

ActiveImage Protector 2018 Update for CLUSTERPRO

Backup and Recovery Guide 4th Edition – September 25, 2020

This guide provides description about the installation and operating procedures of ActiveImage Protector 2018 Update for CLUSTERPRO (hereinafter "AIP") in CLUSTERPRO cluster environment.

CLUSTERPRO is designed for two-node cluster, one for active server and the other for passive server.

For more detailed procedures, please refer to AIP Help and CLUSTERPRO User Guide.

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# **Revision History**

Edition	Revised on	Revised page	Description
1st Edition	9/26/2018		First Edition
2 <sup>nd</sup> Edition	4/23/2019	31-38	Changes made corresponding to the user guide for CLUSTERPRO X4.1
3rd Edition	6/29/2020	1, 4, footer	Corrections according to the company name change
4th Edition	9/25/2020	8, 12, 15, 20, 26	Added and changed descriptions.

# CONTENTS

Revision History2	
CONTENTS	
Introduction4	
1. Configuration Example5	
2. Before Backing up CLUSTERPRO	
3. AIP Backup Feature	
3.1 Backup Feature	
3.2 Backup Operating Procedures8	
3.3 Check backup task behavior11	
4. Recovery Operating Procedures13	
4.1 System Recovery Procedures AIPBE Linux-based boot environment	
4.2 System Recovery Procedures AIPBE Windows PE-based boot	
environment19	
4.3 Data Partition Recovery Procedures24	
Appendix 1 Script to stop application service29	
Appendix 2 Restore clustered data partition	
Appendix 3 Reconfiguration of Servers	

# Introduction

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This document is not officially provided by NEC Corporation. Any information included in this document is provided solely on informational purposes and Actiphy shall not be liable for technical or editorial errors or omissions contained herein.

This document provides general descriptions for standard settings to use CLUSTERPRO and ActiveImage Protector that may not be applicable to a specific system environment or operation. You will be solely responsible for the installation, the use, the operation of the product in your customer's system environment.

This document is intended for the system engineers who are engaged in an effort to design and introduce a new system or the system administrators and maintenance staff who are engaged in maintenance and operational management of the existing system.

The readers of this document are supposed to have specialized expertise about Windows Server operating system and computer literacy.

This document provides the minimum of the required information for the operation of ActiveImage Protector and CLUSTERPRO. For more detailed information about the operating procedures, please refer to the manuals for the respective products.

The screen images included in this document provide only examples of the settings but may differ from the actual appearance.

# 1. Configuration Example

This user guide provides backup and recovery procedures based on the following system environment.

#### **Configuration Example**

Server	SRV1	SRV2
Public Network IP Address	192.168.0.41	192.168.0.42
Mirror Network IP Address	172.16.0.41	172.16.0.42
Heartbeat Redundant Network IP	192.168.10.41	192.168.10.42
Address		
Data Partition (Mirror Drive)	E Drive	E Drive
Cluster Partition	Q Drive	Q Drive



The following recovery procedures are described assuming that the system failure occurs on SRV 1, failover to SRV 2 takes place, restore of SRV 1 and cluster configuration is performed. The operating procedures are provided by using ActiveImage Protector (hereinafter "AIP").

# 2. Before Backing up CLUSTERPRO

Before you start backing up CLUSTERPRO cluster environment, please note that the data partition on passive server is RAW (file system) that cannot be backed up.

For example, suppose that SRV1 is configured as the active server and SRV2 as the passive server. Because the data partition on the passive server is RAW partition, the use of Explorer does not allow you to browse in the data partition.



Referring to the above disk management window, the drive letters and file system information are displayed for the active server. On the other hand, because the data partitions on the passive server are RAW partitions, you are not allowed to monitor the status.

Therefore, the sector information of the drive is not readable on the passive server and backup is not allowed.

The use of AIP's Backup feature by enabling [Ignore inaccessible volumes] option that prevents backup task interruptions when an inaccessible volume is encountered and allows the backup task to be completed.

# 3. AIP Backup Feature

## 3.1 Backup Feature

Please install AIP on both active and passive servers.

For more detailed AIP installation procedures, please refer to [Install and Start ActiveImage Protector] in AIP Help.

If cluster environment is already configured by using CLUSTERPRO, the data partition must be placed online to read the drive information. To run AIP backup task or to create a schedule, please make sure that the data partition is placed online.

\*For the detailed operating procedures, please refer to ActiveImage Protector or CLUSTERPRO User Manual.

Summary of Operating Procedures

- (1) Create a schedule on the active server
- (2) Manually perform failover
- (3) Create a schedule on the active server after switchover as a result of failover
- (4) Manually perform failover and restore the active server back to the active node

Create Backup Schedule



Once a schedule is created while the data partition is readable, backup task normally runs on passive server.

## 3.2 Backup Operating Procedures

1. Go to [Backup] – [Schedule Backup] in AIP menu to launch Backup wizard.

Operation View Preferences U	Acti tilities Help	iveIn	nage Protec	tor			
🗽 srv1 👻							
📮 Dashboard	Schedule Backup						
📤 Backup	1 Source	2	Destinatio	on	3	Schedule	4 Summary
Schedule Backup	🔘 Entire Disk 🔘 Volume						
vStandby	Volume Name	# 1	File System NTFS	Volume 350.0 ME	Size B	Used Space 47.8 MB	Associated Disk 0
Recovery >	✓      ✓	2 NTFS 59.7 GB 1 NTFS 18.0 GB 2 FAT 2.0 GB			11.1 GB 13.9 GB	Disk 1 Disk 1 Disk 1	
🛐 Image Manager 🔉	📄 Basic 🖄 Dynamic disk	🗆 V	'olume 🚥 Dyna	imic volume			
🔮 Virtualization 🔹 🔸	Disk 0 Basic (MBR) 50 D CR System B	eserve	d (:)	Local D	iisk (C)		
🖬 Utilities 🔹 🗲	★ Used : 11.1 GB 350.0 MB	S NTES		59.7 GE	I NTFS		
	Disk 1 Basic (MBR) 20.0 GB ↓ Used : 13.9 GB	k (E:) NTFS				Local Disk 2.0 GB FAT	Q)
	Primary						
🛃 Local Host 🕴 🔒						(	Next > <u>Cancel</u>

When backing up the system in uEFI environment, please back up uEFI system volume as well as the Windows system volume since uEFI system volume has to be restored before restoring Windows system volume.

You are recommended to back up the entire uEFI system disk, so that the backup image of the entire disk will be restored.

Also, please remember to back up the cluster partition together with mirror disk by selecting [Entire Disk].

#### 2. Select Destination

	ActiveImage Protector	_ <b>_</b> X
Operation View Preferences U	Itilities Help	
📓 srv1 🔻		
📮 Dashboard	Schedule Backup	
📑 Backup	1 Source 2 Destination 3 Schedu	Ile 4 Summary
Schedule Backup       Backup Now       VStandby       Recovery       Image Manager	Task Name: Backup_20180927_1455 Destination folder: \\\\T2\\Share\clusterpro	Options:     < Advanced Options       Image: Compression:     Image: Compression:       Image: Deduptication Compression:     Image: Compression:       Image: Compression:     Image: Compression:       I
Virtualization >	srv1d00.aiv © Designate a separate image file set per disk Comments:	Password Confirm Password Strength: Confirm Password Confirm Password Confirm
Local Host 1	< Back	Next > <u>Cancel</u>

Please make sure that [Designate a separate image file set per disk] option is enabled.

3. Image Option

A	Ac	tiveImage Protector		_ <b>D</b> X
Operation View Preferences L	Jtilities Help			
🗽 srv1 🔷				
📮 Dashboard	Schedule Backup			
📤 Backup	1 Source	2 Destination	3 Schedu	le <u>4</u> Summary
Schedule Backup	Task Name:			Options: <a href="https://www.example.com"></a>
Backup Now	Backup_20180927_1455			Compression: 0
vStandby	Destination folder:	▼ Selec	t folder	Deduplication Compression Level 2 (Optimized)
📩 Recovery 🔹 🕨	Credentials			Change temp file folder      Standard Compression
🚺 Image Manager 👂	T2\administrator File Name: 🔞	••••••		Password Protection
👘 Virtualization 🔹 🕨	srv1 ☑ Designate a separate Comments:	image file set per disk	_d00.aiv	Password Confirm Password
📑 Utilities 🔹 🕨				Enable Encryption AES 128 bit
		-		
Local Host 🕴 🔺 🛋			< Back	Next > <u>Cancel</u>

Click [Advanced Options] at the upper right corner in the right pane.

#### 4. Advanced Backup Options

		ActiveImage Protector	
eration	View Preferences Utilities Help		
srv1			
Advanced	d Backup Options:		
General ·	Split image into     0     MB files.       I gnore bad sectors.       Create an MDS file for image	Verify backup image upon completion.         Use network throttle:         0       (Max KB/Second)	- 🔊
3	✓ Ignore inaccessible volumes(s).	Use network write caching. Automatically eject removable USB target after backup.	
H	finaufficient disk space is detected before operation:         Auto-switch from default to an alternate folder:         Continue operation with [Standard] compression         Temporary File Folder:         c/windows/temp		
Scripting		Time-out Run on:	- 💌
S	Script to execute after the snapshot is taken:	30 mins. Base and Incremental ▼	
S	Script to execute after image creation:		
		Apply Done>	Cancel

Enable [Ignore inaccessible volumes] option (enabled by default). If non-VSS-compliant application or database is up and running, please use Scripting feature to stop the service or a process before taking a snapshot.

Backup_	20180927_	1455		E	ffective	Date/Time: [	2018/09/27 1	5:09 🗸	~ 201	9/09/27 1	5:09 🗸	No	t Specifie
Base We	<b>)</b> eekly	•				×®	Increme Wee	e <b>ntal @</b> ekly	•				× @
Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Add Ne	w Base						<ul> <li>One ti</li> <li>Add Nev</li> </ul>	ime only: w Increme	01:00		Minutes		
Event E	Backup:	aat					Option Auto	<b>n:</b> orun if a s	cheduler	l task is m	issed.		

Configure the schedule settings depending on your system environment.

For more detailed operating procedures, please refer to [Backup] – [Create Backup Schedule] in AIP Help.

 Create Backup Schedule on Passive Server Manually perform failover and create backup schedule on passive server.

## 3.3 Check backup task behavior

Run Full (Base) Backup according to the schedule configured for the both servers and make sure that the tasks successfully completed.

Upon completion of the backup task, you can monitor the task log from AIP Console.

A			ActiveImage	e Protector			- • ×
Operation View Prefere	nces U	tilities Help					
srv1	<b>.</b>						
📮 Dashboard		Dashboard					Dashboard
Backup	>	🔔 System Hea	alth Status				Selected Task
вискир		📋 Current Tas	sk			•	Dause Task
💷 vStandby		🕒 Task log					Cancel Task
		Event	Results	Start Date/Time	End Date/Time		
📥 Recovery	>	Backup Backup	Success Success	2018/09/27 15:26:41 2018/09/27 15:06:42	2018/09/27 15:27:31 2018/09/27 15:19:26	-	
🚺 Image Manager	>						
👹 Virtualization	>						
🔲 Utilities	>						
Na hadatata							
		E Schodulo				-	
📜 Local Host	1					<u> </u>	
	*	🔠 Disk Inform	lation			×.	

You can make sure that backup images are created and "Success" is displayed for active server.

### Backup Event on Active Server

<u>.</u>			ActiveImage	e Protector		= 🗆 X
Operation View Prefere	nces U	tilities Help				
🔛 srv2	•					
📮 Dashboard		Dashboard				Dashboard     A     Refresh
Rackup	>	🛕 System Hea	Ith Status			Selected Task
Buckup		Current Tas	k			Pause Task
💵 vStandby		🕒 Task log			4	Cancel Task
		Event	Results	Start Date/Time	End Date/Time	
🕍 Recovery	>	Backup	Success	2018/09/27 15:26:45 2018/09/27 15:06:45	2018/09/27 15:27:23	
🧕 Image Manager	>					
🔮 Virtualization	>					
🗖 Utilities	>					
	1 0	🔲 Schedule			2	7
La rotal Host	× 0	📕 Disk Inform	ation			»

#### **Backup Event on Passive Server**

On the passive server, though you cannot browse in data partition, "Success" is indicated.

If a backup image of the mirror drive of passive server is not created yet, execution of the first backup task creates a full backup file. When other disks (volumes) such as the system disk are included in backup source, a full backup image file will be created instead of an incremental backup.

# 4. Recovery Operating Procedures

Take the following are the steps to restore CLUSTERPRO cluster environment.

- Restore the system from backup file.
- Restore the mirror drive from backup file

### CLUSTERPRO Recovery Approaches

Recovery Approach	Requirements
Restore the system	AIP backup image of the system is created.
Restore data in mirror drive	AIP backup image is created.

### 4.1 System Recovery Procedures --- AIPBE Linux-based boot environment ---

To restore the system, you need to boot your machine into AIP boot environment (by using AIP's media) while the OS is shut down. If the OS is up and running, please shut down the OS and boot up AIP boot environment.

\*For more detailed operating procedures, please refer to ActiveImage Protector User Guide.

1. Boot up AIP boot environment

Applications races Actively age rotector		Wed 11.50
	ActiveImage Protector	
	Select Language	
		ØNetJapan

Boot up AIP Boot Environment by using AIP media.

Backup & Restore Guide for CLUSTERPRO

2. Go to [Recovery] – [Volume Recovery].

Operation View Utilities Help			
🗽 localhost			
📮 Dashboard	Volume Recovery		
<sub> </sub>	1 Select Recovery Point	2 Restore Settings	3 Summary
📩 Recovery	Backup Destination	Source Computers	Revovery Points
Nolume Recovery	< 11	•	
📔 Image Manager 🗲	Local Disk (C:) Local Disk (D:)		
📑 Utilities 🔉 🗲			
	Backup Information		
Local Host A			Next > Cancel

Select an image file to restore.

3. Restore Settings

Image Manager       Disk 0         Basic (MBR)       2         Recovery       Disk 0         Basic (MBR)       2         Disk 0       Basic (MBR)         2.0 GB       10 GG N1FS Boxt         Disk 1       Basic (MBR)         2.0 GG       Disk 1         Basic (MBR)       Disk 1 <t< th=""><th>Operation View Utilities Help</th><th></th><th></th><th></th></t<>	Operation View Utilities Help			
Dashboard       Volume Recovery         Backup       1 Select Recovery Point       2 Restore Settings       3 Summary         Recovery       Source Objects: Thew to Select         Volume Recovery       Disk 0       Batic (MBR) 0.0 GB       3 59.7 GB N175 Boxt         Utilities       Disk 1       Batic (MBR) 20.0 GB       3 59.7 GB N175 Boxt         Utilities       Disk 1       Batic (MBR) 20.0 GB       3 59.7 GB N175 Boxt         Disk 1       Basic (MBR) 20.0 GB       1 Boce N175       20.6 GL         Disk 1       Basic (MBR) 20.0 GB       1 Boce N175       20.6 GL         Disk 1       Basic (MBR) 20.0 GB       I Boce N175       20.6 GL         Disk 1       Disk 1       I Boce N175       20.6 GL         Disk 1       I Coel Disk (D) 20.0 GB       I Coel Disk (D) I Coel Disk (D) 20.0 GB       I Coel Disk (D) I	localhost			
Image Manager >   Utilities     1   Select Recovery Point     2   Recovery   Source Objects:  How to Select   Image Manager >   Utilities >     Disk 0   Back (MBR)   20 GB     1   Select Recovery Point   2   Restore Settings   3   Summary        Disk 0   Back (MBR)   20 GB   1   Settings:          Target Settings:                   Disk 1   Back (MBR)   20 GB            Disk 0   Back (MBR)   20 GB   1   Disk 1 Back (MBR)	📮 Dashboard	Volume Recovery		
Recovery   Volume Recovery   Image Manager >   Utilities >     Disk 0   Basic (MBR)   200 GB   Ued: 13.9 GB     Image Settings: How to Configure.     Disk 1   Basic (MBR)   200 GB   Utilities :     Disk 1   Basic (MBR)   Used: 11.1 GB     Image Settings: How to Configure.     Disk 1   Basic (MBR)   Used: 11.1 GB     Image Settings: How to Configure.     Disk 1   Basic (MBR)   Used: 11.1 GB     Image Settings: How to Configure.     Disk 1   Basic (MBR)   Used: 11.1 GB	<sub> </sub>	1 Select Recovery Point	2 Restore Settings	3 Summary
Image Manager >         Image Manager >         Utilities >         Disk 1         Basic (MBR)         20 GB         Used: 13.9 GB         180.0 GB NTFS	📥 Recovery	Source Objects: I How to Select		
Image Manager >   Utilities >     Disk 1   Basic (MBR)   20.0 GB   Used : 11.1 GB     Image Manager >     Disk 1   Basic (MBR)   20.0 GB   Used : 13.9 GB     IBOGE NTFS     Disk 1   Basic (MBR)   20.0 GB   Used : 11.1 GB     Disk 0   Basic (MBR)   60.0 GB   Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB   Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB   Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB   Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB     Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB     Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB     Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB     Used : 11.1 GB     Disk 1   Basic (MBR)   0.0 GB     Used : 11.1 GB <td< th=""><th>Volume Recovery</th><th>Disk 0</th><th></th><th></th></td<>	Volume Recovery	Disk 0		
Utilities	🚺 Image Manager 🗲	Basic (MBR) 60.0 GB ★ Used : 11.1 GB 3. 59.7 GB NTFS B	oot	
Target Settings:  How to Configure   Post Restore Operation Reboot system    Disk 0 Basic (MBR)    Used: 11.1 GB   Local Date, (C) bort Call to f:  Disk 1 Basic (MBR) 20.0 GB   Local Date, (P)    Local Date, (P)    Local Date, (P)	Utilities >	Disk 1 Basic (MBR) 20.0 GB & Used : 13.9 GB 18.0 GB NTFS		20 GB U.,
Disk 0 Basic (MBR) & Used : 11.1 GB Disk 1 Basic (MBR) 20.0 GB & Used : 13.6 GB Local Disk (P) (B.0 GB N1FS Local Disk (P) (B.0 GB N1FS Disk 1 Basic (MBR) 20.0 GB & Used : 13.6 GB		Target Settings: I How to Configure	崎 🕅 Po	st Restore Operation Reboot system
Disk 1 Basic (MBR) 20.0 GB # Used : 13.6 GB Local Disk (D) B0 GB N1FS		Disk 0 Basic (MBR) 60.0 GB ★ Used : 11.1 GB		
		Disk 1 Basic (MBR) 20.0 GB & Used : 13.6 GB		Licen Die 2005 F
< Back Next> Caroel	🚺 Local Host 🔄 🔒 🖪		< Back	Next > Cancel

Drag and drop the source object to the restore target disk.

If the source object disk includes the system only, please select the entire disk. If the disk includes the system volume as well as data partition, please select the system volume in the disk. (Please do not restore the cluster partition.)

4. Summary

Operation View Utilities Help	
📮 Dashboard	Volume Recovery
👛 Backup	1 Select Recovery Point         2 Restore Settings         3 Summary
📩 Recovery	After Restoration:
Nolume Recovery	Disk 0
驞 Image Manager 🗲	Basic (MBR) 60.0 GB ★ Used : 11.1 GB 3. 59.7 GB NTFS Boot
Utilities >	Disk 1         Basic (MBR)           20.0 GB         Local Disk (D)           ★ Used : 13.6 GB         Local Disk (D)           18.0 GB NTFS         20 GB F.
	Details Source: //T2/Share/clusterpro/srv1@srv1_d00_00001_i00001.ali (Disk 0) Boot settings MBR: Restore MBR First Track: Restore First Track
I local Host	Post Restore Operation: No

Please review the summary and make sure that no changes are required. Click [Done] button to start recovery process.

5. Reboot boot environment.

Upon successful completion of the restore task, exit AIP boot environment and reboot the system again.

This is the end of the recovery operating procedures with AIP. Please find the operating procedures with CLUSTERPRO as follows.

6. Recovery of CLUSTERPRO cluster environment

When the restored OS completely boots up, CLUSTERPRO Console status is displayed as follows.

-									. 🗆	x
(←) 🖲 🙋	http://localhost:290	03/#/status	0-0	🗿 Cluster WebUI   Status	×				6	7 🗐
Cluster WebU	I cluster			🕘 Operation mode 🗸	÷	©	3	۶	i ?	ii j
Dashboard	Status	Alert logs	Mirror disks	WebManager						
Ouster has v	warnings									
Server	Server group list	srv1		srv2						
* Server		Offline しううす		online ひうす み み						
🗱 Group	Exclusive rule list			49 <b>4</b> #						
▼ RG		Offline		Online						
Q Monitor	■ ⇒									
▼ fipw1		Offline		Normal						
* mdnw1		Offline		Normal						
▼ mdw1		Offline		Warning						
* userw		Offline		Normal						
▼ vcomw1		Offline		Normal						
										1

## Restore status of one server OS

							-	. 🗆	×
🧲 🕀 🖉 h	ttp://localhost:29	003/#/status 🎾 🗸 🗸	🖉 🦪 Cluster WebUI   Status	×				<b>ŵ</b>	* 🔅
Cluster WebUI	cluster		👋 Operation mode 👻	£	©	C	۶	i î	
Dashboard	Status	Alert logs Mirror d	lisks WebManager						
Server	Server group list	srv1	srv2						
★ Server		Online ひうう ✿	online ゆううう						
Group	Exclusive rule list	4) <b>4</b> 8	·• • •						
▼ RG		Offline	Online						
Q Monitor	∎ ⊳								
▼ fipw1		Offline	Normal						
▼ mdnw1		Normal	Normal						
▼ mdw1		Normal	Normal						
∗ userw		Normal	Normal						
▼ vcomw1		Offline	Normal						
									14

## Status after differential data synchronization between two servers

Upon completion of differential data synchronization, the status is indicated in green. The difference copy log is recorded for the alert log.

## 4.2 System Recovery Procedures --- AIPBE Windows PE-based boot environment

To restore the system, you need to boot your machine into Windows PE-based boot environment while the OS is shut down. If the OS is up and running, please shut down the OS and boot up Windows PE-based boot environment.

\*For more detailed operating procedures, please refer to ActiveImage Protector User Guide.

🚺 minint-sg8iivc							
Dashboard	Dashboard					Dashboard	
- Dashboara						<ul> <li>Refresh</li> </ul>	
📤 Backup	Current Task					<u>'</u>	
	I ask log						
📓 Recovery 🔹 🕨	Volume Name	File System	Volume Size	Used Space	Associated		
🗴 Image Manager 👂	Disk 0     Disk 0     System Reserved (E:)     Disk (C:)	NTFS NTFS	350.0 MB 59.7 GB	47.8 MB 11.1 GB	Disk 0 Disk 0	_	
Virtualization >	<ul> <li>Disk 1</li> <li>Local Disk (D:)</li> <li>Local Disk (F:)</li> </ul>	NTFS FAT	18.0 GB 2.0 GB	13.6 GB	Disk 1 Disk 1		
Utilities >							
	Basic     Local Disk       Disk 0     Basic (MBR)       600 GB     Strittern Re       Vised : 11.2 GB     Strittern Re       Disk 1     Basic (MBR)       200 GB     Local Disk       * Used : 13.6 GB     Local Disk	Volume Volume (C)	Dynamic volume	Local Disk (F) 20 GB FAT			
📕 Local Host 🔰 👔	-						

#### 1. Boot up Windows PE-based boot environment

2. Go to [Recovery] – [Volume Recovery].

Operation View Utilities Hel	p Language		
💹 minint-sg8iivc			
🖵 Dashboard	Volume Recovery		
🛋 Backup	7 Select Recovery Point	2 Restore Settings	3 Summary
📥 Recovery	Backup Destination	Source Computers 🔻	🕔 Revovery Points 🔺
Nolume Recovery	< 11 • •		
🚺 Image Manager ゝ	- I Local Local Disk (C:) Local Disk (D:)		
💕 Virtualization 🔉	- System Reserved (E:) - Local Disk (F:)		
Utilities >	Boot (X:)      Metwork      Backup Information		
🔝 Local Host 🧳 🗈			Next > <u>Cancel</u>

Select an image file created at the point in date/time to restore to.

3. Restore Settings

📮 Dashboard		Volume Recovery		
🔮 Backup		7 Select Recovery Point	2 Restore Settings	3 Summary
🛓 Recovery		Source Objects:      How to Select		
Volume Recovery		Disk 0		
🧕 Image Manager	>	Basic (MBR) 60.0 GB ▲ Used : 11.1 GB 3 59.7 GB NTFS Boot		
💕 Virtualization	>	Disk 1 Basic (MBR)		
📑 Utilities	>	20.0 GB Used : 13.9 GB 18.0 GB NTFS		2.0 GB U
		Target Settings:  How to Configure  Disk 0 Bosic (MBR) Bosic (MBR) Bosic 4 Used : 11.1 GB Bosic 59.7 GB NTFS Boot	<b>n</b> 2	ost Restore Operation Reboot system
		Disk 1 Basic (MBR) 20.0 GB & Used : 13.6 GB		Lorni Dis. 20 GB FAI
		Used : 15:0 GB		

Drag and drop the source object to the restore target disk (or right-click the source object). If the source object disk includes the system only, please select the entire disk. If the disk includes the system volume as well as data partition, please select the system volume in the disk. (Please do not restore the cluster partition.)

#### 4. Summary

Operation View Utilities Help	) Language
📮 Dashboard	Volume Recovery
🛋 Backup	7 Select Recovery Point         2 Restore Settings         3 Summary
📥 Recovery	After Restoration:
Nolume Recovery	Disk 0
🚺 Image Manager 🔉	Basic (MBR) 600 GB * Used : 11.1 GB 2. 59.7 GB NTFS Boot
👹 Virtualization 🔹	Disk 1 Basic (MBR)
📑 Utilities 🛛 🗲	20.0 GB Local Dak (D) ★ Used : 13.9 GB 18.0 GB NTFS 2.0 GB F
	Details         Source:         \\T2\Share\clusterpro\srv1@srv1_d00_00001_i00001.aii (Disk 0)         Auto fit volume size: No         Boot settings         MBR:       Restore MBR         First Track:       Restore First Track         Disk Signature:       Restore Disk Signature
Local Host 🕴 🛤	< Back Done Cancel

Please review the summary and make sure that no changes are required. Click [Done] button to start recovery process.

5. Reboot boot environment.

Upon successful completion of the restore task, exit AIP boot environment and reboot the system again.

This is the end of the recovery operating procedures with AIP. Please find the operating procedures with CLUSTERPRO as follows.

6. Recovery of CLUSTERPRO cluster environment

When the restored OS completely boots up, CLUSTERPRO Console status is displayed as follows

							-		×
$\leftarrow$	http://localhost:290	03/#/status 🔎 🗸	🖸 <i> (</i> Cluster WebUI   Status	×				ŵ	* %
Cluster WebU	I cluster		l Operation mode 🗸	Ŧ	0	ß	۶	i 1	
Dashboard	Status	Alert logs Mirro	or disks WebManager						
0 Cluster has v	wamings								
▼ cluster									
Server	Server group list	srv1	srv2						
★ Server		Offline ひうまな	online ひうまた						
		<b>6 6 8</b>	<u><u>6</u> ¶   </u>						
Group	Exclusive rule list								
▼ RG		Offline	Online						
Q. Monitor	∎ ⊳								
▼ fipw1		Offline	Normal						
▼ mdnw1		Offline	Normal						
▼ mdw1		Offline	Warning						
∗ userw		Offline	Normal						
∗ vcomw1		Offline	Normal						

## Status of restoring one server OS

								. 🗆	×
( <b>(-)</b> )	ttp://localhost:290	03/#/status P - C	🖉 🦉 Cluster WebUI   Status	×				ŵ	* 🕸
Cluster WebUI	cluster		👋 Operation mode 👻	±	©	C	۶	i î	2
Dashboard	Status	Alert logs Mirror d	lisks WebManager						
▼ cluster									
Server	Server group list	srv1	srv2						
* Server		Online ひりまな	Online ひりまな						
🗱 Group	Exclusive rule list								
▼ RG		Offline	Online						
Q Monitor	<b>H</b> 10								
★ fipw1		Offline	Normal						
∗ mdnw1		Normal	Normal						
▼ mdw1		Normal	Normal						
* userw		Normal	Normal						
▼ vcomw1		Offline	Normal						

## Status upon completion of differential data synchronization between two servers

Upon completion of differential data synchronization, the status is indicated in green. The difference copy log is recorded for the alert log.

## 4.3 Data Partition Recovery Procedures

In the event of data loss in data partition such as corruption of data, deletion of data by mistake, AIP Hot Restore feature enables you to restore the entire data partition or a specific file.

As Cold Restore of data partition updates the sector information, which the mirror driver is not aware of, the data integrity between the both servers is not assured. Before you start Cold Restore, please make sure that both servers are synchronized when the system boots up.

1. Stop Group

Cluster WebUI	cluster		
Dashboard	Status	Alert logs	Mirror dis
✓ cluster			
Server	Server group list	srv1	
▼ Server		Online ひうすな いいていました	
🗱 Group	Exclusive rule list		
▲ RG		Online	
▼ fip		Online	
<b>▼</b> md		Online	
≠ vcom		Online	

Select [Stop] button to stop the group before starting to restore the data.

\* From this point, the group is inaccessible from client.

<u>\* Please make sure that the group is stopped before starting restore process.</u> Otherwise, if database or an application is running on data partition, the data integrity is not ensured. As a result database or the application may crash.

2. Start mirror disk resource.



Start mirror disk resource on the restore target server.

#### 3. Suspend every monitor.

Cluster WebU	I cluster	9.		🕘 Operation mode 🗝
Dashboard	Status	Alert logs	Mirror disks	WebManager
0 Cluster has	warnings			
Server	Server group list	srv1		srv2
▼ Server		Online ひううう いううう		Online ひうすな 手 音 書
Group	Exclusive rule list			
▲ RG		Online		Offline
<b>▼</b> fip	i	Offline		Offline
≁md ✿		Online		Offline
≠ vcom		Offline		Offline
Q. Monitor	II D			
▼ fipw1		Offline		Offline
▼ mdnw1		Suspended		Suspended
▼ mdw1		Suspended		Suspended
▼ userw		Suspended		Suspended
▼ vcomw1		Offline		Offline

Please make sure that the monitors are suspended, since execution of recovery task fails while the monitor is working.

4. Restore Volume



Launch AIP console to restore a volume.

#### 5. Restore Setting

	ActiveImage Protector
Operation View Preferences Uti	lities Help
🕅 srv1 💌	
📮 Dashboard	Volume Recovery
💒 Backup 🔹 🗲	1 Select Recovery Point         2 Restore Settings         3 Summary
vStandby	Source Objects:   How to Select
Recovery	Disk 0 Basic (MBR)
Solume Recovery	± Used: 11.1 GB 3 59.7 GB NTFS Boot
🦲 File Recovery	Disk 1
📓 Image Manager 🔉	Basic (MBR) 200 GB ★ Used : 13.9 GB 18.0 GB NIFS 2.0 GB
👹 Virtualization 🔹 🕨	Target Settings: @ How to Configure
🖬 Utilities 🔸	Disk 0 Basic (MBR) 60.0 GB <b>±</b> Used : 11.2 GB
	Disk 1 Basic (MBR) 20.0 GB # Used : 13.9 GB 18.0 GB NTFS
Local Host 🕴 🔍 «	< Back Nex> Cancel

Select an image file created at the point in date/time to restore to.

If you select an image of a data partition, you can select an image of the whichever server. Please restore the data partition only in mirror disk (please do not restore the cluster partition.)

6. Summary

A	ActiveImage Protector	. 🗆 X
Operation View Preference	s Utilities Help	
🔝 srv1	×	
📮 Dashboard	Volume Recovery	
📑 Backup 🔰	1 Select Recovery Point         2 Restore Settings         3 Summary	
vStandby	After Restoration:	
📥 Recovery	Disk 0 Basic (MBR)	a A
Nolume Recovery	60.0 GB ★ Used : 11.2 GB	
File Recovery	Disk 1	
📔 Image Manager 🔇	Basic (MBR) 20.0 GB ★ Used 13.9 GB 18.0 GB NTFS	~
🔮 Virtualization 🛛 🕽	Details Source:	
Utilities 3	\\T2\Share\clusterpro\srv1@srv1_d01_00001_i00001.aii (Disk 1 / Volume 1) Volume settings	
	MBR: Use target MBR Drive Letter: Restore Drive Letter First Track: Use target First Track Make Active: No Disk Signature: Use target Disk Signature Create BCD No	
	Post Restore Operation: No	
🚂 Local Host 🧳	C C C C C C C C C C C C C C C C C C C	Cancel

Please review the summary and make sure that no changes are required. Click [Done] button to start recovery process.

#### 7. Running Restore Volume Task



8. Upon completion of restore process, stop server group.

Cluster WebUI	cluster		
Dashboard	Status	Alert logs	Mirror di
() Cluster has wa	mings		
✓ cluster			
Server	Server group list	srv1	
▼ Server		Online ひうう କ କ 🕯	٥
Croup	Exclusive rule list		
▲ RG		Online	÷
▼ fip		Offline	
↑ md		Online	
▼ vcom		Offline	

Upon completion of restore task, stop server group.

9. Start the group.

Cluster WebU	I cluster		
Dashboard	Status	Alert logs	Mirror dis
0 Cluster has v	varnings		
✓ cluster			
Server	Server group list	srv1	
▼ Server		Online ひうう いいい	\$
Croup	Exclusive rule list		
▲ RG		Offline	÷
<b>▼</b> fip		Offline	
≁md ¢		Offline	
▼ vcom		Offline	

Start the group on the server restored from the image.

### 10. Restart monitor.

Cluster WebU	II cluster	-		🕘 Operation mode 🝷
Dashboard	Status	Alert logs	Mirror disks	WebManager
() Cluster has	warnings			
✓ cluster				
Server	Server group list	srv1		srv2
▼ Server		Online ひううな	ł	Online ひうすな
🖬 Group	Exclusive rule list	4) <b>4</b> 8		4 <b>} 4≣</b> ≅
▲ RG		Online		Offline
<b>▼</b> fip		Online		Offline
nd ¢		Online		Offline
▼ vcom		Online		Offline
Q Monitor	H Þ			
▼ fipw1		Normal		Offline
▼ mdnw1		Suspended		Suspended
▼ mdw1		Suspended		Suspended
▼ userw		Suspended		Suspended
▼ vcomw1		Normal		Offline

Resume the suspended monitor.

# Appendix 1 Script to stop application service

In cluster environment on which VSS-unaware application is installed and clustered, you need to place the service into a paused state before a snapshot is taken for backup, ensuring data integrity.

Before stopping clustered service, please configure the advanced settings for AIP task and create a batch file to run in collaboration with CLUSTERPRO command.

### Script to execute before the snapshot is taken

- 1) Suspend CLUSTERPRO monitor resource.
- 2) Run CLUSTERPRO command to stop the clustered service.

### Script to execute after the snapshot is taken

- 1) Run CLUSTERPRO command to start the clustered service.
- 2) Resume CLUSTERPRO monitor resource.

### Sample script to execute before the snapshot is taken

For more detailed information about CLUSTERPRO command, please refer to CLUSTERPRO Reference Guide.

### Sample script to execute after the snapshot is taken

For more detailed information about CLUSTERPRO command, please refer to CLUSTERPRO Reference Guide.

Please save this batch file in a specified location.

If you encounter a problem, the log information output by this batch may be required, therefore, please save the log information in a safe place.

# Appendix 2 Restore clustered data partition

Configuration of mirror disk resource or disk resource (shared disk) entails configuration of cluster partition (RAW partition) for saving management information and data partition for saving actual data. In the event that the cluster partition or data partition are damaged or if the cluster partition or data partition are deleted by mistake, the following description provides the operating procedures how to restore the mirror disk / disk resource.

			Dis	sk Manageme	ent			
ile Action	View Help							
	🛛 📩 🕼 🗙 🖻	r 🖻 🙆	10.					
(olume	Lavout	Type	File System	Status	Canacity	Free Sna	% Free	
a (C·)	Simple	Basic	NTES	Healthy (S	59.66 GB	48 16 GB	81 %	
= (E·)	Simple	Basic	NTES	Healthy (P	18.00 GB	4 72 GB	26 %	
a (O:)	Simple	Basic	RAW	Healthy (P	2.00 GB	2.00 GB	100 %	
System Resen	ved Simple	Basic	NTES	Healthy (P	350 MB	302 MB	86 %	
<b>Disk 0</b> Basic 50.00 GB Dnline	System Reserve 350 MB NTFS Healthy (Primary	e <b>d</b> Partition)	5	(C:) 9.66 GB NTFS fealthy (System,	Boot, Page File	2. Active. Crash I	Dump, Prima	ny Partition)
<b>Disk 1</b> Basic 20.00 GB Dnline	(E:) 18.00 GB NTFS Healthy (Primary	Partition)			<b>(Q:)</b> 2.00 GB RA Healthy (Pr	W imary Partition)		
6								

1. Create cluster / data Partition again

Go to [Disk Management] and please create RAW partition and mirror partition in the same size.

Disk Management window is displayed as shown above when cluster partition and mirror partition are created.

2. Configure the settings for mirror disk / disk resource

esource	Properties   md				md 🔀
Info [	Dependency Recovery	Operation Details			
Mirror E	Disk No.*		1 🗸		
Data Pa	rtition Drive Letter*		E:		
Cluster	Partition Drive Letter*		Q:		
Cluster	Partition Offset Index*		0 🗸		
Mirror E	Disk Connect		Select		
Servers	that can run the group				
Name	Data Partition	Cluster Partition		Name	
srv1	8bf2653d-61b2-11e9- 80fa-000c29925018	8bf26548-61b2-11e9- 80fa-000c29925018	← Add		
srv2	b35283a6-dfe0-11e7- 80cb-000c2939db82	e863b6c1-b6f8-11e8- 80d3-000c2939db82	→ Remove		
Edit					
Tuning	1				
				OK	0

Select [Details] tab in [Resource Properties] of mirror disk / disk resource in Cluster WebUI setting mode and change the setting.

Select a specific server from [Servers that can run the group] and click [Edit].

Connect				
Data Daetiti	ion			
Volume	Disk No.	Partition No.	Size	GUID
C:¥	0	2	61087MB	bda7b203-2a16-11e3-80b3-806e6f6e6963
E:¥	1	1	18429MB	02aca502-6583-11e9-80fc-000c29925018
	0	1	350MB	bda7b202-2a16-11e3-80b3-806e6f6e6963
Q:¥	1	2	2048MB	02aca50b-6583-11e9-80fc-000c29925018
Cluster Par Volume	tition Disk No.	Partition No.	Size	GUID
C:¥	0	2	61087MB	bda7b203-2a16-11e3-80b3-806e6f6e6963
E:¥	1	1	18429MB	02aca502-6583-11e9-80fc-000c29925018
	0	1	350MB	bda7b202-2a16-11e3-80b3-806e6f6e6963
1.23352.0	1	2	2048MB	02aca50b-6583-11e9-80fc-000c29925018

Click [Connect] and get the updated information of GUID.

Cluster WebUI	cluster		1	Con	nfig moo	de •		Ŧ	0	ζ2	۶	i	?	I
Import Export	Get the Configuration File	Apply the Configuration File	Update	Serve	er Data									
cluster			Ŷ	ø	Î									
Servers			\$	+										
srv1			\$	ø										
srv2			9	ø	1									
Groups			9	+										
▼ RG			\$	1	+ =									
fip			ø	ø										
md			\$				Edite	d						
vcom			9	ø										
Q Monitors			+											
fipw1			\$	ø										
mdnw1			\$	ø										
mdw1			ø	ø										
userw			9	ø										
vcomw1			\$	ø										

### Apply the changes.

e performed.	
ОК	Cancel
	e performed.

Suspend the cluster.



Resume the cluster.

### 3. Monitor the status of mirror disk resource in [Mirror Disk].

ster webo	I cluster				Operation	n mode +	🛓 🛈	e 🌶	i ?
ashboard	Status	Alert logs	Þ	1irror disks					
Mirror dis	iks								
4irror disk name ▲	Synchronization mode	Difference copy	Server name	Active	Status	Progress	Server name	Active	Status
md	Synchronous	Possible	srv1	Inactive	Recovering	<ul> <li>8% (11:21 remaining)</li> </ul>	srv2	Active	Recovering
						31			

When the cluster is properly resumed, reconfiguration of mirror disk is automatically started.

Backup & Restore Guide for CLUSTERPRO

ister WebUI clu	ster			Operation	mode +	🛓 🕓	c 👂	i ?
Dashboard	Status	Alert logs	Mirror disks					
Mirror disks								
Mirror disk name	Synchroniza	tion Difference copy	Server name	Active	Status	Server name	Active	Status
• md	Synchronous		srv1	Inactive	Normal	srv2	Active	Normal
▪ md	Synchronous		srv1	Inactive	Normal	srv2	Active	N

Reconfiguration of mirror disks completed and please make sure that the "Normal" is indicate for [Status].

In the event that the mirror disks are not successfully restored, please refer to CLUSTERPRO Reference Guide "Understand mirrored disk resource", "How to replace server" and perform the recovery operating procedures.

# Appendix 3 Reconfiguration of Servers

In the event of system crash for some reason or corruption of RAID, or if the backup data are not available, the following are the operating procedures to restore the system after reconfiguring the OS.

- Reinstallation of failed server OS and applications Reinstall the OS and the clustered applications in the same configuration as before the system failure.
- Same configuration settings
   Please configure the settings for the following items same as before the system failure.
  - •NIC
  - •IP Addres
  - Data Partition Size
  - •Cluster Partition (RAW partition) size
  - Drive Letter
- Reinstallation of CLUSTERPRO
   Please install CLUSTERPRO in the same configuration as before, and register the license.
- Install CLUSTERPRO patch Apply the same patch as on the running server and make sure that the same version of CLUSTERPRO is installed on both servers.
- Export Cluster Configuration File
   Export the configuration file from Cluster WebUI on the active server and save the file at a specified folder.
- Import the cluster configuration file
   Import the cluster configuration file exported from Cluster WebUI on the restored server.
- Apply the Configuration File Apply the Configuration File from Cluster WebUI.
- Synchronize mirror disk resource Select [Operation Mode] for Cluster WebUI and make sure that "Full copy of mirror disk started" message is displayed in Status and Log of mirror disk resource. In the event that the mirror disk cannot be successfully restored, please refer to CLUSTERPRO Reference Guide "Understand mirrored disk resource", "How to replace server" and perform the recovery operating procedures".