stop.sh

    SAP-ERS-instance/
          exclusive_control.sh
          ers_start.sh
          ers_stop.sh

    SAP-HostExec/
          Hostexec_start.sh
          Hostexec_stop.sh

    SAP-instance/
          instance_start.sh
          instance_stop.sh

    SAP-service/
          service_start.sh
          service_stop.sh

 genw/
       as_instance_genw.sh
       ascs_enq_genw.sh
       ascs_msg_genw.sh
       check_ensa2.sh
       check_monitor_status.sh
       da_instance_genw.sh
       ers_instance_genw.sh
       ers_mon_preaction.sh
       ers_mon_preaction_wrapper.sh
       hostexec_genw.sh
       service_genw.sh
```

The following is a sample script file required for each configuration.

Group resource/Monitor resource	File name	ENSA	ENSA2
EXEC resource	ascs_post_handler.sh	✓	
	ascs_start.sh	✓	✓
	ascs_stop.sh	✓	✓
	check_ensa2.sh		✓
	ers_start.sh	✓	✓
	ers_stop.sh	✓	✓
	exclusive_control.sh	✓	
	hostexec_start.sh	✓	✓
	hostexec_stop.sh	✓	✓
	instance_start.sh	✓	✓
	instance_stop.sh	✓	✓
	service_start.sh	✓	✓
	service_stop.sh	✓	✓
custom monitor	as_instance_genw.sh	✓	✓
	ascs_enq_genw.sh	✓	✓
	ascs_msg_genw.sh	✓	✓
	check_ensa2.sh		✓
	check_monitor_status.sh	✓	✓
	da_instance_genw.sh	✓	✓
	ers_instance_genw.sh	✓	✓
	ers_mon_preaction.sh	✓	
	ers_mon_preaction_wrapper.sh	✓	
	service_genw.sh	✓	✓
	hostexec_genw.sh	✓	✓

2.3.1 Exec resources

Set the following bundled scripts in a media as exec resources.

Bundled scripts are listed below.

Folder name	File name	Use
SAP-ASCS-instance	ascs_post_handler.sh	For exclusive control of ASCS/ERS instance
	ascs_start.sh	For starting ASCS instance
	ascs_stop.sh	For stopping ASCS instance
SAP-ERS-instance	ers_start.sh	For exclusive control of ASCS/ERS instance
	ers_stop.sh	For starting ERS instance
	exclusive_control.sh	For stopping ERS instance
	check_ensa2.sh	For ASCS/ERS exclusion control with ENSA2 used.
SAP-HostExec	hostexec_start.sh	For starting SapHostExec
	hostexec_stop.sh	For stopping SapHostExec
SAP-Instance	instance_start.sh	For starting instance
	instance_stop.sh	For stopping instance
SAP-service	service_start.sh	For starting service
	service_stop.sh	For stopping service

Modify SAP user (SAPUSER), SAP System ID (SID), Diagnostics Agent SAP System ID (DASID) and Instance Number (INO) written in the bundled sample scripts according to the values setting of your installation of SAP NW.

During SAP NW installation instance profiles are automatically created for each instance in the global directory /sapmnt/<*SID*>/profile as well as in the /usr/sap/<*DASID*>/profile directory on both nodes.

The default naming convention is <*SID*>_<*instance name*>_<*Host Name*>.

An example of profile path of each instance is listed below.

Instance	Profile path
Example	/sapmnt/<*SID*>/profile/<*SID*>_<*Instance Name*>_<*Host Name*>
ASCS	/sapmnt/NEC/profile/NEC_ASCS10_ascssv
ERS1	/sapmnt/NEC/profile/NEC_ERS20_sap1
ERS2	/sapmnt/NEC/profile/NEC_ERS21_sap2
PAS	/sapmnt/NEC/profile/NEC_D30_sap1
AAS	/sapmnt/NEC/profile/NEC_D40_sap2
DA1	/usr/sap/DAA/SYS/profile/DAA_SMDA97_sap1
DA2	/usr/sap/NEC/SYS/profile/DAA_SMDA96_sap2

For some sample scripts, the usage changes depending on whether ENSA or ENSA2 is used. For these sample scripts, refer to either of the following sections depending on the selected configuration.

- For ENSA configuration
  - *Usage of sample script (only for ENSA configuration)*
- For ENSA2 configuration
  - *Usage of sample script (only for ENSA2 configuration)*

For the instance number configuration, refer to SAP HANA System Configuration Guide - "Instance number configuration of the SAP NW components"

Listed below are updated contents for each version:

File Name	EXPRESSCLUSTER Internal Version 3.3.*x*/4.0.*x*	EXPRESSCLUSTER Internal Version 4.1.*x*or later
check_ensa2.sh	-	Used when ENSA2 is used. It checks if the failover group for ASCS is activated before ERS instance is started. If it is activated, the activation fails.
hostexec_start.sh	It detects the abnormal termination of hostexec process by the return value of saphostexec command.	It detects the abnormal termination of hostexec process by the output result of saphostexec command. The detection accuracy has been improved.
service_stop.sh	It does not wait for instance service to be stopped completely.	It waits for instance service to be stopped completely.

Usage of the sample scripts

- **Failover group name:** ASCS-Group
  - **Exec resource name:** exec-ascs-SAP-service_NEC_10

    Copy the contents of "service_start.sh" and "service_stop.sh" to start.sh and stop.sh respectively.
    Modify <*instance name*> to the "file name of SAP profile" of ASCS.

    Example in this manual

    ```
    NEC_ASCS10_ascssv
    ```

    Modify <CLUSTER_instance_resource_name> to the exec resource name setting in Setting up the ASCS resource in the supplied SAP NetWeaver System Configuration Guide.

    Example in this manual

    ```
    exec-ascs-SAP-instance_NEC_10
    ```

    Modify "TIMEOUT" of service_stop.sh to the time in seconds until ASCS instance stops.
    "TIMEOUT" is the time period used for each waiting process in the sample script (e.g. waiting process for sapcontrol command in the sample script).
    Therefore, if more than 1 waiting processes exist in the sample script, the maximum time period for the waiting process is calculated as the timeout value multiplied by the number of waiting processes.
    Additionally, please consider the Start Script-Timeout and Stop Script-Timeout of EXEC resource.

    Example in this manual

    ```
    300
    ```

    The stop script confirms whether the instance has stopped or not every "DELAY" seconds of service_stop.sh until the elapsed time reaches "TIMEOUT".

    Example in this manual

    ```
    10
    ```

    Note: To estimate the necessary time to stop the group resource of ASCS instance, stop the group resource with "DELAY=1", and then check alerts using the WebManager (for Internal Version 3.3.*x*/4.0.*x*)/Cluster WebUI (for Internal Version 4.1.*x*or later).

- **Failover group name:** PAS-Group
  - **Exec resource name:** exec-PAS-SAP-instance_NEC_30

    Copy the contents of "instance_start.sh" and "instance_stop.sh" to start.sh and stop.sh respectively.

Modify <*instance name*> to the "file name of SAP profile" of PAS.

Example in this manual

```
NEC_D30_sap1
```

– **Exec resource name:** exec-PAS-SAP-service_NEC_30

Copy the contents of "service_start.sh" and "service_stop.sh" to start.sh and stop.sh respectively.
Modify <*instance name*> to the "file name of SAP profile" of PAS.

Example in this manual

```
NEC_D30_sap1
```

Modify <CLUSTER_instance_resource_name> to the exec resource name setting in Setting up the PAS resource in the supplied SAP NetWeaver System Configuration Guide.

Example in this manual

```
exec-PAS-SAP-instance_NEC_30
```

Modify "TIMEOUT" of service_stop.sh to the time in seconds until PAS instance stops.
"TIMEOUT" is the time period used for each waiting process in the sample script (e.g. waiting process for sapcontrol command in the sample script).
Therefore, if more than 1 waiting processes exist in the sample script, the maximum time period for the waiting process is calculated as the timeout value multiplied by the number of waiting processes.
Additionally, please consider the Start Script-Timeout and Stop Script-Timeout of EXEC resource.

Example in this manual

```
300
```

The stop script confirms whether the instance has stopped or not every "DELAY" seconds of service_stop.sh until the elapsed time reaches "TIMEOUT".

Example in this manual

```
10
```

Note:

To estimate the necessary time to stop the group resource of PAS instance, stop the group resource with "DELAY=1", and then check alerts using the WebManager (for Internal Version 3.3.*x*/4.0.*x*)/Cluster WebUI (for Internal Version 4.1.*x*or later)

- **Failover group name:** AAS-Group

– **Exec resource name:** exec-AAS-SAP-instance_NEC_40

Copy the contents of "instance_start.sh" and "instance_stop.sh" to start.sh and stop.sh respectively.
Modify <*instance name*> to the "file name of SAP profile" of AAS.

Example in this manual

```
NEC_D40_sap2
```

– **Exec resource name:** exec-AAS-SAP-service_NEC_40

Copy the contents of "service_start.sh" and "service_stop.sh" to start.sh and stop.sh respectively.
Modify <*instance name*> to the "file name of SAP profile" of AAS.

Example in this manual

```
NEC_D40_sap2
```

Modify <CLUSTER_instance_resource_name> to the exec resource name setting in Setting up the AAS resource in the supplied SAP NetWeaver System Configuration Guide.

Example in this manual

```
exec-AAS-SAP-instance_NEC_40
```

Modify "TIMEOUT" of service_stop.sh to the time in seconds until AAS instance stops.
"TIMEOUT" is the time period used for each waiting process in the sample script (e.g. waiting process for sapcontrol command in the sample script).
Therefore, if more than 1 waiting processes exist in the sample script, the maximum time period for the waiting process is calculated as the timeout value multiplied by the number of waiting processes.
Additionally, please consider the Start Script-Timeout and Stop Script-Timeout of EXEC resource.

Example in this manual

```
300
```

The stop script confirms whether the instance has stopped or not every "DELAY" seconds of service_stop.sh until the elapsed time reaches "TIMEOUT".

Example in this manual

```
10
```

Note:

To estimate the necessary time to stop the group resource of AAS instance, stop the group resource with "DELAY=1", and then check alerts using the WebManager (for Internal Version 3.3.*x*/4.0.*x*)/Cluster WebUI (for Internal Version 4.1.*x*or later).

- **Failover group name:** DA1-Group
  - **Exec resource name:** exec-DA1-instance_NEC_97

    Copy the contents of "instance_start.sh" and "instance_stop.sh" to start.sh and stop.sh respectively.
    Modify <*instance name*> to the "file name of SAP profile" of DA1.

    Example in this manual

    ```
    DAA_SMDA97_sap1
    ```

  - **Exec resource name:** exec-DA1-service_NEC_97

    Copy the contents of "service_start.sh" and "service_stop.sh" to start.sh and stop.sh respectively.
    Modify <*instance name*> to "file name of SAP profile" of DA1.

    Example in this manual

    ```
    DAA_SMDA97_sap1
    ```

    Modify <CLUSTER_instance_resource_name> to the exec resource name setting in Setting up the DA1 (Node#1) resource in the supplied SAP NetWeaver System Configuration Guide.

    Example in this manual

    ```
    exec-DA1-instance_DAA_97
    ```

    Modify "TIMEOUT" of service_stop.sh to the time in seconds until DA1 instance stops.
    "TIMEOUT" is the time period used for each waiting process in the sample script (e.g. waiting process for sapcontrol command in the sample script).
    Therefore, if more than 1 waiting processes exist in the sample script, the maximum time period for the waiting process is calculated as the timeout value multiplied by the number of waiting processes.
    Additionally, please consider the Start Script-Timeout and Stop Script-Timeout of EXEC resource.

    Example in this manual

    ```
    300
    ```

    The stop script confirms whether the instance has stopped or not every "DELAY" seconds of service_stop.sh until the elapsed time reaches "TIMEOUT".

    Example in this manual

```
10
```

Note:

To estimate the necessary time to stop the group resource of DA1 instance, stop the group resource with "DELAY=1", and then check alerts using the WebManager (for Internal Version 3.3.*x*/4.0.*x*)/Cluster WebUI (for Internal Version 4.1.*x*or later).

- **Failover group name:** DA2-Group
  - **Exec resource name:** exec-DA2-instance_NEC_96

    Copy the contents of "instance_start.sh" and "instance_stop.sh" to start.sh and stop.sh respectively.
    Modify <*instance name*> to the "file name of SAP profile" of DA1.

    Example in this manual

    ```
    DAA_SMDA96_sap2
    ```

  - **Exec resource name:** exec-DA2-service_NEC_96

    Copy the contents of "service_start.sh" and "service_stop.sh" to start.sh and stop.sh respectively.
    Modify <*instance name*> to the "file name of SAP profile" of DA1.

    Example in this manual

    ```
    DAA_SMDA96_sap2
    ```

    Modify <CLUSTER_instance_resource_name> to the exec resource name setting in Setting up the DA2 (Node#2) resource in the supplied SAP NetWeaver System Configuration Guide.

    Example in this manual

    ```
    exec-DA2-instance_DAA_96
    ```

    Modify "TIMEOUT" of service_stop.sh to the time in seconds until DA2 instance stops.
    "TIMEOUT" is the time period used for each waiting process in the sample script (e.g. waiting process for sapcontrol command in the sample script).
    Therefore, if more than 1 waiting processes exist in the sample script, the maximum time period for the waiting process is calculated as the timeout value multiplied by the number of waiting processes.
    Additionally, please consider the Start Script-Timeout and Stop Script-Timeout of EXEC resource.

    Example in this manual

    ```
    300
    ```

The stop script confirms whether the instance has stopped or not every "DELAY" seconds of service_stop.sh until the elapsed time reaches "TIMEOUT".

Example in this manual

```
10
```

Note:

To estimate the necessary time to stop the group resource of DA2 instance, stop the group resource with "DELAY=1", and then check alerts using the WebManager (for Internal Version 3.3.*x*/4.0.*x*)/Cluster WebUI (for Internal Version 4.1.*x*or later).

- **Failover group name:** hostexec1-Group
  - **Exec resource name:** exec-hostexec1

    Copy the contents of "hostexec_start.sh" and "hostexec_stop.sh" to start.sh and stop.sh respectively.
    Use the default path of SAP NW for SAPHOSTEXEC and PROFILE.

    Note:

    In SAP NW 7.5 or later environment, activation of the exec-hostexec1 may be failed. In that case, add " -restart" to the end of the line "${SAPHOSTEXEC} pf=${PROFILE}" in the start.sh.

- **Failover group name:** hostexec2-Group
  - **Exec resource name:** exec-hostexec2

    Setting like the above exec-hostexec1.

    Note:

    In SAP NW 7.5 or later environment, activation of the exec-hostexec2 may be failed. In that case, add " -restart" to the end of the line "${SAPHOSTEXEC} pf=${PROFILE}" in the start.sh.

Usage of sample script (only for ENSA configuration)

- **Failover group name:** ASCS-Group
  - **Exec resource name:** exec-ascs-SAP-instance_NEC_10

    Copy the files of SAP-ASCS-instance directory to any directory.

    Example in this manual
    /root/sample/scripts/SAP-ASCS-instance

    Assign the execute permission to ascs_post_handler.sh, ascs_start.sh and ascs_stop.sh.

    Example in this manual

```
# chmod 700 /root/sample/scripts/SAP-ASCS-instance/ascs_post_
↪handler.sh
# chmod 700 /root/sample/scripts/SAP-ASCS-instance/ascs_start.sh
# chmod 700 /root/sample/scripts/SAP-ASCS-instance/ascs_stop.sh
```

Modify <ASCS_instance_name> of ascs_start.sh and ascs_stop.sh to the "file name of SAP profile" of ASCS.

Example in this manual

```
NEC_ASCS10_ascssv
```

Modify <directory_path_of_ascs_post_handler.sh> of ascs_start.sh to the absolute path of the directory where ascs_post_handler.sh is placed.

Example in this manual

```
/root/sample/scripts/SAP-ASCS-instance
```

Modify the "SAP_ERS_INO" of ascs_start.sh to the sequence of ERS1 instance INO and ERS2 instance INO set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1" and - "Installation of ERS instance Node#2" Use a space for delimiter.

Example in this manual

```
20 21
```

Select the Properties of EXEC resource and select the Details tab.
Enter the absolute path of ascs_start.sh in Start.
Enter the absolute path of ascs_stop.sh in Stop.

Example in this manual

Start path :

```
/root/sample/scripts/SAP-ASCS-instance/ascs_start.sh
```

Stop path :

```
/root/sample/scripts/SAP-ASCS-instance/ascs_stop.sh
```

Note: If any failover group of the ERS instance is not working, the failover group of ERS instance is started automatically when administrator starts or moves ASCS instance manually. For disabling auto startup of the failover group of the ERS instance change the value of "ENABLED" of ascs_start.sh to "0", and start or move ASCS instance by manual.

- **Failover group name:** ERS1-Group
  - **Exec resource name:** exec-ERS1-SAP-instance_NEC_20

    Copy the files of SAP- ERS-instance directory to any directory.

    Example in this manual

    ```
    /root/sample/scripts/SAP-ERS-instance
    ```

Assign the execute permission to ers_start.sh, ers_stop.sh and exclusive_control.sh.

Example in this manual

```
# chmod 700 /root/sample/scripts/SAP-ERS-instance/ers_start.sh
# chmod 700 /root/sample/scripts/SAP-ERS-instance/ers_stop.sh
# chmod 700 /root/sample/scripts/SAP-ERS-instance/exclusive_
↪control.sh
```

Modify <ERS_instance_name> of ers_start.sh and ers_stop.sh to the "file name of SAP profile" of ERS.

Example in this manual

```
NEC_ERS20_sap1
```

Modify <directory_path_of_exclusive_control.sh> of ers_start.sh and ers_stop.sh to the absolute path of the directory where exclusive_control.sh is placed.

Example in this manual

```
/root/sample/scripts/SAP-ERS-instance
```

Modify the "SAP_ERS_INO" of ers_start.sh and ers_stop.sh to the sequence of ERS1 instance INO and ERS2 instance INO set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1" and - "Installation of ERS instance Node#2" Use a space for delimiter.

Example in this manual

```
20 21
```

Modify the "EXCLUSIVE_GROUP" of ers_start.sh and ers_stop.sh to the common failover group name for exclusive control set in SAP NetWeaver System Configuration Guide - "Create failover groups"

Select the Properties of EXEC resource and select the Details tab.
Enter the absolute path of ers_start.sh in Start.
Enter the absolute path of ers_stop.sh in Stop.

Example in this manual

Start path :

```
/root/sample/scripts/SAP-ERS-instance/ers_start.sh
```

Stop path :

```
/root/sample/scripts/SAP-ERS-instance/ers_stop.sh
```

– **Exec resource name:** exec-ERS1-SAP-service_NEC_20

Copy the contents of "service_start.sh" and "service_stop.sh" to start.sh and stop.sh respectively. Modify <*instance name*> to the "file name of SAP profile" of ERS1.

Example in this manual

```
NEC_ERS20_sap1
```

Modify <*CLUSTER_instance_resource_name*>to the exec resource name setting in "Setting up the ERS1 (Node#1) resource in the supplied "SAP NetWeaver System Configuration Guide".

Example in this manual

```
exec-ERS1-SAP-instance_NEC_20
```

Modify "TIMEOUT" of service_stop.sh to the time in seconds until ERS1 instance stops.

Example in this manual

```
300
```

The stop script confirms whether the instance has stopped or not every "DELAY" seconds of service_stop.sh until the elapsed time reaches "TIMEOUT".

Example in this manual

```
10
```

Note: To estimate the necessary time to stop the group resource of ERS1 instance, stop the group resource with "DELAY=1", and then check alerts using the WebManager (for Internal Version 3.3.*x*/4.0.*x*) or Cluster WebUI (for Internal Version 4.1.*x*or later).

- **Failover group name:** ERS2-Group
  - **Exec resource name:** exec-ERS2-SAP-instance_NEC_21

Copy the files of SAP- ERS-instance directory to any directory.

Example in this manual

```
/root/sample/scripts/SAP-ERS-instance
```

Assign the execute permission to ers_start.sh, ers_stop.sh and exclusive_control.sh.

Example in this manual

```
# chmod 700 /root/sample/scripts/SAP-ERS-instance/ers_start.sh
# chmod 700 /root/sample/scripts/SAP-ERS-instance/ers_stop.sh
# chmod 700 /root/sample/scripts/SAP-ERS-instance/exclusive_
↪control.sh
```

Modify <ERS_instance_name> of ers_start.sh and ers_stop.sh to the "file name of SAP profile" of ERS.

Example in this manual

```
NEC_ERS21_sap2
```

Modify <directory_path_of_exclusive_control.sh> of ers_start.sh and ers_stop.sh to the absolute path of the directory where exclusive_control.sh is placed.

Example in this manual

```
/root/sample/scripts/SAP-ERS-instance
```

Modify the "SAP_ERS_INO" of ascs_start.sh to the sequence of ERS1 instance INO and ERS2 instance INO set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1" and - "Installation of ERS instance Node#2" Use a space for delimiter.

Example in this manual

```
20 21
```

Modify the "EXCLUSIVE_GROUP" of ers_start.sh and ers_stop.sh to the common failover group name for exclusive control set in SAP NetWeaver System Configuration Guide - "Failover group for exclusive control"

Select the Properties of EXEC resource and select the Details tab.
Enter the absolute path of ers_start.sh in Start.
Enter the absolute path of ers_stop.sh in Stop.

Example in this manual

Start path :

```
/root/sample/scripts/SAP-ERS-instance/ers_start.sh
```

Stop path :

```
/root/sample/scripts/SAP-ERS-instance/ers_stop.sh
```

– **Exec resource name:** exec-ERS2-SAP-service_NEC_21

Copy the contents of "service_start.sh" and "service_stop.sh" to start.sh and stop.sh respectively. Modify <*instance name*> to the "file name of SAP profile" of ERS2.

Example in this manual

```
NEC_ERS21_sap2
```

Modify <*CLUSTER_instance_resource_name*>to the exec resource name setting in "Setting up the ERS2 (Node#2) resource in the supplied "SAP NetWeaver System Configuration Guide".

Example in this manual

```
exec-ERS2-SAP-instance_NEC_21
```

Modify "TIMEOUT" of service_stop.sh to the time in seconds until ERS2 instance stops.

Example in this manual

```
300
```

The stop script confirms whether the instance has stopped or not every "DELAY" seconds of service_stop.sh until the elapsed time reaches "TIMEOUT".

Example in this manual

```
10
```

Note: To estimate the necessary time to stop the group resource of ERS2 instance, stop the group resource with "DELAY=1", and then check alerts using the WebManager (for Internal Version 3.3.*x*/4.0.*x*) or Cluster WebUI (for Internal Version 4.1.*x*or later).

Usage of sample script (only for ENSA2 configuration)

- **Failover group name:** ASCS-Group
  - **Exec resource name:** exec-ascs-SAP-instance_NEC_10

    Locate the files under SAP-ASCS-instance directory on a voluntary directory.

    Example in this manual

    ```
    /root/sample/scripts/SAP-ASCS-instance
    ```

    Give execution permission to ascs_start.sh and ascs_stop.sh.

    Example in this manual

    ```
    # chmod 700 /root/sample/scripts/SAP-ASCS-instance/ascs_start.sh
    # chmod 700 /root/sample/scripts/SAP-ASCS-instance/ascs_stop.sh
    ```

    Rename the <ASCS_instance_name> of ascs_start.sh and ascs_stop.sh as "File name of SAP profile" of ASCS.

    Example in this manual

    ```
    NEC_ASCS10_ascssv
    ```

    Click User Application in the Dedails of EXEC resource.
    Enter the absolute path of ascs_start.sh in Start.
    Enter the absolute path of ascs_stop.sh in Stop.

    Example in this manual

    Start path :

    ```
    /root/sample/scripts/SAP-ASCS-instance/ascs_start.sh
    ```

    Stop path :

    ```
    /root/sample/scripts/SAP-ASCS-instance/ascs_stop.sh
    ```

- **Failover group name:** ERS-Group
  - **Exec resource name:** exec-check-ENSA2

    Copy the contents of check_ensa2.sh on start.sh and rename the <ASCS_GROUP> of check_ensa2.sh as ASCS failover group and <ERS_GROUP> as ERS failover group.

    Example in this manual

    ```
    ASCS-Group
    ERS-Group
    ```

– **Exec resource name:** exec-ERS-SAP-instance_NEC_20

Locate the files under the SAP-ERS-instance directory on a voluntary directory.

Example in this manual

```
/root/sample/scripts/SAP-ERS-instance
```

Give execution permission to ers_start.sh, ers_stop.sh.

Example in this manual

```
# chmod 700 /root/sample/scripts/SAP-ERS-instance/ers_start.sh
# chmod 700 /root/sample/scripts/SAP-ERS-instance/ers_stop.sh
```

Rename the < ERS_instance_name > of ers_start.sh and ers_stop.sh as "File name of SAP profile" of ERS.

Example in this manual

```
NEC_ERS20_erssv
```

– **Exec resource name:** exec-ERS-SAP-service_NEC_20

Copy the contents of service_start.sh on start.sh and service_stop.sh on stop.sh. Then rename the <*instance_name*> as "File name of SAP profile" of ERS.

Example in this manual

```
NEC_ERS20_erssv
```

Rename <CLUSTER_instance_resource_name> as the EXEC resource name set in the SAP NetWeaver System Configuration Guide - "Setting up the ERS resource".

Example in this manual

```
exec-ERS-SAP-instance_NEC_20
```

Set the required value (in second) for "TIMEOUT" in service_stop.sh to stop the group resources for ERS2 instance.
"TIMEOUT" is the time period used for each waiting process in the sample script (e.g. waiting process for sapcontrol command in the sample script).

Therefore, if more than 1 waiting processes exist in the sample script, the maximum time period for the waiting process is calculated as the timeout value multiplied by the number of waiting processes. Additionally, please consider the Start Script-Timeout and Stop Script-Timeout of EXEC resource.

Example in this manual

```
300
```

"DELAY" in service_stop.sh is to check if it stops every time period set until it reaches "TIMEOUT".

Example in this manual

```
10
```

Note: In order to confirm the time period required to start/stop the group resource for ERS instance, perform the start/stop of the group resource with setting 1 for DELAY and check the alerts on WebManager (for Internal Version 3.3.*x*/4.0.*x*) or Cluster WebUI (for Internal Version 4.1.*x*or later).

2.3.2 Custom monitor

Use the following bundled sample scripts as custom monitor resources.

File name	Use
as_instance_genw.sh	For monitoring the PAS/AAS instance
ascs_enq_genw.sh	For monitoring ASCS enqueue server
ascs_msg_genw.sh	For monitoring ASCS message server
check_ensa2.sh	For ASCS/ERS exclusion control when ENSA2 is used
check_monitor_status.sh	Sample script to check whether access to files in /sapmnt/<*SID*> is available before each custom monitor starts monitoring
da_instance_genw.sh	For monitoring the DA instance
ers_instance_genw.sh	For monitoring the ERS instance
ers_mon_preaction.sh	Bundled script of recovery action for ERS instance monitoring
ers_mon_preaction_wrapper.sh	Bundled script of recovery action for ERS instance monitoring
service_genw.sh	For monitoring instance service
hostexec_genw.sh	For monitoring Saphostexec

Note:

(for EXPRESSCLUSTER Internal Version 3.3.*x*):

If the "as_instance_genw.sh", "da_instance_genw.sh", "ers_instance_genw.sh" and "check_monitor_status.sh.sh" are not bundled on the media, you can download them form the support portal (Content ID: 9510100151).

In the same way as in 2.3.1. *Exec resources*,modify SAPUSER, SID (SAP System ID), DASID (Diagnostics agent SAP System ID) and INO (Instance Number) used in the bundled sample Ascripts according to the values used during the installation of SAP NW.

Listed below are the changes in each version.

File name	EXPRESSCLUSTER Internal Version 3.3.*x*/4.0.*x*	EXPRESSCLUSTER Internal Version 4.1.*x*or later
ascs_enq_genw.sh	It monitors the status of enserver process	It monitors the status of enserver process when ENSA is used. When ENSA 2 is used, it monitors the status of enq_server process. Use ENSA _VERSION parameter in clp_shi_connector.conf to specify which one is to be used. Refer to the SAP NetWeaver System Configuration Guide - "ENSA settings (for Internal Version 4.1.0-1 or later)" for more details.
check_ensa2.sh	-	When ENSA2 is used, it triggers a monitoring error if the failover groups for ASCS and ERS are activated on the same node.
ers_instance_genw.sh	It monitors the status of enrepserver process	When ENSA is used, it monitors the status of the enrepserver process. When ENSA2 is used, it monitors the status of the enq_replicator process. Use ENSA _VERSION parameter in clp_shi_connector.conf to specify which one is to be used. Refer to the SAP NetWeaver System Configuration Guide - "ENSA settings (for Internal Version 4.1.0-1 or later)" for more details.
hostexec_genw.sh	It detects the abnormal termination of the process in SAP Host Agent by the return value of saphostexec command.	It detects the abnormal termination of the process in SAP Host Agent by the return value of saphostexec command. The detection accuracy has been improved.

Continued on next page

Table 2.50 – continued from previous page

File name	EXPRESSCLUSTER Internal Version 3.3.*x*/4.0.*x*	EXPRESSCLUSTER Internal Version 4.1.*x*or later
as_instance_genw.sh ascs_enq_genw.sh ascs_msg_genw.sh da_instance_genw.sh ers_instance_genw.sh	As a result of checking the statuses of the processes, which compose each instance, by sapcontrol -function GetProcessList, it triggers a monitoring error if the results are not all GREEN.	As a result of checking the statuses of the processes, which compose each instance, by sapcontrol -function GetProcessList, it triggers a monitoring error if the results are not all GREEN or contain any other status than GREEN or YELLOW. Use the YELLOW_AS_ERROR parameter in clp_shi_connector.conf for determining which case is recognized as a monitoring error. Refer to the SAP NetWeaver System Configuration Guide - "Setting abnormal process judgement for each instance (for Internal Version 4.1.0-1 or later)" for more details.

Usage of the sample scripts

An example of setting: modifying contents included in <>.

- **Custom monitor name:** genw-ASCS-instance-ENQ

  Copy the contents of "ascs_enq_genw.sh" to genw.sh. Modify <*instance name*> to the "file name of SAP profile" of ASCS.

  Example in this manual

  ```
  NEC_ASCS10_ascssv
  ```

  Modify <*DISKW*> of genw.sh to the name of the disk monitor added the SAP NW cluster.

  Example in this manual

  ```
  diskw-NFS
  ```

  Modify <*directory_path_of_check_monitor_status.sh*> of genw.sh to the absolute path of the directory where check_monitor_status.sh is placed.

  Example in this manual

  ```
  /root/sample/genw
  ```

  For details of check_monitor_status.sh, refer to "2.3.2. *Usage of check_monitor_status.sh*".

- **Custom monitor name:** genw-ASCS-instance-MSG

  Copy the contents of "ascs_msg_genw.sh" to genw.sh. Modify <*instance name*> to the "file name of SAP profile" of ASCS.

  Example in this manual

  ```
  NEC_ASCS10_ascssv
  ```

  Modify <*DISKW*> of genw.sh to the name of the disk monitor added the SAP NW cluster.

  Example in this manual

  ```
  diskw-NFS
  ```

  Modify <*directory_path_of_check_monitor_status.sh*> of genw.sh to the absolute path of the directory where check_monitor_status.sh is placed.

  Example in this manual

  ```
  /root/sample/genw
  ```

  For details of check_monitor_status.sh, refer to "2.3.2. *Usage of check_monitor_status.sh*".

- **Custom monitor name:** genw-ERS1-instance (for ENSA configuration)
- **Custom monitor name:** genw-ERS2-instance (for ENSA configuration)
- **Custom monitor name:** genw-ERS-instance (for ENSA2 configuration)

  Copy the contents of "ers_instance_genw.sh" to genw.sh. Modify <*instance name*> to the "file name of SAP profile" which corresponds to each instance.

  Example in this manual

  ```
  NEC_ERS20_sap1 (for ENSA configuration)
  NEC_ERS21_sap2 (for ENSA configuration)
  NEC_ERS20_erssv (for ENSA2 configuration)
  ```

  Modify <*DISKW*> of genw.sh to the name of the disk monitor added the SAP NW cluster.

  Example in this manual

  ```
  diskw-NFS
  ```

  Modify <*directory_path_of_check_monitor_status.sh*> of genw.sh to the absolute path of the directory where check_monitor_status.sh is placed.

  Example in this manual

  ```
  /root/sample/genw
  ```

  For details of check_monitor_status.sh, refer to "2.3.2. *Usage of check_monitor_status.sh*".

- **Custom monitor name:** genw-PAS-instance
- **Custom monitor name:** genw-AAS-instance

  Copy the contents of "as_instance_genw.sh" to genw.sh. Modify <*instance name*> to the "file name of SAP profile" which corresponds to each instance.

  Example in this manual

```
NEC_D30_sap1
NEC_D40_sap2
```

Modify <*DISKW*> of genw.sh to the name of the disk monitor added the SAP NW cluster.

Example in this manual

```
diskw-NFS
```

Modify <*directory_path_of_check_monitor_status.sh*> of genw.sh to the absolute path of the directory where check_monitor_status.sh is placed.

Example in this manual

```
/root/sample/genw
```

For details of check_monitor_status.sh, refer to "2.3.2. *Usage of check_monitor_status.sh*".

- **Custom monitor name:** genw-DA1-instance
- **Custom monitor name:** genw-DA2-instance

Copy the contents of "da_instance_genw.sh" to genw.sh. Modify <*instance name*> to the "file name of SAP profile" which corresponds to each instance.

Example in this manual

```
DAA_SMDA97_sap1
DAA_SMDA96_sap2
```

Modify <*DISKW*> of genw.sh to the name of the disk monitor added the SAP NW cluster.

Example in this manual

```
diskw-NFS
```

Modify <*directory_path_of_check_monitor_status.sh*> of genw.sh to the absolute path of the directory where check_monitor_status.sh is placed.

Example in this manual

```
/root/sample/genw
```

For details of check_monitor_status.sh, refer to "2.3.2. *Usage of check_monitor_status.sh*".

- **Custom monitor name:** genw-ASCS-service
- **Custom monitor name:** genw-ERS1-service (for ENSA configuration)
- **Custom monitor name:** genw-ERS2-service (for ENSA configuration)
- **Custom monitor name:** genw-ERS-service (for ENSA2 configuration)
- **Custom monitor name:** genw-PAS-service
- **Custom monitor name:** genw-AAS-service
- **Custom monitor name:** genw-DA1-service
- **Custom monitor name:** genw-DA2-service

Copy the contents of "instance_genw.sh" to genw.sh.
Modify <*instance name*> to the "file name of SAP profile" which corresponds to each instance.

Example in this manual

```
NEC_ASCS10_ascssv
NEC_ERS20_sap1 (for ENSA configuration)
NEC_ERS21_sap2 (for ENSA configuration)
NEC_ERS20_erssv (for ENSA2 configuration)
NEC_D30_sap1
NEC_D40_sap2
DAA_SMDA97_sap1
DAA_SMDA96_sap2
```

Modify *<DISKW>* of genw.sh to the name of the disk monitor added the SAP NW cluster.

Example in this manual

```
diskw-NFS
```

Modify *<directory_path_of_check_monitor_status.sh>* of genw.sh to the absolute path of the directory where check_monitor_status.sh is placed.

Example in this manual

```
/root/sample/genw
```

For details of check_monitor_status.sh, refer to "2.3.2. *Usage of check_monitor_status.sh*".

- **Custom monitor name:** genw-hostexec1
- **Custom monitor name:** genw-hostexec2

  Copy the contents of "hostexec_genw.sh" to genw.sh and modify the following part.
  For SAPHOSTEXEC, use the default path of SAP NW.

- **Custom monitor name:** genw-check-ENSA2

  Copy the contents of check_ensa2.sh on genw.sh and rename the <ASCS_GROUP> of check_ensa2.sh as ASCS failover group and <ERS_GROUP> as ERS failover group.

  Example in this manual

```
ASCS-Group
ERS-Group
```

Usage of the recovery scripts (only for ENSA configuration)

It order to use ENSA, it is necessary for the ENSA configuration to configure the following recovery script.

- **Custom monitor name:** genw-ERS1-instance

  Copy ers_mon_preaction.sh and ers_mon_preaction_wrapper.sh in any directory.

  Example in this manual

```
/root/sample/genw
```

  Assign the execute permission to ers_mon_preaction.sh and ers_mon_preaction_wrapper.sh.

  Example in this manual

```
# chmod 700 /root/sample/genw/ers_mon_preaction.sh
# chmod 700 /root/sample/genw/ers_mon_preaction_wrapper.sh
```

Modify <directory_path_of_ers_mon_preaction.sh> of ers_mon_preaction_wrapper.sh to the absolute path of the directory where ers_mon_preaction.sh is placed.

Example in this manual

```
/root/sample/genw
```

Modify <*SID*> of ers_mon_preaction_wrapper.sh to the SID set in SAP NetWeaver System Configuration Guide- "Installation of ASCS and ERS instances Node#1".

Example in this manual

```
NEC
```

Modify the "SAP_ASCS_INO" of ers_mon_preaction_wrapper.sh to the ASCS instance INO set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1"

Example in this manual

```
10
```

Modify the "SAP_ERS_INO" of ers_mon_preaction_wrapper.sh to the sequence of ERS1 instance INO and ERS2 instance INO set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1 " and - "Installation of ERS instance Node#2" Use a space for delimiter.

Example in this manual

```
20 21
```

Select the Properties of custom monitor resource and select the Recovery Action tab.
Click Script Settings to display the Edit Script dialog box.
Click User Application in the Edit Script dialog box.
Enter the absolute path of ers_mon_preaction_wrapper.sh in File.

Example in this manual

```
/root/sample/genw/ers_mon_preaction_wrapper.sh
```

- **Custom monitor name:** genw-ERS2-instance

Copy ers_mon_preaction.sh and ers_mon_preaction_wrapper.sh in any directory.

Example in this manual

```
/root/sample/genw
```

Assign the execute permission to ers_mon_preaction.sh and ers_mon_preaction_wrapper.sh.

Example in this manual

```
# chmod 700 /root/sample/genw/ers_mon_preaction.sh
# chmod 700 /root/sample/genw/ers_mon_preaction_wrapper.sh
```

Modify <directory_path_of_ers_mon_preaction.sh> of ers_mon_preaction_wrapper.sh to the absolute path of the directory where ers_mon_preaction.sh is placed.

Example in this manual

```
/root/sample/genw
```

Modify <*SID*> of ers_mon_preaction_wrapper.sh to the SID set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1".

Example in this manual

```
NEC
```

Modify the "SAP_ASCS_INO" of ers_mon_preaction_wrapper.sh to the ASCS instance INO set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1"

Example in this manual

```
10
```

Modify the "SAP_ERS_INO" of ers_mon_preaction_wrapper.sh to the sequence of ERS1 instance INO and ERS2 instance INO set in SAP NetWeaver System Configuration Guide - "Installation of ASCS and ERS instances Node#1 " and - "Installation of ERS instance Node#2" Use a space for delimiter.

Example in this manual

```
20 21
```

Select the Properties of custom monitor resource and select the Recovery Action tab. Click Script Settings to display the Edit Script dialog box. Click User Application in the Edit Script dialog box. Enter the absolute path of ers_mon_preaction_wrapper.sh in File.

Example in this manual

```
/root/sample/genw/ers_mon_preaction_wrapper.sh
```

Usage of check_monitor_status.sh

Copy check_monitor_status.sh in any directory.

Example in this manual

```
/root/sample/genw
```

Assign the execute permission to check_monitor_status.sh.

Example in this manual

```
# chmod 700 /root/sample/genw/check_monitor_status.sh
```

Note:

(for EXPRESSCLUSTER Internal Version 3.3.*x*):
If the "check_monitor_status.sh.sh" is not bundled on the media, you can download it from the support portal (Content ID: 9510100151).

CHAPTER

THREE

LEGAL NOTICE

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CHAPTER

FOUR

REVISION HISTORY

Edition	Revised Date	Description
1st	Apr 17, 2018	New guide
2nd	Apr 10, 2019	Added the configuration of ENSA2. 2.2.1. *Sample configuration of EXPRESSCLUSTER in a SAP NW cluster* 2.3.1. *Usage of sample script (only for ENSA2 configuration)* 2.3.2. *Usage of the sample scripts* Added the sample script required for each configuration. 2.3. *Bundled scripts* Added the list of changes made on sample scripts for each version. 2.3.1. *Exec resources* 2.3.2. *Custom monitor* Added the explanation for "TIMEOUT" 2.3.1. *Usage of the sample scripts* 2.3.1. *Usage of sample script (only for ENSA2 configuration)*
3rd	Apr 10, 2020	Added the information of internal version 4.2.0-1
4th	Jul 10,2020	Added the setting method of exec-ERS1-SAP-service_NEC_20, exec-ERS2-SAP-service_NEC_21. 2.3.1. *Usage of sample script (only for ENSA configuration)* Typo correction.(genw-AAS-instance **Recovery Target**) 2.2.1. *Example of the configuration of the Monitor Resources*
5th	Apr 09, 2021	Corresponds to the internal version 4.3.0-1.
6th	Apr 08, 2022	Corresponds to the internal version 5.0.0-1.
7th	Aug 26, 2022	Supports the internal version 5.0.0-1.

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